

MASTERARBEIT

Titel der Masterarbeit

„Trends in and prospects for foreign direct investment in
the Bosnian and Herzegovinian energy sector”

Verfasser

Beganovic Dzenan, Bakk.

angestrebter akademischer Grad

Master of Science (MSc)

Wien, 2013

Studienkennzahl lt. Studienblatt:
Studienrichtung lt. Studienblatt:
Betreuer:

A 066 915
Masterstudium Betriebswirtschaft
Neil Foster-McGregor BA MSc PhD

1 TABLE OF CONTENTS

1 Table of Contents.....	3
2 List of Figures and Table.....	5
3 List of Abbreviations.....	7
4 Introduction.....	8
5 Bosnian and Herzegovinian History and Policy.....	10
6 An Overview of the Energy Sector in Bosnian and Herzegovina.....	15
6.1 Introduction.....	15
6.2 Institutional and Legal Framework in B&H energy sector.....	17
6.2.1 The key actors in the energy sector in B&H.....	17
6.2.2 International Energy Obligations.....	20
7 Energy Sub-sectors in Bosnia and Herzegovina.....	21
7.1 Coal Sector.....	21
7.1.1 Coal and energy trends in EU.....	21
7.1.2 Coal-mines and trends in Bosnia and Herzegovina.....	24
7.1.3 Basic economic characteristics of B&H coal sector.....	26
7.2 Power Sector.....	31
7.2.1 Characteristics of Electro-energy sector in Bosnia and Herzegovina.....	31
7.2.2 Energy Demand in the Region.....	37
7.2.3 New projects with implementation until 2020/30 Year.....	39
7.2.4 Wind Power Potential.....	41
7.2.5 Small HPP's Production Potential.....	43
7.2.6 Solar Energy Potential.....	44
7.3 Gas Sector.....	46
7.3.1 Characteristics of the gas sector in EU and B&H.....	46

7.4 Oil Sector.....	53
7.4.1 Characteristics of B&H Oil Sector.....	53
8 Investment and Financing options.....	57
8.1 General conditions for FDI in a state.....	58
8.2 Investment plan in B&H energy sector.....	59
8.3 Financing Options in B&H energy sector.....	62
9 SWOT analysis of B&H energy sector.....	65
10 Conclusion.....	66
11 References.....	67
12 Appendix.....	71

2 LIST OF FIGURES AND TABLES

I. FIGURES:

- Figure 1: Ethnic groups in B&H in last population census in 1991
- Figure 2: Map of Bosnia and Herzegovina after Dayton agreement in 1995
- Figure 3: Energy demand and production in EU 27
- Figure 4: Share of energy resources in the EU energy sector
- Figure 5: Location of coal mines and thermal power plants in B&H
- Figure 6: Supply and Demand Balance of Electricity in B&H
- Figure 7: Export-Import Balance of electricity in B&H
- Figure 8: Electricity average prices for households and industry
- Figure 9: Household electricity prices in Europe
- Figure 10: Electricity Consumption and Deficit in the Region
- Figure 11: Currently B&H gas transmission network
- Figure 12: Seasonal consumption in B&H Gas Sector
- Figure 13: Development of new B&H gas transport networks, all studies
- Figure 14: Structure of investments in B&H energy sector

II. TABLES:

- Table 1: Coal production in Bosnia and Herzegovina in pre- and post-war time
- Table 2: Coal Sales in Bosnia and Herzegovina
- Table 3: Costs in Bosnian and Herzegovinian mining sector
- Table 4: Total electricity installed power in B&H
- Table 5: Total electricity production in B&H
- Table 6: Annual balance of electricity in B&H from 2008-2011
- Table 7: Electricity average prices in B&H

Table 8:	New potential Thermal Power Plants in Bosnia and Herzegovina
Table 9:	New potential Hydro Power Plants in Bosnia and Herzegovina
Table 10:	New Potential Wind Farms in Bosnia and Herzegovina
Table 11:	Consumption of Oil products in period 2000-2005 and in 2010
Table 12:	Forecast for oil products consumption in 2015 and 2020
Table 13:	Investment Plan in B&H energy sector

• *„Ich habe mich bemüht, sämtliche Inhaber der Bildrechte ausfindig zu machen und ihre Zustimmung zur Verwendung der Bilder in dieser Arbeit eingeholt. Sollte dennoch eine Urheberrechtsverletzung bekannt werden, ersuche ich um Meldung bei mir.“*

3 LIST OF ABBREVIATIONS

B&H	Bosnia and Herzegovina
F B&H	Federation of Bosnia and Herzegovina
RS	Republic of Srpska
DA	Dayton Agreement
BD	Brcko District
FIPA	Foreign Investment Promotion Agency of B&H
EUSR	European Union Special Representative
OHR	Office of the High Representative
CEFTA	Central European Free Trade Agreement
EU	European Union
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
KM/BAM	Konvertibilna Marka
NATO	North-Atlantic Treaty Organization
SEER	South-East European Regional Energy Market
EPBiH	JP Elektroprivreda BiH d.d. Sarajevo
EPHZHB	JP Elektroprivreda HZHB d.d. Mostar
EPRS	JMDP Elektroprivreda RS Trebinje
DERK	State Electricity Regulatory Commission
NOS	Nezavisni operator sistema
FERK	Regulatory Commission for Electricity of Federation of BiH
RERS	Regulatory Commission for Energy of Republic of Srpska

4 Introduction

The aim of this paper is to present the main indicators of the energy sector in Bosnia and Herzegovina (B&H) and to give prospects about reserves, potentials, new projects and trends for foreign direct investment. The energy sector in B&H has enormous growth potential. Most of this potential is in Hydro power because of its rich water resources. Only 37% of total hydro potential is currently used. B&H is current the only country in South-East Europe providing exports of electricity.¹ The building of new hydro power stations presents a crucial opportunity for foreign investors. Because of high demand for electricity in the region and Europe, the building of new hydro power stations is and will stay as a trend for the next couple of decades. Beside the hydro power potential, B&H disposes of more than six billion tons of coal, lignite and peat. Most of the existing coal mines serve thermal power plants with one small plant serving district heating systems in various cities.

The electricity production from renewable energy sources such as hydro, wind, biomass, solar and geothermal energy is important for further energy supply in the region.² Building of new wind power farms, especially in Herzegovina, presents s second crucial oncoming trend. The first official wind power farm in Bosnia and Herzegovina is starting its operation in 2013. Currently utilization of wind energy potential is 0 %.³

It is obvious that Bosnia and Herzegovina disposes of many natural resources, many of them are currently used and many of them stay unused. The previous war destroyed many hydro, thermal, oil and gas plants. Eighteen years after the war, with external financial help (EU and USA), energy sector in Bosnia and Herzegovina is becoming stable and progressive for new oncoming development. Unfortunately dissensions between ethnic groups and their policy representatives still exist. The complexity of the political and organizational structure extends to the energy sector. Because of this there is no comprehensive national energy strategy at the state level. European Union and foreign investors prefer one “Address” in order to achieve their own goals (establish a business).⁴

¹ WBC-INCO: http://wbc-inco.net/attach/0_National_Background_Report_Energy_BiH_2012.pdf,

² WBC-INCO: http://wbc-inco.net/attach/0_National_Background_Report_Energy_BiH_2012.pdf

³ Aljazeera Business News Balkan, <http://balkans.aljazeera.net/vijesti/vjetroelektrane-najveci-bh-projekt>

⁴ Foreign Investment Promotion Agency of B&H (FIPA), <http://www.fipa.gov.ba/doc/brosure/Energy%20sector.pdf>

Currently two entity governments and three national power utilities are key factors in the B&H energy sector. Meeting all five addresses can't be attractive for new investors. With EU help, some common energy agencies at the state level are providing direct communication to foreign investors. In addition, there has been certain progress in adopting legislation on electricity and the establishment of new institutions such as DERK (State Electricity Regulatory Commission), NOS (International system operator), Transmission Company at the state level and the establishment of FERK (Regulatory Commission for Electricity of Federation of Bosnia and Herzegovina) and RERS (Regulatory Commission for Energy of Republic of Srpska).⁵

However, the established institutions do not operate at full capacity because the representatives of the RS (Entity Republic of Srpska) authorities want the regulatory commissions and companies to be under the RS jurisdiction. At the state level, there is no comprehensive energy strategy that could be used as a framework for the analysis of an energy policy. As a result, systems and procedures for the design and implementation of solutions are inefficient. In addition, coordination at the national level and coordination of donor funding is inadequate.⁶

Policy in Bosnia and Herzegovina, as already mentioned, is very complex due to the war and ethnic divisions. But the common goal for all ethnic groups and political representatives, especially in the time of global economic crises, is a better and easier life for everyone. Bosnia and Herzegovina requires new foreign investment for further economic development. Global electricity demand in the region and Europe is a crucial chance for B&H to develop its energy sector. The ethnic policy representatives must find political compromise and start to fulfill the required EU reforms and standards in order to attract foreign investors. More Investment means more jobs, more stability and economic progress.

⁵ Foreign Investment Promotion Agency of B&H (FIPA), <http://www.fipa.gov.ba/doc/brosure/Energy%20sector.pdf>

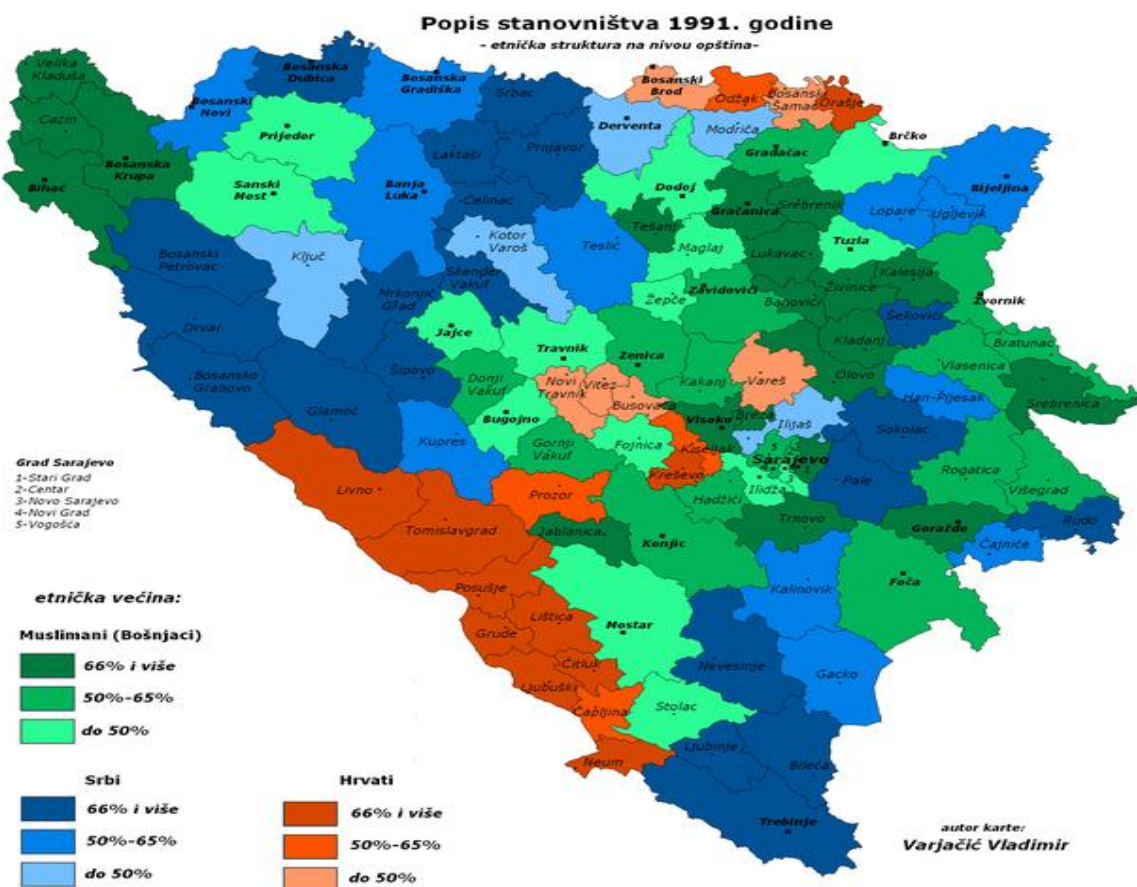
⁶ Federal Ministry of Energy, Mining And Industry STUDY: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

5 Bosnian and Herzegovinian history and policy

Bosnia and Herzegovina is located in the heart of the Balkan area between Serbia and Montenegro on its east side and Croatia on its west side. The total land area is 51 197 km². The Capital city of Bosnia and Herzegovina is Sarajevo with its population of 430 000 people. The currency in Bosnia and Herzegovina is the Convertible Mark “KM” or international “BAM”.⁷

Bosnia and Herzegovina is famous for its multi ethnic groups and population. The largest is the Bosniaks (Muslims) with 48 %, followed by the Serbs (Orthodox) 37.1 %, Croats (Catholic) 14.3 % and Others (Jews, Roma, Atheists, etc.) 0.6 %. The Population of the Bosnia and Herzegovina is 3 839 737 people. These entire figures are based on 2011 year estimates with the first authentic results still being from the last population census in 1991 (see figure 1). The next population census in Bosnia and Herzegovina will be in April, 2013.⁸

Figure 1: Ethnic groups in B&H in last population census in 1991 year⁹



⁷ Wikipedia: http://en.wikipedia.org/wiki/Bosnia_and_Herzegovina

⁸ Wikipedia: http://en.wikipedia.org/wiki/Bosnia_and_Herzegovina.

⁹ Wikipedia: the author is Vladimir Varjarcic, from 1991-Yugoslavia population census.

Unfortunately tensions started to escalate between these ethnic groups, after Bosnia and Herzegovina declared independence on the 3rd of March 1992. The Serb part wanted to stay in the former Republic of Yugoslavia but the other two ethnic groups voted, in a referendum on 1st of March 1992, for independence of Bosnia and Herzegovina. The war was finally ended by the signing of the Dayton agreement in December 1995 by the Presidents of Croatia, Serbia and B&H. The Dayton agreement (DA) created a very complex political system in Bosnia and Herzegovina. According to the DA the country was divided into two entities (administrative units): the Federation of Bosnia and Herzegovina (F BiH) and the Republic of Srpska (RS). Both entities were the result of warring sides and ethnic partitions during the war. An additional entity Brcko District (BD) was created in 2000 which belongs to the first two entities. The BD has its own institutions, as F BiH and RS, but is under the direct jurisdiction of state Bosnia and Herzegovina.¹⁰

The Federation of Bosnia and Herzegovina (F B&H) was created in a Washington convention in 1994 and is inhabited by Bosniaks and Bosnian Croats. It is also called the Bosniak-Croat Federation. F BiH has its own government, president, parliament, court, flag, capital, market, police department etc. The Federation of Bosnia and Herzegovina covers 51% of the total territory of Bosnia and Herzegovina.¹¹

The Republic of Srpska (RS) is the second main political entity in Bosnia and Herzegovina covering 49% of the total land area of BiH. This entity has its own institutions such as parliament, local court and police department located in Banja Luka (Capital city of republic of Srpska).¹² In order to better understand both entities and their political systems we can compare them with West and East Germany. The only difference is that F B&H and RS do not have foreign political jurisdiction. They cannot create or complete international contracts or participate by the international meetings and organizations. The third level of the B&H political system are cantons, dividing the federation of Bosnia and Herzegovina into 10 geopolitical units. All of them have their own government, parliament, court etc. and are under the law of the Federal government (F BiH). In five of these Cantons the Bosniaks are the majority, in three the Croats and the remaining two are Multi ethnic.¹³ The reorganization of the Cantons is priority because of high administrative costs but still there is no political compromise.

¹⁰ Wikipedia: http://en.wikipedia.org/wiki/Bosnia_and_Herzegovina

¹¹ Wikipedia: http://en.wikipedia.org/wiki/Federation_of_Bosnia_and_Herzegovina

¹² Wikipedia: http://en.wikipedia.org/wiki/Republika_Srpska

¹³ Wikipedia: http://en.wikipedia.org/wiki/Bosnia_and_Herzegovina

Figure 2: Map of Bosnia and Herzegovina after Dayton agreement in 1995¹⁴



Despite all these partitions, Bosnia and Herzegovina as a state has its own jurisdictions and legislative institutions. The state has a Three-member Presidency consisting of one Bosniak, one Croat and one Serb. These three presidents are representatives of their own ethnic group in B&H common institutions. They have their obligations, here are some of them: managing of Foreign policy of Bosnia and Herzegovina, representing B&H in international meetings and organizations, proposing the prime Minister to the Council of Ministers, budget consultations with Council of Ministers, accomplishing decisions from state's parliament, constituting ambassadors around the World etc.¹⁵

¹⁴ Wikipedia: http://en.wikipedia.org/wiki/Bosnia_and_Herzegovina

¹⁵ U.S Department of State: <http://www.state.gov/outofdate/bgn/bosniaandherzegovina/197866.htm>,
Wikipedia: http://en.wikipedia.org/wiki/Presidency_of_Bosnia_and_Herzegovina

Each of ethnic representatives (Presidents) is elected directly by the People and is Chair for an 8 months term within the 4 year's mandate. Other important issue in the B&H common institutions is a Council of Ministers consisting of 9 government departments plus a Chair of the Council of Ministers (Prime minister). The Prime Minister is nominated by the three-member Presidency and must be approved by the Parliament. Obligations of the Prime Minister are to appoint the Ministers of his/her government cabinet. Unfortunately there is no energy government department at the state level. Each entity (RS or F B&H) has its own energy department and policy (which will be discussed later). The Parliamentary Assembly of Bosnia and Herzegovina is the highest legislative organ. There are two houses: The House of ethnic groups (people) consisting of 15 delegates and the House of Representatives consisting of 42 delegates. Two thirds of delegates, in each house, are elected from the Federation of B&H (Bosniaks and Croats) and one third from the Republic of Srpska (Serbs).¹⁶

It is obvious that Bosnia and Herzegovina is divided in to too many administrative units representing an enormous cost factor. Since 1996 the political representatives have sought a recomposition of Bosnia and Herzegovina but without success, because representatives of each ethnic group consider it a loss of their own territory and authority.

