Bosnia and Herzegovina
J.P. Elektroprivreda Bosne i Hercegovine

Bosnia and Herzegovina
Preparatory Survey on
Tuzla Coal-fired Power Plant Project
(PPP Infrastructure Project)
Interim Report

December 2014

Japan International Cooperation Agency (JICA)

MITSUBISHI HITACHI POWER SYSTEMS, LTD.
PricewaterhouseCoopers Co., Ltd.

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Preparatory Survey on Tuzla Coal-fired Power Plant Project, Bosnia and Herzegovina (PPP Infrastructure Project)

Interim Report

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LIST OF ABBREVIATIONS

BD	Brcko District
BiH/B&H	Bosnia and Herzegovina
BOD	Biochemical Oxygen Demand
BOT	Build Operate Transfer
BTO	Build Transfer Operate
CAPEX	Capital Cost
CCS	Carbon Dioxide Capture and Storage
COD	Chemical Oxygen Demand
CPI	Consumer Price Index
DO	Dissolved Oxygen
EBRD	European Bank for Reconstruction and Development
EC	European Commission
ECSEE	Energy Community of South East Europe
EDBD	Elektrodistribucija Distrikta Br
EFT	EFT Group - Energy Financing Team Group
EIA	Environmental Impact Assessment
EIRR	Equity Internal rate of Return
EIS	Environmental Impact Study
EPBiH	JP Elektroprivreda BiH
EPC	Engineering, Procurement and Construction
EPHZHB	JP Elektroprivreda HZ HB
EPS	Emission Performance Standard
ERS	MH Elektroprivreda RS a.d. Trebinje
EU	European Union
F/S /FS	Feasibility Study
FBiH	Federation of Bosnia and Herzegovina
FDI	Foreign Direct Investment
FERK	The FBiH Electricity Regulatory Commission
FGD	Flue Gas Desulphurization
FILP	Fiscal Investment and Loan Program
FIPA	The Foreign Investment Promotion Agency of Bosnia and Herzegovina
FIRR	Financial Internal Rate of Return
FMEMI	The Ministry of Energy, Mining and Industry of Federation of Bosnia and Herzegovina
GDP	Gross Domestic Product
HPP	Hydro Power Plant
IAEA	The International Atomic Energy Agency
IAS	International Accounting Standards
IDA	The International Development Association
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
IRBRS	The Republic of Srpska Investment-Development Bank
IRR	Internal Rate of Return

ISA	International Standards on Auditing
ISO BiH	BiH Independent System Operator
ITC Mechanism	inter-TSO compensation mechanism
JICA	Japan International Cooperation Agency
KfW	KfW Bankengruppe
LACP	Land Acquisition and Compensation Plan
MEOT	Ministry of Environment and Tourism
MHPS	Mitsubishi-Hitachi Power Systems, Ltd.
MIEMRS	The Ministry of Industry, Energy and Mining of the Republika Srpska
MOFTER	The Ministry of Foreign Trade and Economic Relations of BiH
NEEAP	National Energy Efficiency Plan
NPV	Net Present Value
NTP	Notice to Proceed
O&M	Operation and Maintenance
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
OHR	Office of the High Representative
OPEX	Operation and Maintenance Cost
OSCE	The Organization for Security and Co-operation in Europe
PAPs	Project Affected People
PPP	Public Private Partnership
PSIF	Private Sector Investment Fund
RAP	Resettlement Action Plan
RCC	The Regional Cooperation Council
RERS	The RS Energy Regulatory Commission
RES	Renewable Energy Sources
RS	Republic of Srpska
RSIS	Republika Srpska Institute for Statistics
SAA	Stabilization and Association Agreement
SC	Supercritical
SCADA	Supervisory Control and Data Acquisition
SDA	Bosniak, Party of Democratic Action
SDP	Croat, Social Democratic Party
SERC	The State Electricity Regulatory Commission
SNSD	Serb, Alliance of Independent Social Democrats
SPC	Special Purpose Company
SS	Suspended Solid
TOR	Terms of Reference
TPP	Thermal Power Plant
Trans Co	BiH Electric Transmission Company
UCTE	The Union for the Coordination of Transmission in Europe
UN	United Nations
UNDP	United Nations Development Programme
USC	Ultra Super Critical

VAT	Value Added Tax
WB	World Bank
ZEKC	The Joint Power Coordinating Center

CHAPTER 1 PREFACE

Bosnia and Herzegovina (BiH) has a large reserve of lignite coal and approx. 60% of power is generated by coal-fired plants. The existing power plants (subcritical) were built by Russian or Eastern European construction companies in the 60s-70s. Thus, the replacement from the aged to new power plants is one of its most urgent issues in BiH. The study conducted feasibility study to introduce an ultra super critical (USC) thermal power plant which can improve energy efficiency, promote environmental protection, stabilize energy demand, contribute to the region, and consequently contribute to the entire Bosnian economy and society.

It is expected that demand for social infrastructure will increasingly grow in BiH. While electricity demand growth in BiH is increasing 3 to 4% per year, existing power plants are aging, resulting in capacity degradation and supply constraints, and the construction of the new power plant with high efficiency is an urgent issue. Besides, the installation of the most advanced facilities is absolutely imperative from the point of strengthening environmental protection. Considering current fiscal circumstances, implementing the project as a PPP project is a possibility for the Government of BiH to manage their funds efficiently, leading to a reduction of its liabilities. In addition, the project would also contribute to joining the EU. In BiH, neither high efficient thermal power plant technology, nor environmental protection system(FGD etc) to satisfy EU environmental regulations, are yet to be introduced. Thus, the utilization of the private sector's knowhow on efficient and stable operation of these facilities can be expected. In the study, study team focused more on the financing feasibility of private investments and financing from lenders.

Study team hope that this report will contribute to the economic development of BiH promoting investment from Japan and to the enhancement of friendly relations between our two countries. Finally, study team wish to express our sincere appreciation to the officials concerned of EPBiH for their close cooperation extended to the study team.

December, 2014

Study Team for the Preparatory Survey
on the Tuzla Coal-fired Power Plant Project
in Bosnia and Herzegovina (PPP Infrastructure Project)

MITSUBISHI HITACHI POWER SYSTEMS,LTD.
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CHAPTER 2 NEEDS AND BACKGROUND OF THE PROJECT

2.1 Socio and economic situation of BiH and the project district

2.1.1 History

BiH was a part of Social Federal Republic of Yugosulavia. In March 1992, it declared its independence from Yugoslavia. Immediately after the declaration, the civil war started between the ethnic groups. The Bosnian War lasted for three years until the United Nations mediated the signing of Dayton Agreement in 1995. The reconstruction is ongoing with assistance from the international community including Japan.

2.1.2 Geography

(1) Geography

BiH is located in the Balkan Peninsula, Southeast Europe. The neighboring countries are Croatia, Serbia, and Montenegro. Although it is close to Adriatic Sea, much of the land is covered by mountains.

Figure 2.1.1 Map of BiH

Source: CIA's the World Factbook

(2) Climate

BiH is in the Temperate Zone; the interior is more in the continental climate.

2.1.3 Demographics

(1) Population

In the 1991 census BiH had a population of 4.4 million, including 43.5 per cent Muslims,

31.2 percent Serbs and 17.4 percent Croats. According to the Census in 2013 the population in BiH is 3,791,622 people who live in 1.16 million households across the country. Over two decades after the war in which 100,000 people were killed and more than 2 million fled their homes. The population portion of major administrative units is 2,371,603 in the Federation of Bosnia and Herzegovina (FBiH) (63%), 1,326,991 in the Republic of Srpska (RS) (35%), 93,028 in Brcko District (BD) (2%)[1]. The total population is 3,833,916 as of 2012.

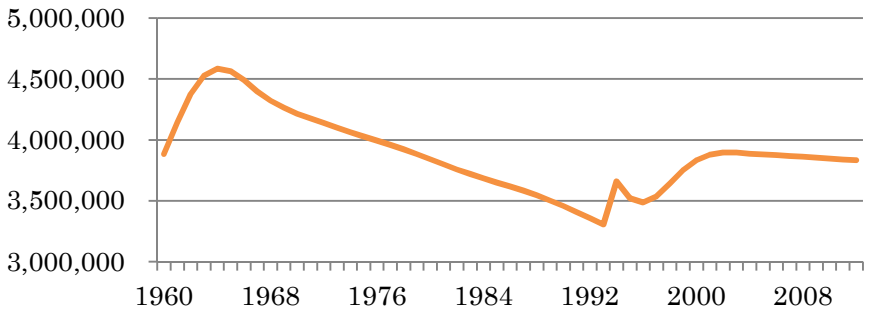

Figure 2.1.2 Population of BiH (1960~2012)

Source: Created by date of the World Bank

(2) Ethic groups and religion

BiH is a home to Bosniaks, Serbs and Croats, and there is a strong correlation between ethnicity and religion: Bosniaks are generally associated with Islam, Bosnian Serbs with the Serbian Orthodox Church, and Bosnian Croats with the Roman Catholic Church. According to unofficial estimates from the BiH State Statistics Agency, Muslims constitute 45 percent of the population, Orthodox Christian 36 percent, Roman Catholics 15 percent, Protestants 1 percent, and other groups including Jewish 3 percent.

The majority of Serbs live in the RS, and the majority of Bosniaks and Croats in the FBiH. Within the Federation distinct, Bosniaks and Croats majority areas remain, with most Croats in Herzegovina and areas of central Bosnia and most Bosniaks elsewhere in central Bosnia and Sarajevo.[2]

(3) Regional district

BiH is decentralized by multi-layer administrative structure. Boundaries were defined by the Dayton Agreement in 1995. There are 10 cantons of the FBiH which serve as the second-level units of local autonomy and federal units of the FBiH. The canton has its own government headed by the Premier. The Premier has his own cabinet, and is assisted in his duties by various cantonal ministries, agencies and cantonal or county services. The ten

[1] Agencija za statistiku

[2] US Department of States, International Religious Freedom Report 2012

cantons are Una-Sana, Tuzla, Zenica-Doboj, Bosnian Podrije, Sarajevo, Posavina, West Herzegovina, Canton 10, Central Bosnia and Herzegovina-Neretva. Under which, there are 80 municipalities in FBiH.

RS has a centralized government and is divided directly into 63 municipalities.

BD is a division of its own under the direct jurisdiction of BiH.

(4) Languages

There are three official national languages, namely Bosnian, Croatian and Serbian (with both Latin and Cyrillic script). These languages emerged from Serbo-Croatian, which used to be the official language in the former Yugoslavia. The entire population of BiH understands all three languages, and is free to decide which to use in their everyday and professional lives.

2.1.4 Politics and Government

(1) Political divisions

The Dayton Peace Agreement, signed on 14 December 1995, endorsed the principle that BiH would remain a single state within existing borders. It divided the country into two entities: FBiH, populated mainly by Bosniaks and Croats and comprising 51 per cent of the country; and the RS, with a predominantly Serb population, holding 49 per cent of the territory. The Dayton Peace Agreement set up the state of Bosnia and Herzegovina with the following elements:

- ✓ a three-person rotating Presidency, comprising two members from the Federation (one Croat and one Bosniaks) and one Serb member from the RS. All three members are elected for a four-year term. The chair of the presidency rotates on an eight month cycle, so that each member occupies the position twice during their four-year term. The Presidency is responsible for executing decisions of the parliamentary assembly, foreign policy, the appointment of ambassadors, international treaties and coordination with international and non-governmental organizations.
- ✓ a Council of Ministers, equally divided between the three ethnic groups and responsible for overseeing foreign, economic and fiscal policy
- ✓ a Parliament, comprising a House of Representatives, a 42-member body — 28 from the FBiH and 14 from the RS — elected by party list vote, and a House of Peoples, with 15 members (5 Serb, 5 Bosnian and 5 Croat) indirectly elected by the Federation's House of Peoples and the RS National Assembly, and-a Central Bank. FBIH and the RS both have their own parliamentary assemblies.

In addition to above governmental structure, the Dayton Agreement also established the Office of the High Representative (OHR) as the highest authority with powers to impose legislation and remove unsatisfactory officials. The High Representative holds wide-ranging

powers to impose laws and binding decisions in cases where the Government is unable to agree, or where it is deemed to be in the interest of the economic and political development of the country. The willingness by successive High Representatives to use these 'Bonn Powers' has been crucial to progressing reforms such as unifying currency and deciding national flag.

Thus BiH establishes a complex political structure that provides for governments at State, Entity and Canton levels.

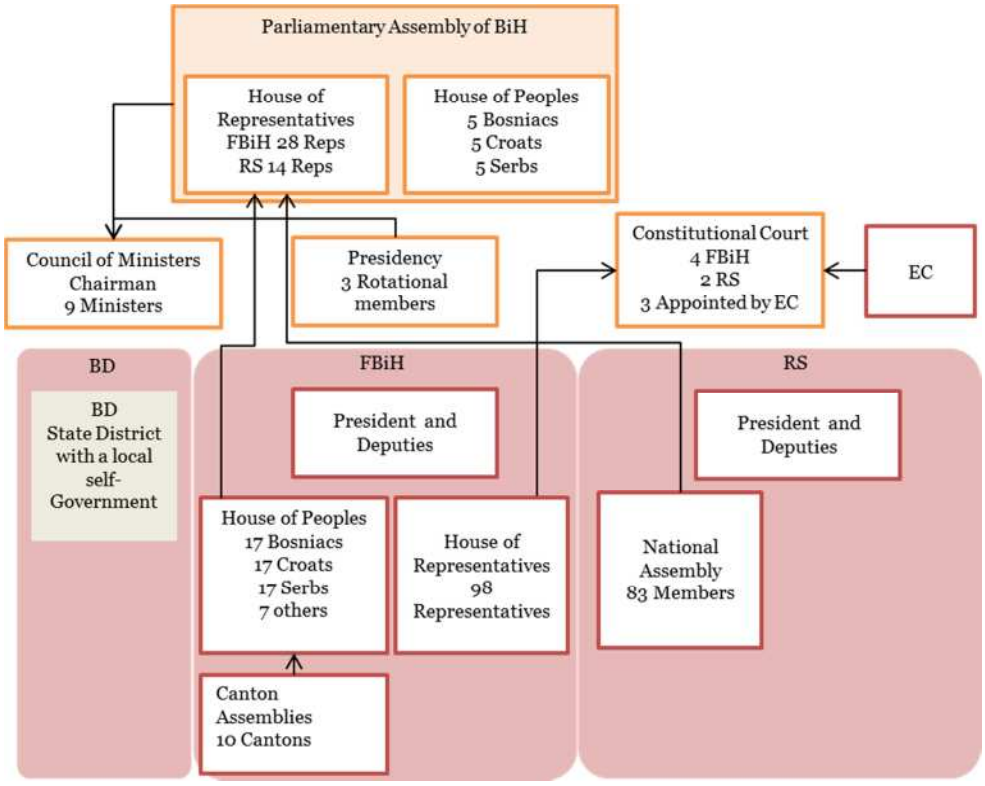

Figure 2.1.3 Political system of BiH

Source: FIPA ”Administrative and territorial organization of Bosnia and Herzegovina”

(2) Parties and elections

The most recent general elections in BiH took place on 3 October 2010 for: Presidency of BiH; House of Representatives of the Parliamentary Assembly of BiH; President and Vice-President of RS; National Assembly of RS; and House of Representatives of the Parliament of the FBiH and the ten Cantonal Assemblies.

The results for the Tripartite Presidency were as follows: HE Mr Željko Komšić (Croat) of the Social Democratic Party with 60.61%; HE Mr Nebojša Radmanović (Serb) of the Alliance of Independent Social Democrats with 48.92%; and HE Mr Bakir Izetbegović (Bosnian) of the Party for Democratic Action with 34.86%. Chairmanship of the Presidency rotates every eight months.

After 16 months of negotiations, BiH’s parliament confirmed Mr Vjekoslav Bevanda (Croat)

as Chair of the Council of Ministers and the country's new Prime Minister on 12 January 2012, bringing to an end the country's protracted political crisis. On 10 February 2012, the new government was officially formed. Mr Zlatko Lagumdžija (Bosniak) was confirmed as Minister of Foreign Affairs and Deputy Prime Minister, while Mr Mirko Šarovic (Serb) was appointed Minister of Foreign Trade and Economic Relations.

(3) Government

BiH comprises 4 tiers of governance, at the State, Entity, Canton and municipal levels and is placed under observation by High Representative who is appointed by Peace Implementation Council.

Figure 2.1.4 Chiefs of State and Cabinet Members of Governments of BiH

Source: JICA Study Team

(4) Government finance

BiH is a multi-level state in the political and in the fiscal sense. However, as compared to those in other multi-level states government finance in BiH has in a rather specific composition. From fiscal responsibilities under the Dayton Agreement only customs policy and determination of tariffs are within the exclusive jurisdiction of the State, while the tax policy, which includes the social contributions systems, is entirely the responsibility of the Entities in terms of legislation, administration and revenue allocation. Financing of the State level of administration was conducted through entity grants from the entity budgets in the ration 2/3 FBiH: 1/3 RS. Subnational governments, in FBiH the cantons, cities and municipalities, and in RS the cities and municipalities were funded from tax revenues collected by Entities. The existence of autonomous customs and tax systems within BiH led to double internal taxation or non-taxation and a loss of public revenues.

FBiH has twice the population of RS, which results in more spending in social benefits and transfers. Social security contribution rates in BiH are higher imposing tax rate of 31% for employees and 10.5% for employers[3] compared to Japan and revenue from social security tax accounts for around 40% of the total revenue (national contribution ratio could be quoted instead of social security contribution rate as social security contribution system in Japan is deferent from that of BiH and it comprises 17.1% of national income in 2011 fiscal year[4]).

Table 2.1.1 Revenue and Expenditure of BiH in 2012 (Unit: million)

Description	Consolidated BiH	Budget for BiH	Entity		BD
			FBiH	RS	
1.Revenue	11,459	1,045	6,642	3,652	246
Tax	6,037	796	3,172	1,895	172
Taxes on income profits and capital gains	818	0	400	396	21
Taxes on payroll and workforce	9	0	9	0	0
Taxes on property	84	0	67	15	1
Taxes on goods and services and international trade and transactions	5,103	796	2,678	1,478	150
Other taxes	22	0	16	5	0
Social contributions	4,046	0	2,668	1,342	35
Grants	60	36	25	18	0
Other revenue	1,314	212	776	395	37
2.Expense	11,170	952	6,595	3,534	215
Compensation of employees	3,323	623	1,681	936	81
Wages and salaries	-	-	1,529	-	-
Social contributions	-	-	152	-	-
Use of goods and services	2,156	162	1,573	346	74
Interest	200	107	99	100	0
Subsidies	416	0	258	146	11
Grants	1	21	0	0	0
Social benefits	4,394	15	2,538	1,801	37
Other expense	678	22	443	203	9
3.Gross operating balance (1-2)	288	92	46	118	30

Source: MAU Database, ITA Governing Board

[3] Foreign Investment Promotion Agency of BiH, Tax System 2014

[4] International comparison of national contribution ratio,、Ministry of Finance, http://www.mof.go.jp/tax_policy/summary/condition/020.htm

(5) Foreign relations

BiH borders Croatia to the north and the west, Serbia to the east and Montenegro to the south. It has a short stretch of Adriatic coastline.

BiH was accepted as a member of the Council of Europe in April 2002, a significant achievement in terms of BiH's desire to be part of European integration.

In February 2008, BiH became a member of the Regional Cooperation Council (RCC). The RCC is intended to sustain focused regional cooperation in South East Europe through a regionally owned and led framework that also supports European and Euro-Atlantic integration. Its headquarters is in Sarajevo.

In June 2008, BiH signed a Stabilization and Association Agreement (SAA) with the EU. BiH has not yet formally applied for EU membership, but remains a potential candidate country. Agreement on constitutional amendments to implement the European Court of Human Rights ruling in the Sejdic-Finci case remains a priority before BiH can progress negotiations.

BiH served as a non-permanent member of the United Nations Security Council between 1 January 2010 and 31 December 2011. It also held the Presidency of the UNSC in January 2011. The key theme of its Presidency was 'Post-Conflict Institution Building'.

2.1.5 Economy

The below table summarizes the major economic indicators in BiH.

Table 2.1.2 Indicators in BiH

Index	2005	2006	2007	2008	2009	2010	2011	2012
Nominal GDP (EUR bill)	8.8	9.9	11.1	12.6	12.3	12.5	13.1	13.1
GDP per capita (EUR)	2283	2564	2898	3289	3194	3258	3358	3419
Real GDP growth (%)	3.9	6	6.2	5.7	-2.9	0.7	1.8	-1.1
Minnig and Manufacturing Production growth (%)	10	11	10	9.2	-3.3	1.6	5.6	-5.2
Ave. wage (EUR)	275	300	322	385	404	408	417	422
Inflation Rate (%)	3.8	6.1	1.5	7.4	-0.4	2.1	3.7	2.0
Unemployment Rate (%)	43	31	29	23.4	24.1	27.2	27.6	28
Foreign Currency Reserve (EUR mil)	2160	2787	3425	3219	3176	3301	3284	3327
Trade balance (EUR bill)	-3.96	-3.41	-4.14	-4.82	-3.48	-3.33	-3.73	-3.78
FDI contribution to GDP (%)	3.2	4.5	12	5.4	1.4	2.4	2.7	2.2

Source: Created by data from FIPA and IMF

(1) Macro-economic performance (Gross domestic product)

Although the long lasting civil war has done great damage to the economy, the economy has been in the recovering process after the civil war ended in 1995 as shown in the below table. The country’s GDP is forecasted to increase 0.5% in 2013 and 2.0% in 2014 by IMF after the little growth recent years due to the Financial Crisis in 2009 and Greek Crisis in 2010.

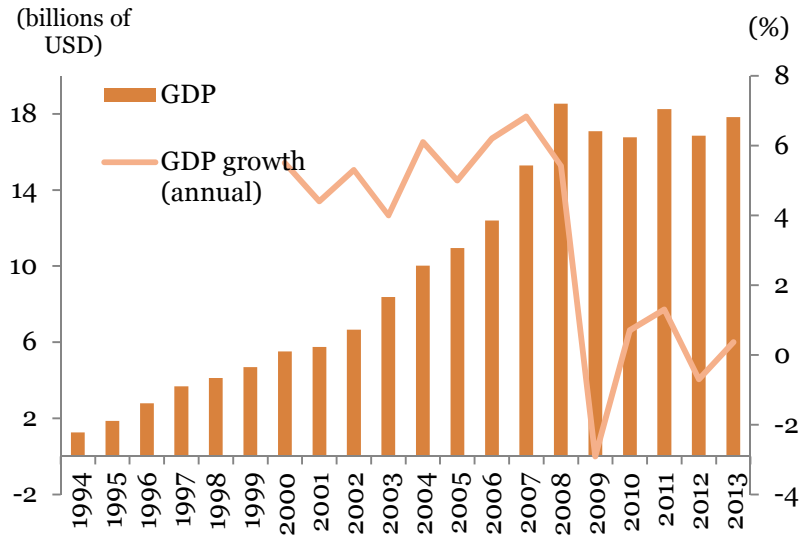

Figure 2.1.5 GDP of BiH (1994~2012)

Source: Created from data of World Development Indicator by the World Bank

(2) Government finance

Account balance of BiH is deficit from 2008 to 2012. In addition, external debt of government sector is accumulated and the debt percentage of GDP is increasing.

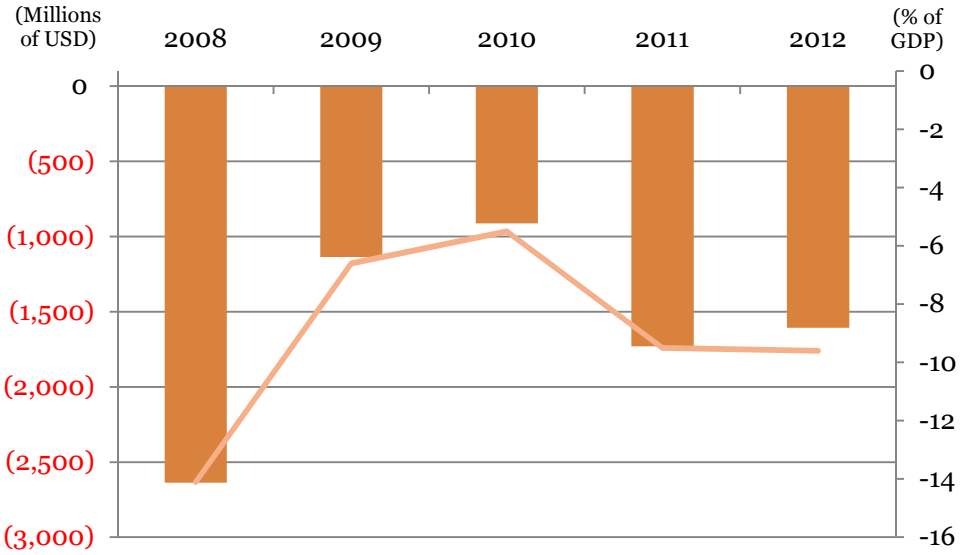

Figure 2.1.6 Current Account Balance of BiH (2008~2012)

Source: Created from data of Central Bank of Bosnia and Herzegovina

(3) Trade relationships

BiH suffers from chronically large trade deficits, mostly due to rebuilding efforts after the wars. In BiH, imports are more than export approximately twice for a decade. The trade partners are often neighboring counties such as Croatia, Germany, Serbia and Italy. Mineral

resources share the highest portion of BiH's exports and electrical energy is also a major export.

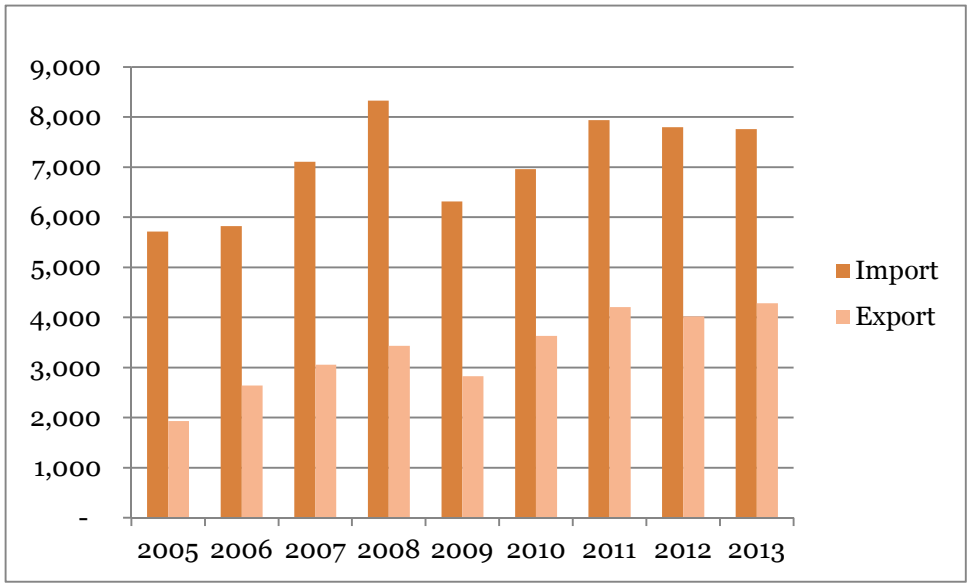

Figure 2.1.7 External Trade (million EURO)(2005~2013)

Source: INVESTMENT OPPORTUNITIES IN BOSNIA AND HERZEGOVINA 2012 , Foreign Investment Promotion Agency of BiH

1) Products

As for export, "Manufactured goods classified chiefly by material", e.g. manufactures of leather, rubber, cork or wood, paper, textile and iron or steel, and "Miscellaneous manufactured articles", e.g. buildings, furniture and apparel goods have a majority. As for import, "Manufactured goods classified chiefly by material", "Mineral fuels and lubricants" and "Marchinery and transport equipment" have a majority.