Bosnia and Herzegovina is a country with clear objectives: as soon as possible to be a part of Europe Union and NATO family. This process requires many reforms, reorganizations, offerings, compromises etc. Despite the fact that war finished eighteen years ago there is still little political and economic progress. The political representatives are still manipulating the people by talking about nationalism and war. This is their way winning elections and crucial problems of simple men are secondary.

The Europe Union is since September 2011 very political active in B&H. After stagnation in reforms, the EU appointed "The European Union Special Representative" (EUSR) who is responsible for the implementation of all necessary reforms. The crucial point of this action was to show B&H representatives how to forget past and start new common future for all ethnic groups. Discussions focused on economics and better social policy.

¹⁶ http://en.wikipedia.org/wiki/Bosnia_and_Herzegovina#Government_and_politics

Bosnian and Herzegovinian Energy Sector



17

¹⁷ Data Source: Federal Ministry of Energy, Mining And Industry STUDY: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

6 An Overview of Energy Sector in Bosnia and Herzegovina

6.1 Introduction

The energy sector in B&H is considered the sector of future with its significant potential. Bosnia and Herzegovina is the only country in the region with net electricity exports thanks to its large water and coal resources. In 2009, the ratio of exports and imports of electricity in Bosnia was GWh (Gigawatt per hour) +2991, compared to Croatia -5663, to Montenegro -1293, to Serbia -1316, to Macedonia -1539 and to Albania -1393.¹⁸

Hydro and thermal power plants, as the main producers of electricity in a country, have the capacity to meet the country's own energy needs and to export the rest. Economically hydropower potential in the country is estimated to around 5800 MW taking into account potential from small hydro power plants. Electricity generation capacity by the current existing 14 large hydro power plants amounted to 2100 MW (see table 4), which is 37 % of the total energy feasible production capacity.¹⁹

B&H is rich in coal resources, especially lignite and peat, whose reserves are estimated at more than 6 billion tons. Most of these coal reserves serve four large thermal power plants with 1559 MW (Megawatt) installed capacity (see table 4).²⁰ Exploration of additional coal deposits is crucial for the construction of new thermal power plants.

Besides significant potential in coal and hydro, renewable energy potential such as wind, solar, biomass and geothermal energy are crucial for electricity production in the future. This especially applies to wind energy potential that is estimated at 2000 MW²¹, solar energy with an estimation of ca. 67 PWh (Petawatt per hour) and biomass with proven forest reserves; more than 50 % of B&H total area consists of forest.²²

¹⁸ WBC-INCO: http://wbc-inco.net/attach/0_National_Background_Report_Energy_BiH_2012.pdf, CPU Center for Policy and governance in B&H, www.cpu.org.ba/?p=actuel-detail&nid=14

¹⁹ WBC-INCO: http://wbc-inco.net/attach/0_National_Background_Report_Energy_BiH_2012.pdf, World Bank : Study of Energy sector in Bosnia and Herzegovina , <http://www.eihp.hr/bh-study/index.htm>

²⁰ Development Bank of Turkey, Energy sector report, www.sarajevobusinessforum.com/projects/ENERGY.pdf WBC-INCO: http://wbc-inco.net/attach/0_National_Background_Report_Energy_BiH_2012.pdf

²¹ Foreign Investment Promotion Agency of B&H (FIPA), Energy Sector, <http://www.fipa.gov.ba/doc/brosure/Energy%20sector.pdf>

²² WBC-INCO: http://wbc-inco.net/attach/0_National_Background_Report_Energy_BiH_2012.pdf, World Bank : Study of Energy sector in Bosnia and Herzegovina , <http://www.eihp.hr/bh-study/index.htm>

Natural gas is imported from Russia via Hungary and Serbia and the gas market is almost 100 % dependent on imports. The gas pipeline system in B&H is undeveloped; it includes only 191 km of main gas pipelines from Zvornik via Sarajevo to Zenica with a technical capacity of 1 billion cubic meters. B&H gas consumption for 2020 is estimated to 2 billion cubic meters and in order to meet gas increasing demand in Bosnia, it is planned to build new gas pipelines, by granting construction concessions to foreign partners.²³

The B&H oil sector in comparison with the gas sector has much more potential. Most of this potential is expressed through the production of oil and petroleum products. Oil production in Refinery Bosanski Brod and Modrica exceeds total oil demand in B&H. Due to high oil production potential, it is very important to continue oil explorations.²⁴

According to the last official release from the B&H agency for statistics, Code: GODINA/ **YEAR 3 and 4**; in **SARAJEVO, 23.11.2012. BROJ/ NUMBER 3 and 4**, energy consumption in 2011 is presented below:²⁵

“In final electricity consumption in 2011, households participated with share of 42.1%, industry with share of 38.3% and other consumers including construction, transport and agriculture with 19.6%.”

“In final coal consumption of 833 013 tons in 2011, lignite participates with share of 48.7%, brown coal with 4.6% and cooking coal and anthracite with 7.7%.”

“In final natural gas consumption of 202 544 000 Sm³ in 2011, industry participates with share of 58%, households with 26% and other consumers with 16%.”

Chapter 7 of this Master thesis will present in detail the subsectors of B&H energy sectors such as: Mining sector, Power sector-renewable energy sources, Natural gas and Oil and oil products sector.

²³ World Bank: Study of Energy sector in Bosnia and Herzegovina , <http://www.eihp.hr/bh-study/index.htm>, WBC-INCO: http://wbc-inco.net/attach/0_National_Background_Report_Energy_BiH_2012.pdf

²⁴ World Bank: Study of Energy sector in Bosnia and Herzegovina , <http://www.eihp.hr/bh-study/index.htm>

²⁵ B&H Agency for Statistics, Energy Statistics, http://www.bhas.ba/saopstenja/2012/EET_2011G01_001_01_BA.pdf, http://www.bhas.ba/saopstenja/2012/EUG_2011G01_001_01_BA.pdf, http://www.bhas.ba/saopstenja/2012/EPP_2011G01_001_01_BA.pdf.

6.2 Institutional and Legal Framework in B&H energy sector

6.2.1 The key actors in the energy sector in B&H

It took a lot of effort, after the war, to establish new institutions with an ability to deal with necessary economic reforms. Unfortunately many of the institutions, agencies, and laws were imposed by the OHR (EU Office of the High Representative) because the politicians have not been able to find a common compromise. Despite the fact that there are many institutions at the state level, their work is every day blocked by ethnic politicians wishing supremacy in all economic decisions. As a result of their superiority, Bosnia has a lot of problems with corruption. Corruption currently represents one of the major barriers to foreign investment. It is important to add that, despite the existence of institutions at the B&H level, the keywords lead the entity governments and agencies that enter into international business with foreign partners. Bosnia and Herzegovina, through its integration into the European Union, has to reform its coordination system, reduce corruption and cut red tape in order to facilitate foreign investments. Below are listed the B&H main institutions providing crucial decisions for energy sector:²⁶

1. Council of Ministers of B&H (NO energy sector development strategy at the state level, www.vijeceministara.gov.ba)
2. Ministry of Foreign Trade and Economic Relations of B&H - Sole department at the state level dealing with coordination of energy policy and international business issues (contracts), www.mvteo.gov.ba
3. Government of F B&H - Energy sector department and policy at the entity level. In the Federation of B&H it is called the Ministry of Energy, Mining and Industry, this Ministry is not allowed to sign international energy contracts and to represent the state, www.fmeri.gov.ba
4. Government of RS - Energy sector department and policy at the entity level, Ministry of Economy, Energy and Development of the Republic of Srpska, this Ministry is not allowed to sign international energy contracts and to represent the state, www.vladars.net

²⁶ Foreign Investment Promotion Agency of B&H (FIPA), Energy Sector, <http://www.fipa.gov.ba/doc/brosure/Energy%20sector.pdf>

5. State's Electricity transmission company "Elektroprijenos" B&H,
www.elprenosb&h.ba
6. State Electricity Regulatory Commission (DERK) - www.derk.ba
7. Regulatory Commission for Electricity of Federation of Bosnia and Herzegovina (FERK) – responsible for supply, generation and distribution of electricity in this entity, granting energy concessions to potential investors, www.ferk.ba
8. Regulatory Commission for Energy of Republic of Srpska (RERS) - responsible for supply, generation and distribution of electricity in this entity, granting energy concessions to potential investors, www.reers.ba
9. Nezavisni operator sistema - NOS or ISO - Independent system operator of B&H,
www.nosb&h.ba

Three national power utilities are:²⁷

- ❖ Company Elektroprivreda Bosne i Hercegovine (EPB&H) – www.elektroprivreda.ba
- ❖ Company Elektroprivreda Hrvatske zajednice Herceg Bosne (EPHZHB)
– www.ephzhb.ba
- ❖ Company Elektroprivreda Republike Srpske (EPRS) – www.ers.ba

All national utilities in Bosnia and Herzegovina are subjected to the laws of electricity that were adopted immediately after the war. Still there is no law on electricity for the entire B&H. These laws are soon to be replaced by new laws and standards proposed by the European Union.

The legal framework for the energy sector in Bosnia and Herzegovina is listed below:²⁸

²⁷ Foreign Investment Promotion Agency of B&H (FIPA), Energy Sector, <http://www.fipa.gov.ba/doc/brosure/Energy%20sector.pdf>

²⁸ Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, <http://www.energy-community.org/pls/portal/docs/1608181.PDF>

State Level:

- ❖ “Law on transmission, regulator and system operator of electricity in B&H, Official Gazette of B&H, No. 7/02”
- ❖ “Law on establishment Transmission Company in Bosnia and Herzegovina, “Elektroprijenos B&H”, Official Gazette of B&H, No. 35/2004”
- ❖ “Law on establishment Independent System Operator in Bosnia and Herzegovina. “ISO” or “NOS” Nezavisni Operator Sistema, Official Gazette of B&H, No. 35/2004”

Entity Level:

1. Republic of Srpska:

- ❖ “Energy Law, Official Gazette of RS No. 49/09”
- ❖ “Electricity Law, Official Gazette of RS No. 08/08”
- ❖ “Gas Law, Official Gazette of RS No. 86/07”
- ❖ “Oil and oil derivatives Law, Official Gazette of RS No. 36/09”
- ❖ “Mining Law, Official Gazette of RS No. 107/05”
- ❖ “Decree on use of renewable and co-generation resources, Official Gazette of RS No. 28/11”

2. Federation of B&H:

- ❖ “Electricity Law, Official Gazette of F B&H No. 41/02”
- ❖ “Mining Law, Official Gazette of FB&H No. 26/10”
- ❖ “Decree on the organization and regulation of Gas Sector, Official Gazette of F B&H No. 83/07”
- ❖ “Decree on use of renewable resources and co-generation, Official Gazette of F B&H No. 36/10”
- ❖ “Law on Application of Tariff System, Official Gazette of F B&H No. 06/04”

District level:

- ❖ “Electricity Law of the Brčko District, Official Gazette of BD No. 36/04, 28/07, 61/10”

6.2.2 International Energy Obligations

The ministry of Foreign Trade and Economic Relations of B&H has ratified many international agreements, contracts and protocols and here are some of them:²⁹

- ❖ Agreement on the Energy Charter Treaty (ECT) - The ratification of the ECT sends positive signals towards new investors in the energy sector; reduces investment risks, secures stable economic environment, provides help for energy market development in transition countries, facilitates business establishment between states and governments etc.
- ❖ Stabilization and Association Agreement (SAA); signing this agreement B&H agreed to start reforms related to policy, economy, trade etc. in order to enter into EU.
- ❖ UN Framework Conventions on Climate Changes; whose aim is to reduce state's greenhouse gas concentration in the atmosphere and to slow global warming.
- ❖ Agreement on Launching of Energy Community
- ❖ Kyoto Protocol; Realization of the objectives of this protocol is uncertain because many states have already stepped out such as Canada, Japan etc.
- ❖ Convention on Traffic Control of disposal dangerous waste

Bosnia and Herzegovina belongs to the regional energy markets of South East Europe (South-East European Regional Energy Market - SEEREM), consisting of members of the European Union: Austria, Greece, Hungary, Italy and Slovenia, and regional members: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Romania, Serbia, Montenegro, Turkey and Kosovo. Energy progress in all countries each year is measured by benchmarking. B&H is unfortunately behind all these countries in energy progress due to the complex policy structure and the lack of a unique development program and plan for the energy sector.³⁰

²⁹ Foreign Investment Promotion Agency of B&H (FIPA), Energy Sector, <http://www.fipa.gov.ba/doc/brosure/Energy%20sector.pdf>

³⁰ Wikipedia: http://en.wikipedia.org/wiki/Energy_Community

7 Energy Sub-sectors in Bosnia and Herzegovina

Coal Sector



31

³¹ Data Source: Federal Ministry of Energy, Mining And Industry STUDY: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

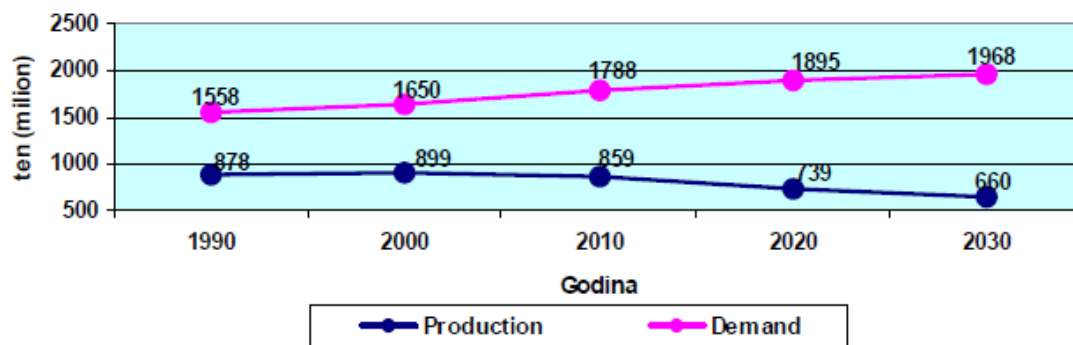
7.1 Coal Sector

7.1.1 Coal and energy trends in EU

The energy sector in the European Union is currently a key sector and is important for every member country due to geological, political and economic connectivity. The European Union is occupied with increasing demand for energy and must recognize its energy potentials for future needs. Unfortunately the European Union is much more dependent on external suppliers, the situation in the global energy market, etc. The goal is to become a global leader in energy and environmental terms. To accomplish their goals, all member States must have a single policy that includes:³²

- higher investments in new facilities and technologies,
- better energy efficiency,
- the invention and development of new energy sources,
- a joint appearance on the global energy market,
- higher level of environmental policy.