Table 2.1.3 Export & import in goods (Unit: millions EURO ,2013)

Item	Export		Import	
Food and Live animals	253	6%	1,083	14%
Beverages and tabacco	30	1%	225	3%
Crude materials, except fuels	526	13%	247	3%
Mineral fuels and lubricants	373	9%	1,601	21%
Animal and vegetable oils and rats	38	1%	78	1%
Chemicals	245	6%	974	12%
Manufactured goods classified chiefly by material	1,125	28%	1,493	19%
Machinery and transport equipment	501	13%	1,414	18%
Miscellaneous manufactured articles	942	23%	684	9%
Commodities and transactions, n.e.c.	6	-	-	-
Total	4,285	100,0%	7,756	100,0%

Source: INVESTMENT OPPORTUNITIES IN BOSNIA AND HERZEGOVINA 2014 , Foreign Investment Promotion Agency of BiH

Major exports are Unwrought aluminum (7%), Electrical energy (6%), Seats (5%), Coke etc of coal, lignite or peat, retort carbon (4%), Footwear, with leather body (4%) .

Major imports are petroleum oils, refined (9%), Cars (4%), Medicaments, packaged (4%), Beer (2%), Electrical energy (1%)

2) Countries

Germany, Croatia, Italy, Serbia and Slovenia are major countries for BiH exports, while imports, Croatia, Italy, Russia and Serbia are major countries.

Table 2.1.4 Exports & imports with major countries (Unit: millions EURO)

Country	SHARE	2012	SHARE	2013
TOTAL	**100.00**	**11,816,417**	**100.00**	**12,040,959**
Croatia	14.57	1,721,808	13.38	1,611,076
Germany	12.70	1,501,101	12.93	1,557,235
Italy	10.25	1,211,047	10.55	1,270,842
Serbia	9.27	1,094,950	9.56	1,151,610
Russian Federation	6.71	792,460	6.64	799,231
Slovenia	6.30	744,780	6.12	736,693
Austria	5.01	592,515	5.12	617,056
China	3.57	421,760	3.93	472,695
Turkey	2.74	323,267	2.84	341,455
Hungary	2.29	270,150	2.46	296,626
Poland	2.23	263,511	2.06	248,457
USA	1.80	212,662	1.80	216,544
France	1.82	214,521	1.70	204,977
Czech Republic	1.59	188,424	1.69	204,094
Montenegro	1.32	155,839	1.30	156,958
TOP 15	82.17	9,708,795	82.08	9,885,548

Source : INVESTMENT OPPORTUNITIES IN BOSNIA AND HERZEGOVINA 2014 , Foreign Investment Promotion Agency of BiH

(4) Currency movement

The currency of BiH is Konvertibilna Marka (KM) which is tagged to German currency. Because Germany employed EURO in 1999, 1KM is currently tagged to 0.51129 EUR.

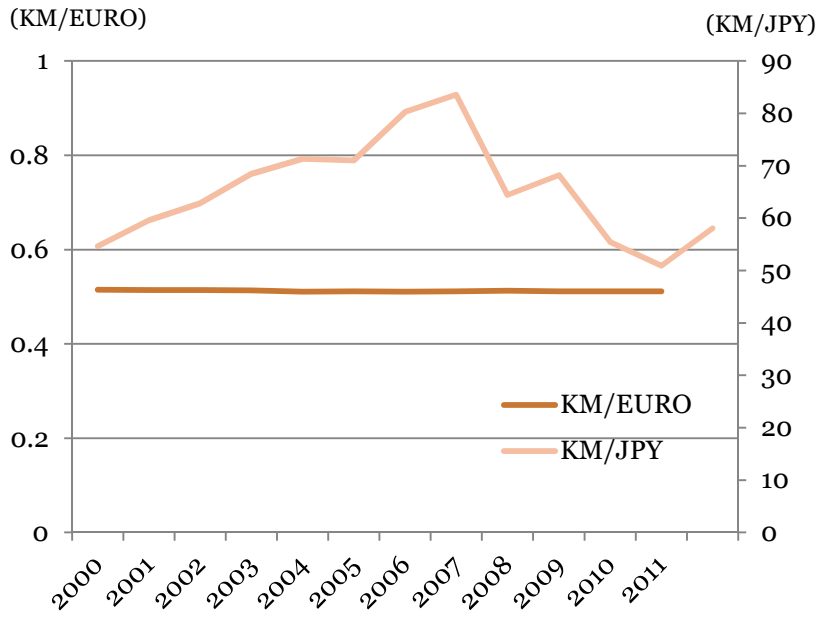

Figure 2.1.8 Exchange rate KM/EURO and KM/JPY (2000~2011)

Source: Created from data of Bloomberg

(5) Domestic price fluctuations

While high increases in inflation rate which started in 2005 in connection with introduction of VAT and in 2008 with global financial crisis are seen, the average inflation rate between 1999 and 2011 is 2.5766%. IMF predicts 2.5% inflation for the coming few years.

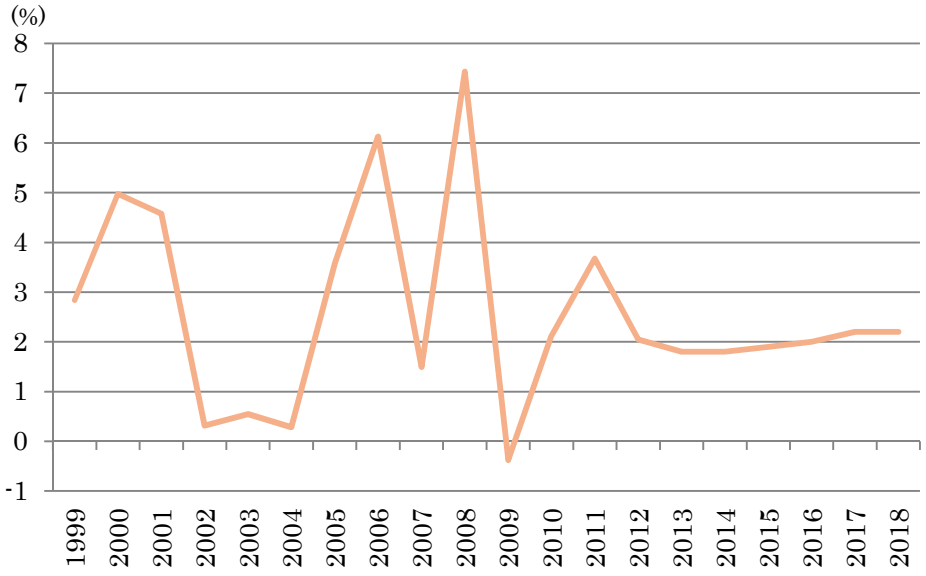

Figure 2.1.9 Inflation rate of BiH (1999~2017)

Source: Created from IMF's World Economic Outlook Database * Estimates start after 2012

(6) National financial condition

BiH's GDP per capita is ranked as the lowest tiers and categorized into Upper Middle Income Country.[5]

Table 2.1.5 Central/Eastern Europe Countries' GDP per Capita 2011 (USD)

Country	GDP per Capita
Albania	3,964.68
BiH	4,689.53
Macedonia	5,122.04
Serbia	6,030.45
Montenegrc	7,251.39
Bulgaria	7,311.80
Romania	8,539.55
Poland	13,383.56
Hungary	13,916.32
Croatia	14,021.39
Slovenia	24,534.03
Average	9,887.70

Source: IMF

(7) Market Liberalization

An estimated 60% of small companies and more than 30% of the large ones are now privately owned or publicly traded. BiH is accelerating the privatization process for companies of strategic importance in order to increase economic growth and enhance the volume of foreign investment. 42% of state capital and 74.4% of the companies have been privatized in FBiH and 70% of state capital and 60% of the companies have been privatized have been made privatized in RS[6]. Nevertheless, a number of these "strategic enterprises", which includes large enterprises, telecommunications and power utilities sectors, public utilities, mines etc. are not still privatized, offering opportunities for potential foreign and local investors.

Privatization is managed by the FBiH Privatization Agency and cantonal privatization agencies in the FBiH, and the Republic of Srpska Investment-Development Bank (IRBRS).

Constitutionally, the Entities are responsible for structural reform, though, for instance, state level law deals with non-discrimination and transparency of the privatization process throughout the country, and in the FBiH significant implementing authority is at the cantonal level in the privatization of enterprises. About 80 percent of banking capital is privately owned, but a lack of contract enforcement and an insecure regulatory environment limit

[5] OECD "DCA List of ODA Recipient Effective for reporting on 2012 and 2013 flows"

[6] INVESTMENT OPPORTUNITIES IN BOSNIA AND HERZEGOVINA 2014 , Foreign Investment Promotion Agency of BiH

credit availability[7].

2.1.6 Relationship between BiH and EU

(1) Efforts to be a member of the EU

BiH along with other Western Balkans countries was identified as a potential candidate for EU membership during the Thessaloniki European Council Summit in June 2003. Since then, a number of agreements between the EU and BiH have entered into force-visa facilitation and readmission agreements, Interim Agreement on Trade and Trade-related issues. To become a EU member, member country needs to require Copenhagen Criteria and EU Convergence Criteria.

From political perspective the progress report released in Oct 2013 sees that the BiH political representatives do not share a vision on the overall direction and future of the country or on how it should function. There is no thorough internal political dialogue on fundamental issues such as the EU integration process nor any priority-setting related to it.

The EU agenda has not been a priority for the political representatives of the country resulting in no progress in its European perspective.[8]

From Economic perspective, EU sees the consensus on economic and fiscal policy essentials remains weak. Also financial and monetary stability have been preserved as the low inflation environment was maintained and the currency board arrangement continued to enjoy a high level of confidence and credibility. However, rising fiscal deficit, substantial external imbalances as well as very high unemployment continue challenging the overall macroeconomic stability.

Table 2.1.6 Copenhagen Criteria

	Criteria
Political	Stability of institutions guaranteeing democracy, the rule of law, human rights and respect for and protection of minorities. It also monitors regional cooperation, good neighbourly relations with enlargement countries and Member States, and compliance with international obligations
Economic	Existence of a functioning market economy and the capacity to cope with competitive pressure and market forces within the Union

Source: BiH Progress Report 2013

[7] Heritage Foundation “BiH country report”

[8] European Committee “BiH Progress Report 2013”

Table 2.1.7 EU Convergence Criteria

Index			BiH
Price Stability	Average Rate of Inflation of the three best-performing Member States in terms of price stability for a period of one year before the examination	<1.5%	✓
Government Budgetary Position	Ratio of Actual Government Deficit to Gross Domestic Product	<3%	
	Ratio of Government Debt to GDP	<60%	
Exchange Rate	Normal fluctuation margins of the Exchange rate mechanism without severe tensions for at least the two years before the examination		✓
Long interest Rate	Average nominal long-term interest rate over a period of one year before the examination	<2%	

Source: Created from various documents

2.2 Current status and issues with BiH's electricity sector

2.2.1 Framework of power related policies and forms of enforcement (sharing of roles between the public and private sectors)

(1) Framework

As a consequence of BiH's unique political structure, the country has multiple energy regulatory bodies with one regulator at the national level, and one at each Entity level.

(2) National Level

On the national level, the ministry with primary responsibility over the energy sector is the Ministry of Foreign Trade and Economic Relations of BiH (MOFTER). Regulatory implementation is the responsibility of the State Electricity Regulatory Commission (SERC), which has jurisdiction over the electricity transmission, transmission system operation and international trade. SERC has three commissioners appointed to five-year terms (two from the FBiH, one from the RS, rotating annually as chairman) and a staff of 15. Commissioners are appointed by the National Parliament. Transition of SERC commissioners following expiry of term has been an issue. While the four-year term of the RS commissioner on SERC expired in 2007 and the term of one of the FBiH commissioners expired in 2008, they were not replaced in a timely manner and so continued to serve. In April 2008, the Parliament asked the Council of Ministers to expedite appointment procedures to enable SERC to operate in its full capacity. Prior to the end of a term of service, dismissal of commissioners is only based upon on cause. Standard conflict of interest rules apply.

SERC's budget is financed out of regulatory fees, with no requirement of parliamentary approval. All SERC decisions can be appealed to the Court of BiH, and remain in effect pending appeal[9].

(3) Entity level

On the Entity level, the two corresponding ministries are the Ministry of Energy, Mining and Industry of Federation of Bosnia and Herzegovina (FMEMI); and the Ministry of Industry, Energy and Mining of the Republika Srpska (MIEMRS). The FBiH Electricity Regulatory Commission (FERK) and the RS Energy Regulatory Commission (RERS) implement regulation of generation, distribution and supply of electricity within their respective Entities. FERK has three commissioners; RERS has five, each approved by their respective Entity Parliaments. FERK has a staff of 31, RERS 27. Like SERC, FERK and RERS are funded outside central budgets.

With respect to gas, a regulatory agency for gas has not yet been established on the national level or within the FBiH. Within the RS, RERS has had jurisdiction over the gas sector since

[9]REPORT OF THE STATE ELECTRICITY REGULATORY COMMISSION in 2012 (SERK)

the end of 2007.

There is a separate Council on Competition which consults with the relevant energy regulators on issues relating to competition, although the Council only has the power to provide opinions and recommendations on aspects of competition.

Three power utilities, mostly state-owned, perform power generation: JP Elektroprivreda BiH (EPBiH), MH Elektroprivreda RS a.d. Trebinje (ERS) - holding company and JP Elektroprivreda HZ HB(EPHZHB) for autonomous entity. Power distribution is performed by five power distribution companies in RS, members of ERS. In FBiH the power distribution is performed by EPBiH and EPHZHB. For District of Brčko power distributor is Kumunalno Brčko (EDBD).

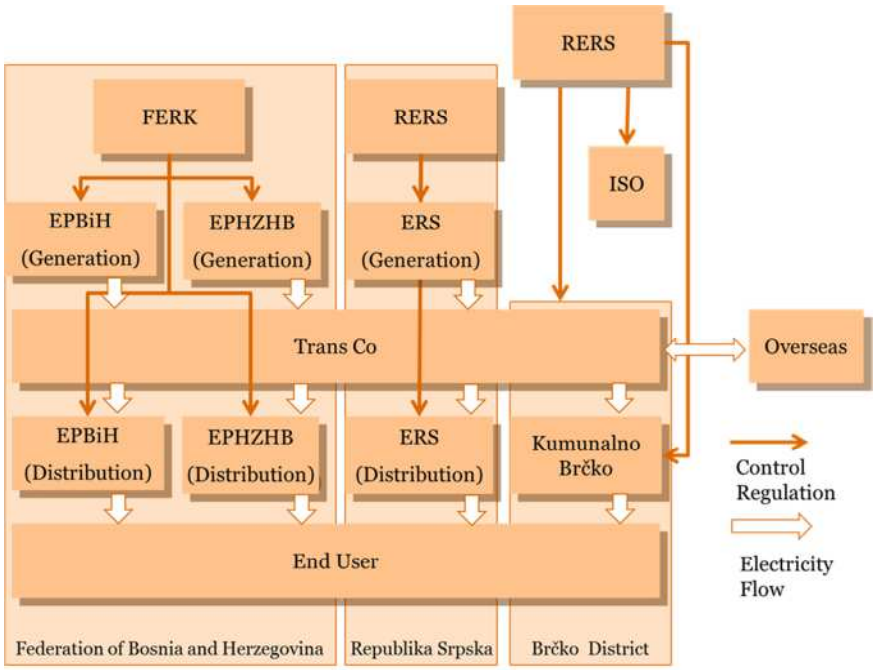

Figure 2.2.1 Control Regulation and Electricity Flow

Source: Created by JICA Study Team based on Statement of Security of Supply 2012

Table 2.2.1 Description on Power related entity

- At the national level:

State Energy Regulatory Commission (SERC)	Regulatory implementation agency under the Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina (MOFTER), in charge of electric transmission relations and international electricity trade.
BiH Independent System Operator (ISO BiH)	An independent non-profit organization independent from power generation, transmission and distribution. Operation and management of the power grid is handled by this organization alone, at the country level. Owned by the FBiH and Republika Srpska.
BiH Electric Transmission Company (Trans Co)	Electric transmission company at the country level in charge of the construction, maintenance and operation of electric power cables (over 110kV), placed under SERC.

- At the autonomous entity level:

BiH Federal Electricity Regulatory Commission (FERK)	Regulatory commission under the Ministry of Energy, Mining and Industry of Federation of Bosnia and Herzegovina (FMEMI), responsible for approval on power generation, power distribution, electricity supply rates and other regulatory matters.
Elektroprivreda Bosne i Hercegovine (EPBiH)	The largest of the 3 power generation and distribution companies in BiH that supplies electricity mainly to areas inhabited by Bosniaks within the FBiH. Supplier of almost half of the domestic power generation, 80% of which is generated at thermal power plant and the remainder at hydraulic power plants.
Elektroprivreda Hrvatske zajednice Herceg Bosne (EPHZHB)	A power generation and distribution company within the FBiH which supplies electricity mainly to areas inhabited by Croats. Only its hydraulic power plant is connected to the power grid and is a supplier 10% of domestic power generation in 2011.
Regulatory Commission for Energy of Republic of Srpska (RERS)	Republika Srpska's regulatory commission on energy under the Repubilc's Ministry of Energy, Mining and Industry, responsible for approval on power generation, power distribution, electricity supply rates

	and other regulatory matters relating to energy.
Elektroprivreda Republike Srpske (ERS)	The only power generation and distribution company in the RS that supplies electricity to the RS. Supplier of ca 40% of BiH's power generation. Owns both hydraulic and thermal power plants which are similar in facility capacity. Ratio of power generation through hydraulic or thermal power fluctuates annually, depending on the amount of rainfall.
Kumunalno Brčko (EDBD)	There are no power plants in the Brčko District. Approved by SERC in 2010, it purchases electricity from FBiH and the RS, and is engaged in power distribution.

Source: Created by JICA Study Team based on Statement of Security of Supply 2012

2.2.2 Overview of Energy Sector of BiH

(1) Coal

Coal shares approximately 50% of country's primary energy supply. Main energy source for electricity production (about 85% of coal is used in the thermal power plants). BiH produced 9.7 million tons in 2007. Brown coal and lignite make a large contribution to primary energy supply (65% in 2009), consumed mainly at power plants close to mines. The country has a total of four power plants; two in EPBiH and the other two in ERS. The region of Tuzla has the biggest coal basin. The Tuzla power plant has four blocks, with an installed capacity of 715 MW. Its annual coal burn is around 3.3 million tons in average. The plant also supplies heat from Tuzla and Lukavac, process steam for nearby industries and fly ash for the cement factory at Lukavac. After the Bosnian war, major overhauls were completed at the plant, including boiler upgrade and the installation of new precipitators. A new 450 MW unit is planned for the site. The Kakanj power plant has a total capacity of 450 MW and like Tuzle, is operated by EPBiH. The Ugljevik power plant has one 300 MW block, operated by state-owned ERS[10]. The Gacko's coal basin is owned by ERS and the Gacko power plant has the capacity of the 300 MW. Gacko has a supercritical unit and burns around 1.8 million tons of lignite per year from the nearby opencast mine. For years, deteriorated equipment by hard cemented overburden and limestone interbed within the principal coal section and a lack of funding for maintenance and investment have hindered mining. In December 2006, the Czech power utility CEZ signed an agreement to invest up to Euro 1.5 billion in a new company to build a second unit at Gacko and complete power plant upgrades and a mine extension. However, the joint venture collapsed in 2009. The Doboj mines is supplying the

[10] REPORT OF THE STATE ELECTRICITY REGULATORY COMMISSION in 2012 (SERK)

Stanari power plant that is under construction.

Table 2.2.2 Capacity of Thermal Power Plants in BiH

EPBiH	Tuzla	MW	GWh
	G3	100	85
	G4	200	182
	G5	200	180
	G6	215	188
	Subtotal	715	635
	Kakanj	MW	GWh
	G5	110	100
	G6	110	90
	G7	230	208
	Subtotal	450	398
ERS	Gacko	MW	GWh
	Subtotal	300	276
	Ugljevik	MW	GWh
	Subtotal	300	279
BiH	Total	1,765	1,588

Source: REPORT OF THE STATE ELECTRICITY REGULATORY COMMISSION in 2012 (SERK)

(2) Imports of oil and gas[11]

In BiH, despite approximately USD 150 million has been invested in oil and gas exploration in an effort to achieve greater energy security by reducing dependence on imported fuel since independence, BiH is still dependent on the importation of oil and natural gas. BiH's oil sector has developed significant production capacities. Refinery Brod, with a capacity of four million tons per year, processes imported crude oil into various products (motor fuels, liquid petroleum gas, bitumen, etc.) Refinery Modriča produces motor oils and various special purpose technical oils for the oil industry and other commercial purposes. The initial results of the study on oil deposit justified further explorations and indicate that there are realistic possibilities of finding commercially viable deposits.

Within BiH's energy sector, the gas subsector is the least developed and currently gas is imported over only one pipeline, with a length of 191 km and the projected annual capacities of 1 billion m3. This small natural gas capacity reduced industry activity and households account for the most of total natural gas consumption. The demand projections until 2020 amount to between 1.5 and 3 billion m3 of gas, meaning that serious gas sector reform and development is required.

(3) Potential energy resources – renewables

Although BiH is not bound by EU directive that 20% of energy needs to be sourced from renewables such as biomass, hydro, wind and solar power by 2020, BiH meets this target

[11] ENERGY SECTOR IN BOSNIA AND HERZEGOVINA 2013 , Foreign Investment Promotion Agency of BiH

seeking candidacy for EU accession. On the other hand, the framework conditions conducive to promotion and financial incentives for the development of renewable energy are still at early stage of introduction and investing in renewable energy by the relevant entities is expected.

- Hydro:

It is said to be a big hydro potential at utilization level of 40%. BiH is in the 8th place in Europe with its annual hydroelectric potential[12]. The production capacity of currently existing plants is 2,100 MW of which the RS 720 MW and FBiH 1380 MW. Germen state-owned development bank KfW will loan Euro 30 million towards construction of the 52 MW Vrilo hydropower by EPHZHB and Euro 50 million towards EPBiH's building of the 13.3 MW Janjici hydro power plant. The 15 year loan has a three-year grace period.

Table 2.2.3 Capacity of Hydropower Plants in BiH

Operator	Hydro Power Plant	MW
ERS	Trebinje I	171
	Trebinje II	8
	Dubrovnik	216
	Čapljina	420
	Višegrad	315
	Bočac	110
EPBiH	Jablanica	180
	Grabovica	114
	Salakovac	210
EPHZHB	Mostar	72
	Mostarsko blato	60
	Peć-Mlini	30
	Jajce I	60
	Jajce II	30
	Rama	160
	Total	2,156

Source: REPORT OF THE STATE ELECTRICITY REGULATORY COMMISSION in 2012 (SERK)

- Wind:

A wind atlas for BiH was recently established. The assessment shows that BiH has significant wind potential. It is estimated that the total wind power potential capacity is about 2,000 MW, but only 900 MW are usable. This potential has no yet been exploited.13. 12 locations marked as having good potential. On behalf of the German Federal Government, KfW Development Bank is providing a reduced-interest loan and a grant to cover some 72 million Euros for building the first wind farm BiH which costs around Euro 78 million. The

[12] World Bank (2008): Energy Study in BiH, Ministry of Foreign Trade and Economic Relations

[13] JICA: JFY 2010 Energy Policy (B) Country Report Bosnia and Herzegovina

remaining 6 million euros are being provided by the energy supply company. The planned Meshihovina wind farm in Southern Herzegovina will be the first of its kind in the country with a total installed capacity of 44 MW, which could supply almost 30,000 households[14].

- Biomass:

  Most significant source is wood mass from forestry and wood waste from the wood processing industry. It is used mainly in rural and suburban areas as the primary source for heating and cooking purposes. As 50% of the land is covered by the forest (BiH's per capita forest area is 0.74ha and it is ranked as the 6th in Europe), the country is said to have potential in thermal power generation from biomass for industrial use. Global Environment Facility (GEF) and the government of Chez Republic have been supporting a project worth USD 1.1 million which has introduced biomass heating system in elementary schools aiming at improving heat supply system, reducing CO2 emissions and establishing biomass business model[15]。

- Solar:

  Total potential of solar energy is estimated at 1,900 TWh. The solar irradiation values in BiH vary accordingly from 1,240kWh/m2 in the northern region to 1,600 kWh/m2 in the southern region[16]. In the southern region, the amount of sunny days can get up to about 270 days per year. Use of solar energy for hot water and heating in the residential sector is insignificant. No license for solar power plant was issued in 2010, but 2011 and 2012 saw an increase; 3 and 26 license respectively17. In 2012, the first solar power plants in BiH were put into operation, with generation reaching 157 MWh. The United States Agency for International Development (USAID) has been funding US 1.2 million for the project called Solar Energy as the Future of Sustainable Development which brings together producers and users of solar energy collectors in BiH. The program provides 20 small medium-sized enterprises with access to finance and technical assistance to develop sustainable production of solar collectors. The program will ultimately help up to 200 potential buyers access campaign will promote the benefits of using and manufacturing solar energy technology[18].

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[14] https://www.kfw-entwicklungsbank.de/International-financing/KfW-Entwicklungsbank/Sectors/Energie/Projektbeispiele/Bosnien-und-Herzegowina-Windenergie/

[15] UNDP website (http://www.ba.undp.org/content/bosnia_and_herzegovina/en/home/operations/projects/environment_and_energy/bosnia_and_herzegovina_biomass_energy_for_employment_and_energy_security_project/)

[16] ENERGY SECTOR IN BOSNIA AND HERZEGOVINA 2014 , Foreign Investment Promotion Agency of BiH

[17] Bosnia and Herzegovina "Statement on Security of Supply, 2013"

[18] USAID website （http://www.usaid.gov/news-information/fact-sheets/fact-sheet-solar-energy-future-sustainable-development-bosnia-and）

2.2.3 Trends of electricity generation and consumption

(1) Background

Power generation in BiH is exclusively related to domestic energy resources – coal and hydropower. Total generated electricity in BiH is 12,934, out of which 4,148 GWh in the hydropower plants and 8,619 GWh in the thermal power plants and 166 GWh in the small hydropower and industrial power plants[19].