Figure 3: Energy demand and production in EU 27(GWh)³³



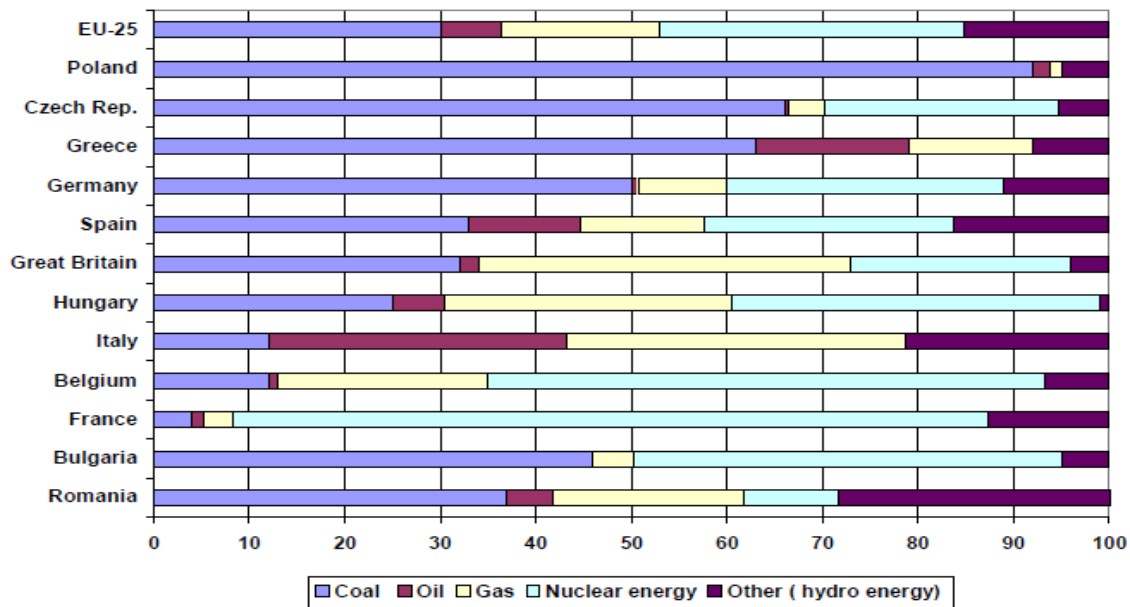
In figure 3, energy demand exceeds production, and this alarming trend is visible until 2030. The EU's energy import dependence in the following period will exceed the current level of 50 %, so EU authorities must therefore secure; further development, energy supply and competitive position. Energy experts consider that it is necessary to invest approximately

³² World Bank : Study of Energy sector in Bosnia and Herzegovina, Mining Sector, http://www.eihp.hr/bh-study/files/final_e/m8_fr.pdf

³³ World Bank : Study of Energy sector in Bosnia and Herzegovina, Mining Sector, http://www.eihp.hr/bh-study/files/final_e/m8_fr.pdf

1000 billion Euros over the next 20 years to meet the high demand. One of the main fuels is coal, which is particularly more evident in the eastern part of Europe (see figure 4). Coal is an important fuel for energy supply, in future, because it is characterized by its price stability and availability.³⁴

Figure 4: Share of energy resources in the EU energy sector³⁵



The share of coal, as shown in the figures, is enormous and the European Union has recognized the importance of this source of energy. The Coal sector requires constant investment; which relates to the reconstruction and modernization of the existing coal mines and thermal power plants in order to increase electricity production, improve energy efficiency and to protect the environment. According to an official release from G8³⁶ in a meeting in April 2007, it has been concluded that it is necessary to continue investment in coal fuelled thermal power plants, but with zero emission of gasses.³⁷ Electricity production from clean coal will, due to high investment costs, increase energy prices. Considering energy analysis and a long term development plan, major EU priorities for the next two decades, beside electricity production from clean coal, will be energy production from renewable energy sources; installing new hydro power plants, wind farms, biomass facilities etc.

³⁴ World Bank : Study of Energy sector in Bosnia and Herzegovina, Mining Sector, http://www.eihp.hr/bh-study/files/final_e/m8_fr.pdf

³⁵ World Bank : Study of Energy sector in Bosnia and Herzegovina, Mining Sector, http://www.eihp.hr/bh-study/files/final_e/m8_fr.pdf

³⁶ Forum for the governments of eight world's largest economies

³⁷ World Bank : Study of Energy sector in Bosnia and Herzegovina, Mining Sector, http://www.eihp.hr/bh-study/files/final_e/m8_fr.pdf

7.1.2 Coal-mines and trends in Bosnia and Herzegovina

Coal mining in Bosnia and Herzegovina began in the late 19th century, in the Austro-Hungarian monarchy. The beginning of the development of the energy sector in Bosnia was in the early eighties when many of the coal reserves in central and eastern Bosnia were discovered. Bosnia and Herzegovina has significant deposits of brown and lignite coals. In this context, entity governments are planning to work on these facts and further produce electricity and thermal energy from coal, especially for domestic needs. Most of the existing coal mines serve thermal power plants (TPP) in both entities. Coal mines located in the central and northern Bosnia fuel thermal power plants in Tuzla and Kakanj, while mines in eastern and western Bosnia serves thermal power plants in RS. A detailed overview of mines, thermal power plants is shown in figure 5.³⁸

Figure 5: Location of coal mines and thermal power plants in B&H³⁹



³⁸ Federal Ministry of Energy, Mining And Industry STUDY: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

³⁹ World Bank : Study of Energy sector in Bosnia and Herzegovina, Mining Sector, http://www.eihp.hr/bh-study/files/final_e/m8_fr.pdf

*Coal mines in Federation of BiH:*⁴⁰

- Banovići: brown coal surface and underground mines
- Djurdjevik: brown coal surface and underground mines
- Kakanj: brown coal surface and underground mines
- Zenica: brown coal underground mine
- Breza: brown coal underground mines
- Bila: brown coal underground and surface mine
- Kreka: lignite surface and underground mines
- Livno: lignite surface mine
- Gračanica and G.Vakuf: lignite surface mine

*Coal mines in RS:*⁴⁰

- Ugljevik: brown coal surface mines
- Gacko: lignite surface mines
- Stanari: lignite surface mine

Total coal reserves in Bosnia are estimated at about 5.7 billion tons of which balance reserves amount to 2.6 billion tons: 1.4 billion tons of lignite coal and 1.2 billion tons of brown coal.⁴¹ The quality of lignite coal is low and pure with a total average heating value of 7 500-12 000 kJ/kg, while brown coal has a stronger impact on heating value of 16 750 kJ/kg.⁴² Coal is unfortunately the leading source of emissions with 75%, followed by petroleum products with 21% and natural gas with 4%. Coal has negative effects on the environment and as a result the EU has adopted a number of dictats in order to better regulate this issue. The trend in the EU is to reduce the emissions produced by coal and the creating of new coal mines in the future must be according to EU environment laws and standards (i.e. clean coal)

⁴⁰ Foreign Investment Promotion Agency of B&H (FIPA), Energy Sector, <http://www.fipa.gov.ba/doc/brosure/Energy%20sector.pdf>

⁴¹ World Bank : Study of Energy sector in Bosnia and Herzegovina, Mining Sector, http://www.eihp.hr/bh-study/files/final_e/m8_fr.pdf

⁴² Heating value is measured in units of energy per unit of the substance: kJ/kg, kJ/mol, kcal/kg.

New Potential Coal Mines in B&H

Bosnia and Herzegovina certainly has the capacity to further develop its coal sector. Prospects and studies have already been completed for the new digs but the problems are the high cost of building new coal mines and meeting environmental standards. New coal mines in projection are listed below:⁴³

- Surface mine Kongora to serve TPP Duvno
- Surface mine Kotezi to serve TPP Bugojno
- Surface mine Sanski Most
- Surface and underground mine Miljevina

B&H does not have capacity to invest itself in these projects, relying exclusively on foreign investors and international credit funds. Through integration into the EU, B&H is available to use EU development funds for further energy sector development. These funds, according to today's trends are mostly directed to the electricity production from renewable energy sources. Current investment in the coal sector is unattractive among investors because it requires large investments, especially in the beginning. B&H needs long-term economic plan for the further development of the coal sector in order to provide the necessary funds to start new planned projects.⁴⁴

7.1.3 Basic economic characteristics of B&H coal sector

According to the latest official available information, in 2011 Bosnia and Herzegovina produced around 12.6 million tons of coal, 6.3 million tons of lignite and 6.3 million tons of brown.⁴⁵ This represents about 59 % of pre-war production. The reason for the decline in coal production is due to many destroyed facilities during the war. Coal production in 2011 compared to 2006 has increased by almost 30 %, if this level of production continues in the

⁴³ World Bank : Study of Energy sector in Bosnia and Herzegovina, Mining sector, http://www.eihp.hr/bh-study/files/final_e/m8_fr.pdf

⁴⁴ Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

⁴⁵ B&H Agency for Statistics, Energy Statistics, http://www.bhas.ba/saopstenja/2012/EUG_2011/G01_001_01_BA.pdf

future; thermal power plants are secured in terms of coal supply for electricity production for the next 20 years.⁴⁶

Table 1: Coal production in Bosnia and Herzegovina in pre- and post-war time (in 000 t)⁴⁷

COAL	Year					
	1990	2002	2004	2005	2006	2011
Federation of BiH						
Brown coal	8232	3246	3391	3526	3606	-
Lignite coal	4893	1826	2248	2229	2279	-
TOTAL	12125	5072	5639	5785	5885	-
Republic of Srpska						
Brown coal	1993	1305	1227	1134	1579	-
Lignite coal	3.023	1.422	2.029	2.220	2.491	-
TOTAL	5016	2727	3256	3354	4070	-
Bosnia and Herzegovina						
Brown coal	10225	4551	4618	4660	5185	6339
Lignite coal	7916	3248	4277	4449	4770	6288
TOTAL	18141	7799	8895	9109	9955	12627

Table 2 clearly shows that in 2011, approximately 93 % of total sales are allocated to thermal power plants (TPP's). The other 5-6 % is for other customers; such as central heating systems in various cities and single households. The rest is exported.

Table 2: Coal Sales in Bosnia and Herzegovina (in 000 t)⁴⁸

Description	2005			2006			2011		
	B&H	F BiH	RS	B&H	F BiH	RS	B&H	FBiH	RS
Total Sales	9088	5789	3299	9950	5880	4070	12600	-	-
Share of TPPs	7721	4579	3142	8482	4743	3691	11809	-	-
% share of TPPs in sales	84	79	93	85	81	91	93	-	-
Other consumers	1086	934	152	1333	1006	375	684	-	-
EXPORT	281	276	5	135	131	4	107	-	-

⁴⁶ World Bank : Study of Energy sector in Bosnia and Herzegovina, Mining sector, http://www.eihp.hr/bh-study/files/final_e/m8_fr.pdf, B&H Agency for Statistics: Energy Statistics, <http://www.bhas.ba/saopstenja>

⁴⁷ World Bank : Study of Energy sector in Bosnia and Herzegovina, Mining sector, http://www.eihp.hr/bh-study/files/final_e/m8_fr.pdf, B&H Agency for Statistics: Energy Statistics, <http://www.bhas.ba/saopstenja>

⁴⁸ World Bank : Study of Energy sector in Bosnia and Herzegovina, Mining sector, http://www.eihp.hr/bh-study/files/final_e/m8_fr.pdf, B&H Agency for Statistics: Energy Statistics, <http://www.bhas.ba/saopstenja>

As expected, labor costs provide the highest cost in recent years with a share of 42 % of total costs. There is even a trend to reduce the number of workers in each coal mine. In comparison with 2005 labor costs have been increased by around 16 %. These costs are followed by operating and other operating cost with a total share of 34 %, energy costs, etc. Table 3 provides all costs occurred in 2005 and 2006 year.⁴⁹

Table 3: Costs in Bosnian and Herzegovinian mining sector (in 000 KM)⁵⁰

Costs	2005			2006		
	B&H	F BiH	RS	B&H	F BiH	RS
Consumption of raw materials, small inventory	59236	51114	8122	58844	50093	8751
Consumed Energy	63033	43936	19097	76331	51095	25236
Depreciation	57635	38610	10025	62248	38971	23276
Labor costs	195932	169002	26930	227287	192634	34653
Other operating costs	75354	42430	32924	54793	30570	24223
Costs from previous period	2466	2428	38	6467	6446	21
Other expenditures	26079	15591	10488	31076	29444	1632
Internal expenditures	7584	7584	0	8443	8443	0
TOTAL Expenditures	487319	370695	116624	525489	407697	117791

Economic development of the B&H coal sector

There are many economic measures that would enhance the existing coal sector. Here are just a few of them:⁵¹

➤ Urgent restructuring:

A measure within the sector implies reorganization, modernization and disposal of surplus employees. These are just some of the measures that would enable more favorable prices in B&H and for potential export.

⁴⁹ World Bank : Study of Energy sector in Bosnia and Herzegovina, Mining sector, http://www.eihp.hr/bh-study/files/final_e/m8_fr.pdf,

⁵⁰ World Bank : Study of Energy sector in Bosnia and Herzegovina, Mining sector, http://www.eihp.hr/bh-study/files/final_e/m8_fr.pdf,

⁵¹ Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

➤ Corporatization:

Corporatization involves the efficient operation of defining the obligations and giving assignments to all actors. It would provide long-term investment in safety and coal production, and thus electrical and thermal energy from TPP to the end-user.

➤ “Green” production:

B&H needs to meet all the requirements of international obligations relating to the environment and emissions and to improve the general image in the energy market. Exploiting the trend of “green” production in the world, it is necessary to make a marketing plan to attract new foreign investors and customers.

Power Sector



52

⁵² Data Source: Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

7.2 Power Sector

7.2.1 Characteristics of Electro-energy sector in Bosnia and Herzegovina

It is already proven that the country has large coal reserves and the potential for the production of coal. Almost all stocks are used to generate electricity in thermal power plants. Renewable energy sources are second ranked and present the greatest potential for the further development of the energy sector. Here are the most mentioned: hydro, solar, wind, geo-thermal and bio energy. Currently, electricity is produced only in existing thermal and hydro power plants. Approximately 14 227 GWh of net electricity was produced in 2011, 67.4% of the total electricity is produced from thermal power plants and the rest of 32.6% from hydro power plants.⁵³

Table 4: Total electricity installed power in B&H (in MW)⁵⁴

Hydroelectric Plants	Power Unit Capacity	Total Installed Power	Thermal Plants	Install. Power	Available Power Capacity
Trebinje 1	3x60	180	TUZLA	715	635
Trebinje 2	8	8	G3	100	85
Dubrovnik	2x108	216	G4	200	182
Capljina	2x210	420	G5	200	180
Rama	2x80	160	G6	215	188
Jablanica	1x25,5x30	175			
Grabovica	1x57	114	KAKANJ	450	398
Salakovac	3x70	210	G5	110	100
Mostar	3x24	72	G6	110	90
Jajce 1	2x30	60	G7	230	208
Jajce 2	3x10	30			
Bocac	2x55	110	GACKO	300	276
Visegrad	3x105	315	UGLJEVIK	280	250
Pec-Mlin	2x15	30			
HYDRO TOTAL		2100	THERMAL TOTAL		1559
			TOTAL POWER		3659

According to the latest official information from 2008, electricity installed power in Bosnia amounted to 3659 MW (see table 4). Total installed power in hydro power plants is 2100 MW

⁵³ B&H Agency for Statistics, Energy Statistics, http://www.bhas.ba/saopstenja/2012/EET_2011/G01_001_01_BA.pdf

⁵⁴ Development Bank of Turkey, Energy sector report, www.sarajevobusinessforum.com/projects/ENERGY.pdf, State Electricity Regulatory Committee (DERK), www.derk.ba

representing 57 % of total power. Thermal power plants participate with 1559 MW and 43 % of total installed power. It is important to mention once again that the total estimated hydro potential is around 5800 MW, of which only 37 percent are currently used. Total power capacity serves three national utilities: company Elektroprivreda BiH (EPB&H) owns 46 percent of the total power capacity (74 % thermal- and 26 % hydro plants), Elektroprivreda RS (EPRS) owns 35 percent of the total power capacity (60 % thermal- and 40 % hydro plants) and Company Elektroprivreda HZHB (EPHZHB) owns 19 percent of total power capacity (only hydro plants).⁵⁵

Electricity production in B&H

If we observe table 5, we easily see that the production of electricity from hydropower declined during the past 8 years. In 2004, the share of total electricity production amounted to 46.9 percent, whereas in 2011 it was only 30.6 percent. The only exception was in 2010 when production reached a record by 49.3 percent. One of the main reasons for the fall in production is coal as a primary energy source in Bosnia and worldwide drought because of the climate change. Electricity production in thermal power plants is constantly increasing and in comparison to 2004, it increased by 15.4 percent.

Table 5: Total electricity production in B&H (GWh)⁵⁶

Years	Hydropower		Thermalpower		Other (mini hydro, etc.)		Total
	Production	Share	Production	Share	Production	Share	Production
2004	5979	46.9	6625	52	139	1.2	12743
2006	5900	43.1	7614	55.7	162	1.2	13675
2008	4818	34.6	8933	64.1	191	1.4	13942
2010	7975	49.3	7869	48.7	314	2	16158
2011	4357	30.6	9588	67.4	325	2	14227

Consumption of electricity in B&H

Observing recent statistics in Bosnia and Herzegovina, in 2011 final consumption of electricity was 10 788 GWh. The principal electricity consumers were households (42.1

⁵⁵ Development Bank of Turkey, Energy sector report, www.sarajevobusinessforum.com/projects/ENERGY.pdf

⁵⁶ Development Bank of Turkey, Energy sector report, www.sarajevobusinessforum.com/projects/ENERGY.pdf
B&H Agency for Statistics, http://www.bhas.ba/index.php?option=com_publicacija&view=publicacija_pregled&ids=5&id=18&n=Environment%20and%20Energy

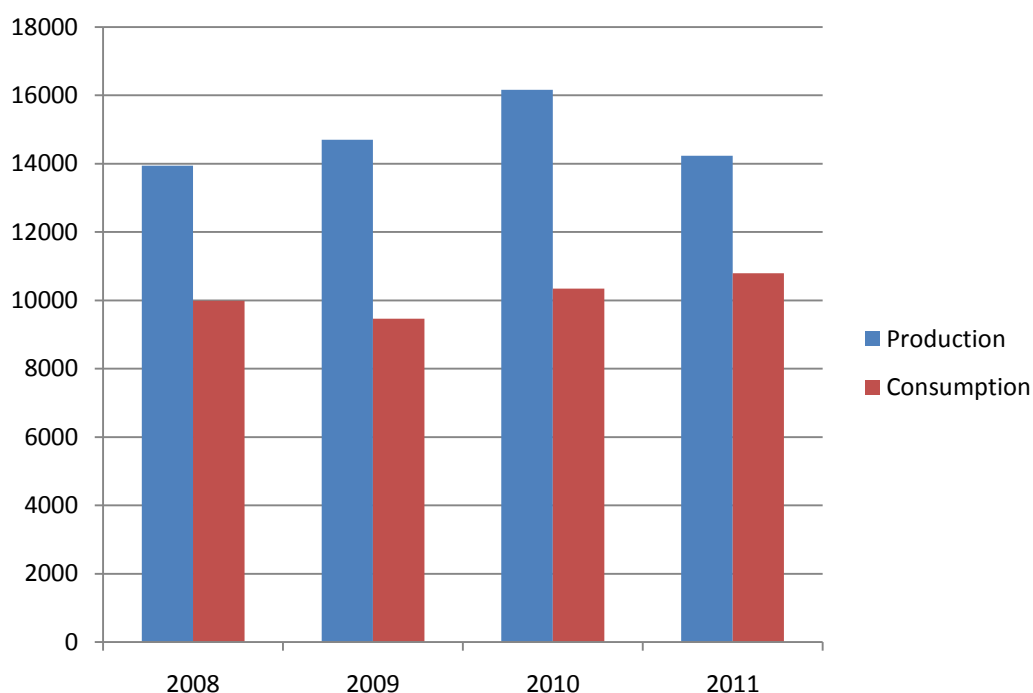
percent), the industry-transport (38.3 percent) and others such as construction, transport and agriculture (19.6 percent). The industrial sector consumes the most electricity in production of non-ferrous metals (51 percent) and in steel and iron production (16.4 percent).⁵⁷

Table 6: Annual balance of electricity in B&H from 2008-2011(GWh)⁵⁸

	Years			
	2008	2009	2010	2011
Net Production	13855	14701	16158	14227
Net Consumption	9984	9463	10347	10788
Export	5057	5877	6905	5660
Import	3412	2887	3076	4171

Production of electricity in the last 4 years is above current consumption which automatically means an increase in export capacity. Bosnia is a net exporter of electricity in the region, the largest portion of electricity exports flow to Slovenia, Montenegro, Serbia and Croatia. Manufacturers, however import approximately 20 percent of electricity for their own use.

Figure 6: Supply and Demand Balance of Electricity in B&H⁵⁸

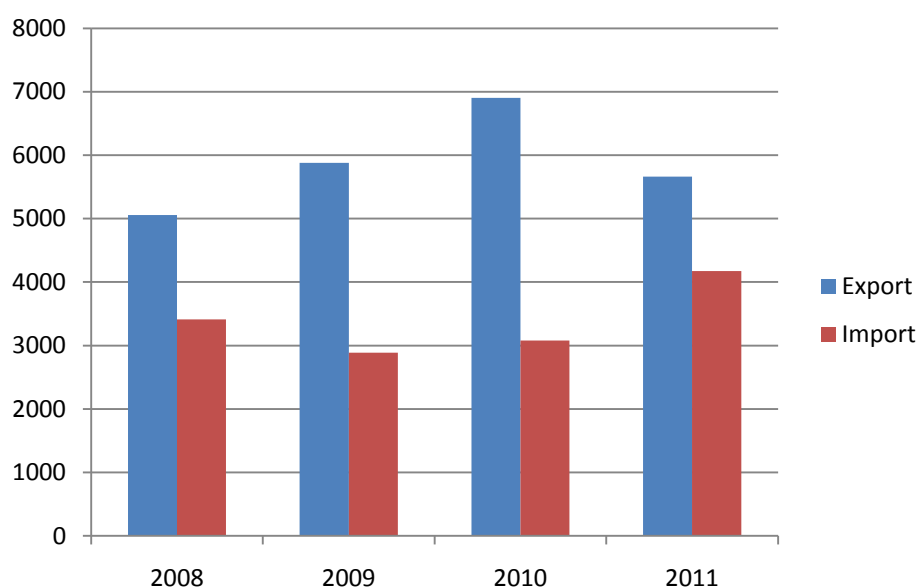


⁵⁷ B&H Agency for Statistics, http://www.bhas.ba/saopstenja/2012/EET_2011G01_001_01_BA.pdf

⁵⁸ B&H Agency for Statistics, http://www.bhas.ba/index.php?option=com_publicacija&view=publicacija_pregled&ids=5&id=18&n=Environment%20and%20Energy

A fascinating electricity production in 2010 had a major impact on exports. As seen in Table 6, 53 percent of total electricity production was exported to countries in the region and Switzerland. The positive export-import balance is an important factor for the foreign trade of Bosnia. Analyzing electricity foreign trade, it is easy to notice an increase in the export surplus from year to year. For example, in 2010, 6905 GWh have been exported and 3076 GWh imported, which means that the total export surplus was +3829. This represents a net electricity export. The fall in electricity production in 2011, especially in hydro power plants, due to a severe drought has led to a reduction in exports and increase in imports of electricity, so that the total export surplus only amounted to +1489 GWh.⁵⁹

Figure 7: Export-Import Balance of electricity in B&H⁶⁰



Exports, as the most important issue in the foreign trade of a country depend not exclusively on production. Exports depend on many economic factors and one of them is competitiveness. B&H national power utilities must accord their production, distribution and pricing with European standards in order to be more competitive. Although there is a high demand for electricity in the region, Bosnia and Herzegovina must also focus on the Western European energy market because electricity production and distribution, in the next decades, will increase due to the construction of new hydro and wind power plants.⁶¹

⁵⁹ Development Bank of Turkey, Energy sector report, www.sarajevobusinessforum.com/projects/ENERGY.pdf

⁶⁰ B&H Agency for Statistics, http://www.bhas.ba/index.php?option=com_publicacija&view=publicacija_pregled&ids=5&id=18&n=Environment%20and%20Energy

⁶¹ Development Bank of Turkey, Energy sector report, www.sarajevobusinessforum.com/projects/ENERGY.pdf

Electricity Prices

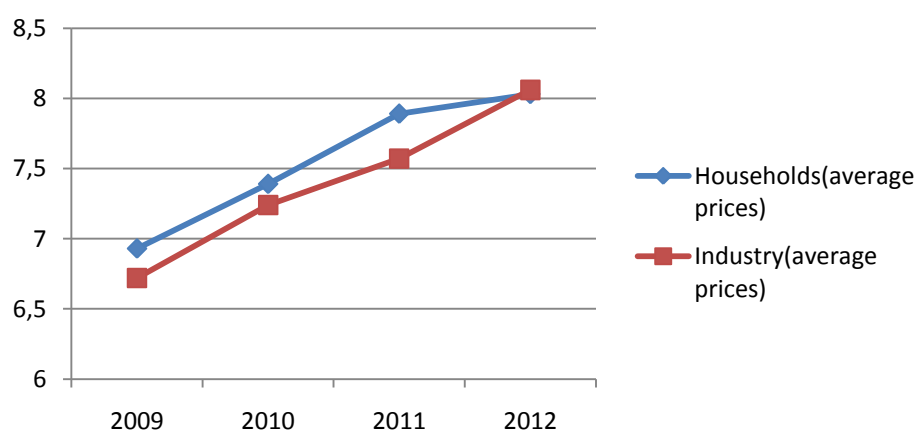
The State Electricity Regulatory Committee (SERC) is competent for determination of electricity prices in Bosnia and Herzegovina. According to the methods used by Eurostat⁶², electricity prices are calculated on the basis of a system of standard consumer groups defined by the scope of the annual electricity consumption. Prices are collected twice annually and refer to the average price paid by end-users of electricity in the previous six months. Prices in table 7 present the weighted average prices for households and industry.⁶³

Table 7: Electricity average prices in B&H (EUR/100 KWh)⁶⁴

	Years			
	2009	2010	2011	2012
Households (average prices)	6.93	7.39	7.89	8.03
Industry (average prices)	6.72	7.24	7.57	8.06

The electricity price of households in 2009 amounted to 6.93 EUR for 100 kWh and to 8.03 EUR at the end of 2012 with an increase of 16.6 percent. Similarly, the price of the electricity that industry uses in 2009 amounted to 6.72 EUR for 100 KWh and to 8.06 EUR at the end of 2012 with an increase of 20 percent. For the first time in the history of electricity pricing in Bosnia, industry prices exceeded household prices.

Figure 8: Electricity average prices for households and industry (EUR/100 KWh)⁶⁴



⁶² EUROSTAT- provides statistical information and statistical methods across its (EU) members.

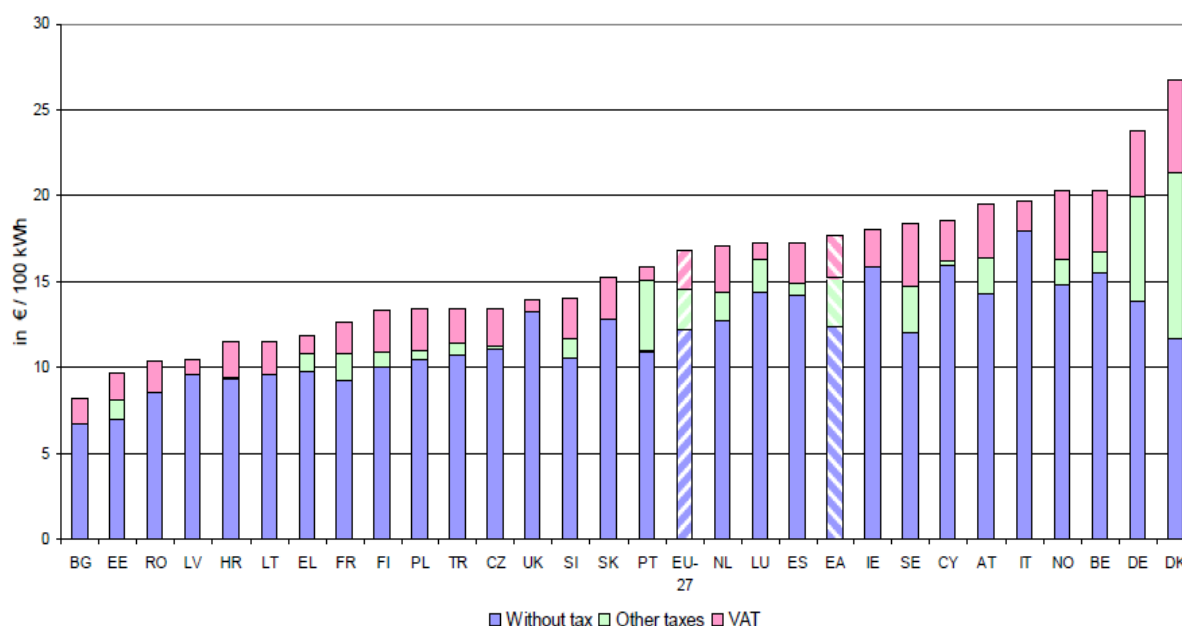
⁶³ B&H Agency for Statistics, http://www.bhas.ba/index.php?option=com_publicacija&view=publicacija_pregled&ids=5&id=18&n=Environment%20and%20Energy

⁶⁴ B&H Agency for Statistics, http://www.bhas.ba/index.php?option=com_publicacija&view=publicacija_pregled&ids=5&id=18&n=Environment%20and%20Energy

According to the report of the statistical office of the European Union (EUROSTAT) for electricity prices in 32 countries in 2010; the price of electricity for households and industrial consumers in B&H is the lowest in Europe, which reduces the financial strength of the domestic power utilities and largely prevents them independently building new power plants. The Minister of Industry, Energy and Mining of F B&H believes that low prices should be used as a crucial advantage for Bosnia and Herzegovina in attracting foreign investment.⁶⁵

In 2010, the average price of electricity among the 27 EU countries was 16.76 EUR per 100 kilowatt-hours. The most expensive electricity in Europe is paid by households in Denmark; 26.7 EUR per kilowatt-hour, followed by Germany 23.75 EUR, Belgium 20.32 EUR, Norway 20.27 EUR, Italy 19.67 EUR and Austria 19.56 EUR per kilowatt-hour. On the other hand, the lowest electricity prices in the EU are in Bulgaria 8.13 EUR, Estonia 9.70 EUR and Romania 10.31 EUR per kilowatt-hour.⁶⁶ Experts in the field of electricity consider that electricity prices in Bosnia are more “social” because of the low standards of the population. For further development of new projects in the energy sector it is necessary to determine new strategic electricity prices.

Figure 9: Household electricity prices in the Europe (EUR/100KWh)⁶⁷



⁶⁵ Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

⁶⁶ EUROSTAT, electricity prices release 2010, http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-QA-10-046/EN/KS-QA-10-046-EN.PDF

⁶⁷ EUROSTAT, electricity prices release 2010, http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-QA-10-046/EN/KS-QA-10-046-EN.PDF

The World Bank in this year's report states that the current and expected level of electricity prices in B&H in the next three-year period is inadequate to cover future investment needs of the power industry, warning even that this brings the risk of financial and commercial viability of the sector.⁶⁸

7.2.2 Energy Demand in the Region

The region is facing a growing energy deficit as a result of the growing demand for electricity and the lack of long-term investment in new production capacities. The cycle of investment in the region has started, but the first new power plant will be in operation in 2015. The fact is that electricity prices in the region will rise over the next couple of years due to high demand and low supply. The countries in Southeast Europe in 1990 had a surplus of electricity, but since 2000, due to the economic recovery and the rapid increase in energy demand, the surplus became a deficit. Mild winters in recent years have helped local electricity companies in overcoming problems in electricity supply. Local energy and economic experts estimate that demand for energy in the region is growing by 3 percent a year, with an expected average economic growth of 5 percent. Lack of investment in new power plants, increasing energy demand and limited transmission networks in the region are the key problems in the supply of electricity in region.⁶⁹

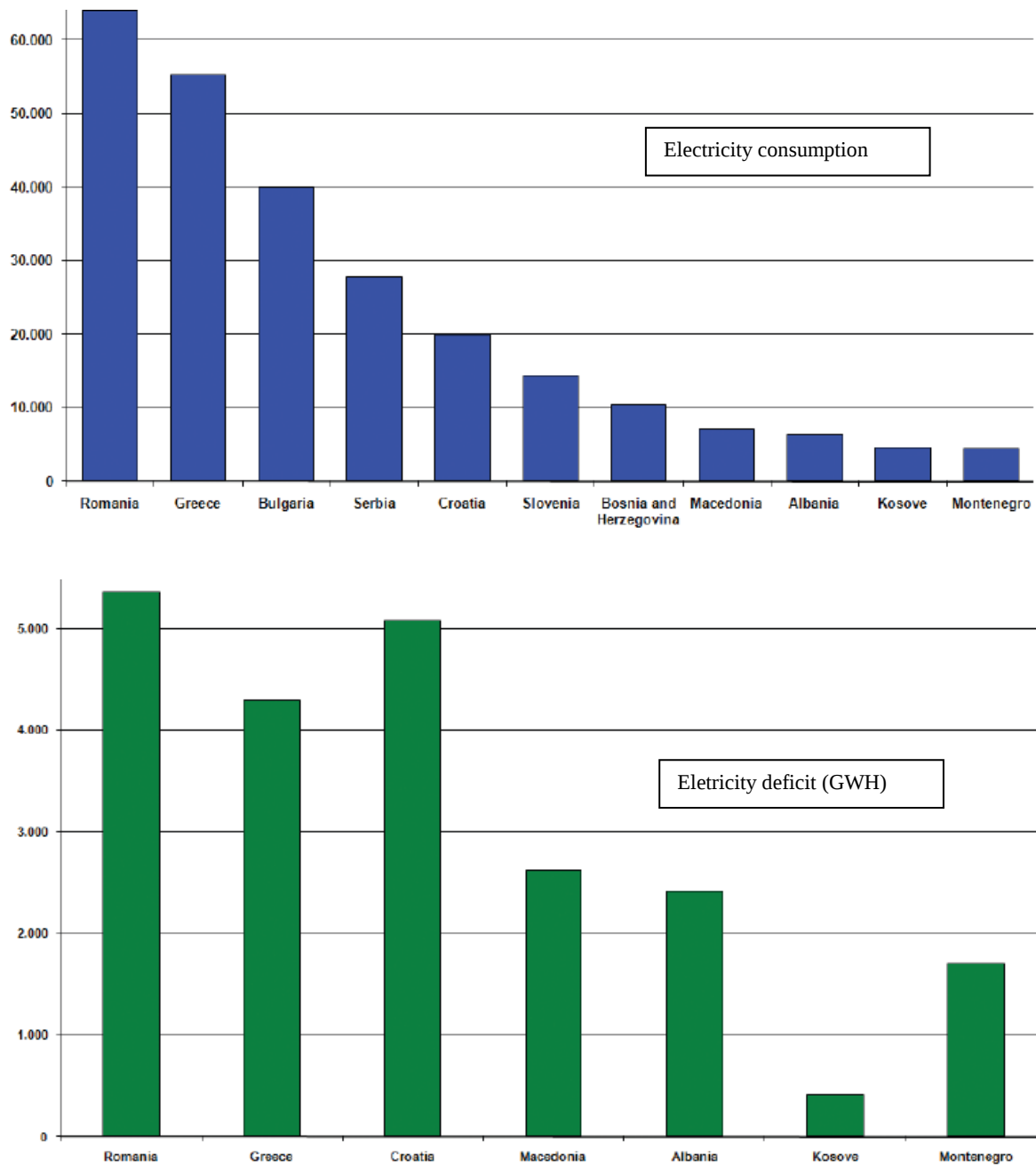
Bosnia and Herzegovina as a sole net electricity exporter in the region with its proven capacities and resources has a high probability to become a major supplier of energy in the region. With the current electricity production of around 14 TW per year and NET electricity export of around 1-3 TW, B&H is still small supplier. In order to be an energy leader in the region B&H must implement a long-term energy development strategy and secure necessary investments. Results from 2008 report that total electricity demand in the region was 254 TW while the deficit was 22 TW (see figure 10). Estimated consumption of electricity for the future of the region is on the rise, 302 TW in 2015 and 437 TW in 2030. Unfortunately, countries from the European Union such as Greece and Romania have the highest electricity consumption and deficit followed by Bulgaria with high electricity consumption and Croatia with high electricity deficit.⁷⁰