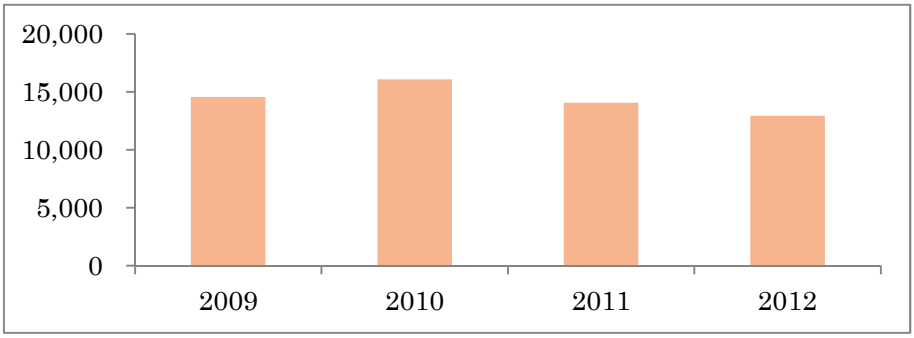


Figure 2.2.2 Total Power Generation in BiH (GWh)

Source: Created by PwC based on Statement of Security of Supply 2008-2012

As shown in the Figure above, 2010 saw the largest electricity generation. It was increased by 10% and amounted to 16,068 GWh, with electricity export of 3,800 GWh which was the best record in the past[20]. The electricity in BiH is reliance on weather as half of the generation of electricity comes from hydropower plants.

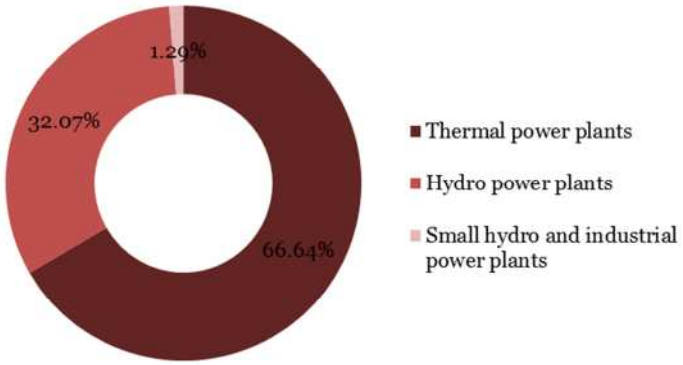


Figure 2.2.3 Breakdown of electricity generation in BiH in 2012

Source: REPORT OF THE STATE ELECTRICITY REGULATORY COMMISSION in 2012 (SERK)

[19] REPORT OF THE STATE ELECTRICITY REGULATORY COMMISSION in 2012 (SERK)

[20] REPORT OF THE STATE ELECTRICITY REGULATORY COMMISSION in 2012 (SERK)

(2) Generation of electricity by three utilities

Installed generation capacity amounts to 1,682 MW (thermal-1,165 MW and hydro-517 MW) with annual generation in year 2012 of 6,509 GWh with sales of KM 805 million. Out of the generation amount, thermal power plants generated 5,368 GWh and hydro water plants 1,141 GWh and the generation of thermal power plants accounts for 80%.[21] ERS is 100% owned by the RS and has 65% ownership in subsidiaries except the R&D center. In the past years, due to the bad weather conditions over a long period of time, the production of electricity from hydro power plants has been reduced. The production dropped to 5,127GWh in 2012 from 5,295 GWh in 2011 and 6,165 GWh in 2010. Out of the total production in 2012, 1,832GWh was produced by hydropower plants, 3,251GWh by thermal power plants and the rest by small hydropower and other plants [22]。

EPHZHB operates only six hydro plants and has over 1,500 employees. Under the unfavorable hydrological situation during the year, the production dropped to 1,402 GWh in 2011 and 1,237 GWh in 2012. The sales was KM 373.9 million [23]。

2.2.4 Electricity market and supply

(1) Distributed/supplied area

Electricity distribution in BiH is performed by four distribution system operators: EPBiH, EPHZHB, ERS, EDBD. The distribution activity is performed by eight distribution system operators: EPBiH, EPHZHB, EDBD and five users of electricity distribution license owned by ERS. EPBiH organizes five distribution areas: ED Sarajevo, ED Zenica, ED Bihać and ED Mostar. EPHZHB organizes three distribution areas: South, Center and North. Electricity distribution within ERS is organized in five independent system operators. EDBD is the smallest distribution system operator.

[21] Annual Report 2014, EPBiH

[22] REPORT OF THE STATE ELECTRICITY REGULATORY COMMISSION in 2012 (SERK)

[23] Annual Report 2012, JP Elektroprivreda HZ HB d.d..

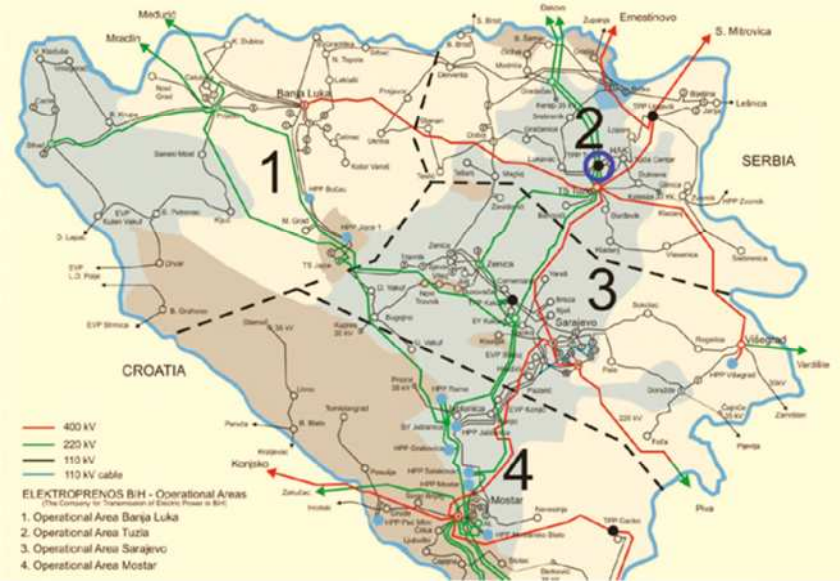


Figure 2.2.4 Geographical Network and Operational Area

Source: REPORT OF THE STATE ELECTRICITY REGULATORY COMMISSION in 2012 (SERK)

(2) Market Framework and Operation and Management Structure of Fee System

The retail electricity market in the country is said to be not mature as it is dominated by three biggest companies; EPBiH, ERS and Kumunalno Brčko. The law provides for phased market opening, with opening as of 1 January 2008 for all non-household customers (57.5% of the market) and after 1 January 2015 for all customers[24].

SERC has been revising the fee system and adopted a new system in 2012. The system prohibits electricity companies from charging electric transmission of international trade, which lowered the prices of the transmission services and shrunk the companies' revenue25。 It was also decided in 20120 that regulation on all the fees except those of households in BD. While FERC and SERC already stopped regulating the prices of customers over transmission network, other regulations will be abolished gradually.

(3) Electricity Market and Shift in the Price[26]

Total sales to customers in BiH amounted to 11,047 GWh in 2012, increased by 0.4% from the previous year. The average selling price for customers was 13.43 pfennig/kWh. Total value of sale to these customers amounted to 1.361 billion KM and was increased by 62 million KM (4.8%) in comparison to 2011 (1 €=1.95583 KM; 1 KM = 100 pfennig). At the beginning of the year, tariffs for electricity customers supplied by EPHZHB increased, while

[24] Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina " Day of BIH in the Energy Community 14 June 2012"

[25] REPORT OF THE STATE ELECTRICITY REGULATORY COMMISSION in 2012(SERK)

[26] REPORT OF THE STATE ELECTRICITY REGULATORY COMMISSION in 2012 (SERK)

somewhat earlier, in the middle of 2011, tariffs for customers supplied by EPBiH increased. Trends of average electricity prices for end customers in BiH are gradually rising.

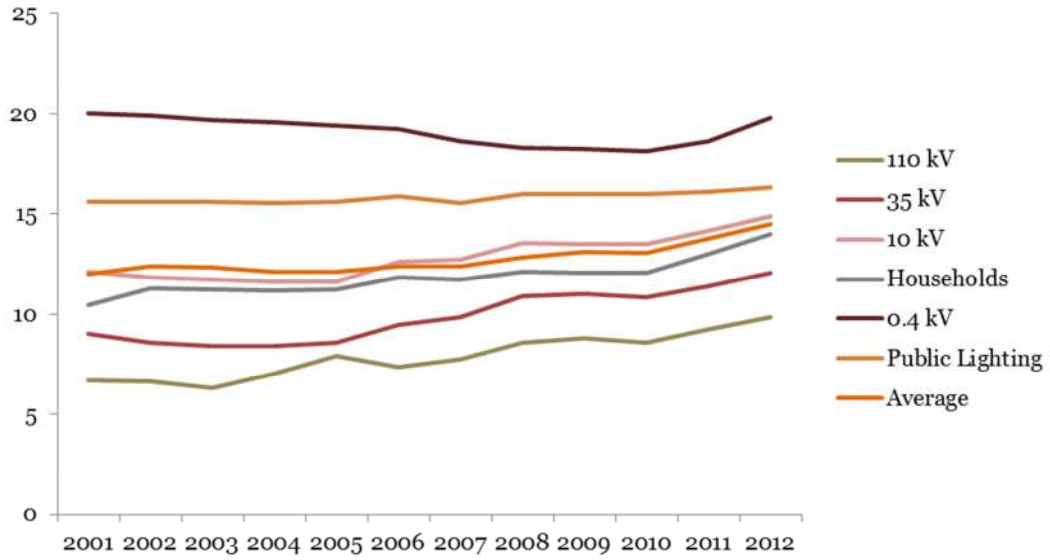


Figure 2.2.5 Average electricity prices for EPBiH tariff customers

Source: Created by Data from EPBiH

The number of electricity customers in BiH was steadily increasing, and at the end of 2012 it reached a total of 1.476 million. In the process, a total number of customers during the year increased by 16,310, 14,615 of which belonged to the category of households.

Table 2.2.4 Number of Customers by Supplier in BiH

	110kV	35kV	10kV	Other Consumption	Households	Public Lighting	Total
EPBiH	5	46	710	59,003	652,102	3,546	715,412
ERS	8	32	77	34,762	498,890	1,000	534,769
EPHZHB	3	3	160	14,684	172,416	1,659	188,925
Komunalno Brcko		1	18	4,223	31,485	397	36,124
							1,475,230

Source: Annual Report of ISO BiH in 2012

(4) Tariff Structure

EPBiH's price is composed of two parts; regulated cost and non-regulated cost. Regulated cost includes use of distribution network, use of transmission network and funding for renewable energy sources. Non-regulated cost represents the cost of producing electricity and supplier's services. Regulated cost applies to all suppliers without any exceptions.

The cost of electricity production, which represents more than half of the total cost for electricity and in the case of EPBiH these are the costs of producing electricity from thermal

power plants, hydro power plants and purchase of electricity from producers of electricity from renewable energy sources (small hydro and solar power plants). The cost of supplier's service is related to the cost of issuing bills and other expenses incurred by a supplier of electric power. The network costs means the costs of transmission and distribution networks (construction and maintenance of transmission and distribution networks, maintenance and reading of the metering points, the cost of electricity losses and cost of auxiliary services). The fee for renewable energy sources is compensation for the promotion of renewable energy sources in accordance with Regulation of the Government of BiH on renewable energy sources and cogeneration.

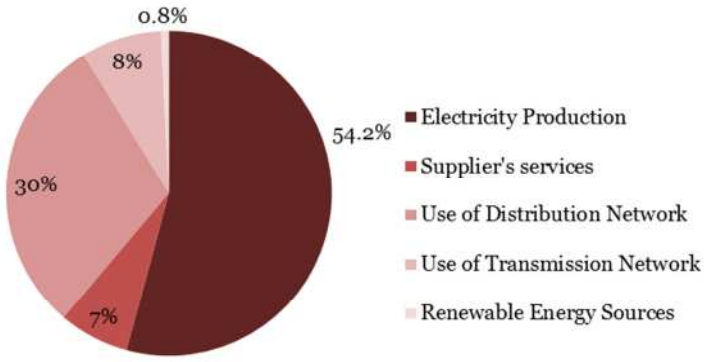


Figure 2.2.6 Cost Breakdown

Source: Annual Report of ISO BiH in 2012

(5) Billing and collection methods

EPBiH issues electricity bill once a month to customers. For non-household customers, electricity bill is received at the beginning of every month. For household, once the reading is done, the bill is sent out. If Bill for electricity, without commission can be paid at collection location of distribution subsidiaries, branches of Sparkasse Bank dd Sarajevo and Branches of Vakufsak Bank dd Sarajevo. With commission, bill can be paid at commercial banks and payment counter of BH Post.

2.2.5 Tariff in European countries and cross-border trade

(1) Tariff in European countries[27]

The market price of electricity in the South Eastern Europe is quite stable except occasional temporary fluctuations, ranging between 50 and 55 EURO/MWh. When comparing the electricity prices of the country with the European countries, that of BiH is relatively cheap.

[27] REPORT OF THE STATE ELECTRICITY REGULATORY COMMISSION in 2012 (SERK)

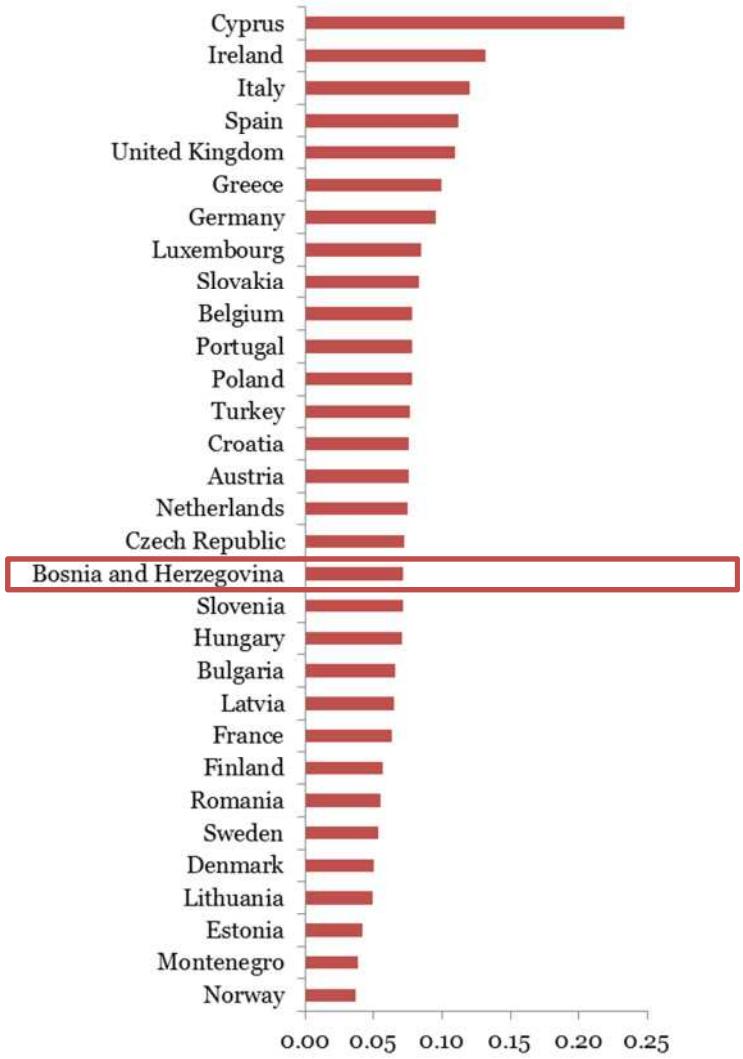


Figure 2.2.7 Electricity Price Components for industry in Europe 2012 (EURO/kWh)

Source: Created from the data of Eurostat

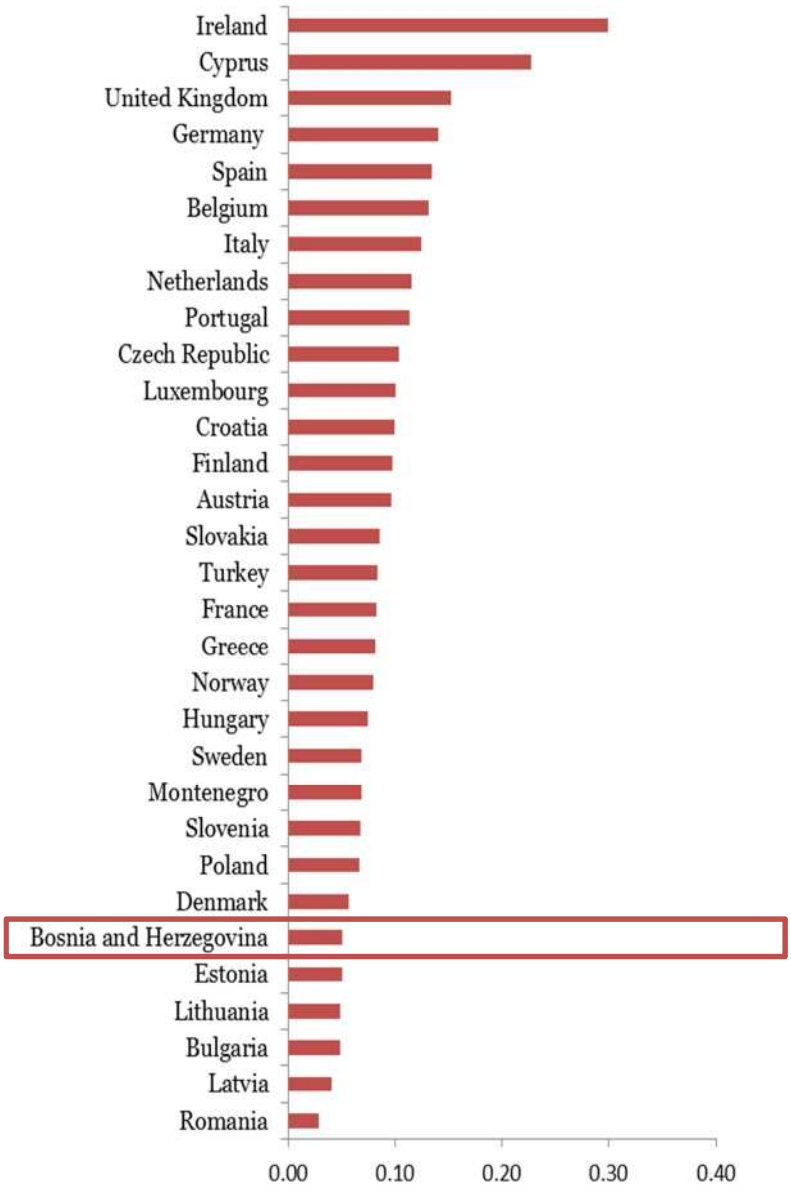


Figure 2.2.8 Electricity Price Components for household in Europe 2012 (EURO/kWh)

Source: Created from the data of Eurostat

(4) Cross-border trade[28]

BiH is one of the few countries in the region with a positive balance of electricity exports. The scope of cross-border trade was significantly reduced in 2012 compared to last year due to reduced generation, so the largest exporters, EPBiH and ERS, had minimum electricity surpluses available for export. Total export amounted to 1,569 GWh, which is a 39.5% decrease in comparison to 2011. In total, 13 entities exported electricity, among which GEN-I with 344 GWh was the leader in terms of the export scope. The largest scope of cross-border

[28] REPORT OF THE STATE ELECTRICITY REGULATORY COMMISSION in 2012 (SERK)

exchange is traditionally realized with Croatia and Montenegro respectively, and the smallest with Serbia. It is known that Croatia and Montenegro have significant balance deficits and thus are among the leading importers at the regional level. With respect to cross-border exchange, inter-connection capacities are contracted by the ISO with the neighboring countries on yearly basis and maintained monthly.

Table 2.2.5 Cross-border trade per border, including transit (GWh)

Country	Export	Import
Croatia	1,317.0	2,338.1
Serbia	634.5	848.3
Montenegro	1,734.9	164.7
Total	3,686.4	3,351.1

Source: Annual Report of ISO BiH in 2012

Electricity import amounted to 1,245 GWh, with the largest importer being "Aluminij" Mostar as in the previous years, with the amount of 878.4 GWh imported for self-consumption. 13 entities were involved in electricity import activities. The second largest importer was Rudnap with 121 GWh. In 2012, registered electricity transit via the BiH transmission network amounted to 2,111GWh, which is a 9.6% reduction in comparison to the previous year. Transit flows are important because their scope is used as the basis for determining revenues of every country participating in the inter-TSO compensation mechanism (ITC mechanism), which is described in more detail in earlier SERC reports on activities. Total revenue realized by BiH in the first six months of 2012 amounted to 2,965,092 KM, while for all of 2011, it amounted to 5,489,899 KM.

Since 2010, ISO BiH has applied the *Rules of Allocation of the Right to Use Cross-Border Transmission Capacities*, organizing auctions on a daily, monthly and annual basis.

Revenues realized to date on the basis of auctions for allocation of cross-border transmission capacities on an annual basis are provided as follows;

Table 2.2.6 Revenues realized on annual auctions

Year	Revenue (BAM)
2011	4,789,300
2012	4,970,880
2013	2,036,125
Total	11,796,305

Source: Annual Report of ISO BiH in 2012

At the auction in December 2012, available auction capacity was allocated to 12 registered companies. The highest price in the past was reached on the border with Serbia in the direction from Serbia to BIH in the amount of 5,379 KM/MW and the highest price in 2012 reached at a monthly auction amounted to 1,264.3 KM/MW and was registered on the border

with Croatia in the direction from BIH at the auction for March 2012.

The user of all revenues from auctions for allocation of the right to use cross-border capacities as well as revenues realized by the application of the ITC mechanism is Elektroprijenos/Elektroprenos BiH.

2.3 Trends in relevant policies, plans, budget and funding source that are determined by the government

2.3.1 Energy and funding policy

(1) Outline of energy policy

The complexity of political and organizational structure extends to the energy sector, where the entities have the primary responsibility over the sector.

The authorities in BiH believe that the energy sector is one of the stronger sectors of the economy with potential to contribute to economic development in the short and medium term. Accordingly and with regard to its obligations under the Energy Community and its ambitions for EU membership, reform of the electricity sector figures prominently in the economic development plans of BiH. However, due to the difficulty in reaching a shared understanding and acceptance of the tradeoffs implied in any major decision where tension between objectives is inevitable, there is as yet no fully articulated set of Entity policies, or a detailed framework at the delivery of energy policy reforms with the EU and with other Western Balkan countries within the competence of the two entities of BiH. Accordingly national energy efficiency action plan has not yet to be decided.

(2) Energy policy of each entity

General energy policy framework presented by the "Agreement on the principles of energy policy" and signed on the 6th November, 2008 by the Premiers of the entities and the Chairman of the Council of Ministers, stipulates that the principles for the development of the state energy strategy be defined once the entities' strategies have been adopted.

Pursuant to the Agreement and previously initiated activities, the Parliament of the Federation of BiH (the House of Representatives at the session held on the 13th January, 2009 and the House of Peoples at the session held on the 19th March, 2009) adopted the "Strategic Plan and Program of the Energy Sector Development of FBiH".

In December 2010, the National Assembly of the RS adopted a draft form of the RS Energy Development Strategy for the time period until 2030 and submitted it for public debate. The strategy was finally adopted by the National Assembly in March 2012. MoFTER BiH, as the ministry responsible for the fulfillment of international obligations in the energy sector, should start to work on harmonization of the terms of reference for the development of a comprehensive strategy for energy in BiH for the time period until 2030.

(3) Budgets

Due to decentralized government structure and administrative authorities below entity level have the right to collect and spend tax revenue while state government does not have it, information on the budget as a whole country is not available. As the State and Entity budgets available for addressing energy efficiency issues are limited and compete with other critical

areas of the economy for scarce funds, the primary source of finance for energy efficiency investments shall, for the time being, be directly financed by donor program. The government of BiH has established an "environment conservation foundation" to support a project which aims to reduce CO2.[29]

[29] http://www.fzofbih.org.ba/en/index.php

2.4 International cooperation toward energy sector in BiH

2.4.1 Basic principles of international and regional institutions towards power sector

(1) EU and European Investment Bank (EIB)

The achievement of EU energy objectives-i.e. cheap, clean and secure energy will require a substantial increase in energy investments. The bank's activities are primarily guided by EU policies in energy, climate change, and external affairs and development. It is estimated that three sectors-energy efficiency, renewable energy and energy networks-will account for most of the total investment in the EU and the majority of EIB's investments in the EU energy sector over coming years. Lending to these three sectors will also continue to be a substantial component of Bank financing for developing countries outside the EU. Limiting the environmental impacts of the energy sector remains a key objective of the EU. In October 2012, the European Investment Bank launched a public consultation as part of a review of its lending to the energy sector and in light of the market and EU policy developments that have occurred in recent years. In 2013, the consultation reached the following conclusion; emphasis on renewable energy and more stringent screening criteria for fossil fuels generation should be made.

- Emphasis on Renewable Energy:

  Although fossil fuels will remain the dominant fuel in primary energy consumption at a global as well as EU renewable energy sources (RES) have been established as an essential part of power production. The EIB will continue to focus on the economic justification of RES projects to ensure that the projects it finances are viable in the long term. Energy Efficiency investments remain a high priority for the EU and the EIB will aim to increase its activity in this area to further support EU and Member State policy initiatives.

- Stringent Screening criteria for fossil fuels generation:

  EU energy policy leaves the choice of the best mix of technologies to meet the EU's climate and energy objectives to Member States. The Bank takes "Technology neutral" approach to the financing of fossil fuel electricity generation projects but will screen out projects whose carbon footprint benchmark or the emission performance standard (EPS) in g/kWh is above a threshold level. This threshold is set at a level which reflects the EU's and EU Member States' existing commitments to limit EU carbon emissions as established in current energy and climate legislation.

(2) European Bank for Reconstruction and Development (EBRD)

The forthcoming Draft Energy Strategy in the period from November 2012 to April 2013 is being prepared as much has changed since 2006 when existing Energy Operations Policy was guided. Since 2006 EBRD has invested EURO 8.6 billion in 172 projects. The EBRD will support increased efficiency and decreased carbon intensity along the coal value chain.

However, the Bank will not finance any greenfield coal-fired power plant except in rare circumstances, where there are no economically feasible alternative energy sources.

(3) Others

The Energy Sector Directions Paper of the World Bank sets a principles-based course for the Bank Group's work in the energy sector with a focus on expanding energy access and sustainable energy. BiH participates in the UNECE's Climate Change Mitigation project and receives support to reform regulation and promote financial institutions financing for projects on regional energy efficiency and renewable energy investment.