⁶⁸ World Bank : Study of Energy sector in Bosnia and Herzegovina, <http://www.eihp.hr/bh-study/index.htm>,

⁶⁹ World Bank : Study of Energy sector in Bosnia and Herzegovina, <http://www.eihp.hr/bh-study/index.htm>,
Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in
Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

⁷⁰ Development Bank of Turkey, Energy sector report, www.sarajevobusinessforum.com/projects/ENERGY.pdf

Figure 10: Electricity Consumption and Deficit in the Region (GWH)⁷¹



The European Union's efforts in recent years have been tremendous to help these countries, they have provided development funds for electricity production from renewable energy and as a result Romania is a current leader in the production of wind power in the region followed by Bulgaria and Croatia.⁷²

⁷¹ ERRA, Regional Energy Regulatory Association, Development Bank of Turkey, Energy sector report, www.sarajevobusinessforum.com/projects/ENERGY.pdf,

⁷² Development Bank of Turkey, Energy sector report, www.sarajevobusinessforum.com/projects/ENERGY.pdf

7.2.3 New projects with implementation until 2020/30 Year

In Bosnia and Herzegovina, since 2008, there is a trend of developing new plans, programs and studies for investments in the B&H energy sector. Many government and non-governmental organizations have realized the importance of the construction of new potential power plants for the Bosnian economy. In the last 4 years, many feasibility studies for the energy sector were created, especially regarding the power sector. Both entity governments keep about 60 new projects in their drawers awaiting their realization. Unfortunately the global economic crisis has contributed to the fact that investments in energy sector declined, but since 2013 the investment trend is expected to continue. There is a small probability to start construction on new thermal power plants in this decade whereas construction of new hydro power plants is more evident. The major projects related to the thermal and hydro power production are listed below:

Table 8: New potential Thermal Power Plants in Bosnia and Herzegovina⁷³

New Projects	Thermal Power Plants				
	Location	Fuel	Net electric Power	Investments (Mio)	Project schedule
TPP⁷⁴ Tuzla	Tuzla, Extension Unit 7	Coal lignite	450 MW	€ 841.60	2020
CM⁷⁵&TPP Kongora	Tomislavgrad	Coal lignite	300 MW	€ 1100	2017
TPP Kakanj	Kakanj, Extension Unit 8	Coal brown	300 MW	€ 681	2017
CHP⁷⁶ Zenica	Zenica	Gas+ Diesel	240+170 MW	€ 250	2013
TPP Bugojno	Near to coal mine Bugojno	Coal lignite	300 MW	€ 584	2022
TPP Banovici	Near to Tuzla	Coal brown	300 MW	€ 690	/
TPP Gacko II	Gacko, Extension to 660 MW	Coal lignite	660 MW	€ 1322	/
TPP Ugljevik	Tuzla, Extension +300 MW	Coal brown	300 MW	€ 1200	
CM & TPP Miljevina	Miljevina	Coal lignite	140 MW	/	/

⁷³ FIPA: http://www.fipa.gov.ba/projekti/FIPA_ENERGY_SECTOR_13.11.2012.pdf

⁷⁴ TPP-Thermal Power Plant

⁷⁵ CM-Coal Mine

⁷⁶ CHP- Combined Heat and Power

Table 9: New potential Hydro Power Plants in Bosnia and Herzegovina⁷⁷

New Projects	Hydro Power Plants				
	Location	River	Net electric power	Investments MIO	Project Schedule
HPP⁷⁸ Vanduk	Zenica	Bosna	19.58 MW	€ 47.6	Start 2010
HPP Ustikolina Gorazde	Gorazde	Drina	63.6 MW	€ 92.2	Start 2011
HPP Krusevo	Olovo	Biostica	11.9 MW	€ 46.6	Start 2012
HPP Unac	Martin D.	Una	73.6 MW	€ 87	/
HPP Vrh Polje	Sanski M.	Sana	79.4 MW	€ 151.8	Start 2012
HPP Caplje	Sanski M.	Sana	12 MW	€ 23	Start 2012
HPP Vinac	Jajce	Vrbas	11.5 MW	€ 25.1	Start 2012
HPP Babino Selo	Donji V.	Vrbas	11.5 MW	€ 22.1	Start 2012
HPP Han Skela	Jajce	Vrbas	12 MW	€ 29.5	Start 2013
HPP Ugar Usce	Jajce	Vrbas	11.6 MW	€ 12.87	Start 2014
HPP Vrletna Kosa	Jajce	Ugar	11.2 MW	€ 6.93	Start 2016
HPP Ivik	Jajce	Ugar	11.2 MW	€ 7	Start 2016
PS⁷⁹ Vrilo	Tomislav.	Suica	52 MW	€ 60.7	Start 2013
PS Kablic	Livno	Livanjsko	52 MW	€ 58.42	Start 2015
HPP Buk Bjela	Foca	Drina	115 MW	€ 140	Start 2015
HPP Foca	Foca	Drina	52 Mw	€ 55	Start 2015
HPP Paunci	Paunci	Drina	35 MW	€ 98	Start 2015
HPP Sutjeska	Sutjeska	Sutjeska	35 MW	€ 61	Start 2015
HPP Mrsovo	Mrsovo	Lim	44 MW	€ 92	Start 2015
HPP Rogacica	Rogacica	Drina	140 MW	€ 190	/
HPP Tegare	Tegare	Drina	126 MW	€ 215	/
HPP Dubravica	Dubravica	Drina	122 MW	€ 245	/
HPP Kozluk	Kozluk	Drina	93 MW	€ 210	/
HPP Drina I	/	Drina	93 MW	€ 155	/
HPP Drina II	/	Drina	93 MW	€ 171	/
HPP Drina III	/	Drina	93 MW	€ 198	/
HPP Bileca	Bileca	Trebisnica	33 MW	€ 48	/
HPP Nevesinje	Nevesinje	Trebisnica	60 MW	€ 100	/
HPP Dubrovnik 2	Trebinje	Trebisnica	2x152 MW	€ 175	/
HPP Krupa	Banja Luka	Vrbas	48 MW	€ 93	/
HPP Dabar	Bileca	Trebisnica	160 MW	€ 198	/
HPP Banja Luka	Banja Luka	Vrbas	37 MW	€ 71	/

⁷⁷ FIPA: http://www.fipa.gov.ba/projekti/FIPA_ENERGY_SECTOR_13.11.2012.pdf⁷⁸ HPP-Hydro Power Plants⁷⁹ PS-Pumped storage

These are just some of the most important projects that await potential investment. It is important for Bosnian legal institutions to have ready all necessary legal documents and studies in order to facilitate business issues to investors. When all these projects are implemented, and finally all of the above hydro and thermal power plants are in operation, then the utilization of the power sector will amount to 71.8%. It is easy to conclude that there is more capacity to be used in the future, but it is obvious that nothing can be finished in a short period. Although there is no department of energy at the state level, the entity governments are investing a lot of effort in promoting these projects around the world. In terms of success, it is important to mention a contract signed by government of the Republic of Srpska and RWE Company in 2012.⁸⁰ The Project "HES Gornja Drina" envisages the establishment of joint venture companies RWE and ERS (Elektroprivreda RS), with the ownership share of 60 percent compared to 40 in favor of the German partner. It is planned to build hydro power plants Buk Bijela, Foca, Paunci and Sutjeska with total installed power of about 260 MW and an annual production of 760 GWh of electricity.⁸¹ Meanwhile the government of the Federation of B&H has intensive negotiations with eastern partners such as Turkey, Saudi Arabia, Qatar and Kuwait.

7.2.4 Wind Power Potentials

Currently there are about 30 locations in the southern part of Bosnia, especially from the entrance to Herzegovina until the Croatian border; these sites represent the largest wind potential among the whole territory of Bosnia and Herzegovina. The potential of those locations is estimated at ca. 1300 MW while total wind potential is much higher and is estimated at 2000 MW (see table 10). Measurements taken in 2005 have shown that the average wind speed is about 9 m/s and therefore this part of Herzegovina is considered the most promising for the production of new wind farms.⁸² The main projects are planned in the area Livno, Kupres, Stolac, Tomislavgrad and Mostar. In addition to several private investors and developers who have succeeded in obtaining a building permit, wind farms are currently developed by national utilities like Elektroprivreda BiH and Elektroprivreda HZHB. The project of EPBiH lies on a plateau Podveležje near Mostar, while the project Mesihovina of EPHZHB is located near the Tomislavgrad town.

⁸⁰ RWE is a German electric company based in Essen dealing with electricity generation, distribution, etc.

⁸¹ Public Release Government of RS: <http://www.nezavisne.com/posao/privreda/RWE-investira-u-cetiri-hidroelektrane-na-Drini-160316.html>

⁸² FIPA: <http://www.fipa.gov.ba/doc/brosure/Energy%20sector.pdf>

In September 2012, construction of the first wind farm in the electricity production system of Elektroprivreda HZHB and Bosnia and Herzegovina finished but it is not yet connected to the entire electricity system.⁸³ In January 2013, an open competition for the selection of contractors to build a wind farm on Podveležje should occur. This is the largest project in Mostar, whose investment value is close to 62 million Euros. The contest will be open for 30 days, and then, after the selection of the best performers and the signing of contracts, official work will begin. It was agreed that by the end of 2013, two wind turbines will be finished and by the end of 2014, it is planned to complete the entire project.⁸⁴

Table 10: New Potential Wind Farms in Bosnia and Herzegovina⁸⁵

Location	Estimated Installed Power (MW)	Location	Estimated Installed Power (MW)
Mostar region		Duvno region	
Velika Vljajna	42	Ugrovaca	40
Jastrebnika	20	Duvanjsko Polje	70
Raska Gora	20	Livno region	
Kresica Gaj	20	Burova glava	30
Jasenjani	30	Cincar	30
Podveležje	180	Bihac region	
Plocno	20	two locations	50
Bahtijevica	30	Cvrsnica region	
Stolac Region		Plocno	20
Hrgud	20	Capljina region	
Dabarsko Polje	20	Hrasno	20
Kupres Region		Nevesinje region	
Debelo Brdo	30	Morine	150
Zlo Selo	30	Krusevljani	30
Suica	30	Grebak	30
Ravanska Vrata	30	Berkovici region	
Filipovica Polje	20	Gornja trusina	20
Glamoc region	30	Trebinje region	
Bosansko Grahovo		Popovo polje	60
Medeno Polje	30	Bjelasnica region	40

⁸³ Aljazeera Business News Balkan, <http://balkans.aljazeera.net/vijesti/vjetroelektrane-najveci-bh-projekt>

⁸⁴ Aljazeera Business News Balkan, <http://balkans.aljazeera.net/vijesti/vjetroelektrane-najveci-bh-projekt>

⁸⁵ Foreign Investment Promotion Agency of B&H (FIPA), Energy Sector, <http://www.fipa.gov.ba/doc/brosure/Energy%20sector.pdf>

According to latest research from Eurostat, 2011 was a record year for investment in renewable energy in the world. These investments were exceeded 260 billion dollars, a five percent increase compared to 2010, and nearly five times more than in 2004 with total investments of 53.6 billion dollars.⁸⁶

For now there is no action plan for the promotion of renewable energy sources or legislation at the B&H state level. The government of the Federation B&H in 2010 adopted the regulation on the use of renewable energy sources, but it has not yet implemented the law on renewable energy sources which is an important condition for entry into the European Union and its funds. On the other hand, in the Republic of Srpska there is only an ordinance for encouraging the production of electricity from renewable sources. No or low legislations are representing the major problem in attracting foreign investments. This is the reason why all these projects currently are or can be implemented only by national utilities.⁸⁷

7.2.5 Small HPP's Production Potentials

Small hydro power plants, besides solar energy, currently represent the most important source of renewable energy and their development should be a priority in defining strategic policy in this area. There are various estimates and studies of the potential for small HPP's and here are a few of these estimates that do not differ much among themselves. In a study of the company Elektroprivreda B&H, installed capacity of small HPP's is estimated at ca. 2600 GWH and total installed power at ca. 700 MW. It means that this power could be used to build over 800 small HPP's up to 5 MW. According to a study made by the Elektroprivreda RS, the potential power is ca. 1000 MW and ca. 3600 GWH, 2100 GWH would be available for FBiH and 1500 GWH for RS. Additionally, feasibility studies for 160 locations for small HPP's with anticipated capacities of ca. 125 MW and ca. 560 GWH has been completed. According to the law of concessions in FBiH, cantons are responsible for the issuance of the necessary permits for the construction of small HPP up to 5 MW and above 5 MW federal governments. Despite the significant potential for the construction of hydropower facilities, the extent of the use of hydropower in Bosnia and Herzegovina is still very low, less than 35 %.⁸⁸

⁸⁶ Aljazeera Business News Balkan, <http://balkans.aljazeera.net/vijesti/vjetroelektrane-najveci-bh-projekt>

⁸⁷ Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

⁸⁸ Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

7.2.6 Solar Energy Potentials

Bosnia and Herzegovina has approximately 1841 hours of sunshine per year, while the number of these hours in the southern part of the country reaches a value of up to 2353. The theoretical potential of solar energy amounts to 67 PWH, assuming that every day of the year in every square meter of the horizontal surface on average "fall" radiant energy of 3.6 KWh. This value exceeds total energy consumption in B&H. According to the current situation in Bosnia and Herzegovina, from the total available energy, solar radiation takes only a modest 3.3 GWH per year, mostly for domestic water heating.⁸⁹

Use of solar energy for thermal energy production is today one of the major trends in the world. Key benefits of these applications include: contribute to the conservation of natural resources, indirectly affects the reduction of CO2 emissions, available immediately, inexhaustible source of energy and create local jobs and stimulate the local economy.⁹⁰

In Bosnia and Herzegovina in the period up to 2020 there will be no significant application of solar energy to produce electricity, except for individual building low-power solar systems, and the same trend is expected for 2030 year. There are several limitations in this respect, and the basic ones are: the non-competitiveness of such facilities, and the area needed for their construction.⁹¹

⁸⁹ Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

⁹⁰ Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

⁹¹ Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

Gas Sector



92

⁹² Data Source: Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

7.3 Gas Sector

7.3.1 Characteristics of the gas sector in EU and B&H

Natural gas has the greatest increase in primary energy consumption in the EU 27. Its use dates back to the 1950s, but as a secondary energy product in the exploitation of oil reservoirs. The possibility of direct use by end users within the distribution system have made it a fuel that is used in all sectors, for example, heating, electricity production, transport etc. From total gas consumption in 2010 in the EU 27 gas is used 35 % in industry, around 28 % in electricity production and the rest for residential consumption. Natural gas consumption in the period from 2000 to 2010 had an annual average increase of 5.9 %. Such a significant increase is a consequence of its enormous use for electricity production, as well as for commercial, residential and industrial consumption. About 73% of world reserves are located in the former Soviet Union Republics, mostly in the Russian Federation and in the Middle East.⁹³

Bosnia and Herzegovina did not yet discover its gas deposits; consequently gas supply depends exclusively on imports. Transport of gas to end customers in Bosnia and Herzegovina is made through a gas pipeline transport system from the Russian Federation to the place Beregovo; border between Ukraine and Hungary, the Hungarian gas transport system continues to Horgos on the border with Serbia, and continues to transport gas system from Serbia to Zvornik, where the transceiver measurement station take place for Bosnia and Herzegovina. The total length of the gas transmission system to the border of Bosnia and Herzegovina is around 640 km. Current gas transport capacity through existing gas pipelines is around 750 million cubic meters in a year. Bosnia and Herzegovina has long-term transportation capacity contracts with foreign partners; MOL until 2018 and Srbijagas until 2017.⁹⁴ The gas transportation system of B&H consists of two lines, the first one built in the direction Zvornik – Sarajevo, started operation in the early 1980s. The second gas pipeline route is Sarajevo-Zenica, built in 1984. It is important to mention that the gas system from Zenica to Sarajevo only serves gas to industrial plants, not residential consumption.⁹⁵

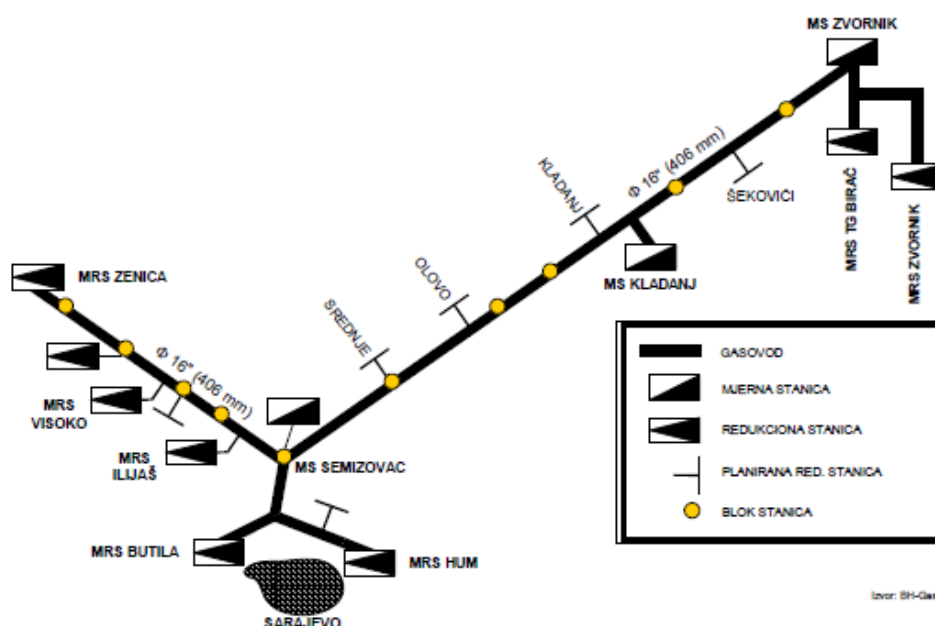
⁹³ Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

⁹⁴ Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

⁹⁵ World Bank: Natural Gas, http://www.eihp.hr/bh-study/files/final_e/m10_fr.pdf

The total length of the transmission system is ca. 191 km of which 131 km is in the territory of the Federation of Bosnia and Herzegovina, owned by BH-Gas Company and ca. 60 km in the territory of the Republic of Srpska owned by companies; Sarajevogas Lukavica and Gaspromet – Pale. Gas transport to end customers in Bosnia is provided by four national gas utilities; BH Gas Sarajevo, Sarajevo Gas, Slavija gas Lukavica and Gaspromet Pale.⁹⁶

Figure 11: Currently B&H gas transmission network⁹⁷



Gas consumption

Gas distribution and consumption in Bosnia is quite low in comparison with neighboring countries. The reason for the poor usage of natural gas is because the country is still in the post-war period and the process of reconstruction and recovery of the gas sector is long. In 2011, 202 544 000 Sm³ of natural gas was consumed; most natural gas is used in the industry with a share of 58 %. The two largest industrial consumers of gas are Metal Steel Zenica and Birac Zvornik. After industry, comes residential consumption (households) with a share of 26 % and finally other consumers (energy transformation etc.) with a share of 16 %.⁹⁸

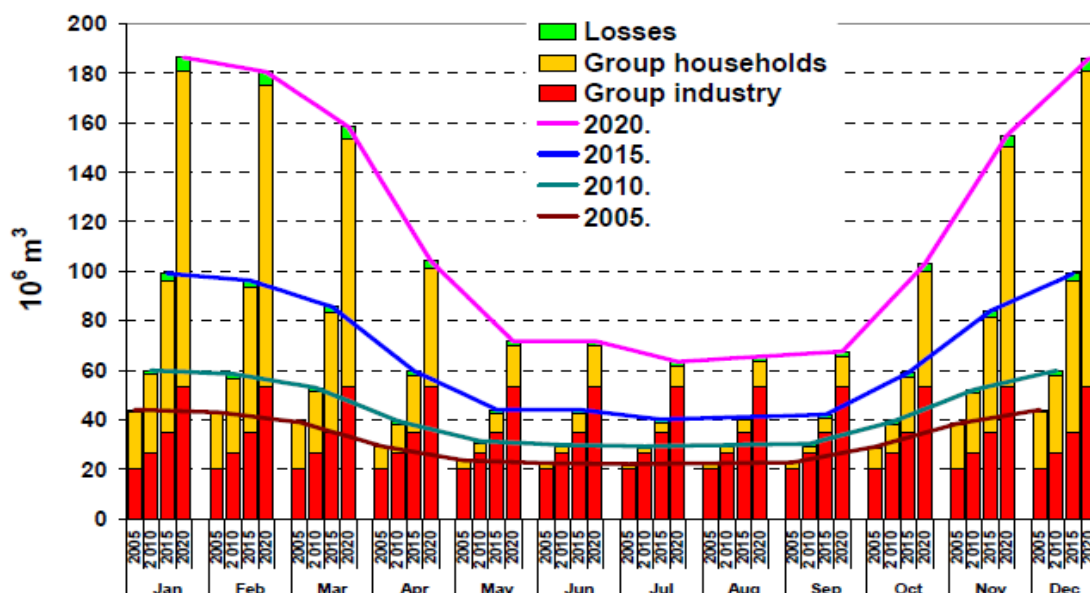
⁹⁶ World Bank : Study of Energy sector in Bosnia and Herzegovina, Natural Gas, http://www.eihp.hr/bh-study/files/final_e/m10_fr.pdf

⁹⁷ World Bank : Study of Energy sector in Bosnia and Herzegovina, Natural Gas, http://www.eihp.hr/bh-study/files/final_e/m10_fr.pdf , BH GAS national gas company, <http://www.bh-gas.ba>

⁹⁸ B&H Agency for Statistics, http://www.bhas.ba/saopstenja/2012/EPP_2011G01_001_01_BA.pdf

Seasonal changes have a major impact on gas demand and prices. Winter consumption is extremely high and for satisfying their needs is necessary to provide additional transportation capacities to the end users in Bosnia and Herzegovina. On the other hand, summer needs are below average annual needs, with monthly and daily imbalances, and around 50% lower than winter needs. The amount of gas to align seasonal fluctuations winter-summer is 32% of the total annual amount. Until 2020, gas consumption is expected to be much higher due to the development of the state's economy and integration in the EU (see figure 12). Household consumption in particular is going to increase due to an extension plan of gas the transport network to the region Banja Luka, Mostar and Tuzla.⁹⁹

Figure 12: Seasonal consumption in B&H Gas Sector¹⁰⁰



Unfortunately Bosnia depends on its Russian suppliers and there is almost no influence on the gas prices. This is most felt in the winter months when higher demand for gas occur and gas supplier require higher prices knowing that the Bosnian gas sector is poor and helpless, and everything works on the principle of "leave or pay it." Gas prices for households are regulated by national gas utilities, whereas industry gas prices are approved by Entity ministries.¹⁰¹

⁹⁹ Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

¹⁰⁰ World Bank : Study of Energy sector in Bosnia and Herzegovina, Natural Gas, http://www.eihp.hr/bh-study/files/final_e/m10_fr.pdf

¹⁰¹ World Bank : Study of Energy sector in Bosnia and Herzegovina, Natural Gas, http://www.eihp.hr/bh-study/files/final_e/m10_fr.pdf

Gas Supply

One of the biggest challenges of this century is to satisfy the needs for energy consumption and environmental protection. Gas, as a fossil fuel, has a big role in meeting these challenges. In comparison to other fossil fuels, gas has the lowest emissions of pollution. Because of this, the EU and its energy institutions tend to promote gas as green energy production and demand from new potential member states to develop their gas pipeline network, in order to become part of the European gas transportation network.¹⁰²

B&H is classified in the group of countries with low or no consumption of natural gas and with poor gas infrastructure. These facts lead to the conclusion that B&H must urgently develop an action plan to reform the gas sector, develop appropriate laws and regulations, to ensure that at all levels of B&H authorities, appropriate institutions responsible for the preparation and implementation of reforms in this sector will be established. The primary goal is to build a new gas transport system to the western, southern and eastern part of Bosnia and Herzegovina. In order to start the construction and expansion of the gas network, it is necessary to have a Gas Law at the state level. The Gas Law at the state level is of great importance because basically B&H will with this document meet all necessary obligations in the framework of the Energy Community. The organization and regulation of the gas sector, as already mentioned needs to follow the ultimate goal of creating the best conditions and frameworks for the efficient operation of all participants in the gas sector, especially with new potential suppliers, transport operators and distribution systems.¹⁰³

The construction of the new gas pipelines is a major priority for the B&H gas sector in the following 10-20 years. Since there is no law on the gas sector at the state level, entities are responsible for the implementation of projects and the approval of concession contracts. Heating systems in cities like Banja Luka, Tuzla, Zenica, Mostar and Bihac, after the war, had been destroyed and their restoration is still not carried out. The construction of new gas pipelines will not only solve the issue of heating systems in these cities, but will contribute to the global development of gas sector and state's economy.¹⁰⁴

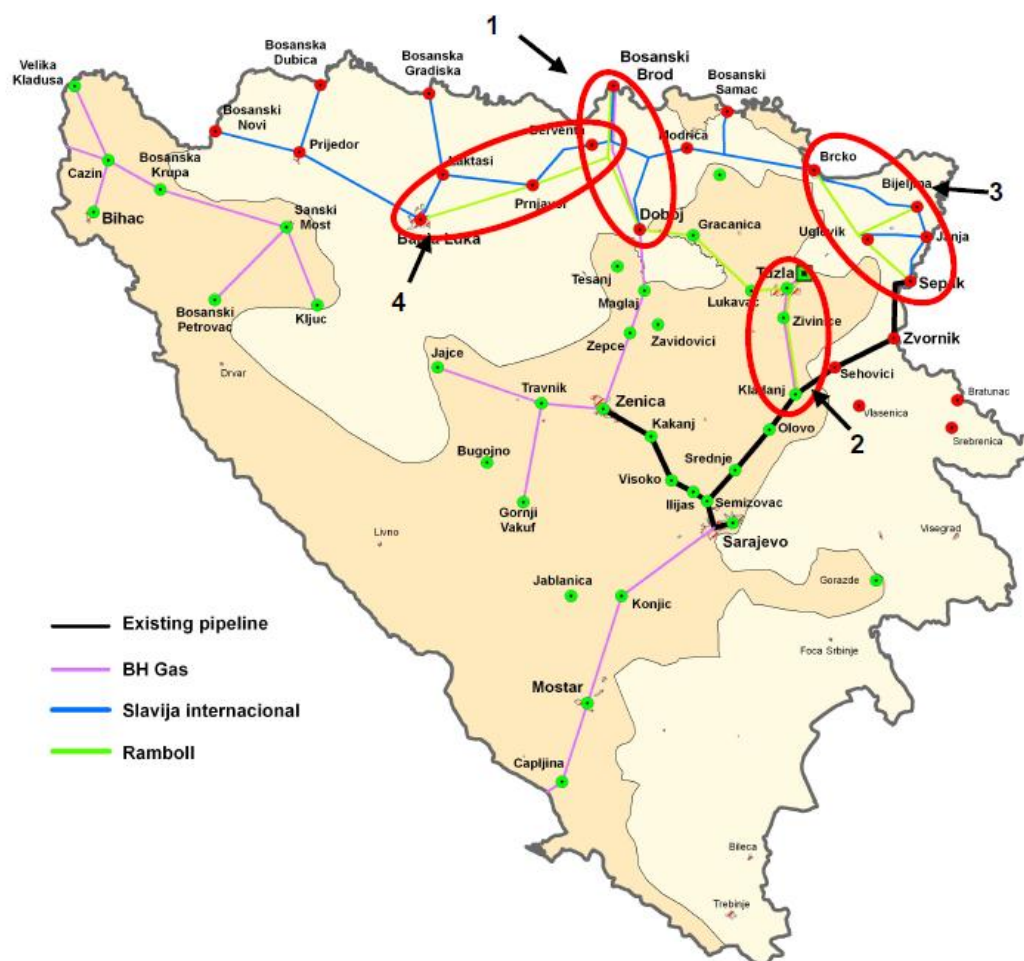
¹⁰² World Bank : Study of Energy sector in Bosnia and Herzegovina, Natural Gas, http://www.eihp.hr/bh-study/files/final_e/m10_fr.pdf

¹⁰³ Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

¹⁰⁴ Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

The most important study for the development of the natural gas sector has been done by Danish company Ramboll, supported by the World Bank. The other two studies have been done by the companies BH Gas Sarajevo and Slavija International (since 2002 concessionaire with the government of Republika Srpska). The Ramboll study predicts development of new gas networks to Croatia, via Tuzla toward Brcko and Bijeljina (see Figure 13). The ideal scenario would be the further construction of the gas pipeline via Doboj toward Banja Luka. Slavija International concentrated its study exclusively on the territory of the Republika Srpska, the pipeline would go from Bijeljina via Banja Luka, to the Novi Grad at the border with Croatia. In this project the gas supplier stays same; from Russia via Srbija Gas.¹⁰⁵

Figure 13: Development of new B&H gas transport networks, all studies¹⁰⁶



¹⁰⁵ World Bank : Study of Energy sector in Bosnia and Herzegovina, Natural Gas, http://www.eihp.hr/bh-study/files/final_e/m10_fr.pdf

¹⁰⁶ World Bank : Study of Energy sector in Bosnia and Herzegovina, Natural Gas, http://www.eihp.hr/bh-study/files/final_e/m10_fr.pdf

The Project BH Gas Sarajevo is more complex and is similar to the study by Ramboll. In the first phase, it is planned to build a pipeline Zenica-Bosanski Brod, in this case, imports of natural gas from Italy via Croatia would be feasible. The second phase is from Sarajevo towards the Adriatic Sea - Port Ploče and also imports via Croatia. The third phase of construction is gas pipeline extension from Zenica to Travnik and the region central Bosnia. The last phase includes the supply of natural gas to the western part of B&H, toward Bihac, Velika Kladusa and Ključ. The red circles show the overlapping of gas pipelines in all three studies.¹⁰⁷

The total required investments to develop new gas pipelines are estimated at ca. 510 million Euros. There already exist priorities in the building of B&H new gas pipelines; it is construction of the section Bosanski Brod-Zenica and Sarajevo-Ploče in order to reduce dependence from eastern suppliers. Unfortunately, none of these projects have started due to lack of investment. Although Slavija International, 11 years ago, has signed a concession agreement with the government of RS, work has not yet started. In the near future it is expected to adopt all necessary legislation at the level of B&H in order to facilitate access to serious investors for further development of the B&H Gas sector.¹⁰⁸

¹⁰⁷ World Bank : Study of Energy sector in Bosnia and Herzegovina, Natural Gas, http://www.eihp.hr/bh-study/files/final_e/m10_fr.pdf

¹⁰⁸ World Bank : Study of Energy sector in Bosnia and Herzegovina, Natural Gas, http://www.eihp.hr/bh-study/files/final_e/m10_fr.pdf

Oil Sector



109

¹⁰⁹ Data Source: Federal Ministry of Energy, Mining And Industry : Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

7.4 Oil Sector

7.4.1 Characteristics of B&H Oil Sector

Oil is considered as the most demanded fuel in the global energy market. It is already known that today's modern World has a problem with its energy supply in the future. Oil is a non-renewable source of energy and therefore there is a high level of fear for its disappearance in the future. Thousands of studies have been done that predict the disappearance of oil between 2050 and 2070 year. Already we have witnessed a reduction of oil supply, and prices increase of at least 2.5 % each year as a result of increasing oil demand. Alternatives to oil consumption are researched and analyzed in the last several years but unfortunately, there are still no 100 % corresponding results. The oil market is influenced by many global policy changes, so that any new war or violence in the countries near petroleum facilities increases oil prices. For this reason it is important that each country has a strong state oil policy and long-term vision of the development of this sector.¹¹⁰

Bosnia and Herzegovina has a significant capacity for manufacturing and processing crude oil, modern technological capabilities, long term experience in the processing of crude oil and production of oil and greases. In addition, based on current research, the potential geological oil reserves are determined and estimated at about 50 million tons. The utilization of these determined reserves is very low, mostly because the project realization was stopped due to war activities. Despite of all these benefits that Bosnia and Herzegovina owns to develop its oil industry as part of the energy sector, it still imports over 90% of petroleum products.¹¹¹ Bosnia does not have its own oil wells but there exist two national oil utilities; oil refinery in Bosanski Brod with production capacity of 4.3 million tons of oil in a year and a refinery in Modrica. The refinery in Modrica is mostly specialized for the production of greases. Crude oil in Bosnia is purchased in tankers, via Croatia, to refinery in Bosanski Brod. One part is imported by railway, via the Port of Ploče in Croatia, and one part by the river Sava. Until 1990, the procurement and distribution of oil were performed by Energopetrol Sarajevo with a market share of about 75%, and the INA Zagreb with its market share of 25%.¹¹²

¹¹⁰ World Bank : Study of Energy sector in Bosnia and Herzegovina, Petroleum, http://www.eihp.hr/bh-study/files/final_e/m11_fr.pdf

¹¹¹ Federal Ministry of Energy, Mining And Industry : Strategic and Development Plan of the energy sector in Federation of BiH, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

¹¹² World Bank : Study of Energy sector in Bosnia and Herzegovina, Petroleum, http://www.eihp.hr/bh-study/files/final_e/m11_fr.pdf

After 1990, a law to open the gas market and to allow independent business was adopted. After adoption of this law, began the intensive construction of private petrol stations. This has mostly led to competitiveness in the oil market but also to uncontrolled development of new petrol stations. Before the war, the need for oil in Bosnia amounted to 1.5 million tons per year, and the state companies with its own 221 petrol stations were able to meet the needs of all consumers. Today in B&H exist over 900 petrol stations, which is 4-5 times more than the pre-war period, although the population is reduced due to the war. This all speaks about non-organization of the oil sector in Bosnia and its urgent need for progress and development.¹¹³

Consumption of Oil Products

The consumption of oil (petroleum) products amounted to 20 % of total energy consumption.¹¹⁴ In the table below can be seen the total consumption of oil products from 2000 to 2005 and in 2010. In the first period, it is visible a stagnation or even a slight decline, whereas in 2010 an increase of 35 % compared to 2005. This is due to increase in number of private cars and development of freight traffic.