2.4.2 ODA and assistance by international organization

(1) Track record

・Overall

There is no big change of Net ODA amount as well as bilateral share in last three years. Net ODA/GNI also remains around 2-3%. EU institutions are the one of the biggest donors, followed by IDA. United States and European countries such as Germany, Austria, Spain, Sweden are the second tier among top ten donors. United States has spent nearly USD 1.5 billion to improve the lives of citizens of BiH since 1994. Initially starting off with Post-war reintegration and development, United States is now focusing on Economic Restructuring and Democracy/Governance in BiH.[30] Germany has been working in BiH since 1995 with three priority areas; Governance/Democracy, Environment and Climate Change, Economic Development and Employment.[31]

Table 2.4.1 ODA to BiH Summary (2010-11)

Receipts	2009	2010	2011
Net ODA (USD million)	414	510	425
Bilateral share (gross ODA)	73%	52%	67%
Net ODA / GNI	2.3%	3.0%	2.3%
Net Private flows (USD million)	-30	217	153

Source: OECA-World Bank, www.oecd.org/dac/stats

30 USAID Website

31 Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH Website

Table 2.4.2 Bilateral ODA by Country (2010-11)

Top Ten Donors of gross ODA (2010-11 average)		USD m)
1	EU Institutions	92
2	IDA	76
3	United States	33
4	Germany	32
5	Austria	29
6	Spain	29
7	Sweden	29
8	Switzerland	23
9	Turkey	22
10	Korea	20

Source: OECD-World Bank

- Japan

BiH is implementing various domestic reforms in terms of the consolidation of peace and ethnic reconciliation and sustainable economic growth that takes the environment into consideration. Japan is providing support such efforts and side support for its efforts to join the EU eventually.

Japanese Government contributed development of BiH especially in latter 1990's and early 2000's.

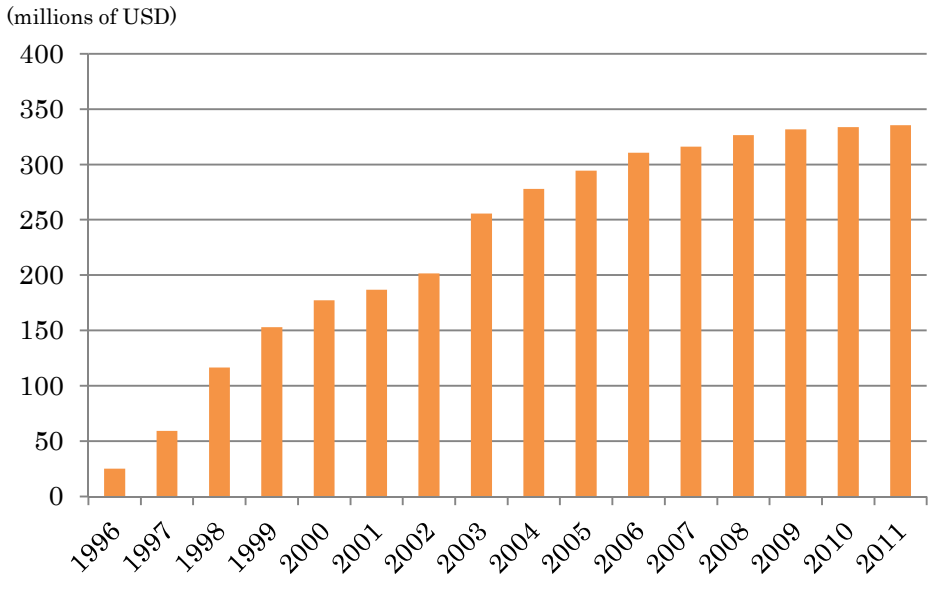


Figure 2.4.1 Accumulated ODA Disbursements by Japanese Government

Source: Created by date of the Ministry of Foreign Affairs of Japan

Table 2.4.3 ODA Disbursements by Japanese Government (Unit: million USD)

Year	Loan	Grant	Technical cooperation	ODA Total
1996		24.76	0.28	25.04
1997		32.89	1.28	34.17
1998		54.2	3.09	57.29
1999		34.11	2.29	36.4
2000		19.73	4.63	24.36
2001		6.76	2.88	9.64
2002	3.2	10.15	1.39	14.74
2003	20.41	28.63	4.93	53.97
2004	4.46	10.91	6.84	22.21
2005	3.97	6.26	6.45	16.69
2006	3.58	9.22	3.33	16.13
2007		1.65	3.73	5.39
2008	-0.65	7.75	3.5	10.6
2009	-1.44	1.84	4.54	4.95
2010	-1.44	0.98	2.69	2.24
2011	-1.53	1.36	1.68	1.51
Total	30.56	251.21	53.55	335.32

Source: Created by date of the Ministry of Foreign Affairs of Japan

Details of recent distribution of ODA by the Japanese Government are following:

- as ODA loan, the Japanese Government signed a loan agreement which promised to provide up to 12.633 billion Yen for the Flue Gas Desulphurization Construction Project for Ugljevik Thermal Power Plant in 2009;
- as grant aids, it provided 8.44 million USD for the Project for Improvement of the Equipment for Road Maintenance;
- technical cooperation programs are as follows:

  the Project for Sustainable Regional Development Through Eco-Tourism / 07.1-09.12; SME Promotion Project in BiH / 07.10-09.3; Informatics Curricula Modernization / 08.4-10.7; Comprehensive Pain Management in BiH / 08.5-10.5; The Project for Confidence-Building in Srebrenica on Agricultural and Rural Enterprise Development (SACRED) / 08.9-11.9; and Project for Informatics Curricula Modernization Phase 2 / 10.8-13.8.

There are two projects in energy sector.

- *Emergency Electric Power Improvement Project*: This loan, provided in the form of co-financing with the World Bank, is the first Japanese ODA Loan to BiH. The purpose of the project is to restore the supply of electricity by rehabilitating Kakanj thermal power plant and four coal mines adjacent to thermal power plants including Kakanj plant. Also, resumption of the supply of steam for house heating would contribute to the prevention of deforestation by inhabitants. This project provided almost 20% of all post-war facility investment in the two units of the Kakanj Power Plant and the six coal

mines. Although the railroad facilities at the Kakanj Coal Mines have not been utilized, over 80% of the facilities supplied by this project have been fully utilized. The facilities have contributed to improving performance of the Kakanj Themal Power Plant and maintaining and restoring productivity at Breza Coal Mines and Kreka Coal Mines. Consequently, the project promoted a drastic increase in energy production at the Kakanj Power Plant as well as securement of necessary coal supply for the four thermal power plants including Kakanj. Since the four thermal plants account for about 70% of the nation's entire power production, this project can be deemed contributory to economic reconstruction and improvement in the people's livelihood. Further, this project had a positive impact for the Kakanj Thermal Power Plant to reduce contaminants in emission gas.

- *Flue Gas Desulphurization Construction Project for Ugljevik Thermal Power Plant*: The ODA loan of 12.633 billion Yen was approved in 2009. Ugljevik Thermal Power Plant (TPP) located at Ugljevik, RS, with nominal output of around 300Mw with average annual production of about 1300GWh has about 8% of the electricity capacity of power generation in BiH and 23% of RS and is therefore an important supplier of energy in the Region. Ugljevik emits up to 25,000 mg/m3 N of SO2 which is 60 times more than the indicative amount in EU regulations. JICA has agreed to finance the supply, installation and commissioning of the FGD Installation in Ugljevik therefore to give a contribution to the improvement of the environment in BiH in line with EU regulation.

Table 2.4.4 Japan's ODA Disbursements to BiH (Unit: 100 million JPY)

Fiscal Year	Loan Aid	Grand Aid	Technical Cooperation
Total until 2006	41.4	278.17	42.3
2007		9.2	3.55
		The Project for Improvement of the Equipment for Road Maintenance 8.44 Grassroots Human Security PJ 0.76	(JICA 3.31)
2008	0	1.21	4.01
		Total PJ for the Improvement of Studio Equipment of Public Broadcasting Service of BiH (0.45) Grassroots Human Security PJ (0.76)	(JICA 3.90)
2009	126.33	0.85	3.63
	The Fueld Gal Desulphurization Construction PJ for Ugljevik Thermal Power Plant	Grassroots Human Rights (8 Projects)	JICA 3.49
2010		1.43	1.93
		PJ for the Improvement of Musical Instruments of the Sarajevo Philharmonic Orchestra (0.44) Grassroots Human Security PJ 7 projemcts(0.99)	JICA 1.79
2011	-	1.08	1.3
		Grassroots Human Security Projects (1.08)	
Total	167.43	291.95	56.31

Source: Created by PwC based from JICA data

Table 2.4.5 Japan's ODA Project in Energy Sector

No	Project name	Subsector	Project type	Date of approval (year/month/day)	Amount of (millions; jpy)	Main portion (portion applied to reduced interest rate)				Executing agency
						Interest rate(%)	Repayment period (years)	Grace period (years)	Tying status	
1	Emergency Electric Power Improvement Project	Power Plants	Environmental	1998/12/17	4,110	0.75	40	10	General Untied	Elektroprivreda Bosne I Hercegovine, Central Bosnia Coal Mines, Tuzla Coal Mines, Elektroprivr
2	FGD Construction Project for Ugljevik Thermal Power Plant	Power Plants	Environmental	2009/10/20	12,633	0.55	30	10	General Untied	Elektroprivreda of Republika Srpska Parent Company

Source: JICA

(2) Trends and focus areas

The state structure under the Dayton Agreement has contributed to an institutionalization of ethnic differences. The challenges are not only at the state level; there are also considerable challenges at the entity level. Fragmentation of power downwards in the system is a major challenge which creates a poor political balance in the country. The international community has an important role to play in the reform process but this role must be exercised in a considerable manner. The political situation is difficult, with low economic growth, deficit in the trade balance and high unemployment. To improve the situation, economic infrastructure and other social sectors are main focus areas, which accounts for 73%.

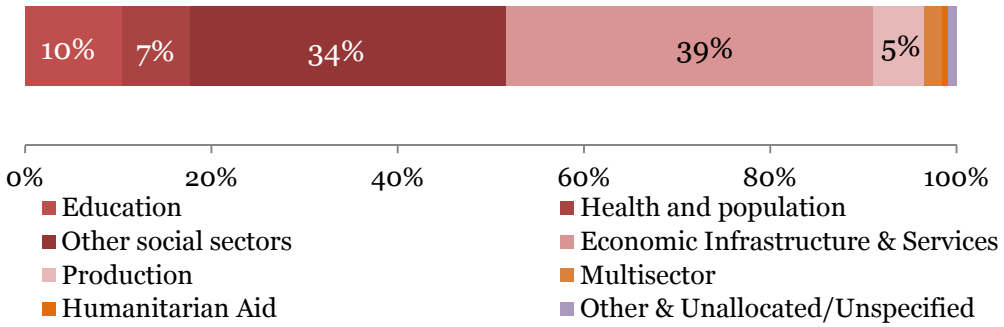


Figure 2.4.2 ODA by Sector 2011

Source: World Bank DCA Stat.

(3) Initiatives in energy/power sector

・ Past Projects

Previously there are four major projects related to energy sector initiated by World Bank.

- *Emergency Power Reconstruction Project (closed in 1998)*: The objective of the project is to (i) restore electricity service to acceptable levels in the major cities and for vital industries, (ii) increase coal production in the most efficient mines to supply the fuel necessary for thermal power plants (iii) reconfigure the electric power network (iv) enhance the electricity enterprises' institutional capacity and improve their finances; and (v) support power and coal sector restructuring. The project beneficiaries were EPBiH and RUT, the Tuzla coal company. Inclusion of the latter was an indispensable precondition to increasing power generation. The project was completed and fully disbursed on schedule by end-1998, only three years from identification. As an outcome, electricity production from EPBiH's rehabilitated plants rose by two-thirds, to over 2,400 GWh, by the time of project completion. RUT's coal production doubled between 1996 and 1998 to over 2 million ton, keeping pace with the needs of the power sector. Excellent results were also achieved in the financial areas as energy losses in the EPBiH

distribution system fell sharply and there were major improvements in meter reading, billing and revenue collection. Tariffs were also raised to nearly US 7 cents/kWh on average. EPBiH's revenue collections reached 100 percent of its cash operating expenses, above the covenanted level of 100 percent.

Table 2.4.6 Summary of Emergency Power Reconstruction Project

	Appraisal Estimate	Actual Estimate	Actual as % of appraisal estimate
IDA Credit	35.00	34.24	98%
Confinancing	146.35	134.12	92%
Government	15.00	14.07	94%
Total Project Costs	196.35	168.36	86%

Source: World Bank Project Report

- *Second Electric Power Reconstruction Project (closed in 2001)*: The objective is to improve cost recovery by the three electricity utilities. A third unstated objective was to reduce improve cost recovery by the three electricity utilities and also to reduce the environmental impact of electricity generation in BiH. The project successfully increased the capability of the three utilities to expand their production and sales of electricity. Collectively they raise the demand served in their operating areas by about 20 percent in three years, to 9,400 GWh in 2001. It also permitted the restoration of electricity supply to over 60,000 post-conflict returnees in rural areas, which was an important achievement from a social and political perspective. More modest progress was recorded in reducing energy losses at 25-30 percent particularly in the areas service by ERS and EPHZHB.

Table 2.4.7 Summary of Second Electric Power Reconstruction Project

	Appraisal Estimate	Actual Estimate	Actual as % of appraisal estimate
IDA Credit	25.00	23.97	96%
Confinancing	111.86	102.38	92%
Government	32.88	32.65	99%
Total Project Costs	169.74	159.00	94%

Source: World Bank Project Report

- *Electric Power 3 RECN Project (Closed in 2008)*: Project Development Objectives is to ensure access to reliable and lower cost electricity which will be supplied with reduced environmental and safety risks, and improved cost recovery by suppliers. Target population was household and non-household consumers of electricity throughout Lashva and those in small towns and rural areas who did not benefit from previous stages of rehabilitation of the power system. The project's focus was on restoration of the 400kV and other high voltage transmission systems, especially reconstruction of

damaged substations. This restoration was envisioned to help BiH to help to restore the pre-war interconnections with the other parts of former Yugoslavia and eventually to rejoin the Union for the Coordination of Transmission in Europe (UCTE). There were seven principle project components: 1) Rehabilitation of the high voltage transmission network lines started under Power 2. 2) Reconstruction of key 400/220/110 kV substations. 3) Establishment of Supervisory Control and Data Acquisition (SCADA) system and associated telecommunication facilities. 4) Safety and rehabilitation requirements of select hydropower stations (Jablanica, Rama and Trebinje). 5) Pollution reduction at selected thermal power generation plants as Tuzla, Kakanj, Gacko and Uglijevik. 6) Distribution investments focus on areas identified for refuge return and heavily damaged and cut-off areas. 7) Technical assistance and training in support of procurement and implementation of the physical components, the development of the Joint Power Coordinating Center (ZEKC) into an ISO BiH, a survey of socially vulnerable electricity consumers, corporation and commercialization of the power sector enterprises and establishment of independent power sector regulatory agencies for BiH.

Table 2.4.8 Summary of Electric Power 3 RECN Project (Unit: million USD)

EPBiH	Total	IDA	EBRD	EIB	SECO	Own fund
A. Transmission	24.89	9.22		14.94		0.73
B. SCADA	7.53		7.53			
C. Hydropower Stations	13.68				13.68	
D. Thermal Power Stations	9.28		9.28			
E. Technical Assitance	1.07	1.07				
Total	56.45	10.29	16.81	14.94	13.68	0.73

EPHZHB	Total	IDA	EBRD	EIB	EC	Own fund
A. Transmission	26.24	3.09		17.62		5.53
B. SCADA	17.51		17.51			
C. Hydropower Stations	3.72	2.62				1.10
D. Thermal Power Stations	0.00					
E. Technical Assitance	3.51	2.88			0.63	
Total	50.98	8.59	17.51	17.62	0.63	6.63

EPRS	Total	IDA	EBRD	EIB	KfW	Own fund
A. Transmission	44.69	8.79		24.24		11.66
B. SCADA	15.34		11.79			3.55
C. Hydropower Stations	4.64				3.89	0.75
D. Thermal Power Stations	8.57		7.19			1.38
E. Technical Assitance	1.17	1.17				
Total	74.41	9.96	18.98	24.24	3.89	17.34

Source: World Bank Project Report

- *Energy Community of South East Europe APL3-Bosnia and Herzegovina Project (closed in 2012)*: The objective of the project is to facilitate BiH's participation in ECSEE through investments to (i) improve dam safety; (ii) reduce adverse

environmental impacts at thermal power stations; (iii) replace ageing existing facilities and equipment at hydropower and thermal power stations; (iv) rehabilitate distribution systems and introduce distribution Supervisory Control and Data Acquisition (SCADA) systems (v) establish a market operation system (vi) provide hardware and software to improve the financial management information systems of the Elektroprivredas; and through technical assistance to facilitate project implementation, and determine the best way to reduce sulfur dioxide and nitrogen oxide emissions at a power plant. The project was implemented by EPHZHB, ERS and EPBiH. Disbursed amount is XDR 24.85 million with co-financiers are KFW, EBRD and EIB. The project consists of four parts, of which Parts A with EPBiH, B with EPHZHB and C with ERS were for financing by IDA and Part D (HPPs) was for financing by co-financiers (EBRD, EIB and KfW) through parallel financing arrangements.

Table 2.4.9 Summary of Energy Community of South East Europe APL3-Bosnia and Herzegovina Project

	Cost During Appraisal ($m)	Cost as Completed or latest estimates ($ m)	Percentage of Appraisal estimate
A. IDA Financed Compotents			
EPBiH Kakanj TPP			
ESP unit 5	3.17	5.18	163.40
Waste Water Treatment	1.24	0.08	6.50
Cultivate Ash and Slag Waste dump	1.56	1.31	84.00
Environmental Monitoring Equipment	0.62	0.78	125.80
Study for Reduction of Sox	0.62	0.32	51.60
EPBiH Tuzla TPP			
Ash and slag transportation system	12.18	13.29	109.10
Coal handling and Waste water treatmer	7.29	13.56	186.00
EPBiH Financial Mangement Information Sy	1.00	1.56	156.00
EPBiH TA for implementation of IDA financ	0.40	0.06	15.00
EPHZHB FMIS	1.00	0.53	53.00
EPRS Ugljevik TPP			
Monitoring and automatic control syster	3.04	4.04	132.90
Wastewater treatment and monitoring s	0.74	4.41	595.90
Water cooling system	1.05	2.57	244.80
Power Plant for owne electricity consum	4.17	5.79	138.80
EPRS Gacko TPP			
Waste Water Treatment	2.86	5.51	192.70
Ash and slag transportation system	1.36	3.28	241.20
0.4 kV auxiliary services system	3.48	3.35	96.30
EPRS FMIS	1.00	1.32	132.00
EPRS TA for Implementation of IDA finance	0.50	0.58	116.00
Dam Safety Components consulting for all 3	1.00	1.51	151.00
Procurement Training	0.06	0	
Base cost for IDA financed Components	48.34	69.03	142.80
B. EBRD Financed Components			
EPBiH Selected facilities of Distribution	19.43	26.73	137.6
EPHZHB Selected facilities of Distribution	19.43	24.7	127.1
EPRS Selected facilities of Distribution	17.03	21.48	126.1
Support for Implementation to all 3 EPs	2.00	0.22	11
Base cost for EBRD Financed Components	57.89	73.13	126.3
C. KfW Financed Components			
EPHZHB HPP Rama			
Enlarge 220 kV switchgear	2.68	5.92	220
Replace Turbine, Generator and Bulk Transfo	19.34	27.67	143.1
Distribution SCADA systems for all Eps	18.01	27.75	154.1
Implementation of KfW financed Componen	1.3	0.31	23.8
Base Cost for KfW financed Components	41.33	61.65	149.2
D. EIB Financed Components			
EPBiH			
HPP Grabovica	1.08	0.66	61.1
HPP Salakovac	2.01	2.53	125.9
HPP Jablanica	2.05	4.74	737.9
Water Leaks	0.47	3.33	708.5
Selected Distribution facilities	26.18	36.26	138.5
EPHZHB			
HPP Capljina	3.08	4.12	133.8
HPP Rama	5.69	3.58	82.9
Selected Distribution facilities	10.47	14.05	134.2
EPRS			
HPP Trebinje II	1.14	1.61	141.2
HPP Visegrad Repair of water leak	13.24	12.9	160.9
HPP Bocac	6.54	9.67	304
Selected Distribution facilities	23.22	22.43	96.6
ISO: Install Market Operating System	6.09	0	0
Implementation of EIB financed Component	2.6	0.05	1.9
Base Cost for EIB financed Components	103.86	115.93	111.6
Total Base Cost for all components	251.42	319.74	127.2
Physical Contingencies	21.59		
Price Contingencies	13.56		
Total Project Cost	286.57	319.74	127.2

Source: World Bank Project Report

Currently there are no coal-fired plant related projects sponsored by international/regional organizations. However, the low energy efficiency in BiH has been brought to the attention among them. BiH Energy efficiency Project which is now in the appraisal phase has initiated by the fact of high energy and carbon emission in BiH. Despite a 20 percent decrease in energy intensity since the 1990s, BiH is still almost 40 percent more energy intensive than the average in the Western Balkan countries, and more than twice the average in EU countries. High levels of losses in energy transformation, dated infrastructure and technologies, poorly insulated buildings and the use of inefficient equipment are major factors contributing to the combined with a fragmented legislative and institutional framework create an insufficient environment to provide incentives for energy efficiency improvements. Mirroring the high energy intensity and heave reliance on coal in the energy sector, CO2 emissions intensity is also comparatively high. BiH emitted nine times more CO2 per USD of GDP than the average in EU countries and 76 percent more than the average in the Western Balkan region. According to the World Bank report, as a result, there is significant potential for energy savings and carbon emission reductions through energy efficiency improvements. The Government of BiH has recognized the importance of energy efficiency to support sustainable economic growth and move towards EU accession. The international community plans to support the affordable financing for investment in the area at estimated cost around USD 32 million.

- Ongoing Project

There are ongoing several projects of Hydro Power and Wind Power plants supported by regional organizations, which could lead the sustainable economic growth. Apart from EIB and EBRD, the German KfW is proactive to invest these alternative energies.

Table 2.4.10 Ongoing Project Summary

PROJECT*	Description	Source and type of funds	Estimated / Contracted loan (grant) funds (KM)	Total 2014	Quarterly disbursement plan in 2014				Total 2015	Quarterly disbursement plan in 2015				Total 2016	Quarterly disbursement plan in 2016			
					I	II	III	IV		I	II	III	IV		I	II	III	IV
HPP Vranduk	Construction of HPP Vranduk	EIB-loan	73.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7	0.0	9.7	0.0	0.0
		EBRD-loan	50.9	18.5	4.6	4.6	4.6	4.6	30.5	7.6	7.6	7.6	7.6	0.0	0.0	0.0	0.0	0.0
HPP Kovanići	Preparation of Feasibility Study for Construction of HPP Kovanići	KfW-grant, with KfW as potential financier of main project	1.7	0.7	0.0	0.3	0.2	0.2	1.0	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0
HPP Una Aneks	Rehabilitation of HPP Una and construction of a new Unit (Annex)	EBRD-loan	17.6	3.5	1.8	0.0	0.0	1.8	7.0	1.8	1.8	1.8	1.8	7.0	1.8	1.8	3.5	0.0
HPP Kruševo & Zeleni vir	Preparation of Feasibility Study for Construction of HPP Kruševo & Zeleni vir	Western Balkans Investment Framework-grant, with EIB as potential financier of main project	2.0	2.0	0.5	0.1	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HPP Babino selo	Preparation of Feasibility Study for Construction of HPP Babino selo	Western Balkans Investment Framework-grant, with EBRD as potential financier of main project	1.5	1.5	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HPP Janjići	Construction of HPP Janjići	KfW-loan	58.7	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	4.0	34.4	8.6	8.6	8.6	8.6
HYDRO POWER PLANTS			**205.6**	**26.2**	**7.3**	**5.5**	**5.7**	**7.4**	**42.6**	**9.7**	**9.7**	**9.7**	**13.4**	**51.1**	**10.4**	**20.0**	**12.1**	**8.6**
WPP Podveležje	Construction of WPP Podveležje	KfW-loan	127.1	0.0	0.0	0.0	0.0	0.0	25.4	0.0	25.4	0.0	0.0	50.8	25.4	0.0	25.4	0.0
WPP Vlašić	Preparation of Feasibility Study for Construction of WPP Vlasic	Western Balkans Investment Framework-grant, with EIB as potential financier of main project	1.5	0.5	0.0	0.0	0.5	0.0	1.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WIND POWER PLANTS			**128.6**	**0.5**	**0.0**	**0.0**	**0.5**	**0.0**	**26.4**	**0.5**	**25.9**	**0.0**	**0.0**	**50.8**	**25.4**	**0.0**	**25.4**	**0.0**
Distribution (smart meters)	Purchase and installation of approx. 120.000 smart meters	EIB-loan	29.3	9.8	0.0	0.0	0.0	9.8	9.8	0.0	0.0	0.0	9.8	9.8	0.0	0.0	9.8	0.0
SCADA/DMS/OMS on distribution level	Introduction of SCADA/DMS/OMS on distribution level	KfW-loan	9.3	0.0	0.0	0.0	0.0	0.0	5.0	2.0	1.0	1.0	1.0	4.3	1.0	1.0	1.0	1.3
		KfW-grant	5.1	1.0	0.0	1.0	0.0	0.0	2.5	1.0	0.0	0.5	1.0	1.6	0.0	1.0	0.0	0.6
DISTRIBUTION			**43.7**	**10.8**	**0.0**	**1.0**	**0.0**	**9.8**	**17.3**	**3.0**	**1.0**	**1.5**	**11.8**	**15.7**	**1.0**	**2.0**	**10.8**	**1.9**
TOTAL ENERGY			***377.9***	***37.5***	***7.3***	***6.5***	***6.2***	***17.2***	***86.3***	***13.2***	***36.6***	***11.2***	***25.2***	***117.6***	***36.8***	***22.0***	***48.3***	***10.5***

Source: World Bank Project Report

2.5 The country's relevant laws and regulations

2.5.1 Legal system in BiH

Legal autonomy is entitled to both state government and local governments (FBiH, RS and Brcko district). Under state level, the Parliamentary Assembly is responsible for enacting legislation as necessary to implement decisions of the Presidency or to carry out the responsibilities of the Assembly under the constitution; deciding upon the sources and amounts of revenues for the operations of the institutions of BiH; approving a budget for the institutions of BiH; deciding upon international policies of BiH such as foreign policy, foreign trade, custom policy, monetary policy; and deciding whether to consent to the ratification of treaties. Under local government level, legal system depends on two entities but have competencies in areas such as finance, taxation, operation of the business and general legislation. However most substantive and procedural laws governing private business transactions have been adopted and are enforced at the entity level.

2 entities in BiH are organized into municipalities as the basic local government unit. Each entity has own legislature, basic laws (constitutions), governors and ministries. In FBiH, in addition to a federal level of government and local governments, ten sub-national units called cantons. RS has a centralized administrative structure and Ministry of Local Self-Government to regulate and co-ordinate municipalities.

2.5.2 PPP/BOT Law

PPP Law in BiH and FBiH are still being under discussion while some cantons in FBiH, RS and Brcko District have enacted its own law.

(1) Outline of PPP/BOT Law in BiH

In BiH, there is the Law on Concessions of BiH (Official Gazette of BiH no. 32/02, November 7th 2002) but PPP law has not been adopted yet although the promotion of PPP projects is identified as a priority under Public Administration Reform in BiH. The objective of PPP Project is the establishment of the functional PPP system in BiH in accordance with European legislation, standards and best European practices.