Table 11: Consumption of Oil products in period 2000-2005 and in 2010 (1000 t)¹¹⁵

	2000	2001	2002	2003	2005	2010
LPG	16.5	15.6	18.6	23.4	28.7	44.2
Motor Gasoline	328	316	271	264	270	310.5
Kerosene type	9.5	8	8.2	7.3	5.3	6.7
Diesel Oil	423	414	407	452	513	668.9
Light fuel Oil	157	170	147	113	111	162.8
Fuel Oil	216	191	167	128	119	194.9
Bitumen	50	47	56	66	77	85.1
Greases	11	10	13	14	17	6.2
Other	2	1	0,9	1,2	20	89
Total	1213	1172.6	1088.7	1068.9	1161	1568.2

The total consumption of all oil products listed in table 11 can be observed as consumption in segments like traffic, industry, agriculture, services and households. Most of these products

¹¹³ Federal Ministry of Energy, Mining And Industry : Strategic and Development Plan of the energy sector in Federation of BiH, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

¹¹⁴ World Bank : Study of Energy sector in Bosnia and Herzegovina, Petroleum, http://www.eihp.hr/bh-study/files/final_e/m11_fr.pdf

¹¹⁵ World Bank : Study of Energy sector in Bosnia and Herzegovina, Petroleum, http://www.eihp.hr/bh-study/files/final_e/m11_fr.pdf

are consumed in traffic with a share of 70 %, second and third ranked are industry with 12 % and households with 10 %, and finally other consumers (agriculture 8 % and services 2 %).¹¹⁷ The most potential for further growth is estimated in the traffic segment. Although there is a trend of electricity production and consumption from renewable energy resources, oil demand is going to remain high due to the enormous growth of traffic, especially the consumption of diesel and fuel oil. Total estimated consumption of oil products in 2020 will be doubled compared to 2005. The B&H oil sector has capacity to produce around 4.3 million tons/year of oil and should not be concerned about forecasted oil consumption in 2020.¹¹⁶

Table 12: Forecast for oil products consumption in 2015 and 2020 (1000 t)¹¹⁷

	2015	2020
LPG	62.9	80.9
Motor Gasoline	338.8	364.8
Kerosene type	8.5	10.6
Diesel Oil	841.8	1029.8
Light fuel Oil	199.8	178
Fuel Oil	278.4	359.1
Bitumen	97.8	112.5
Greases	7.2	8.3
Other	100.4	122.7
Total	1935.5	2266.6

The World's oil reserves are considered to be very important for further oil production. Considering the instant trend of oil consumption in the world, current oil reserves can meet oil needs over the next 40-45 years.¹¹⁸ The biggest trends in the global oil sector represent exploration and exploitation of oil reserves. This trend exists since 1973; and the time of the world's first energy crisis also known as the Oil crisis. During the oil crisis, oil prices increased by up to five times and it was one of the crucial reasons to start oil exploration around the World and in Bosnia as well. Company Energoinvest Sarajevo signed a 10 years - concession contract with refinery Bosanski Brod in order to begin oil and gas exploration in B&H. The period between 1963 and 1990 is considered to be the crucial period in the exploration of oil. Many researchers and projects have been carried out but the two most

¹¹⁶ World Bank : Study of Energy sector in Bosnia and Herzegovina, Petroleum, http://www.eihp.hr/bh-study/files/final_e/m11_fr.pdf

¹¹⁷ World Bank : Study of Energy sector in Bosnia and Herzegovina, Petroleum, http://www.eihp.hr/bh-study/files/final_e/m11_fr.pdf

¹¹⁸ World Bank : Study of Energy sector in Bosnia and Herzegovina, Petroleum, http://www.eihp.hr/bh-study/files/final_e/m11_fr.pdf

successful were: project Northern Bosnia and project Dinaridi. Project Northern Bosnia consisted of territory from Drina River in the east to the River Una in the west and the River Sava in the north with total area of 12000 km². After years of research, four locations with significant oil reserves have been discovered: Bosanski Samac area - with its estimated oil reserves of 9.2 million tons, Orasje area- between 6.1 and 15 million tons of estimated oil reserves, in Tuzla area estimated oil reserves totaled 14.3 million tons and Lopare area with total oil reserves estimated to 11.9 million tons.¹¹⁹ These four locations present the most promising locations for Oil exploration in Bosnia. Project Dinaridi was placed in central and southern Bosnia near to cities Zenica and Sarajevo but this project was stopped due to the war in 1992. Approximately 150 million US dollars were invested in Bosnia in oil exploration. Further research and development of these areas did not continue after the war due to lack of investments. Entity governments are considering the possibility of granting concessions to foreign investors, as the most widely used form of financing in the energy sector. High oil demand and prices around the world represent an opportunity to foreign and domestic investors for further investments in exploration of B&H oil reserves.¹²⁰

There are some crucial examples of successful cooperation between the B&H governance and foreign partners in energy sector. The following list presents the top five foreign companies with total investments of 15 million Euros in the B&H oil sector:¹²¹

- ❖ Company PETROL from Slovenia
- ❖ Company NEFTEGAUINKOR from Russia
- ❖ Consortium MOL/INA from Hungary/Croatia
- ❖ EFT (Holdings) APS KOPENHAGEN from Denmark
- ❖ Company MESSER GRESHEIM H. from Germany

¹¹⁹ World Bank : Study of Energy sector in Bosnia and Herzegovina, Petroleum, http://www.eihp.hr/bh-study/files/final_e/m11_fr.pdf

¹²⁰ World Bank : Study of Energy sector in Bosnia and Herzegovina, Petroleum, http://www.eihp.hr/bh-study/files/final_e/m11_fr.pdf

¹²¹ Foreign Investment Promotion Agency of B&H (FIPA):<http://www.fipa.gov.ba/doc/brosure/Energy%20sector.pdf>, Ministry of Foreign Trade and Economic relations of B&H, <http://www.mvteo.gov.ba>

8 Investment and Financing options



122

¹²² Google Images: Investment; <http://www.mergersandinquisitions.com/2010-investment-banking-analyst-bonus-predictions/>, http://www.123rf.com/photo_15995937_abstract-word-cloud-for-return-on-investment-with-related-tags-and-terms.html

8.1 General conditions for FDI in a state

The main objective of a country, in order to attract FDIs, is to establish a good investment climate. An optimal investment climate includes many factors that affect investor's decisions. Some of these crucial factors are listed below:¹²³

- ❖ State's institutional capacity to give legal support to foreign investors in achieving their own business goals. This refers to the adoption of rational laws in order to facilitate access to national and international markets, international funds. By signing joint venture or concession agreements, each state must have capacity to guarantee the fulfillment of its contract obligations. It is important that the country has all characteristics of the legal state.
- ❖ A political and social stability; this issue presents one of the highest risks in obtaining foreign direct investment. Areas subjected to conflicts and wars have always been characterized as politically unstable. Unfortunately political instability leads to unequal social policy.
- ❖ Economic stability; It can be seen by observing the economic development of the state; especially the state's GDP and GDP per capita, state's credit rating, membership in economic unions and communities, unemployment rate, national currency, dynamics of previous investments, etc.
- ❖ Favorable tax rates; Low taxes are an important factor in attracting investors. It automatically brings higher return of investments and profits. Beside the favorable tax rates, an amount of custom's fees is crucial. Custom and financial policies must be unique in order to provide best services for potential investors.
- ❖ Necessary infrastructure:
 - Traffic infrastructure (streets, railways, highways, air traffic, airports, sea shipping, sea ports etc),

¹²³ Mag. Habiba Ramic, „Risiken von ausländischen Investitionen in Bosnien und Herzegowina“
www.othes.univie.ac.at/4286/1/2009-03-25_0103383.pdf

- Telecommunication infrastructure (phone and mobile network lines, the Internet etc.),
 - Technical infrastructure (water systems, drinking water supply, disposal waste, energy supply (gas, electro-energy and oil supply) etc.)
 - Social infrastructure (Educational facilities (Schools, Universities, libraries etc), Health care facilities (Hospitals, Emergency medical service etc.), Cultural facilities (Museums, Theatres, Cinemas etc.) and Public help facilities (Police, Fire department etc.))
- ❖ Responsible and qualified labor: Quality and cheap labor represent the key factors in obtaining FDI. Among all company's costs, labor costs mostly have the highest share. Because of this fact it is important to have and to invest in qualified labor. Countries with qualified and cheap labor will always be at an advantage. This has been proven in the example of China, where thousands of companies settled their business.

8.2 Investment plan in B&H energy sector

Economic development can't be imagined without the necessary investment, and this refers to companies as well as states. The intention of each investor is to realize its investment business plan and profit margins. The state must have a plan and a program to attract foreign investment, which means that they must offer fair conditions and benefits and ensure institutional and legal support. B&H in the previous period did much to attract foreign investment, as a result of this; contracts with foreign partners were signed, particularly in the power and oil sectors. The problem is that the whole process of investing in Bosnia is long and sluggish, from the basic idea of construction to the start of production. The jurisdictions of the energy sector have not yet been defined so that each entity has its own methods of attracting and supporting investors.¹²⁴ Simply B&H does not yet have 100% unique institutional capacity that could serve investor's needs and wishes. Currently one of the main conditions for EU accession is solving the problem of coordination in the B&H authority. When all jurisdictions at each level of authority are finally known, B&H will move faster toward its investments and economic development.¹²⁵

¹²⁴ Federal Ministry of Energy, Mining And Industry: Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

¹²⁵ World Bank: Investment plan and financing options, http://www.eihp.hr/bh-study/files/final_e/m14_fr.pdf

An investment plan in the energy sector is a result of cooperation between B&H national energy utilities and potential investors. A more detailed overview can be seen in table 13 including all energy subsectors. This investment plan was completed in 2007, and it was planned to start investments in the same year, but due to the complex policy system, economic instability and low FDIs, everything works so slowly.¹²⁶ For this reason the beginning of the realization of this investment plan is postponed to 2013 or 2014. In the meantime, some investment in the power sector was completed, especially in the field of small hydro power plants where small investments are required. The realization and implementation of large projects, which could activate fast development of B&H energy sector, is still waiting.

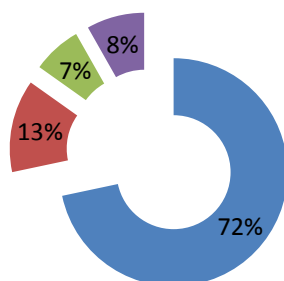
Table 13: Investment Plan in B&H energy sector (Mio €)¹²⁷

Energy sub-sectors	2011-2015	2016-2020	Total Investments	Share
Power sector	2360	1697	4057	71.67%
Coal sector	402	343	745	13.16%
Gas sector	200	194	394	6.96%
Oil sector	323	142	465	8.21%
Total Investments	3285	2376	5661	100.00%

The largest share in the structure of investment in the B&H energy sector is evident in the power sector with 71.67 %, followed by coal sector with 13.16 %, oil sector with 8.21 % and gas sector with 6.96 %. The level of investments in the first period is higher; the more the time passes the greater the decline in level of investment.

Figure 14: Structure of investments in B&H energy sector¹²⁷

■ Power sector ■ Coal sector ■ Gas sector ■ Oil Sector



¹²⁶ World Bank : Study of Energy sector in Bosnia and Herzegovina, Investment plan and financing Options, http://www.eihp.hr/bh-study/files/final_e/m14_fr.pdf

¹²⁷ Foreign Trade Chamber of Bosnia and Herzegovina, <http://www.komorabih.ba/eng/>, World Bank: Investment plan and financing Options, http://www.eihp.hr/bh-study/files/final_e/m14_fr.pdf

Due to its rich water resources and coal deposits, the most potential has been seen in the development of the power sector with a total 4057 million Euros of required investments. Because the production of energy from renewable energy sources is clean, most investment is expected in the construction of new hydro power plants. The development plan in Bosnian power sector includes:¹²⁸

- ❖ Construction of new HPPs with total power of ca. 2000 MW (see table 8)
- ❖ Construction of new TPPs with total power of ca. 3100 MW (see table 9)
- ❖ Revitalization of old TPPs
- ❖ Construction of new Wind farms with total power of ca. 1300 MW (see table 10)
- ❖ Construction of new small HPPs
- ❖ Renovation and construction of power lines and transformer stations
- ❖ Use of low emission technologies
- ❖ Development of transmission networks

The production of electricity in TPPs requires huge quantities of lignite and brown coal. The primary goal in the construction of new TPPs should be the parallel exploration of new coal reserves. Bosnia and Herzegovina has large coal reserves but currently capacity could not serve new potential TPPs. Total estimated investment in the coal sector amounted to 745 million Euros. Coal sector development planning includes:¹²⁹

- ❖ Opening of new mine surfaces
- ❖ Revitalization of existing mines
- ❖ Use of low emission technologies
- ❖ Improve labor safety

The B&H gas sector and its gas infrastructure are very poor. Demand for gas as an energy element is enormous due to its availability, distribution and cleanliness. The main objectives of the B&H gas sector are the construction of new pipelines and seeking a new gas supplier in order to reduce gas dependence on Russia via Serbia. New potential gas suppliers could be from Italy via Croatia. For realization of these objectives; 394 million Euro of new investments are required. Construction of new gas pipelines includes distribution of gas to the following cities:¹³⁰

¹²⁸ World Bank : Investment plan and financing Options, http://www.eihp.hr/bh-study/files/final_e/m14_fr.pdf

¹²⁹ World Bank : Investment plan and financing Options, http://www.eihp.hr/bh-study/files/final_e/m14_fr.pdf

¹³⁰ World Bank : Investment plan and financing Options, http://www.eihp.hr/bh-study/files/final_e/m14_fr.pdf

- ❖ Bosanski Brod- Zenica- Travnik
- ❖ Kladanj- Tuzla
- ❖ Sepak- Bjeljina
- ❖ Sarajevo- Mostar- Ploce Port
- ❖ Kljuc- Bihac- Cazin- V.Kladusa- Bosanska Krupa
- ❖ Bjeljina- Brcko- Modrica-Derventa- Banja Luka- Prijedor

Bosnia and Herzegovina is considered as a country in the process of development. Through this development demand for energy is constantly increasing. One crucial example has been seen in the oil sector where demand for diesel oil in 2010, compared to 2005, increased to 35 %. Currently oil production in B&H refineries exceeds the total oil needs so there is an export potential to neighboring countries. Necessary investments in this sector total 465 million Euros. The development plan in the Bosnian oil sector primarily includes:¹³¹

- ❖ Modernization of existing oil refineries in Bosanski Brod and Modrica
- ❖ Construction of new railways in B&H in order to improve oil distribution
- ❖ Construction of oil storage terminals

8.3 Financing Options in B&H energy sector

In the design and implementation of major projects in the energy sector, a key factor is to determine the manner and sources of financing. There are different sources of financing; own funds from generated profits, by selling own assets or by granting rights to use - Concessions. Besides these sources of financing there are also financial categories such as internal financing (own capital) and external financing (credits, loans, etc.) The terms and financing structures are divided into short, medium and long term. Generally in the development and investment of energy sector, long term is preferred. Whether it is private or public equity, different methods are determined to secure the necessary capital for the investment projects. In addition, there is the possibility to apply for approval of aid from the European Union investment funds and the specialized institutions that offer these types of services.¹³²

¹³¹ World Bank : Study of Energy sector in Bosnia and Herzegovina, Investment plan and financing Options, http://www.eihp.hr/bh-study/files/final_e/m14_fr.pdf

¹³² Federal Ministry of Energy, Mining And Industry : Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

No matter what kind of financial sources will be taken in consideration, investors must take care about the following issues: project implementing period, amount of funds, risk, interest rate, discount rate, rate of return on investment, profitability, etc. There is no universal model for financing of constructions and operations of power generation facilities that are optimal for all situations. To build the ideal model for financing, it is necessary to consider the economic, technological, environmental, weather, and ownership barriers. When all of these barriers are crossed, optimization of financial options can be implemented.¹³³

Authority in B&H has offered several investment-financing models and some of them are listed below:¹³⁴

❖ MODEL 1:

B&H national energy utilities are acting as the sole owners of projects and investors. In this case it is possible to use own funds generated from company profits or lines of credit from financial institutions, commercial banks, the European Union investment funds. This model should be used for small projects within the existing thermal and hydropower plants.