The Law on Concessions of BiH regulates the concessions in the sectors that are under jurisdiction of BiH, pursuant to the Constitution and laws of BiH and in case it concerns the representation of international subjectivity of BiH, as well as in the cases where concession property extends to FBiH and the RS for providing services, exploitation of natural resources and facilities used for their exploitation, financing, design, construction, rehabilitation, maintenance and/or operation of such infrastructure and all accompanying facilities thereto.

Purpose of the Law on Concisions of BiH is to create a transparent, non-discriminatory and

clear legal framework to set the conditions under which local and foreign legal persons may be granted concessions in BiH and to encourage the investment of foreign capital. Contents of the Law on Concessions are shown as below table.

Authority to grant a concession is the Council of Ministries of BiH which makes the decisions on type and subject as well as volume of the concession to be granted which is subject to ratification by the BiH Parliamentary Assembly.

Table 2.5.1 Article headings of the Law on Concessions in BiH

CHAPTER I- GENERAL PROVISIONS	
Article 1	Contents and subject of the Law
Article 2	Purpose of the Law
Article 3	Definitions
Article 4	Authority to Grant a Concession
CHAPTER II- INSTITUTIONAL STRUCTURE	
Article 5	Concession Committee of Bosnia and Herzegovina
Article 6	Commission's Functional Distribution of Competence
Article 7	Composition of the Com mission
Article 8	Appointment of Commissioners
Article 9	Term of Office
Article 10	Appointment and Remuneration of Personnel
Article 11	Funds for Operation of the Commission
Article 12	Operation of the Commission
Article 13	Decisions of the Commission
Article 14	Reporting Obligation
Article 15	Public Hearings
Article 16	Competence of the Commission
Article 17	Other Duties and Functions of the Commission
Article 18	Reexamination of the Decisions of the Commission
Article 19	Rules of the Commission
Article 20	Inspection and Verification of the Work of Concessionaires
CHAPTER III- TENDERING PROCEDURE	
Article 21	Concession Project Approval
Article 22	Public Invitation
Article 23	Approving Public Invitation
Article 24	Granting of Concession
Article 25	Unsolicited Proposal
CHAPTER IV- CONCESSION CONTRACT	
Article 26	Contents of Concession Contract
Article 27	Termination of Concession Contract

Article 28	Legal Status of the Concessionaire
Article 29	Rights of the Concessionaire
Article 30	Obligations of the Concessionaire
CHAPTER VI- TRANSITIONAL, PENAL AND FINAL PROVISIONS	
Article 31	Initial composition of the Commission
Article 32	Application of law
Article 33	Penalties
Article 34	Payment of funds
Article 35	Jurisdiction of court
Article 36	Entry into force

Source: JICA Study Team

(2) Discussion of PPP/BOT Law in FBiH

In FBiH, there is the Law on Concessions of the Federation of Bosnia and Herzegovina (Official Gazette of FBiH, no.40/02) while draft PPP Law proposed by the Federal Ministry of Transport and Communication is still being under discussed..

In January 2013, the Government of FBiH signed an agreement with IFC in order to structure and implement a PPP transaction for the design, financing, construction, operation and maintenance of a highway section part of Corridor Vc with the assistance of IFC as its Lead Transaction Advisor. Draft PPP Law is under the discussion by the parliament as of the end of 2013.

PPP Law in FBiH is still being under discussion. Draft PPP law basically intends to create public, nondiscriminatory and clear legal grounds for the purpose of identifying requirements under which the domestic and international legal and natural persons can implement the PPP projects together with the public partners in the Federation.

It shall regulate a contractually regulated cooperation between the public and the private partner to carry out PPP projects. Public partner represents one or more public bodies which conclude(s) a contract with a private partner; or one or more public bodies which has a membership in the Company along with a private partner. Public body represents: the Federation, canton, town, municipality, public institution founded by the Federation, canton, town or municipality and a company with majority state capital. Private partner represents a domestic or international private legal entity, natural person or natural person registered as entrepreneurship which is selected in the procedure determined under this Law and which concludes a contract on PPP with a public partner or becomes a member in the Company along with a public partner.

The subject of PPP is designing, construction, rehabilitation, reconstruction, operation and maintenance of infrastructure so as to fulfill the public needs and principles of PPP project, which are the long-term contractual relations, public interest protection, free competition,

efficiency, equal treatment, transparency, freedom of concluding contracts, and transfer of built infrastructure to the ownership of public partner upon expiration of the agreed period of use with due diligence, definition of fair conditions to ensure repayment of invested capital, profit making and risk allocation, protection of environment.

The selection of a private partner shall be conducted by way of public bid invitation and he bid invitation shall be conducted by the Commission founded by the public partner. A public body shall delegate an authorized representative to be a member in the relevant Commission for the purpose of evaluating the PPP project implementation within the scope of its competence. Contract on PPP can be concluded only upon the approval of the relevant Commission and relevant finance ministry, as well as an opinion of the relevant state attorney.

No later than 90 days from the day when PPP Law comes into force the Federation Government shall pass the following bylaws;

- Rules on the bid invitation for PPP projects
- Rules on criteria for the evaluation and approval of PPP
- Rules of supervision over the PPP projects implementation
- Rules of education of participants in the preparation procedure
- Rules on the structure and manner of keeping the Register of Contracts on PPP.

No later than within six months from the day this Law becomes effective, for the purpose of making entry in the Register, the public bodies shall submit to the Commission all contracts that a public body concluded for a term longer than five years.

Procedures initiated before this Law became effective shall be terminated in accordance with the regulations under which they were initiated, which will be decided by the relevant Government and provisions of this Law relative to the supervision over the PPP project implementation shall also apply to PPP projects implementation of which started before this Law became effective.

Table 2.5.2 Contents of the PPP Law in FBiH

CHAPTER I- GENERAL PROVISIONS	
Article 1	Concepts regulated by the Law
Article 2	Competence of the Federation Concession Commission
Article 3	Purpose of the Law
Article 4	Principles of the PPP
Article 5	Definitions
Article 6	Supplementary definition on the “Private partner”
CHAPTER II- CONTRACTED PUBLIC PRIVATE PARTNERSHIP	
Article 7	Subject of the PPP

Article 8	Rights and obligations under the PPP contract
Article 9	Contracting period
Article 10	Transfer of the PPP contract
Article 11	Termination of the PPP contract
Article 12	Cessation of the PPP contract
Article 13	Supervision of the PPP project
Article 14	Delegation of the representative from the public body
Article 15	Establishment of the project company
III PROCEDURE OF PROPOSAL, APPROVAL AND IMPLEMENTATION OF PPP PROJECTS	
Article 16	Procedure for the decision to enter in PPP
Article 17	List of the PPP projects
Article 18	Evaluation of proposed PPP Project
Article 19	Decision on the project initiation
Article 20	Procedure for the approval on the bidding documentation
Article 21	Implementation of bid invitation
Article 22	Selection procedure of consultant for a public body
Article 23	Self-initiated bid by a private partner
Article 24	Objections against the selection of the most favorable private partner
Article 25	Approval of the signing of contract on PPP project
Article 26	Registration of the contract on PPP project
Article 27	Monitoring authority for the project
IV COMPANY FOR PPP PROJECT IMPLEMENTATION	
Article 28	Entity of the project implementation
Article 29	Preparation and approval of PPP projects through a Company
V INSTITUTIONAL STRUCTURE	
Article 30	Independent regulatory body for PPP project costs paid by a private partner
Article 31	Duties of the Federation Concession Commission
Article 32	Procedure for adoption of the Document on PPP project allocation policy
Article 33	Sources of funds necessary for the operation of the Concession Commission
Article 34	Annual Report
VI LEGAL PROTECTION	
Article 35	Law governing the Concession Commission
Article 36	Jurisdiction of court
Article 37	Applicable law
VII PENALTY CLAUSE	
Article 38	Penalties
VIII TRANSITIONAL AND FINAL PROVISIONS	
Article 39	Relevant regulations
Article 40	Retroactive effect on the previously concluded contracts
Article 41	Entry into force

Source: JICA Study Team

(3) Discussion of PPP/BOT Law in RS

In RS, Law on Public Private Partnership of Republika Srpska (Official Gazette of RS, no. 59/09) ("PPP Act") became effective July 2009 and it is fully compliance with the relevant EU Directives. The PPP Act stipulates that the public partner has to draw up an economic justifiability study for every PPP project before announcement of the public tender and private partner selection procedure shall be regulated by implementing regulation. The PPP Act prescribes two main forms of PPPs[1]:

- The institutional form of PPP wherein the public partner and private partner become shareholders of a special contractor (joint venture company) through which a PPP project is implemented; and
- The contractual form of PPPs wherein the rights and obligations of the public partner and private partner are exclusively contractually regulated. The main contractual forms of PPPs are concessions and private financial initiatives. The concession form of PPPs must be realized in accordance with the provisions of the Law on Concession of Republika Srpska. The private financial initiative is a contract under which the private partner finances, performs, maintains and manages a public building in order to fulfill the need of the public sector, whereby the private partner will charge for its services to the public sector in accordance with the prior specified standards concerning the space and services as well as the payment mechanism.

In accordance with PPP Act, there is a Law on Concessions of Republika Srpska (Official Gazette of RS, no. 25/02).

(4) Discussion of PPP/BOT Law in other jurisdictions

Law on Public Private Partnership of Brcko District (Official Gazette of BD, no. 10.07) came into force in January 2010 in Brchko District and there is also Act koncesijama Brcko District (Official Gazette of BD no. 41/06).

Tuzla Canton has adopted PPP Law in November 29, 2012 and it was published in the Official Gazette of Tuzla Canton.

2.5.3 Law on Public procurement

Public procurement system in BiH is governed by Law on public procurement for Bosnia and Herzegovina (Official Gazette of BiH, no. 49, 2 November 2004) and the purpose of this law is to establish the public procurement system in BiH, the rights, obligations and responsibility of participants in the procurement procedures and the procedure for the control of public procurement procedures with the objectives of ensuring that public funds are used

[1] Source: CMS "PPP in Europe" 2010

in the most cost-effective manner with respect to the purpose and the object of the public procurement.

(1) Applicable entities of the Law

Public procurement refers to the procurement of goods, services and works, performed by contracting authorities and a contracting authority shall be:

- any administrative authority at BiH, Entity, Brčko District, Cantonal, City or Municipal level (hereinafter referred to as authorities at State or local levels of administration);
- any public entity defined as follows;
  - established for the specific purpose of meeting needs in the general interest, not having an industrial or commercial character, and
  - having legal personality, and
  - financed, for the most part, by authorities at State or local levels of administration or by other public entities; or subject to management supervision by those authorities or entities; or having an administrative, managerial or supervisory board, more than half of whose members are appointed by authorities at State or local levels of administration or by other public entities.
- any public enterprise carrying out one of the activities defined as follows over which a contracting authority may exercise a dominant influence by virtue of its ownership of it, its financial participation therein, or the rules which govern it.
  - the provision or operation of fixed networks intended to provide a service to the public in connection with the production, transport or distribution of water; or electricity; or gas or heat or the supply of water, electricity, gas or heat to such networks.
  - the exploitation of a geographical area for the purpose of exploring for or extracting oil, gas, coal or other solid fuels, or the provision of airport, maritime or inland port or other terminal facilities to carriers by air, sea or inland waterway.
  - the operation of networks providing a service to the public in the field of transport by railway, automated systems, tramway, trolley bus, bus or cable;
  - the provision or operation of public telecommunications networks or the provision of one or more public telecommunications services.

However, the following contracts may be exempted from the application of this Law:

- contracts related to state secrets as they are defined by the relevant BiH Laws, Regulations or Administrative Provisions in force;
- contracts, the execution of which must be accompanied by special security measures in

accordance with the relevant BiH Laws, Regulations or Administrative Provisions in force;

- contracts awarded pursuant to an agreement under which the particular procedure of an international lending or donor organization applies;
- contracts in the field of defense related to the production of or trade in arms, munitions and war material;
- the acquisition or rental, by whatever financial means, of land, existing buildings or other immovable property, or concerning rights thereon.
- Concession contracts

(2) Types of award procedures

Contract shall be awarded by means of one of the following procedures.

- open procedure;
- restricted procedure with pre-qualification;
- negotiated procedure with publication of a procurement notice;
- negotiated procedure without publication of a procurement notice;
- design contest.

However, when the contract value is lower than KM 30 000 (thirty thousands) in the case of goods and services, or KM 60 000 (sixty thousands) in the case of works, competitive request-for-quotations procedure shall be awarded by a competitive request-for-quotations procedure as well as above procedures.

(3) Evaluation criteria

Upon completion of the selection of the qualified candidates or tenderers, the criteria on which the contracting authority shall base the award of contracts shall be:

- either the most economically advantageous tender for the contracting authority, based on stipulated evaluation criteria identified according to the nature and scope of the subject matter of the public contract in question, for example: quality, price, technical merit, functional and environmental characteristics, running costs, cost-effectiveness, after-sales service and technical assistance, delivery date and delivery period or period of completion; or
- the lowest price of a technically compliant tender.

2.5.4 Law on Foreign direct investment

Law on Foreign Investments (Official Gazette of the FBiH, 61/01 and 50/03) stipulates rights, obligations and privileges, forms, procedure of approval and registration and authorities in charge of approval and registration relating to foreign investment in the FBiH.

(1) Main rights, obligations and benefit of foreign investors are as follows:

- Foreign investor may establish a company in the FBiH under the same terms and conditions applicable to local investors according to the Company Law;
- Foreign investors shall have the same ownership rights of real estate as have domestic legal and physical persons;
- Foreign investors shall have the right to transfers abroad, freely and without delay, in free convertible currency, of profits accrued as a result of their investment in the Federation BiH including but not limited to:
  - ✓ investment gains accrued in the form of profit, dividends, interest and other forms;
  - ✓ funds earned by investors after partial or total liquidation of their investments in the FBiH or from the sale of assets or ownership rights; and
  - ✓ compensation for nationalization.

(2) Forms of foreign investments:

1. legal entity fully owned by foreign investor;
2. legal entity with joint venture;
3. Investment in the existing legal entity; and
4. Special forms of investments.

(3) Foreign investments approval and registration procedure (Article xx)

Foreign investors have to submit an application for approval of investment and be registered with approval from the relevant Ministry within 30 days from the day of signing of the Contract or any other document on investment together with any amendments to the respective documents. If foreign investors failed to apply for registration of foreign investment or submitted incorrect information in the application or the person in charge of the legal entity will be fined from 100.00 KM to 1.000 KM for violation of Paragraph 1 of this Article, a legal entity shall be fined 500.00 KM to 5.000 KM for violation.

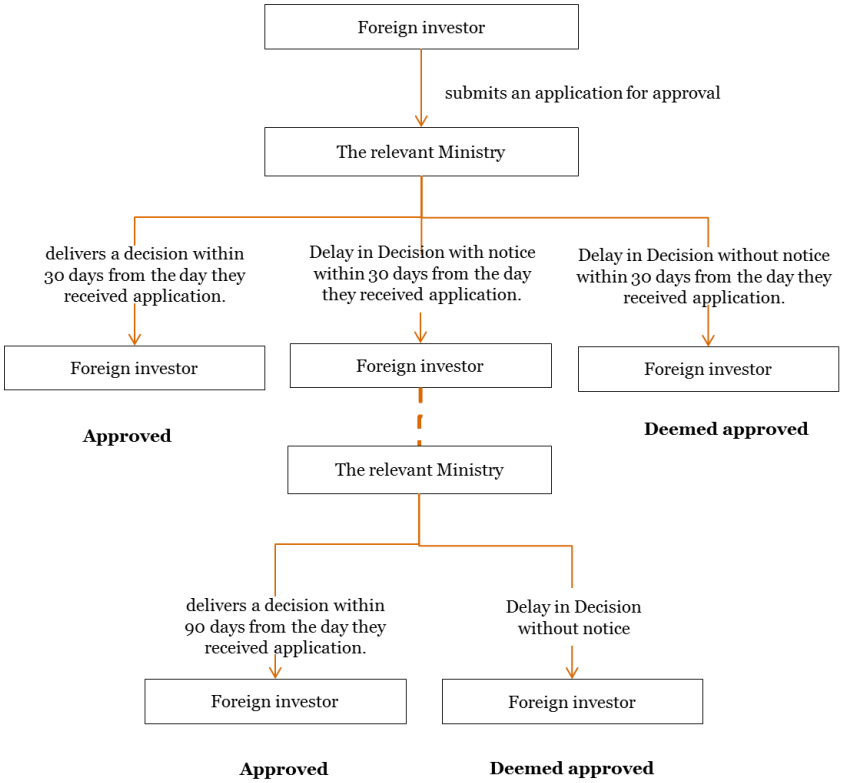


Figure 2.5.1 Foreign investments approval and registration procedure

Source: Created from " Law on Foreign Investments ("Official Gazette" of the FBiH, 61/01 and 50/03, unofficial translation " by JICA study team

2.5.5 Law on debt, borrowing and guarantees

Debt and guarantees of the FBiH, Cantons, towns and municipalities in the Federation shall be regulated by Law on debt, borrowing and guarantees in Federation of Bosnia and Herzegovina ("Official Gazette" of the FBiH, 86/07, 24/09 and 45/10).

2.5.6 Tax regulation

(1) Corporate income tax

Corporate income tax rate in BiH is 10%. Profits are calculated by deducting (real) expenses from revenues. The tax base includes profit gained through revenues and capital gains. Law Corporate Income Tax enables the taxpayer, who in the year for which the corporate income tax is being determined, has achieved 30% of their total revenue by export to be exempted from the tax payment for that year.

The taxpayer who in the period of five consequent years invests into production in the value of minimum 20 million KM, on the territory of the FBiH, is being exempted from the payment of corporate income tax for the period of five years beginning from the first investment year, in which minimum four million KM must be invested.

Profits transferred from abroad are not taxed if they were previously subject to taxation

abroad.

(2) Value Added Tax (VAT)

VAT rate is 17%. Indirect Taxation Authority is in charge of collecting value added tax and coordinating fiscal policy issues in general. This body is also responsible for collecting customs and excises on the entire territory of BiH.

(3) Property tax

In FBiH, the property tax rate is 5%. The tax base is the value of the property estimated by the commission appointed by the local tax administration office.

Payer of property transfer tax is most often the seller of the property (depending on the location of the property being sold). Only in Canton Sarajevo and Hercegovačko-neretvanski Canton the buyer is the payer of property transfer tax.

(4) Withholding tax

The withholding tax is paid at the tax rate of 10%, and for dividends the rate is 5%. In FBiH, the taxpayer is obliged to calculate and pay withholding tax on gross amount of:

· Profit on dividends, interest, royalties and related intellectual rights

· Payment for the performance of market researches, tax consulting, and auditing services

· For entertainment and sporting activities

· Insurance premium for insurance or reinsurance from risk in the Federation

·Telecommunication services between FBiH and a foreign state; as well as all other services made in territory of FBiH.

In case the agreement on avoidance of double taxation exists between BiH and the home country of the contractors, this tax is not applied.

(5) Personal income tax

In FBiH and RS, Personal income tax is 10 % on net salary. All foreigners with permanent residence in FBiH pay personal income tax on revenues earned during a calendar year in BiH territory. Equally, all foreigners who do not reside permanently in BiH but who earn income in FBiH are considered as taxpayers.(6) Social security contributions

In FBiH, social security contributions are 31% on gross wage for employee and 10.5% on gross wage for employer. Details of the rate of social security contributions in BiH are in the below table.

Table 2.5.3 Social security contributions in BiH

		FBiH	RS	Brcko District
Employee	Total on gross wage	31 %	33%	30.5 or 31.5%
	Pension insurance	17%	18,5%	17% (for who apply FBiH law) or18% (for who apply RS law)
	Health insurance	12.5%	12%	12%
	Unemployment insurance	1.5 %	1%	1.5 %
	Child protection	1,5%	-	-
Employer	Total on gross wage	10.50%	no contribu tions	6% or no contributions
	Pension insurance	6%	-	6% (for who apply FBiH law)
	Health insurance	4%	-	-
	Unemployment insurance	0.50%	-	-

Source : FIPA website

(7) Customs

(a) Customs in BiH

Indirect Taxation Authority is responsible for the collection of all customs duties. Customs rate are harmonized with the Combined EU nomenclatures. According to the Interim Trade Agreement signed with the European Union customs rates will be reduced, depending on the type of products, to 90%, 75% or 50% of the previous rate, while customs rates will be completely eliminated for some products.

The reduction of import customs rates is valid only for goods originating from the EU, not all the goods being imported from EU.

(b) Exemption

Equipment being imported as part of share capital is exempt from paying customs duties. This exemption does not refer to passenger vehicles, slot and gambling machines.

In order to enjoy this benefit, the foreign investor should submit a written request for exemption from paying import duties to the competent customs authority (according to the place of seat of the company) along with the following documents:

a. contract or other relevant document about the investment on the basis of which the equipment is being imported,
b. proof of registration of the foreign share (equipment) at the competent authority,
c. specification of equipment with tariff number, tariff mark (with quantity indication), single and total value, certified by the investor,

d. statement of the investor that the equipment is not older than 10 year age limit,
e. certificate of the competent institution confirming that the imported equipment complies with the environmental and employment protection standards.

The procedure is regulated by the Decision on exemption from paying import duties for equipment that represents share capital of a foreign investor (issued by Council of Ministers). The Customs Office issues a decision within 15 days upon submission of the request.

(8) Double taxation avoidance

Between BiH and Japan, there is not double taxation treaty.

(9) Accelerated depreciation

In FBiH, depreciation of fixed assets is allowed as expenditure in the tax balance up to the amount determined by proportional method by application of highest annual depreciation rates, which are prescribed by a rulebook.

The property that is being depreciated and has purchasing value less than 1,000 KM can be deducted in full in the year of purchase, under the condition that it has been placed in service.

Purchasing value of hardware and software can be deducted in full in the year in which the purchasing has been done.

In FBiH, taxpayers are entitled to accelerated depreciation of fixed assets serving the purpose of:

1) Preventing the pollution of air, water, land and decreasing noise levels,

2) Educating and training of staff.

2.5.7 Law on company

(1) Types of company in FBiH

The Company Law of the FBiH (Official Gazette of FBiH No. 23/99, 45/00, 2/02, 29/03, 68/05, 91/07, 84/08, 7/09 and 63/10) regulates the establishment, operation and termination of businesses in FBiH.

Table 2.5.4 Types of company in FBiH

Unlimited Joint Liability Company (d.n.o. / o.d. / UnLtd)	...is a company of at least two persons who bear unlimited mutual liability of the company. The company is founded by the Founding Contract of two or more domestic/foreign natural and/or legal entities. The contract must contain the name and address of the residence or company and address of company members, company address and activity of the company and the rights and obligations of members. Investments of the members may be in cash, kinds, rights or services. Value of investment must be estimated in the Founding Contract. Members' investments have equal value and become the property of

	the company. Every member has the right and obligation to manage the company. The company has no statute, no management bodies because members manage the company directly, including the representation of the company. There are no requirements for minimum or maximum contributions.
Limited Liability Company (d.o.o. / Ltd)	...is company founded by the establishment act or establishment contract by one or more domestic/foreign natural and/or legal entities with basic capital divided in parts. A member in a limited company is liable for the value of his investment in that company. Minimum basic capital is 2,000 KM minimum contribution of each partner cannot be less than 100 KM Limited Liability Company has a Statute. Management of the company is made by the Assembly (if it is only one founder he has all the authority of the Assembly), by the administration (which may have more members) and the Supervisory Board, which must be appointed in cases that the company has at least ten founders, and capital of one million marks. In the Limited Liability Company that has no Supervisory Board its members are held liable.
Limited Partnership (k.d. / LP)	...is a company in which one or more members has unlimited solidarity liability for the liabilities of the company including member's private assets (general partner), and risk of one or more members is limited by the value of their share in that company; Limited Partnership is founded by the contract of two or more domestic/foreign natural and/or legal entities. Limited Partnership can be transformed into Limited Partnership with share capital. General partners manage the business of the company and company is represented by each general partner.
Joint - Stock Company (d.d. / a.d. / JSC)	...is founded by the establishment contract of one or more domestic/foreign natural or legal shareholders with basic capital divided into shares. A Joint Stock Company is founded by the Foundation Contract. Joint Stock Company is not liable for the obligations of shareholders, and can be established by one or more founders. The founders are the shareholders in joint-stock company. The minimum basic capital is 50, 000KM. Nominal value of one share cannot be less than 10KM. The bodies of Joint Stock Company are: assembly, supervisory board, administration and revision board.

	Joint Stock Company can be open and close: Open Joint-Stock Company is a legal entity (banks and insurance companies or company with minimum basic capital of 4,000,000KM and 40 shareholders at least) whose shares are issued through public offering; Closed Joint-Stock company is a legal entity, whose shares are distributed among a limited number of shareholders. The minimum basic capital is 50,000KM.

Source: FIPA website" Bosnia and Herzegovina How to Establish a Business" 2013

(2) Procedure to establish company

According to FIPA guidebook, Steps for establishing company in BiH are as follows:

1) Establishment Contract (made by notary[2]);

2) Payment of initial capital;

3) Registration at the competent court which takes 5 days according to the law (due to technical difficulties the complete procedure in practice may take up to 30-45 days);

4) Making a company stamp;

5) Opening a bank account in a commercial bank;

6) Registration of the company and staff at the Tax Administration;

7) The statement of the company founder about fulfillment of all requirements for starting activity (submit to the Competent Inspection Department); and,

8) Start business

(3) The costs for establishment of company are as follows:

- Administrative costs: approximately 500 EURO
- Lawyer and notary costs: approximately 500 to 1,000 EURO

(4) Accounting and auditing standards in BiH

Companies are liable for keeping financial books, preparing and submitting accounting statements according to the provisions of the Law on Accounting, International Accounting Standards(IAS), International Financial Reporting Standards(IFRS),International Standards on Auditing (ISA).

2.5.8 Laws on Public company

A public company is a company (legal entity entered into the Court Register as a business company, or a public company defined as such by a separate regulation) performing activities of public social interest (energy, communication, utilities, management of public property

[2] Public notaries assist in concluding sales contracts, testaments and verification of documents.

and other activities of public social interest), employing at least 50 employees, as well as a company in which the Municipality, City, Canton or the FBiH hold the share of at least 50% plus one stock, or hold a share, regardless of the activity of the company. Public companies referred to in Article 2 hereof may be organized as joint stock companies or limited liability companies.

(1) Organizational Structure

The bodies of the public company shall be:

- Assembly,
- Supervisory Board,
- Board of Directors and
- Internal Auditing Department /Audit Committee.

Table 2.5.5 Types of management bodies

Assembly	... shall render decisions on the following matters: ・ Rules of Procedure or rulebooks, upon the proposal of the Supervisory Board, ・ Code of Ethics, upon the proposal of the Supervisory Board, ・ Business Plan, or Revised Business Plan. and shall submit reports on the work and business operations of public companies at least once a year to the Municipal Assembly, Cantonal Assembly, or the Parliament of the FBiH respectively.
Supervisory Board	... shall have the following powers: ・ to monitor the work of the Board of Directors; ・ to prepare rules of procedure and propose them to the Assembly; ・ to prepare the Code of Ethics and propose it to the Assembly; ・ to select candidates for the Audit Committee and submit the proposal of their appointments to the Assembly; ・ to consider the by-law on the procurement procedure and monitor its implementation; ・ to give opinion to the Assembly regarding Board of Directors' proposal of the distribution of profit; ・ to appoint and relieve of duty members of the Board of Directors; ・ to issue approvals for activities restricted by this Law; ・ to issue instructions to the director regarding inquiry into irregularities detected
Board of Directors	...shall have the powers to: ・ report to the Supervisory Board upon the request of the

	Supervisory Board; ・ implement the Code of Ethics; ・ make and oversee the implementation of business plans; ・ develop bylaws for procurement procedure and implementation of the applicable laws and regulations on procurement procedure; ・ prepare the proposal of the distribution of profit; ・ hire and dismiss employees in line with the procedures set forth in the Rules of Procedure or rulebooks and applicable laws.
Internal Auditing Department / Audit Committee	...shall have the powers : ・ to submit annual risk assessment and audit plan to the Audit Committee, which contain a thorough analysis of areas of risk and audits to be performed; ・ to submit a report on audits performed and recommendations to the Audit Committee through the head of the Internal Auditing Department; ・ to carry out its duties in full compliance with international accounting standards. Internal Auditing Department shall be established in public companies with 50 employees or more, while the companies with less than 50 employees shall establish the Audit Committee and hire an independent auditor who submits an annual audit report of the public company published on the web site of the public company or its majority owner.

Source: JICA Study Team

(2) Distribution of profit

Decision on distribution of profit/dividend shall be made by the Assembly upon a substantiated proposal of the Board of Directors, subject to previous opinion of the Audit Committee and Supervisory Board.

The Board of Directors must not: allocate as reserve funds amounts exceeding one half of net profit available for distribution and it also must not make allocations for distribution of dividend, if the amount of the share capital of the public company does not exceed the total amount of share capital paid and unallocated reserves, and if the dividend does not reduce these funds below such amount.

(3) Restricted activities

Public company may undertake the following activities only subject to the written approval by the Supervisory Board:

・ settlement of debt to the creditor of the public company by payment to a third person (Agreement on Assignment of Debt);

- offsetting debts to a party against debts of the same party that is thus both the creditor and debtor of the public company at the same time (Agreements on Simple Set-Off);
- participating in an arrangement of multiple debt offsetting among several parties, regardless of whether the arrangement is made by the Government or another body (Agreements on Multilateral or Multi-Party Set-Off);
- settlement of debt towards the public company if the debtor pays to the creditor of the public company;
- write-off of debts

(4) Procurement

All procurement procedures in the public company shall be conducted in strict compliance with the provisions of applicable laws on procurement. The Board of Directors and the Supervisory Board of the public company must comply with the provisions of the relevant laws on procurement.

2.5.9 Free trade zones

Free trade zones in BiH are part of the customs territory of BiH and have status of legal entity. According to the Law on Free Trade Zones of BiH, Free trade zone founders may be one or more domestic and foreign legal entities or natural persons. The free zone establishment is considered economically justified if the submitted feasibility study and other evidence can prove that the value of goods exported from a free zone will exceed at least 50% of the total value of manufactured goods leaving the free zone within the period of 12 months.

2.5.10 Incentives for foreign investors

In order to encourage foreign investors and contribute to the predictable business environment the Council of Ministers established the Foreign Investors Supports Fund in 2007 as a financial incentive for investors. Allocation of the Foreign Investors Support Fund' depends on the Council Ministries BiH budget.

The budget of the Fund per year is 2 million KM (around 1 million EURO).

2.5.11 Electricity Law

Under the Electricity Law(Official Gazette FBIH, No. 41/02), companies established in accordance with the Law on Companies (Official Gazette of the BiH Federation, Nos. 23/99,45/00, 2/02 and 6/02), under the condition that they are licensed to perform the activities determined by this law, shall perform one or more electric power sector activities(generation of electric power, distribution of electric power, supply of electric

power, trade, representation, and mediation in the domestic electric power market).

The obligation to perform public services is determined by the operation license issued by the Regulatory Commission. (Article 6)

2.5.12 Tariff system

2.5.12.1 Categories of customers and market liberalization

According to the right to choose supplier or not, customers of electricity are divided into two categories:

- Non - eligible (tariff) electricity customers - customers who cannot choose a supplier of electricity and for whom price of electricity is determined by the FERK
- Eligible (non-tariff) electricity customers - customers who have the right to freely choose their supplier of electricity and contract cost of electricity

The voltage level to which customers are connected are divided into four categories: 110 kV and above, 35 kV, 10 kV and 0.4 kV.

After January 1st 2008, customers except for the category of households have the ability to freely choose their supplier of electricity (become eligible) and they enjoy transitional period until elimination date of regulated tariff (liberalization) date in the following table. Customers from all categories of households will get that right on January 1st 2015 and starting with that date the electricity market in BiH will be fully open.

During the transitional period, if an eligible customer does not choose a supplier of electricity, it is possible to continue to get supply by previous public supplier.

After the transitional period, customers for more than 10kV (i.e. other than 0.4 kV) shall buy electricity in an open market and shall sign a Supply Contract with a supplier of their own choice. Customers for 0.4kV who fail to freely choose supplier in the market, have the right to purchase electricity from the public supplier.

Table 2.5.6 Categories of customer and market liberalization schedule

Voltage level	Transitional period for liberalization	Date of liberalization
110 kV and above	January 1st 2008~ June 1st 2012	June 1st 2012
35 kV	January 1st 2008~ January 1st 2013	January 1st 2013
10 kV	January 1st 2008~ January 1st 2014	January 1st 2014
0.4 kV	n/a	January 1st 2015

Source: Created from EPBiH website by JICA study team

2.5.12.2 Rules on tariff methodology and tariff proceedings for non-eligible customers

The existent tariff rules for non-eligible customers are described in “RULES ON TARIFF METHODOLOGY AND TARIFF PROCEEDINGS”, MOSTAR, July, 2005” (hereinafter

called the Tariff Rules for non-eligible customers) published by FERK.

The tariff methodology shall be applied to power generation, distribution and supply for non-eligible customers to whom the electricity is supplied in a regulated manner at regulated tariff. The transmission activity and ISO[3] operation are regulated by State Regulatory Commission for Electricity of BiH (hereinafter called DERK), and these functions are not considered under the Tariff Rules for non-eligible customers.

(1) Calculation of revenue requirement (Article 13 of the Tariff Rules for non-eligible customers)

The revenue requirement for performance of regulated activity is established based on costs of operation and maintenance, including depreciation costs, return on assets and taxes and other duties and is expressed as:

$$RR = C_{O\&M} + ((PV - AD) + WC) * WACC + C_D + T - OR \quad (1)$$

Table 2.5.7 Definition of Revenue Requirement Formula

Abbreviation	Meaning	Description
RR	Revenue requirement	
Co&m	Operational and maintenance costs – operational costs	Reviews and approval by FERK
PV	Procurement value of plant in service	Plants in service are assets that in nature have an expected life longer than the current accounting period (year) and are used for the business of the power company
AD	Accumulated depreciation	
WC	Permanent working capital	
WACC	Approved rate of return	See (3) below.
Cd	Depreciation costs	
T	Taxes and other duties	
OR	Other revenues related to regulated activities	

Source: Created from the Tariff Rules for non- eligible customers by JICA study team

(2) Rate Base (Article 15 of the Tariff Rules for non-eligible customers)

Rate Base represents the approved base of a power company, the amount of which equals the sum of the net depreciated value of assets and permanent working capital, excluding granted

[3] Independent System Operator (ISO) means an independent and nonprofit body that maintains the reliability of the energy system in BiH and controls energy flows of the system, as stipulated in the Law on establishing the Independent System Operator in Bosnia and Herzegovina ("Official Gazette of Federation BIH," No. 35\04). (Source: the Tariff Rules for non- eligible customers, p.4)

assets.

$$RAB = PV - AD - GA + WC \quad (2)$$

Table 2.5.8 Definition of Rate Base represents Formula

Abbreviation	Meaning	Description
RAB	Rate base	
PV	Procurement value of fixed assets	In the case of revaluation of fixed assets, the revaluated value will be reviewed and verified by FERK.
AD	Accumulated depreciation	
GA	Granted assets	
WC	Permanent working capital	- The financial assets and inventories that will be used in the current period - Comprised of the sum of minimum necessary inventories, materials and spare parts and a certain amount of cash necessary to cover ongoing liabilities - Only those assets that are used for the performance of regulated activity that is in FERK's jurisdiction shall be included in rate base.

Source: Created from the Tariff Rules for non-eligible customers by JICA study team

(3) Weighted average cost of capital (WACC) (Article 16 of the Tariff Rules for non-eligible customers)

Weighted average cost of capital (WACC) is the weighted cost of debt and equity. When determining the revenue requirement, the WACC will be applied to the rate base. WACC is defined as the amount that equals the sum of the equity portion of total capital multiplied by the price (cost) of equity and the debt portion of total capital (short-term and long-term debts) multiplied by the price (cost) of debt. Weighted average cost of capital is calculated as follows:

$$WACC = ROE * EP + DI * DP \quad (3)$$

Table 2.5.9 Definition of Weighted average cost of capital Formula

Abbreviation	Meaning
WACC	Weighted average cost of capital
ROE	Rate of return (price) on equity approved by FERK
EP	Portion of equity in total capital (equity and debt)
DI	Weighted average interest rate
DP	Portion of debt in the total capital (equity and debt)

Source: Created from the Tariff Rules for non- eligible customers by JICA study team

(4) Costs for each activity

(a) Generation Activity (Article 23 of the Tariff Rules for non-eligible customers)

Power companies that perform a generation activity should present justified costs for each generation unit. Justified costs of generation should be divided into fixed and variable costs:

Fixed costs of generation are related to available capacity of generating units for covering system load in accordance with the electricity balance; and variable costs of generation are related to the output of electric power.

(b) Distribution activity (Article 30 of the Tariff Rules for non-eligible customers)

Power companies that perform a distribution activity will present justified costs by voltage levels and customer classes that are incurred during the performance of the regulated activity (including also costs related to reactive energy).

(c) Costs for Supply Activity(Article 37 of the Tariff Rules for non-eligible customers)

Power companies that perform a supply activity for non-eligible customers shall present costs that are incurred during the performance of the regulated activity by voltage levels. Tariff for electricity supply will cover all FERK approved costs, including the following costs: costs of processing data, accounting, billing and collection for supplied/delivered electricity, as well as costs of service centers for customers.

(5) Revenue requirements for non-eligible customers (2011)

In 2011, revenue requirements of tariff rates for non-eligible customers are shown in the below table.

Table 2.5.10 Revenue requirements and costs of each category

	Categories	Amount
Revenue requirements of Generation and Purchase	Generation	391,359,323KM
	Distribution power plants	5,639,610KM
	Purchase	24,327,131KM
Revenue requirements of Distribution	Distribution	154,737,091KM
Revenue requirements of Supply	Supply First Tier	26,068,024KM
Other costs	Transmission	39,753,516KM
	ISO operation	1,931,405KM

	Secondary and tertiary regulation	9,448,344KM
Total		653,264,444KM

Source: Created from "DECISION on tariffs for sales of electricity to non-eligible (tariff) customers of Javno preduzeće Elektroprivreda Bosne i Hercegovine d.d. - Sarajevo" (No: 07-07-308-81/10/11, Mostar, June 27th, 2011)" by JICA study team

2.5.12.3 Rules on tariff methodology and tariff proceedings for eligible customers

The existent rules on Tariff methodology and tariff proceedings are shown in "RULEBOOK ON ELIGIBLE CUSTOMERS SUPPLY, Mostar, May 9, 2012" (hereinafter called the Tariff Rulebook for eligible customers) published by FERK. With the Tariff Rulebook for eligible customers, FERK prescribes the following:

- rights and responsibilities of an eligible customer;
- rights and responsibilities of the eligible customers public supplier;
- rights to use Supplier of Last Resort;
- switching procedure; and
- methodology to determine the price of the eligible customers public supplier

(1) Tariff rates (since 2013)

(a) Tariff rates for non-eligible customers

For non-eligible customers who are connected to the 10 kV middle voltage and 0.4 kV low voltage level (households, other consumption, public lighting), tariff rates are provided in the table below. Those rates were adopted by FERK and have been in application since July 1st 2011.

Table 2.5.11 Tariff rates for non-eligible customers

Customer Category				Measuring Point	Calculation Power	Active Energy		Excessively Taken Reactive Energy
						VT	MT	
				KM	KM/kW/Month	pf/kWh		pf/kvarh
Medium Voltage	10kV			17.30	21.15	11.56	5.78	2.68
Low Voltage	0.4kV	Households	I tariff group	4.80	-	12.82		-
			II tariff group	4.80	-	16.02	8.01	-
		Other Consumption	I tariff group	10.50	14.49	14.52	7.26	3.22
			II tariff group	6.20	-	24.49	12.25	-
			III tariff group	4.80	-	12.82		-
			IV tariff group	4.80	-	16.02	8.01	-
		Public Lightning		4.60	-	16.07		-

Source: EPBiH website (As of November 2013)

Table 2.5.12 Categories of tariff groups

Group	I tariff group	II tariff group
Description	customers that are connected on 0.4 kV that are not households or public lightning, excluding customers of III or IV tariff group	
	… have peak load from electric power permit higher from or equal to 23 kW	… have peak load from electric power permit less than 23 kW
Group	III tariff group	IV tariff group
Description	customers that are connected on 0.4 kV as follows: - nursery, kindergarten - dorms for children, pupils, students, religious officials, disabled, retirement homes - religious objects and humanitarian organizations' kitchens - companies, institutions and organizations of disabled persons	
	… and have single-tariff or two-tariff meter without timer or any other devices for registering the tariffs	… and have two-tariff meter with timer or any other devices for registering the tariffs

Source: Created from "DECISION (June 27th , 2011)" by JICA study team

(b) Tariff rates for eligible customers

For an eligible customers connected to the high voltage (110 kV) or medium voltage (35 kV), a decision on the tariff of supply services from public supplier JP EPBiH was adopted by FERK and it has been in application since January 1st 2013. Tariff rates are provided in the table below.

Table 2.5.13 Tariff rates for eligible customers

Customer Category		Measuring Point	Calculation Power	Active Energy		Excessively Taken Reactive Energy
				VT	MT	
		KM	KM/kW/月	pf/kWh		pf/kvarh
High Voltage	110kV	20.00	15.68	9.94	4.97	1.09
Medium Voltage	35kV	20.00	16.68	9.56	4.78	2.14

Source: EPBiH website (As of November 2013)

The following Table 2.4.14 is description of components of tariff for non-eligible customers and eligible customers.

Table 2.5.14 Components of tariff

<table>
<tr><th>Items</th><th>Unit</th><th>Description</th></tr>
<tr><td>Measuring Point</td><td>KM /month</td><td>Monthly cost for each metering point</td></tr>
<tr><td>Calculation Power</td><td>KM/kW/ month</td><td>Fixed costs of generation and/or purchase of electricity</td></tr>
<tr><td>Active energy(VT)</td><td>pf/kWh</td><td>Variable costs of generation, Standard rate</td></tr>
<tr><td>Active energy(MT)</td><td>pf/kWh</td><td>Variable costs of generation, Lower rate (“MT”) is adopted to the following customer and time:
<table>
<tr><th></th><th>Target customer</th><th>Date and time</th></tr>
<tr><td rowspan="2">“Standard (winter) time“</td><td>Customers at 110kV and 35kv, Households</td><td>On weekdays and Saturdays during 13:00-16:00 and 22:00-7:00 and all-day on Sundays</td></tr>
<tr><td>Customers at 10kV,0.4kV(excluding Households)</td><td>On weekdays 22:00-7:00 and all-day on Saturdays and Sundays</td></tr>
<tr><td rowspan="2">“Daylight saving (summer) time“</td><td>Customers at 110kV and 35kv, Households</td><td>On weekdays and Saturdays during periods of 14:00-17:00 and 23:00-8:00 and all day on Sundays</td></tr>
<tr><td>Customers at 10kV, 0.4kV(excluding Households)</td><td>On weekdays 23:00-8:00 and all-day on Saturdays and Sundays</td></tr>
</table></td></tr>
<tr><td>ET</td><td>pf/kvarh</td><td>Variable costs of generation and/or purchase of electricity</td></tr>
</table>

Source: Created from the Tariff Rules for non- eligible customers and EPBiH website by JICA study team

(2) Procedure of non-eligible tariff proceeding on a power company’s initiative

(a) Tariff application and Public notice stage

Tariff proceedings shall be initiated by the filing of a tariff application by a power company. After receivable of the application, FERK shall review it whether it contains information specified in table x.x.x and the one-time charge for processing of the application is paid. In case that it is complete, FERK will notice the applicant in writing. Upon receipt of a tariff application determined by FERK as complete, FERK shall publish a public notice.

The applicant must furnish individual notices of the application to each of its customers by the same means it uses to distribute its customer bills with information listed in table 2.4.15.

Table 2.5.15 Description of documents in tariff proceeding

Stage	Document should be prepared by power company	Necessary information
Tariff application and Public notice	Tariff application	・ the name of the power company, a general description of the services covered by the tariff, the effective date of the proposed tariff(s), and the signature of a duly authorized representative of a regulated power company; ・ a table of contents and index of attached tables in sufficient detail to define costs, revenues, requested tariffs or services or any other item related to submission of documents, to be located in that way; ・ the tariffs currently charged by the power company to its customers for any regulated services and containing any further information necessary to identify the power company's tariffs for particular services; ・ the anticipated revenue effects for each customer category and classification, if any, of the proposed tariffs; ・ any significant change in tariff design that is proposed in the application; ・ a statement that it will pay the regulatory fee in the determined amount; ・ a statement that all data included in the application and presented to FERK are true and correct to the best of the applicant's knowledge
	Individual notice	・ a statement of the amount of the proposed tariff change; ・ the percentage of proposed tariff change for each customer class; ・ the proposed effective date of the tariff change; ・ the customer's right to request information relating to the present and proposed tariffs; and ・ the customer's right to participate in an open and fair hearing before FERK

Source: Created from the Tariff Rules for non- eligible customers by JICA study team

(b) Decision making stage

FERK shall conduct public hearing with applicant. The application and result of public hearing shall be considered by FERK at a Regular Session. The decision of FERK on approval of the application becomes effective when it is signed by the President.

(c) Approval of tariff application stage

The decision shall be published in the Official Gazette of FBiH. FERK shall provide the

applicant with a copy of each tariff, which contains the actual effective date of the tariff, the pertinent docket number, and an official stamp of FERK.

The applicant shall make the approved tariffs available to the public during regular business hours for inspection at its authorized department's for customer care, and by posting such documents on the website of the regulated power company.

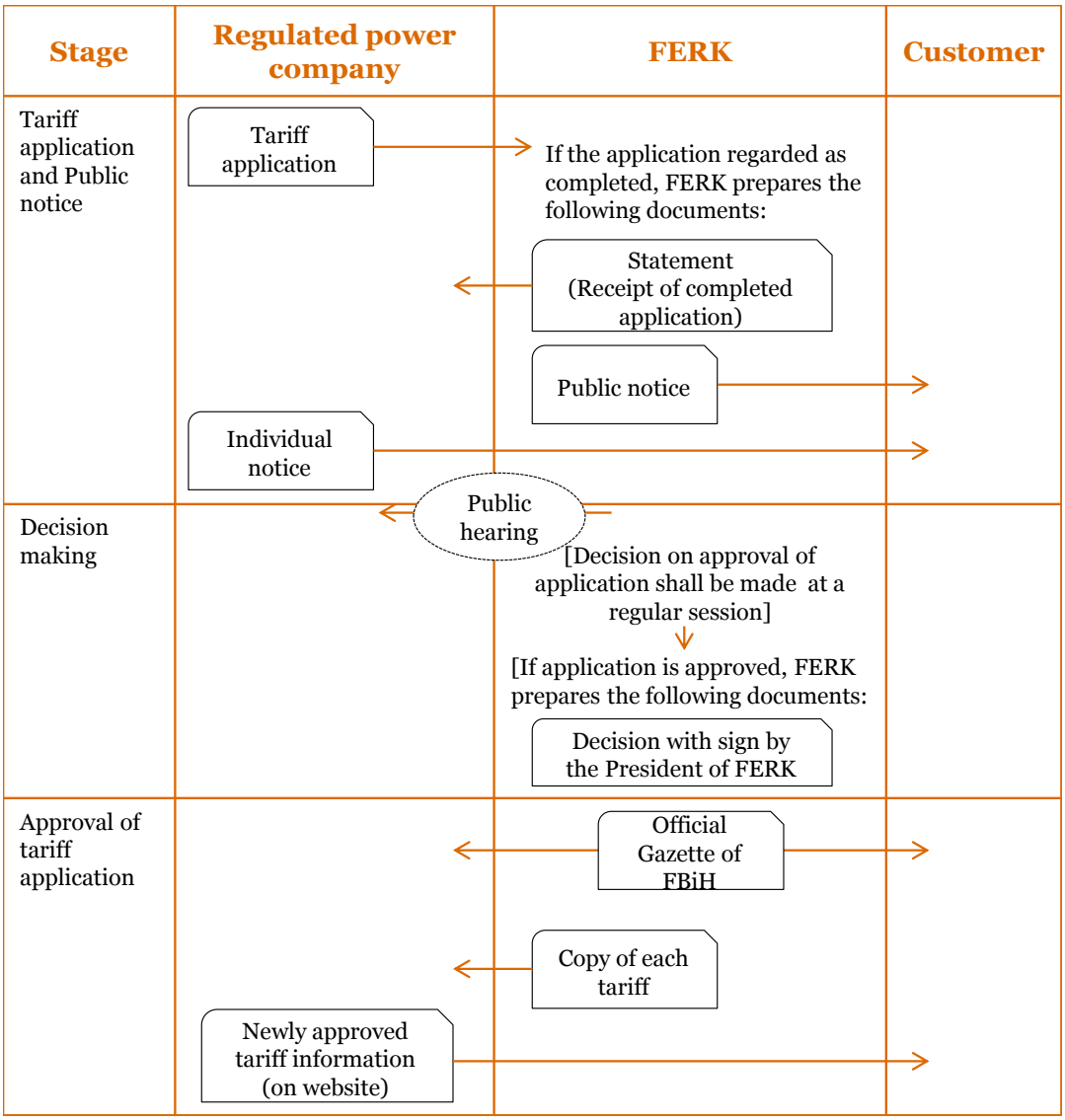


Figure 2.5.2 Tariff proceeding

Source: Created from the Tariff Rules for non- eligible customers by JICA study team

2.6 Situation of infrastructure development through PPP/BOT scheme or privatization

2.6.1. Doboj –Vukosavlje Motorway PPP Phase 1 and 2 (a part of Corridor Vc project)

(1) Outline of Corridor Vc

Corridor V(Five) is one of Pan Pacific Transport Corridor, linking Kiev in Ukraine to 3cities around the Adriatic Sea, Venice (Italy) Rijeka and Ploce (Croatia), via CEE countries. Corridor V is consisted from three branches, the V "c" is from Budapest to Ploče (Croatia) via Osijek (Croatia) and Sarajevo. BiH contains the longest section of the Vc with a total length of approximately 340 km.

Figure 2.4.3 Corridor V

Source: http://mediterranee.revues.org/docannexe/image/2857/img-1.jpg

(2) Outline of the project (section Doboj–Vukosavlje)

The project is the first PPP project in BiH for the financing, design, construction, operation, and maintenance of up to 46.6 km of a new four lane motorway from Doboj to Vukosavlje in RS. The purpose of the Project is to enable improvement of connectivity of BiH with its neighboring countries and the region, enabling, at the same time, stabilization and incentive of development of the country as a whole.

The project shall be developed in two phases:

Phase 1: Doboj–Vukosavlje (41.2 km)

Section 1: Doboj – Podnovlje (19.5km)

Section 2: Podnovlje – Vukosavlje (21.7km)

Phase 2: Doboj - border of FBiH (5.4km)

The Private Partner, Autoputevi Republike Srpske, 100% owned by the RS, will pay for the design, construction works and operations and maintenance services to be provided via an availability payment, which shall be paid commensurate to the sequence of construction completion and the obtainment of usage permits.

Construction costs for this route were assessed at approximately 500 million EURO.

Table 2.6.1 Project Summary

Project owner	Autoputevi Republike Srpske (Republika Srpska Motorways) (100% owned by the RS)	
Sponsor	Under bidding process	
Project sector	46.6 km of a new four lane motorway	
Project location	Doboj to Vukosavlje in RS	
Project type	Design, Built, Financing, Operation and maintenance(DBFO)	
Project period	The duration of the project period shall be defined within competitive dialogue and the provisions of the PPP contract.	
Project cost	500 million EURO	
Project schedule	The project shall be developed in two phases: Phase 1: Doboj–Vukosavlje (41.2 km) Section 1: Doboj – Podnovlje (19.5km) Section 2: Podnovlje – Vukosavlje (21.7km) Phase 2: Doboj - border of FBiH (5.4km)	
Tender schedule	6 September 2012	Project information session was held at the offices of EBRD
	12 September 2012	According to the prime minister of RS, Strabag, Bouygues and Salini have purchased prequalification documents for the Doboj-Vukosavlje motorway project.
	12 October 2012	Deadline for the submission of an Application for Participation
	26 December 2012	Two consortia were shortlisted for the project: Austrian Strabag-French Bouygues and Korean Samsung-French Egis
Finance	Equity	(not decided yet)

	Debt	(not decided yet)
	D/E ratio	(not decided yet)
Payment structure	availability payment, which shall be paid commensurate to the sequence of construction completion and the obtainment of usage permits	

(3) Bidding procedure

Tender documentation is prepared in two phases:

- Phase I – Application for Participation/Prequalification Document; and

- Phase II –Invitation to Bidders.

and evaluation method in prequalification stage is as follows:

Table 2.6.2 Evaluation in PQ stage

Criteria Weight with respect to	Overall Score
The total combined aggregate value of construction costs for the Candidates PPP and/ or Concession Project(s) references, each reference exceeding the value of 50 million EURO	60%
Average Total Equity of the Candidate for the previous three closed accounting periods	40%

The status of tender is as follows:

6 September 2012	Project information session was held at the offices of EBRD.
12 September 2012	According to the prime minister of RS, Strabag, Bouygues and Salini have purchased prequalification documents for the Doboj-Vukosavlje motorway project.
12 October 2012	Deadline for the submission of an Application for Participation
26 December 2012	Two consortia were shortlisted for the project: Austrian Strabag-French Bouygues and Korean Samsung-French Egis

(4) Project cost and finance

EBRD has confirmed its willingness to grant 350 million EURO loan at early stage.

2.6.2. Stanari Coal-fired Power Plant

(1) Outline of the project including aspects as a PPP project

The Stanari coal fired power plant is located near the town of Stanari, 70 km east of the city of Banja Luka. It is fuelled by lignite from the nearby Stanari lignite mine.

Government of RS made decision on construction in May 2005 and has issued the decision to grant for the concession to EFT for the construction and operation of mine and power plant

Stanari on February 19 2008.