❖ MODEL 2:

This model includes an establishment of a Joint Venture between a B&H national utility and foreign strategic partners. In this case, new joint venture company will be formed with share of 50:50 %; the foreign partner is responsible to secure the funding, permits, licenses and concessions in coordination with the B&H national Company. This model is exclusively used for long-term projects with large investments such as construction of new thermal power plants, new hydro power plants and rehabilitation of existing mines. The sub-model in model 2 would be “granting a concession” for small projects. In such projects, it is not necessary to establish a new joint venture company but foreign partners must secure all required funding, permits and licenses. This sub-model provides concession contracts for the construction of new mini hydro power plants and new wind farms. Using concession model, B&H authorities keep ownership of energy resources and allow their use in period of 12-15 years.

¹³³ Federal Ministry of Energy, Mining And Industry : Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

¹³⁴ Federal Ministry of Energy, Mining And Industry : Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

❖ MODEL 3:

This model represents a partnership of the private and public sector. (PPP - Public Private Partnership). The goal of this partnership is to involve the private sector in the implementation of public works and investments. The private sector is responsible for the maintenance and management of potential energy facilities. In addition, the private sector has an opportunity to participate in the design, research, construction preparation, construction and development of new energy plants.

Beside these three models, there are also some investor specific models dealing with mathematical optimization. In such models, investor looks for the optimal solution taking into account his wishes and national interests. The objective function will be determined under some constraints. The goal is either to minimize costs or maximize the profit (investor's intention). There are many constraints which affect the optimal solution; environment, technology, energy demand-supply, permits and licenses etc. (i.e. the national interest) This type of specific model can be negotiated with B&H national utilities in order to meet needs of both sides.¹³⁵

¹³⁵ Federal Ministry of Energy, Mining And Industry : Strategic and Development Plan of the energy sector in Federation of B&H, www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1

9 SWOT analysis of B&H energy sector

Strengths	Weaknesses
➤ Proven energy potential (hydro, coal, wind) ➤ Increasing energy demand in B&H ➤ High global demand for energy(in region) ➤ High export potential ➤ Stable economic environment ➤ Political support for Investment ➤ Low electricity prices ➤ Purchase guarantee for produced electricity	➤ Despite political willingness to attract Investment, weak institutional capacity ➤ No energy ministry at the state level ➤ Entity governments separately promote energy potentials (no unique policy) ➤ Due to non-unique policy-high level of corruption ➤ Poor traffic and transport infrastructure ➤ Slow administration
Opportunities	Threats
➤ Use global trend of elec. production from renewable energy sources ➤ Use low emission technologies ➤ Attract foreign Investment ➤ Integration into EU ➤ Use funds and favorable credits from EU ➤ Free trade agreements with EU countries is crucial ➤ Faster economy recovery ➤ Find political compromise for better political stability	➤ Continue of policy conflicts between entities about jurisdictions ➤ Weakening of integration into EU ➤ Political instability ➤ Poor use of proven potentials ➤ No fulfillment of international obligations ➤ Being unattractive market for foreign investments

10 Conclusion

Bosnia and Herzegovina is a developing country with the ultimate goal of joining the European Union and NATO. Membership in the European Union and NATO will improve the overall image of the country. The Process of joining to EU and NATO is quite complex and difficult. This applies to reforms at all levels of government, providing a better and more prosperous life to its citizens. The current political structure in B & H is a very composite and inefficient. Two republics in one state are “fighting” for its own jurisdiction and deliberately ignore the existence of the state Bosnia and Herzegovina and its institutions. The problem of political inefficiency at the level of Bosnia and Herzegovina can be felt in all areas including the energy sector. The state administration is slow and creates fragmentation, which includes two administrative levels in five different cities and one energy sector in each entity. This has caused problems in the implementation of reforms, organization, allocating funds, management of national companies, etc. Creating a unified energy sector at the level of B & H brings significant advantages in efficiency, coherence, credibility and investments; which would encourage donors and investors. The absence of this sector adversely affects the competitiveness of the country, consumers and industry.

Due to the existence of many administrative levels, corruption has increased. Corruption is the biggest cause of poor or no investment in the B&H economy. The European Union is ready to assist B&H in its further development, but will not solve the problems of local politicians. Political agony has lasted for 18 years and it is time that politicians put civic interests ahead of their own interests, otherwise Bosnia and Herzegovina and, its citizens will remain isolated. The positive thing for B & H is the existence of enormous energy potential. The greatest potential for the production of electricity has been seen in renewable energy sources. Current utilization of hydro potential is about 37 %, and that of wind potential 0 %. During the coal research and exploration, additional coal reserves were found in Central Bosnia, enabling greater supply of coal to thermal power plants. Taking into account advantages of energy resources, Bosnia and Herzegovina with a unique development plan and program of the energy sector could become a major supplier of electricity in the region. Due to poor living standards and low electricity prices, B&H energy sector itself is unable to finance further development. Because of these shortcomings, the only alternative for rapid economic progress of all sectors in Bosnia and Herzegovina is the integration into European Union and NATO.

11 References

- Authors of Study: Goran Granić (Team Leader), Mladen Zeljko (Electric Power expert), Idriz Moranjkić (Coal Sector expert), Jose Andres Martinez (Oil and Gas Sector Expert), Marisa Olano (Expert for Renewable Sources), Željko Jurić (Environmental Expert): **“Energy Sector Study in BIH”**, implemented by the Consortium of: Energy Institute Hrvoje Požar (Croatia), Soluziona (Spain), Economics Institute Banjaluka (BIH), Mining Institute Tuzla (BIH), This energy study consists of 17 books and one Summary book, in total 4.200 pages and it is funded by THE WORLD BANK, <http://www.eihp.hr/bh-study/index.htm>

Book 1: Energy Reserves, Production, Consumption and Trade, pp. 1-86

Book 2: Electricity Demand, pp. 1-101

Book 3: Power Generation, pp. 1-78

Book 5: Power Distribution, pp. 1-19, 67-134

Book 6: Power Sector Restructuring and Regulatory Framework, pp. 1-87

Book 8: Coal Mining, pp. 23-299

Book 10: Natural Gas, pp. 1-113

Book 11: Petroleum (Oil), pp. 1-88

Book 13: Environment, pp.1-78

Book14: Investment Plan and Financing Options, pp. 1-96

- Izet Smajevic PhD.BSc.M.E, Hilmo Sehovic MSc.BSc.E.E, Ahmet Basic PhD. BSc.Min.E, Srecko Vucina BSc.E.E, Nadzida Ninkovic BSc.M.E, Aleksandar Knezevic PhD.BSc.M.E, Semin Petrovic MSc.BSc.M.E, Elvir Cizmic PhD.BSc.Ec, Anes Kazagic PhD.BSc.M.E, Mirela Hadziomerovic-Sutovic BSc.M.E (2009): **“Strategic and Development Plan of the energy sector in Federation of B&H”**, Study of Energy sector concluded by above listed experts, pp. 1-377
www.fmeri.gov.ba/systems/file_download.ashx?pg=94&ver=1
- Doc.dr.sc. Admir Softić, Dr.sc. Ljubo Glamočić (2012): National background report on Energy for Bosnia and Herzegovina, Coordination of research policies with the western Balkan countries,
http://wbc-inco.net/attach/0_National_Background_Report_Energy_BiH_2012.pdf

- Economic commission for Europe; Committee on environmental policy (2004): Environmental Performance Reviews Bosnia and Herzegovina, Environmental Performance Reviews Series No.20, supported by UN-United Nations, pp.1-160
http://www.unece.org/fileadmin/DAM/env/epr/epr_studies/bosnia_and_herzegovina.pdf
- Foreign Investment Promotion Agency- FIPA (2011): “Bosnia and Herzegovina Energy Sector”, Annual Energy Release from Agency,
<http://fipa.gov.ba/doc/brosure/Energy%20sector.pdf>
- Joško Jenko, B.Sc. El. Eng (2007), “Power sector development”, Background Paper,
http://www.esiweb.org/pdf/bosnia_BIHPowerSectorDevBackgroundPaperCASEstudy.pdf
- Bosna i Hercegovina, Vlada Federacije B&H, Ministarstvo energije, rudarstva i industrije(2010): “Construction of power plants in federation of B&H-Priorities”
<http://www.fbihvlada.gov.ba/bosanski/izdvajamo/izgradnja.pdf>
- Center for Policy and Governance (2010): Izvještaj o politikama energetskeg sektora u Bosni i Hercegovini, www.cpu.org.ba/files/Energetski%20sektor.pdf
- Foreign Investment Promotion Agency- FIPA (2012): “New Projects in B&H energy sector”, Last Investment Release for foreign partners,
http://www.fipa.gov.ba/projekti/FIPA_ENERGY_SECTOR_13.11.2012.pdf
- Oktay Küçükkiremitçi, Ömür Genç, Mustafa Şimşek and Aykut Ekinci (2010): B&H energy sector report” Development Bank of Turkey, Directorate of Economic and Social Research, <http://www.sarajevobusinessforum.com/projects/ENERGY.pdf>
- Ing. Mag. Sigmund Nemeti (2011), „Bosnien und Herzegowina;Energie- und Umweltsektor“ Wirtschaftskammer Österreich WKÖ-AußenwirtschaftsCenter Sarajevo, <http://forumvelden.at/wp-content/uploads/2011/09/PPP-Nemeti-Sigmund-de.pdf>

- Uni Credit Group- Bank Austria (2007): “Investment Guide Bosnia and Herzegovina” Working Paper, http://www.bankaustria.at/informationpdfs/Investment-Guide-Bosnia_10-07.pdf
- Ismet Kamal, Paul Suchar, Daniel Radic(2009), „Investment in Bosnia and Herzegovina” Working Paper from KPMG B-H d.o.o.-cutting through complexity, <http://www.kpmg.com/ba/en/pages/default.aspx>
- Erika Bürkle, Dr. Markus Palenberg(2007): „Windenergieprojekt Windkraft Simonsfeld, Bosnien-Herzegowina“, Case Study from Global Public Policy Institute (GPPI),http://www.entwicklung.at/uploads/media/3_Fallstudie_Windenergie_Simonsfeld_BiH.pdf
- UN Economic Commission for Europe(2009), “Policy Reforms to Promote Energy Efficiency and Renewable Energy Investments in Bosnia and Herzegovina”, Seminar on Policy Reforms to Promote Energy Efficiency and Renewable Energy Investments, http://www.unece.org/fileadmin/DAM/energy/se/pp/adhoc/EE21_14_AHGE_Oct09/5_bh_poyry_pr_paolettil.pdf
- Euro Balkan Partner (2007): Investment opportunities in Bosnia and Herzegovina, Working Paper in cooperation with Foreign Investment Promotion Agency, <http://www.eurobalkanpartner.com/download/BiH/B&H,%20Foreign%20Investment%20Promotion.pdf>
- European Commission (2011): “Support to energy market liberalization”, Approximation of European Standards – Energy, Energy policy and administrative management,http://ec.europa.eu/enlargement/pdf/bosnia_and_herzegovina/ipa/2011/11_ipa_2011_energy_final.pdf
- Ana Rozić, (2009): University of Mostar, Faculty of law, Mostar, Bosnia and Herzegovina, Legal framework of Bosnia and Herzegovina, “Electricity market: is there place for Implementation of the third generations of EU Energy directives?”, Research Paper , <http://oliver.efri.hr/~euconf/2009/docs/session10/8%20Rozic.pdf>

- Mag. Habiba Ramic (2009), „Risiken von ausländischen Investitionen in Bosnien und Herzegowina“, Master thesis University Vienna, http://othes.univie.ac.at/4286/1/2009-03-25_0103383.pdf, pp.32-65
- Aljazeera Business Balkan (2012): „Vjetroelektrane - Najveći BH. Projekt” Business News Release, <http://balkans.aljazeera.net/vijesti/vjetroelektrane-najveci-bh-projekt>

1. Internet Links:

- www.bhas.ba -Agency for Statistics of BiH
- www.worldbank.org -The World Bank
- www.balkananalysis.com -Balkan Statistics
- www.cbbih.ba -Central Bank of BiH
- www.ec.europa.eu -European Commission
- www.imf.org -International Monetary Fund
- www.fipa.gov.ba -Foreign Investment promotion Agency of BiH
- www.komorabih.ba -Foreign Trade Chamber of BiH
- www.sarajevobusinessforum.com -Sarajevo business forum-energy sector
- www.mvteo.gov.ba -Ministry of Foreign Trade and Ec. Relations
- www.vijeceministara.gov.ba -The Council of Ministers of BIH
- www.fbihvlada.gov.ba -The Government of the Federation BiH
- www.balkanenergy.com -Balkan Energy
- www.vladars.net -The Government of RS
- www.energy-community.org -Energy Community
- www.fbihvlada.gov.ba -Fed. Ministry of Energy, Mining and Industry
- www.iea.org -International Energy Agency

12 Appendix

Abstract

Bosnia and Herzegovina has proven energy potential. This potential, in particular, is most evident in electricity production from renewable energy sources. The coal is second crucial fuel for electricity supply in the future. Exploration of new surface and underground mines secures electricity production from thermal power stations. In this thesis, the purpose was to provide crucial information, prospects and trends in B&H energy sector for foreign direct investment. The most important sectors such as: coal-, power-, oil- and gas sector were presented in detail. The chapter investment and financial options can directly influence the investor's decisions because a spectrum of possibilities for investment in B&H energy sector is obtained. Bosnian and Herzegovinian policy, due to its complexity and existing corruption, does not allow much inflow of foreign direct investment. The Integration in to NATO and European Union does not have an alternative because it contributes to rapid progress and development of a state. The energy sector in B&H with its strengths, weaknesses, opportunities and threats is briefly presented in chapter 9.

Zusammenfassung

Bosnien und Herzegowina ist ein Entwicklungsland mit dem Ziel des Beitritts zur Europäischen Union und der NATO. Die Mitgliedschaft in der Europäischen Union und der NATO trägt zur Verbesserung der allgemeinen Bild des Landes bei. Der Prozess des Beitritts zur EU und NATO ist sehr komplex und schwierig. Die aktuelle politische Struktur in Bosnien ist sehr aufwändig und ineffizient. Beide Republiken in einem Staat "kämpfen" für ihren Zuständigkeitsbereich und ignorieren absichtlich die Existenz des Staates Bosnien und Herzegowina und ihrer Institutionen. Das Problem der politischen Ineffizienz auf der Ebene von Bosnien und Herzegowina ist in allen Bereichen, einschließlich des Energiesektors zu spüren. Die staatliche Verwaltung ist langsam und schafft Fragmentierung, die zwei Ebenen der Verwaltung in fünf verschiedenen Städten, enthält. Erstellen eines einheitlichen Energiesektors auf der Ebene der B&H bringt erhebliche Vorteile in Effizienz, Kohärenz, Glaubwürdigkeit und Investitionen. Das Fehlen dieses Sektors beeinträchtigt die Wettbewerbsfähigkeit des Landes, der Verbraucher und der Industrie.

Aufgrund der Existenz von vielen administrativen Ebenen ist die Korruption erhöht. Korruption ist die häufigste Ursache für schlechte oder gar keine Investitionen in die B&H Wirtschaft. Die Europäische Union ist bereit, B&H in ihrer weiteren Entwicklung zu unterstützen, aber will keine Probleme der lokalen Politiker lösen. Politische Agonie dauert schon 15 Jahre und es ist Zeit, dass die Politiker bürgerlichen Interessen über ihre eigenen, setzen. Die positive Sache für Bosnien ist die Existenz von riesigem Energiepotenzial. Das größte Potenzial für die Erzeugung von Strom ist im Bereich der erneuerbaren Energien. Aktuelle Nutzung der Wasserkraft liegt bei etwa 37%, und dass von Windpotenzial bei 0%. Unter Berücksichtigung der Vorteile der Energieressourcen, Bosnien und Herzegowina konnte mit einer einzigartigem Entwicklungsplan und Programm im Energiesektor ein bedeutender Lieferant von Strom in der Region werden. Aufgrund der schlechten Lebensbedingungen und niedrige Strompreise, B&H Energiesektor ist selbst nicht in der Lage die weitere Entwicklung zu finanzieren. Aufgrund dieser Mängel, die einzige Alternative für einen schnellen wirtschaftlichen Fortschritt aller Sektoren in Bosnien und Herzegowina ist die Integration in die Europäische Union und die NATO.

Lebenslauf

Persönliche Daten:

Name: Beganovic Dzenan
Staatsangehörigkeit: bosnisch und herzegowinisch
Geburtsort: Zenica, Bosnien und Herzegowina
E-Mail: dzenanbeg@gmail.com

Schulbildung:

1999-2004 International School Sarajevo College (privates Gymnasium), B&H
2006-2011 Universität Wien, Betriebswirtschaftliches Studium- Bachelor,
Österreich
2011-2012 Universität Wien, Betriebswirtschaftliches Studium-Master,
Österreich

Sprachen:

Muttersprache: Bosnisch
Sehr gute Kenntnisse: Deutsch, English und Türkisch

EDV:

MS Office Kenntnisse (Word, Excel, PowerPoint usw.),
Datenbank SQL, Java, Internet Kenntnisse und Spss.