The project term is 30 years and 5 years period planned for construction is included in the concession period. Concession fee is 3.6% of total income. Concession can be transferred to third parties under some conditions. The project cost is around 550 million EURO.

It is expected that the plant to start its trial operation in the last quarter of 2015.

Table 2.6.3 Project Summary

Project owner	Government of RS	
Concessionaire	EFT Group, a unique European energy trading and investment company with an operating focus on the countries of central and south-east Europe.	
Project sector	300 MW coal fired power plant	
Project location	Stanari, 70 km east of the city of Banja Luka	
Project type and basis law	Concession based on Law on Concessions of Republika Srpska (Official Gazette of RS, no. 25/02)	
Project period	30 years including 5years for construction	
Project cost	Power Plant: 550 million EURO Mine: 10 million EURO	
Project schedule	last quarter of 2015	Planned to start its trial operation
Tender schedule	May 2005	The Government of RS made decision on construction of this power plant
	February 19 2008	The Government of RS has issued the decision to grant for the concession to EFT for the construction and operation of mine and power plant Stanari
	September 29 2008	REQUEST FOR TENDERS For Design, Manufacture, Delivery, Supervision over Erection, Tests and Commissioning of Continuous Overburden Excavation, Transport and Disposal System in Stanari Lignite Mine,
	2009	REQUEST FOR TENDER FOR THE ENGINEERING, PROCUREMENT AND CONSTRUCTION OF TPP Stanari
	May 5 2010	EFT made deal with Chinese Dongfang Electric Corporation to build the plant
	last quarter	It is expected that the plant to start its trial operation

	of 2015	
Finance	Equity	EFT: 90 million EURO(15% of project cost)
	Debt	Financing comprises a 350 million EURO 15-year loan arranged by China Development Bank. Loan agreement signing took place on 20 Jun 2012.
	D/E ratio	80:20
Concession fee	3.6% of total income	

(2) Procurement procedure

In 2009, three bidders for the EPC contractor for the Stanari TPP were submitted proposal:

1. SNC LAVALIN and Rafako (Canada- Poland) for a 420 MW TPP plant with supercritical parameters

2. EM Aliance (Russia) for a 350 MW plant and supercritical parameters

3. Dongfang Electric Corporation – DEC (China) for a 300 MW plant with subcritical parameters and CFB Boiler (whereby the coal combustion is to be conducted in fluidized layer).

Finally on May 5 2010 EFT made deal with Chinese Dongfang Electric Corporation to build the plant.

In 2000's, the capacity of generation unit was planned 400MW and EFT negotiated some potential bidders including French Alstom and project cost proposed by Alstom was said to be 1 billion EURO, while Dongfang proposed half price of Alstom with downgrade of specifications: capacity of generation unit changed 300 MW from planned 400MW and gross efficiency 43% to 38.5 %. EFT's communications chief said that the Chinese technology concurs with EU emission directives and environmental standards, while EBRD regarded the specifications as not enough to EU directives.

(3) Project specifications

Following the negotiations with the Dongfang Electric Corporation Ltd, the feasibility study for the Stanari TPP has been revised by Colenco & Steinmueller to set the following key parameters:

- The generation unit will have an installed capacity of 300 MW
- Net Power Capacity 265 MW
- Power Plant Availability 90%
- Expected power plant production 2,000,000 MWh (at base load operation)
- Complete flue gas treatment, including desulphurization and dust removal
- Indirect dry cooling system with dry natural draft cooling tower

- Ash and residue disposal within the excavated areas of the Stanari mine.

In 2011, consortium made up of AF-Consult and Steinmüller Engineering conclude basic design for TPP Stanari.

The contract for the coal supply system connecting the mine and TPP Stanari has been signed with German-based company FAM Förderanlagen Magdeburg.

(4) Project cost and finance

China Development Bank provided about 85% of the project cost, 500 million EURO and the remaining 15 % was came from EFT's own capital. China's state credit and export insurer, Sinosure, is to cover political risks, which still cannot be dismissed in the Balkans.

Though EBRD planned to provide 25% of project cost in 2000's, it is said that that is because the specifications was changed and those did not meet EU directives.

2.7 Project in the context of the country (including the development plan)

The "mid-term development strategy" was drafted in BiH in March, 2004 and the following three goals were established: "Sustainable economic development", "Poverty reduction", and "Acceleration of the integration of the EU." In order to become a member of the EU, it is a precondition to meet the EU environmental standards, and the process of adapting BiH environmental standards to EU environmental standards is ongoing. In the "Strategic plans regarding the development of the Energy Sectors in Bosnia and Herzegovina" (2009), Tuzla was listed as candidate for the construction site of the thermal power plant, and in the following year, "Decision on preparation and construction for TPP Tuzla Unit 7 – 450MW" (2010) was adopted. The high efficiency ultra super critical (USC) Tuzla Unit7 (450MW) is highly prioritized in Bosnia's development policy.

2.8 Foreign (such as Chinese and European) companies and donors in the project and the power (production) sector; current market overview

2.8.1 Status of Foreign Direct Investment(FDI)

(1) Governmental Support to Promote Foreign Investment

Recognizing the importance of the foreign investments in the development of the country, BiH has signed 35 Agreements on Promotion and Protection of Investments. The Law on the Policy of Foreign Direct Investment in BiH treats foreign investors under the same conditions as those defined for local residents. In this context, foreign investors are entitled to invest in any sector of the economy in the same form as local residents. In practice, most business sectors in BiH are fully open to foreign equity ownership. Foreign investors are protected against nationalization, expropriation, requisition or other measures. Foreign

investors are also entitled to freely employ foreign nationals, subject to the labor and immigration laws in BiH.

Currently FIPA is the special agency to invite the investment from overseas. The focus area of investment includes tourism, agriculture, forestry, transportation, mining, automobile and construction. BiH guarantees the foreign investor's right including overseas remittance and saving of overseas currency in local banks. European investment fund to BiH approved by MIGA of World Bank guarantees political risks (overseas remittance, internal war etc) to 39 countries (excluding Japan).

BiH offers free trade zones, meaning free transfer of profit and investment, relief from customs and other tariffs on imports and exports. Furthermore, the country has signed several agreements with different countries in order to eliminate quantitative restrictions and other barriers to the Bosnia's exports. BiH has signed the Central European Free Trade Agreement (CEFTA) with Albania, Serbia, Montenegro, Croatia, Macedonia, Kosovo and Moldova. The country has also signed a Free Trade Agreement with Turkey which provides additional free access to this consumer market with 70 million people and EU Association and Stabilization Agreement in 2008, which means that the products originated from Bosnia, can be imported to all EU countries without any quantitative restrictions and without paying customs and other similar duties. The country has also signed preferential agreements with other countries including Canada, Japan, Russia, Turkey and the USA.

The country offers an attractive tax package to foreign investors with only 10% corporate tax rate (on the whole territory of BiH), 10% withholding tax rate in FBiH (5% on dividends) and 10% in RS and only 10% on personal tax income. The country's VAT tax rate stands at 17%.

The inflow of Foreign Direct Investment (FDI) recorded 285.1 million EURO (2.2%) in 2012, 354.9 million EURO (2.7%) in 2011 and 306.6 million EURO (2.4% of GDP) in 2010 according to the Central Bank of BiH data.

In 2007, the amount is 1.3 billion EURO which is the highest amount recorded in the last 15 years mainly due to the privatization of large state-owned enterprises, Telekom Srpska, which was purchased by Serbian Telekom Srbije.

However, in 2009 the global economic crisis hit the inflow of FDI. There is a gradual increase in inflows in 2010 and 2011, but it is still significantly lower than in the period before the global crisis.

As for the structure of FDI in 2012, 154.2 million EURO is the equity, 140.2 million EURO is the other capital, while the amount of reinvested earnings was negative (-9.2 million EURO).

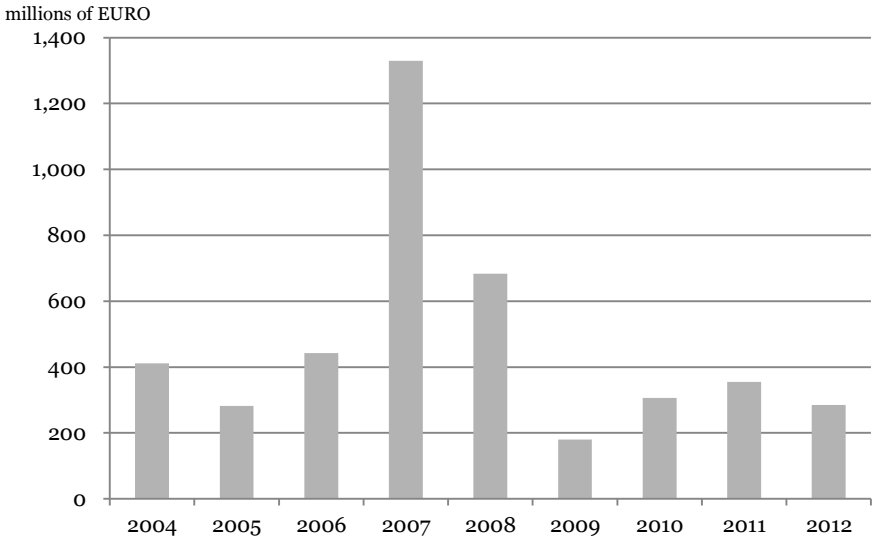


Figure 2.8.1 Foreign direct investment in BiH (EURO, 2004~2012)

Source: Created from Central Bank of BiH website by JICA study team

In terms of countries distribution of investment inflows, the most investments were from Russia (7.2 million EURO), Austria (67.2 million EURO) and Croatia (60.3 million EURO) in 2012.

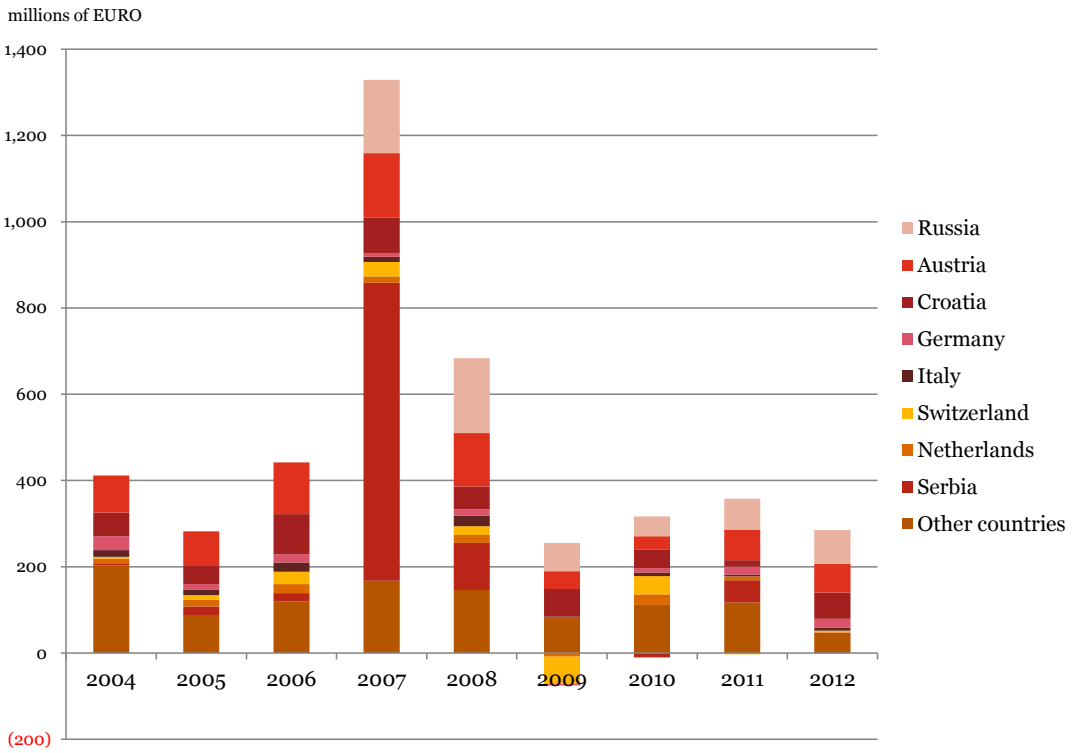


Figure 2.8.2 Foreign direct investment in BiH by countries (EURO, 2004~2012)

Source: Created from Central Bank of BiH website by JICA study team

Table 2.8.1 Foreign direct investment Flows in BiH by countries (EURO, 2004~2012)

Year	Flows of foreign direct investment									
	All countries	Russia	Austria	Croatia	Germany	Italy	Switzerland	Netherlands	Serbia	Other countries
2004	411.7	0	85.6	55.3	32.2	15.4	4	12.4	3.1	203.4
2005	282.4	0	80.8	41.8	12.1	13.3	11	15.3	19.9	88
2006	442.2	0	120.2	93.1	19	21.4	28.4	21.1	19.8	119.1
2007	1,329.20	170.1	149.5	82.1	8.5	11.8	33.6	14.8	690.80	167.8
2008	683.80	173.5	124.2	52.7	14.7	24.3	20.7	18.4	109.1	146
2009	179.9	66	40.7	64	-4.7	1.9	-62.5	-8.4	1.7	81
2010	306.6	45.6	30.6	43.5	10	8.4	42.7	24.4	-10.2	111.4
2011	354.9	71.7	70.8	14.8	18.5	4.6	-3	8.4	51.7	117.3
2012	285.1	78.2	67.2	60.3	20.7	7.1	3.8	0.9	-0.3	47

Source: Central Bank of BiH

According to the OECD Database, FDI by Japanese companies has not been recorded.

(2) Activities of foreign companies in BiH

Top foreign investors in BiH in 2010~2012 is the following table. Most of the companies from Europe. Major foreign energy company in BiH is Interenergo d.o.o. Ljubljana from Slovenia is working on some hydro power plants and solar power plants, 5 small hydro power plants in FBiH, 1 in RS. EFT Holdings from Denmark is working on Stanari mine and Coal-fired Power Plant and Ulog Hydro Power Plant.

Table 2.8.2 Top foreign investors in BiH (2010~2012)

Year	Foreign company	Country	Sector
2012	Interenergo d.o.o. Ljubljana	Slovenia	Energy
2012	Telekom Slovenije d.d. Ljubljana	Slovenia	Telecommunication
2011	Mercator	Slovenia	Trade
2011	Kolektor Group	Slovenia	Manufacturing
2010	Prevent Group	Slovenia	Manufacturing
2012	Naftna industrije Srbije (NIS)	Serbia	Trade
2011	Agrobanka, Poljoprivredna banka Beograd	Serbia	Banking
2010	Delta Holding and Aleksandrija	Serbia	Trade
2010	IMLEK (Danube Foods Group)	Serbia (UK)	Manufacturing
2012	Vienna Insurance Group	Austria	Other financial services
2010	Hypo Group	Austria	Banking and Fin.service
2010	Agrana-Studen	Austria	Manufacturing
2012	Zott Holding International GmbH	Germany	Manufacturing
2011	HeidelbergCement	Germany	Manufacturing
2012	Cividale S.P.A	Italy	Manufacturing
2012	Alfa Studio s.a.s.di Brugnera M.L.&C I grupa investitora	Italy	Tourism, Real Estate
2012, 2011	EFT Holdings	Denmark	Manufacturing / Energy
2010	Brodomerkur d.d. and Saponija d.d.	Croatia	Manufacturing
2010	Consortium MOL INA	Hungary and Croatia	Trade
2012	IONIX (ELECTRONIC) ASSEMBLIES LIMITED	Great Britain	Manufacturing
2010	Securitias AB	Sweden	Service
2010	AB Ukio bankas and UAB - Ukio banko investment	Lithuania	Banking
2011	Bosnia Broadband S.A.R.L.	Luxemburg	Telecommunication
2012, 2011, 2010	OAD Neftegazovaja Innovacionnaja Korporacija	Russia	Manufacturing and Trade
2011	Adam Vitarigov	Russia	Manufacturing
2011, 2010	Al Shiddi Group	Saudi Arabia	Tourism, Real Estate and Trade
2010	Soda Sanayii A.S.	Turkey	Manufacturing
2011	Al Jazeera Satellite Network	Qatar	Telecommunication
2011	Chellomedia	USA	Telecommunication

Source: Created from FIPA"Frequently asked questions 2010, 2011, 2012" by JICA study team

2.9 Project needs

Bosnia has 5,200MW grid generation capacity which consists of thermal power plants (55%) and hydropower plants (45%). Bosnia depends approx. 60% of thermal power generation on its coal, and the efficient usage of domestic resources is one of the most important issues. On the other hand, the existing power plants were installed by Russian or Eastern European manufactures in the 1960s-70s and have become aged, thus, the improvement of efficiency and environment impact caused by NOx, SOx or soot and dust are imminent issues.

Tuzla Thermal Power Plant accounted for 53% of electricity produced by EPBiH in 2011 and is indispensable for stable electricity supply. South East European Energy Community Treaty requires that emission of NOx, SOx and soot and dust be reduced to that of EU standards by the end of 2017. Therefore, the power plant needs to be replaced urgently to secure sufficient electricity in the country for 2018 onwards.

2.10 Project objectives

BiH has a large reserve of lignite coal and approx. 60% of power is generated by coal-fired plants. The existing power plants (subcritical) were built by Russian or Eastern European

construction companies in the 60s-70s. Thus, the replacement from the aged to new power plants is one of its most urgent issues.

The objective of the project is to introduce an ultra super critical (USC) thermal power plant which can improve energy efficiency, promote environmental protection, stabilize energy demand, contribute to the region, and consequently contribute to the entire Bosnian economy and society.

CHAPTER 3 Demand Forecast

3.1 Current demand-supply situation

3.1.1 Current demand-supply situation in BiH

(1) Overview

In 2012, the BiH power sector operated under unfavorable hydrological conditions that also existed in the previous year. Generation by hydro power plants amounted only to 4,149 GWh, which is 4.1% less than in 2011 and 52.2% less than in 2010. Generation by thermal power plants amounted to 8,620GWh, and it was reduced by 10.1% in comparison to the realization in the previous year due to the reduced availability of generating units at thermal power plants caused by unplanned and planned interruptions (regular overhauls, reconstruction). Generation by small hydro and solar power plants, and industrial power amounted to 162.5 GWh and 3.8 GWh respectively.

In 2012, the first solar power plants in BiH were put into operation, with generation reaching 157 MWh. Although the strong expansion in construction of renewable sources exists, their generation is still modest, amounting to 1.3% of total generation in 2012.

The following table x.x.x is basic power indicators of BiH. Total generation of all power plants reached 12,935GWh in 2012, which is an increase of 7.9% in comparison to 2011. In previous seven years, lower generation was registered only in 2007.

EPBiH and ERS have enough generation capacity to supply their jurisdictional districts and sell other domestic and foreign power companies. On the other hand, EPHZHB and Komunarno Brcko don't have enough generation capacity and rely on purchased electricity to supply their districts.

Customers connected to the transmission and distribution networks took 2,702 GWh and 9,533 GWh respectively. Regarding electricity losses in the transmission and distribution networks, positive trends continue. Transmission losses amounted to 308 GWh, i.e., 1.84% in relation to total energy in the transmission network, and in the absolute value they are lower by 4.9% compared to the previous year, which is the direct consequence of the reduction of both generation and cross-border flows. Distribution losses were also reduced amounting to 1,188 GWh or 12.5% in relation to gross distribution consumption, which is the lowest level in the past twenty years.

A maximum load of the power system in 2012, registered on 10 February 2012 at 19:00 hrs, amounted to 2,143 MW. This did not exceed a maximum of 2,173 MW, which is a historic record registered on 31 December 2010 at 18:00 hrs. Low temperature and heavy snow, as was in February 2012, tend to increase the amount of consumption.

Table 3.1.1 Basic Power Indicators of BiH

(GWh)

	EP BIH	ERS	EP HZHB	Komunalno Brcko	BiH
Year 2011					
Generation	6,569.83	5,127.51	1,237.19		12,934.54
Generation in hydro power plants	1,086.63	1,832.77	1,229.30		4,148.70
Generation in thermal power plants	5,367.80	3,251.70			8,619.50
Generation in small and industrial PPs	115.40	43.04	7.89		166.33
Consumption	4,786.52	3,683.94	3,583.10	262.54	12,624.24
Distribution Consumption	4,340.28	3,551.14	1,379.43	262.54	9,533.39
Transmission Losses					308.14
Large customers	446.23	119.18	2,136.41		2,701.83
Pumping and mines consumption		13.62	67.26		80.88
Surplus or Deficit	1,783.31	1,443.57	-2,345.91	-262.54	310.30
Year 2011					
Generation	7,352.47	5,295.46	1,402.00		14,049.93
Generation in hydro power plants	1,113.63	1,817.09	1,395.40		4,326.12
Generation in thermal power plants	6,138.01	3,449.76			9,587.77
Generation in small and industrial PPs	100.82	28.61	6.60		136.04
Consumption	4,701.34	3,694.47	3,600.88	271.71	12,592.57
Distribution Consumption	4,287.17	3,556.16	1,363.04	271.71	9,475.08
Transmission Losses					324.17
Large customers	417.17	124.08	2,216.62		2,757.87
Pumping and mines consumption		14.23	21.22		35.45
Surplus or Deficit	2,651.13	1,600.99	-2,198.88	-271.71	1,457.36
Year 2010					
Generation	7,290.17	6,165.02	2,613.21		16,068.41
Generation in hydro power plants	2,094.61	3,246.91	2,604.67		7,946.20
Generation in thermal power plants	5,012.79	2,856.00			7,868.80
Generation in small and industrial PPs	182.77	62.11	8.54		253.41
Consumption	4,604.35	3,645.41	3,400.76	277.35	12,265.82
Distribution Consumption	4,232.92	3,522.19	1,367.75	277.35	9,400.21
Transmission Losses					337.95
Large customers	371.43	110.26	2,030.80		2,512.49
Pumping and mines consumption		12.96	2.21		15.17
Surplus or Deficit	2,685.82	2,519.61	-787.55	-277.35	3,802.59
Year 2009					
Generation	6,993.22	5,623.23	1,945.06	0.00	14,561.51
Generation in hydro power plants	1,631.23	2,577.36	1,939.82		6,148.41
Generation in thermal power plants	5,233.60	2,993.02			8,226.63
Generation in small and industrial PPs	128.39	52.85	5.24		186.47
Consumption	4,499.76	3,538.70	2,980.13	272.22	11,597.28
Distribution Consumption	4,132.46	3,403.46	1,349.97	272.22	9,158.11
Transmission Losses					306.46
Large customers	367.30	120.90	1,630.16		2,118.37
Pumping and mines consumption		14.34			14.34
Surplus or Deficit	2,493.46	2,084.53	-1,035.07	-272.22	2,964.23

Source: State Electricity Regulatory Commission "Report on Activities of the State Electricity Regulatory Commission in 2012"

(2) Situation in the most recent one year period (2012)

An overview of power balance volumes realized in 2012 and the percentage share, that is, the break-down of electricity generation in 2012, are provided in Figure 1.

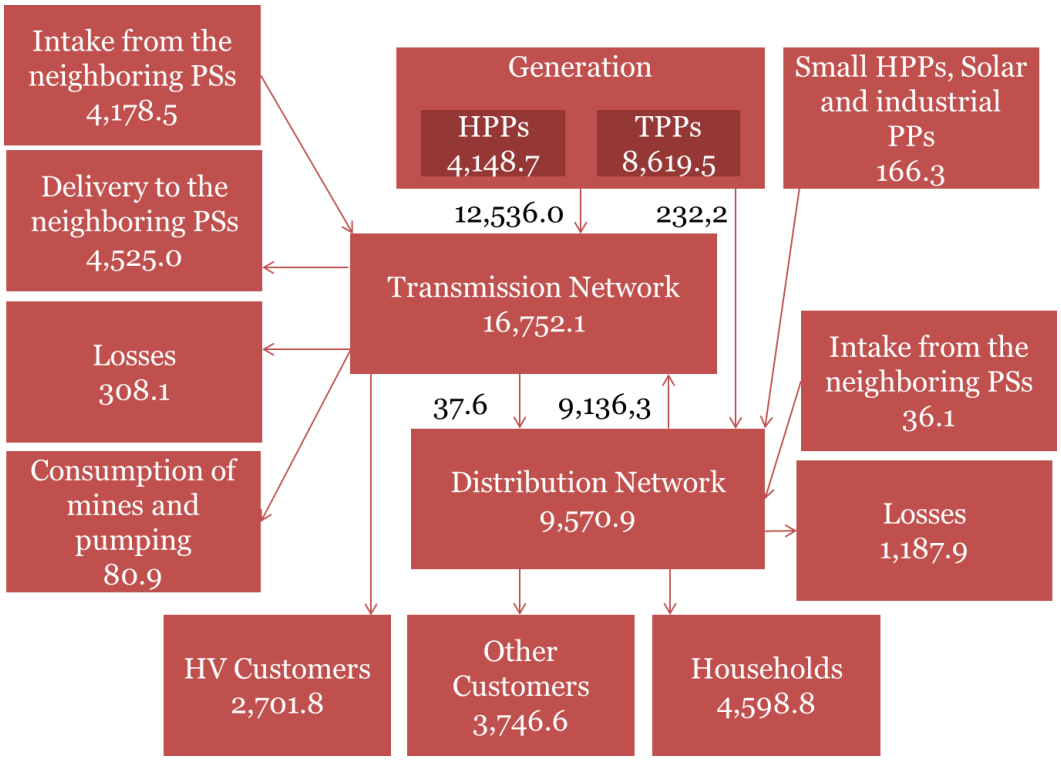


Figure 3.1.1 Balance Volumes Realized in BiH in 2012 (GWh)

Source: Annual Report of ISO BiH in 2012

3.1.2 Current demand-supply situation in neighboring countries

Total amount of electricity generation and consumption in EU countries was gradually increased in the early first decade of the 2000s, and after mid-2000s, it was gradually decreased. Germany, France, UK, Italy and Spain are top 5 countries in electricity market in EU.

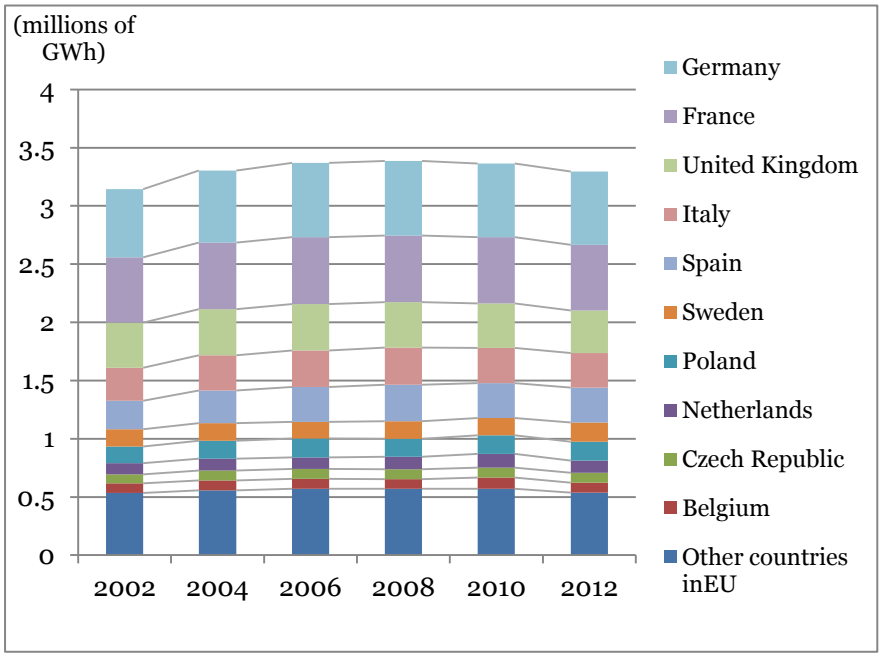


Figure 3.1.2 Electricity generation in EU(millions of GWh)

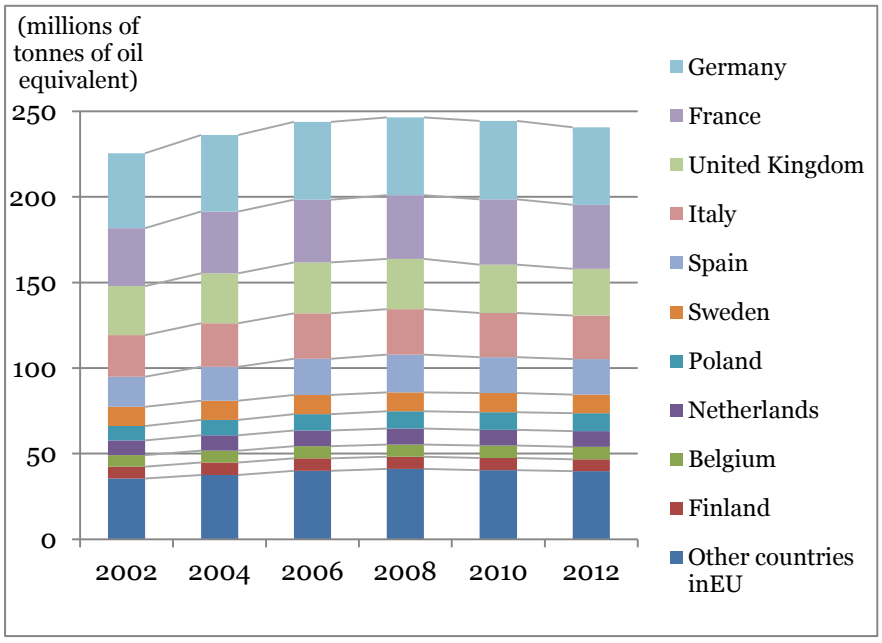


Figure 3.1.3 Electricity consumption in EU (millions of tonnes of oil equivalent)

Source: EUROSTAT Database

3.2 Demand Forecast

3.2.1 Forecast on generation, consumption and electricity balance in BiH

In Indicative Generation Plan for period 2014-2023("the Plan"), the following plants will be decommissioned; Tuzla 3 power plant with the capacity of 100MW will be decommissioned in 2019, Tuzula 4 with 200MW and Kakanji power plant in 2024. The construction of renewable energy power plant has been planned: four hydro power plants with a total capacity of 90MW are planned to be built in 2015, and also TE-TO KTG Zenica thermal power plant with 400MW in 2015 and Stanari thermal power plant with 300MW capacity in 2016. As the demand is expected to increase by 2-3% annually, if the construction of the planned new generation capacities does not start immediately, the year of 2016 may face short supply.

ISO BiH developed forecasts on generation of existing and new power plant and consumption and losses with three scenarios for the periods 2015-2024. Three consumption scenarios are: "Pessimistic"-lower consumption at average increase of 1.5%, "Realistic"-forecast according to GDP at average increase of 2.6% and "Optimistic"-higher consumption at average increase of 3.2%. Generation of wind firm is not considered in the Plan. Though ISO BiH forecasts that construction of new power plants will delay, generation meets for all scenarios of consumption and electricity balance is positive.

The Plan is shown in the following table and figure.

Table 3.2.1 Generation plan and three scenarios of consumption in BiH(2015-2024) (GWh)

(GWh)

Generation			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Existing power plant	Hydro power plant		5,362	5,362	5,362	5,362	5,362	5,362	5,362	5,362	5,362	5,362
	Termal power plant		8,820	9,100	8,956	9,134	7,680	7,560	7,467	6,120	6,351	6,311
	Subtotal		14,182	14,462	14,318	14,496	13,042	12,922	12,829	11,482	11,713	11,673
New power plant	Hydro power plant	HE DUB and USTIPRAČA	74	74	74	74	74	74	74	74	74	74
		HE DUB I HE USTIPRAČA(forecast by ISO BIH)			*74*	*74*	*74*	*74*	*74*	*74*	*74*	*74*
		HE ULOG	82	82	82	82	82	82	82	82	82	82
		HE ULOG(forecast by ISO BIH)			*82*	*82*	*82*	*82*	*82*	*82*	*82*	*82*
		MHE NA RIJECI SUTJESCI	84	84	84	84	84	84	84	84	84	84
		MHE NA RIJECI SUTJESCI (forecast by ISO BIH)			*84*	*84*	*84*	*84*	*84*	*84*	*84*	*84*
		HE DABAR					252	252	252	252	252	252
		HE USTIKOLINA							237	237	237	237
		HE VRANDUK				96	96	96	96	96	96	96
		Subtotal	240	240	240	337	589	589	825	825	825	825
	Termal power plant	TE STANARI		1,500	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
		TE TUZLA, blok 7					2,604	2,604	2,604	2,604	2,604	2,604
		TE KAKANJ, blok 8								910	910	910
		KTG ZENICA	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250
		KTG ZENICA (forecast by ISO BIH)			*3,250*	*3,250*	*3,250*	*3,250*	*3,250*	*3,250*	*3,250*	*3,250*
		Subtotal	3,250	4,750	5,250	5,250	7,854	7,854	7,854	8,764	8,764	8,764
	Subtotal		3,490	4,990	5,490	5,587	8,443	8,443	8,679	9,589	9,589	9,589
Total			17,673	19,453	19,809	20,083	21,485	21,365	21,509	21,072	21,303	21,263

Electricity loss	389	428	436	442	473	470	473	464	469	468

Consumption										
Scenario 1. (Lower consumption)	1.50%	12,087	12,268	12,452	12,639	12,828	13,021	13,216	13,414	13,615	13,820
Scenario 2. (Base case)	2.60%	12,350	12,671	13,001	13,339	13,685	14,041	14,406	14,781	15,165	15,559
Scenario 3. (Higher consumption)	3.20%	12,495	12,895	13,307	13,733	14,173	14,626	15,094	15,577	16,076	16,590

Electricity Balance										
Scenario 1. (Lower consumption):added Electricity loss	5,215	6,775	6,939	7,021	8,203	7,893	7,839	7,213	7,238	6,995
Scenario 2. (Base case):added Electricity loss	5,084	6,354	6,372	6,302	7,327	6,854	6,629	5,827	5,669	5,236
Scenario 3. (Higher consumption):added Electricity loss	5,012	6,360	6,303	6,153	7,092	6,530	6,210	5,309	5,045	4,501

Souce:ISO BiH “Indikativni plan razvoja proizvodnje 2015-2024”

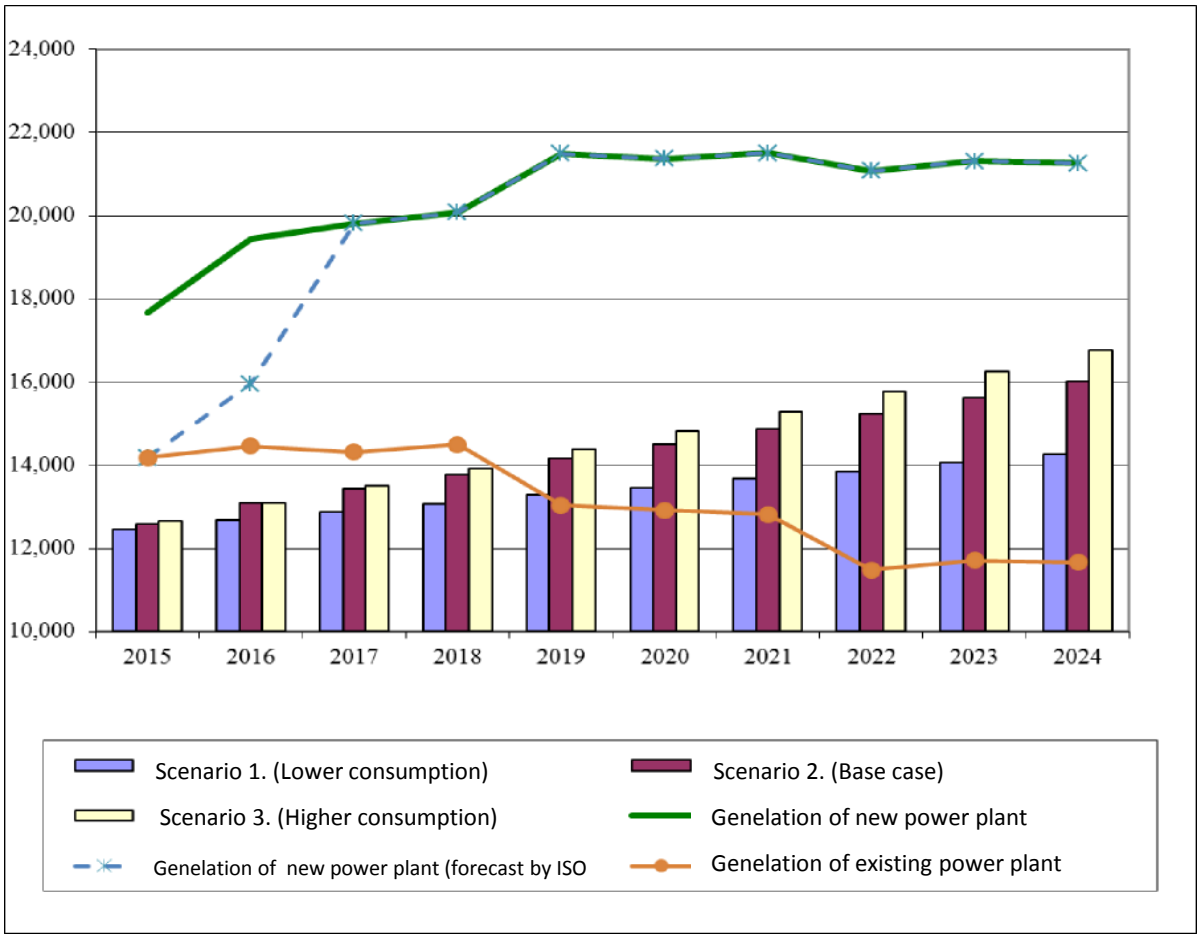


Figure 3.2.1 Three scenarios of consumption and forecasts on generation(2015-2024) (GWh)

Souce:ISO BiH "Indikativni plan razvoja proizvodnje 2015-2024"

3.2.2 Forecast on generation, consumption and electricity balance in FBiH

In FBiH, for the next 20 years, electricity demand in FBiH will increase approximately one-and-a-half times. FBiH has capacity for generation one-and-a-half times larger than its demand, and sell foreign and domestic purchasers.

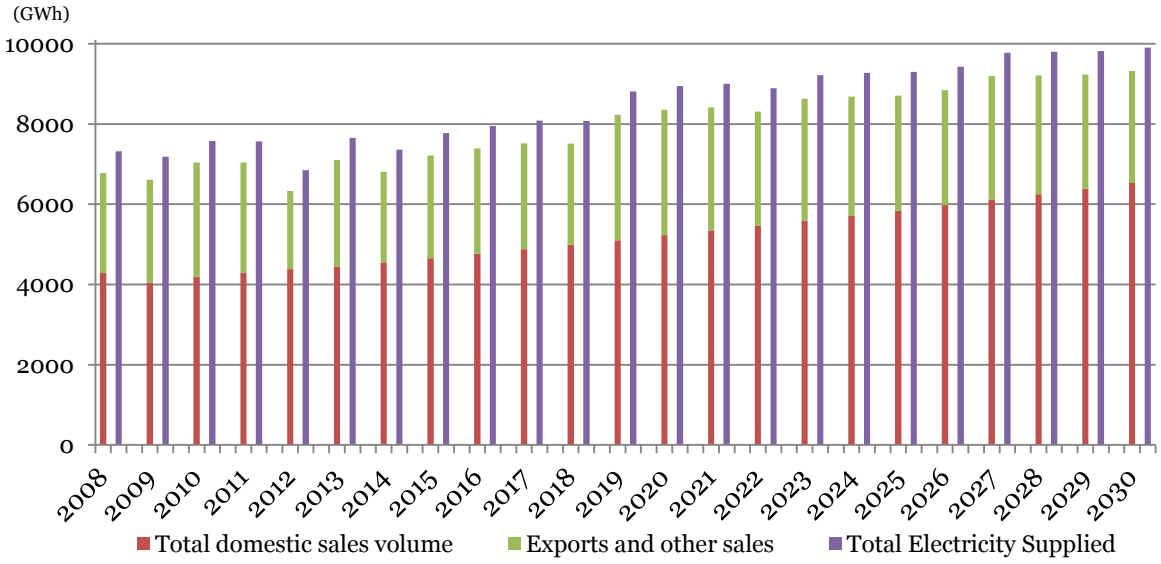


Figure 3.2.2 Forecast on sales and supply of electricity in FBiH (2008-2030) (GWh)

Source: Created from EPBiH " Key Assumptions for Financial Analysis" 03.10.2013

* Regarding data of 2008~2012 is actual, 2013~2015 is 3 years plan and after 2016 is long-term forecast.

The following figure is a breakdown of electricity supply in FBiH. EPBiH, the federal energy company, is planning to increase the generation capacity of Tuzla power plant and installation of small hydro power plants and wind power plants after the mid-2010.

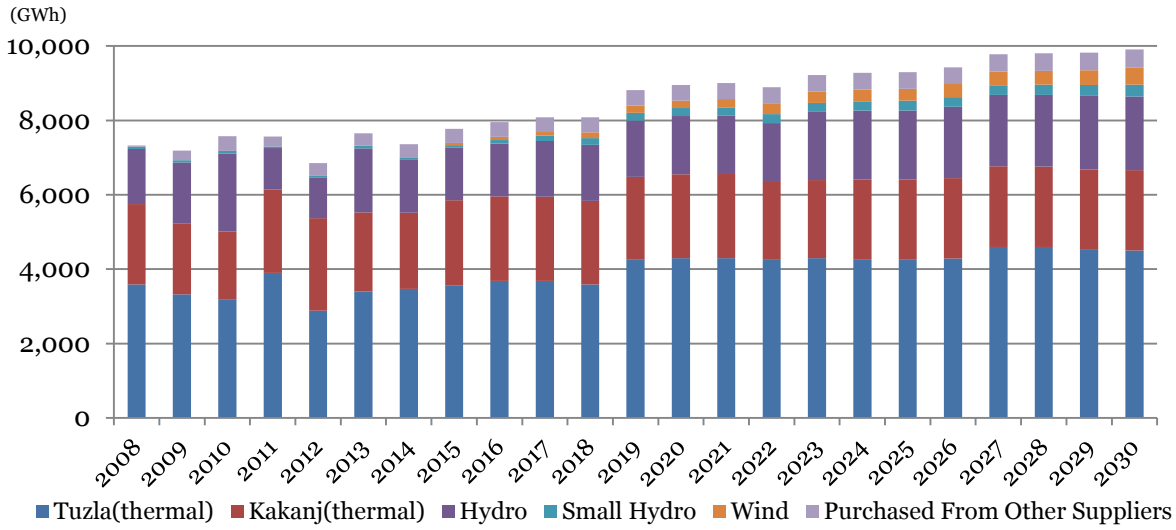


Figure 3.2.3 Breakdown of electricity supply in FBiH (2008-2030) (GWh)

Source: Created from EPBiH " Key Assumptions for Financial Analysis" 03.10.2013

The following figure is a breakdown of electricity sales in FBiH. Revenue from "Residential" customers is largest customer class in domestic sales and expected to increase approximately one-and-a-half times and other customers. "Industrial 10kV", "Commercial" and "Exports and other sales" are expected to increase gradually.

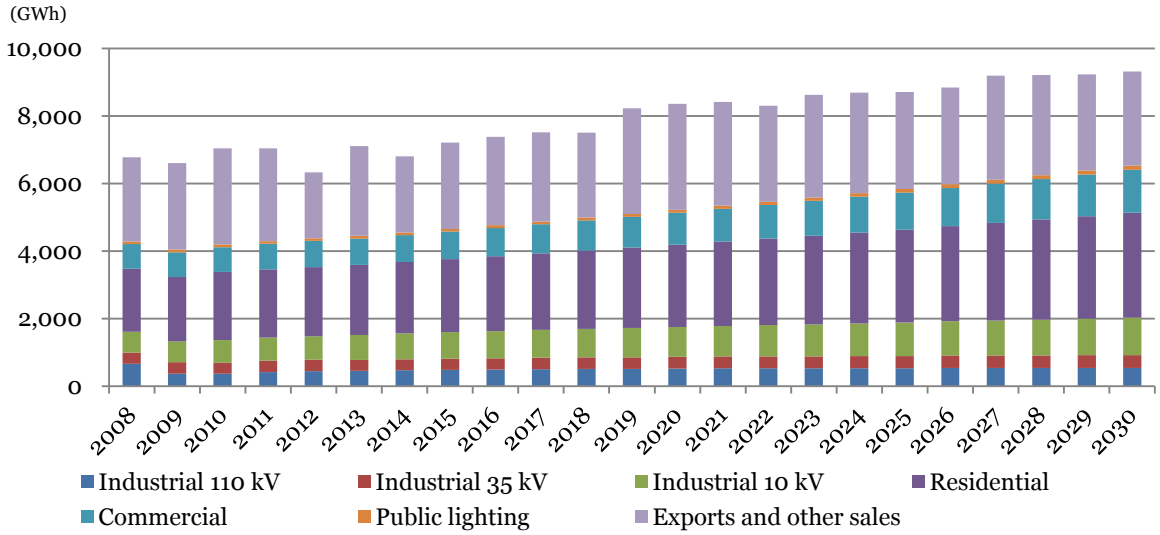


Figure 3.2.4 Breakdown of electricity sales in FBiH (2008-2030) (GWh)

Souce: Created from EPBiH " Key Assumptions for Financial Analysis" 03.10.2013

3.3 Review and evaluation of the stability of fuel (coal) supply to the Project Social and economic situation of BiH and the project district

3.3.1 Trends in natural resources and energy

The only natural resource and energy originally produced in BiH is coal. Reserves of crude oil and natural gas have not been confirmed. Therefore, while the country produces the coal it consumes, it depends completely on import for oil and natural gas.

3.3.2 Coal reserves

BiH is ranked as 17th of coal recoverable reserves in the world[1]. The lowest rank of coal, lignite shares the largest portion. Because of its low energy density and typically high moisture content, lignite and brown coal is inefficient to transport and is not traded extensively on the world market compared with higher coal grades.

Table 3.3.1 Top Coal Recoverable Reserves Country 2011-end

		Bituminous including Anthracite	Sub-bituminous	Lignite and Brown Coal	Total	%
1	US	108,501	98,618	30,176	237,295	27.6%
2	Russia	49,088	97,471	10,450	157,009	18.2%
3	China	62,200	33,700	18,600	114,500	13.3%
4	Australia	37,100	2,100	37,200	76,400	8.9%
5	India	56,100	-	4,500	60,600	7.0%
6	Germany	99	-	40,600	40,699	4.7%
7	Ukraine	15,351	16,577	1,945	33,873	3.9%
8	Kazakhstan	21,500	-	12,100	33,600	3.9%
9	South Africa	30,156	-	-	30,156	3.5%
10	Serbia	9	361	13,400	13,770	1.6%
11	Columbia	6,366	380	-	6,746	0.8%
12	Canada	3,464	872	2,236	6,572	0.8%
13	Poland	4,338	-	1,371	5,709	0.7%
14	Indonesia	1,520	2,904	1,105	5,529	0.6%
15	Brazil	-	4,559	-	4,559	0.5%
16	Greece	-	-	3,020	3,020	0.4%
17	BiH	484	-	2,369	2,853	0.3%
18	Mongol	1,170	-	1,350	2,520	0.3%
19	Bulgaria	2	190	2,174	2,366	0.3%
20	Turkey	529	-	1,814	2,343	0.3%
-	Others	6,775	3,056	10,977	20,808	2.4%
-	Total	404,762	260,789	195,387	860,938	100%

Source: World Energy Council

Coal is of vital importance to BiH's economy. BiH annually consumes approximately 11 million tons of coal and a simple calculation indicates the reserve-production ratio to be 260 years.BiH has geological reserve of an estimated six billion tons of coal. Production of coal

[1]World Energy Conference

in BiH for 2010 is 10.985.152 tons, out of which 5.617.896 tons is lignite and 5.367.256 tones is brown coal. In final coal consumption of 772.823 tons in 2010, lignite participates with share of 56,6%, brown coal with 38,4% and cooking coal and anthracite with 5%. The effective demand of thermal power plants is a regulator of coal production to a major degree since it absorbs 88% of total coal production. The remaining balance is supplied to industry and to broad consumption, whereas only negligible quantities are exported[2].

3.3.3 Import of oil and gas

Natural gas is entirely imported from Russia, but as BiH has no pipeline between Russia or storage facilities, it imports gas from nearby countries that has gas pipelines (Ukraine, Hungary and Serbia) (Gas pipelines have been constructed within BiH in part (between Beregovo-Horgos-Zvornik), but are used only for domestic gas transmission and are not connected to cities in Russia).

Similarly, all the oil is imported from neighboring countries (Croatia, Serbia, Montenegro, and Hungary). As BiH has no storage facilities, it leases facilities located in other countries.

There are no plans to improve this situation in particular, there is no major energy conversion, and the country is expected to remain dependent on the coal it produces.

[2] ENERGY SECTOR IN BOSNIA AND HERZEGOVINA 2013 , Foreign Investment Promotion Agency of BiH

CHAPTER4 OUTLINE DESIGN AND COST ESTIMATION

4.1 Natural environment near the subject project area

4.1.1 Natural environment

Refer to “8.3.2. Natural Environment”

4.1.2 Location of the plant in regard to coal delivery and disposal

Tuzla power plant is well fitted in regard to the coal and water delivery, as well as the coal slag and ash disposal. Coal delivery from surface mines Dubrave and Sikulje could be done by the railway. The following figure shows the satellite images of Tuzla power plant with the disposition of Tuzla city and the coal slag and ash disposal areas Divkovici, the future waste disposal Šički Brod, as well as the surface mine Šikulje and Modrac lake.

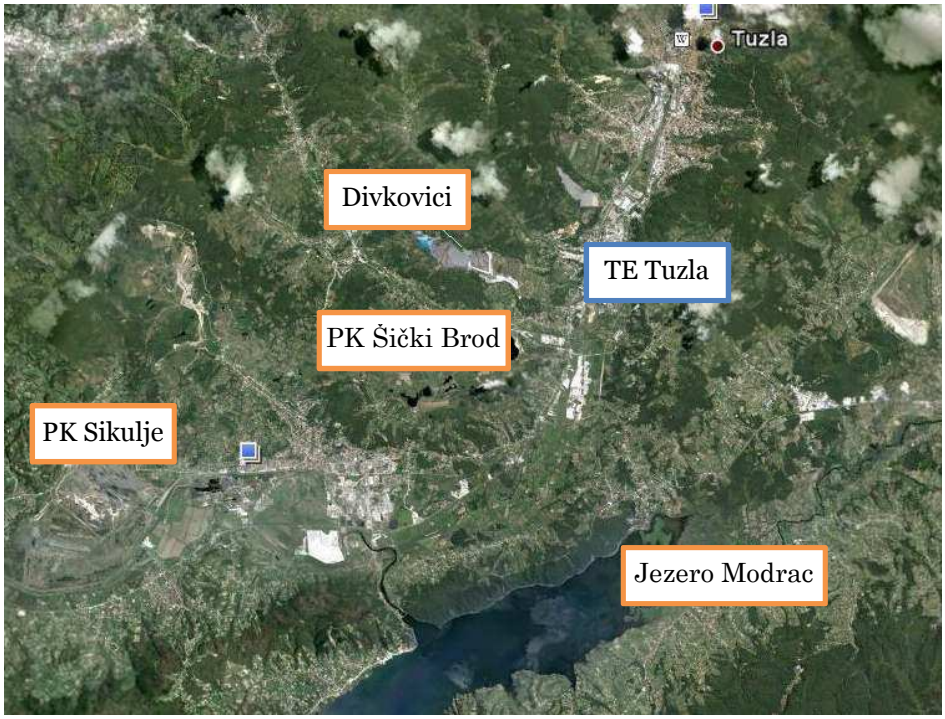


Figure 4.1.1 Location of Tuzla power plant

Source: GoogleEarth, 2013

4.2 Outline Design of the Power Plant and its related facility

4.2.1 Outline design of the project

BiH is one of the Balkan countries with abundant reserve of lignite coal and which depends approx. 60% of power generation on domestic coal, thus the efficient usage of domestic resource is one of the most important issues. On the other hand, the existing power plants were constructed by Russian or Eastern European companies in the 60s-70s, thus, are aged and efficiency is extremely low.

By applying Japan's ultra super critical (USC) technology, a high efficient technology in which Japan is the global leader, and by making use of Japan's reliable manufacturing technology and operation records, we will contribute not only to BiH's energy sector (high efficiency, and stable power supply), but also to measures for the global environment and climate change issues (improve efficiency and reduce CO2 emission).

In BiH, high efficient coal fired power plants and environmental protection systems have not been established. Therefore, Tuzla power plant will be the first USC power plant that satisfies the EU environmental standards in the region.

【Before Installation】 【After Installation】

Figure 4.2.1 Image of power plant

Photos; These are only images.

Table 4.2.1 Comparison of fuel selection

Table 4.1.1: Comparison of fuel selectionItem	Unit 3 (Existing)	Unit 4 (Existing)	Unit 7 (New)
Plant Output (Gross) (MW)	100	200	**450 – 500**
SO_2 Emissions (mg/Nm3)	2058.3 / 2419.7 (in 2010 / 2011)		**< 200**
NOx Emissions (mg/Nm3)	335.3 / 394.0 (in 2010 / 2011)		**< 200**
Particle Emissions (mg/Nm3)	142.9 / 149.1 (in 2010 / 2011)		**< 30**

(Unit 1 and 2 shutdown in 2001)

Figures; planed figures by JICA Study Team

4.3 Identify technologies to be introduced and its verification

Based on the result of comparison among the alternatives Tuzla coal-fired power plant Unit 7 should be planned based on the USC technology.

Elektroprivreda Bosne i Hercegovine (hereinafter called as EPBiH), a state electricity company and owns both thermal power plants and hydro power plants, based on the following background, plans Tuzla power plant Unit 7 as lignite coal fired thermal power plant.

【Background】

a) BiH has abundant reserve of lignite coal and depends approx. 60% of power generation from that domestic coal. From the viewpoint stable supply of energy, energy security, the effective use of lignite coal is the most important issue in the country.

b) The abundant volume of lignite coal are produced around existing Tuzla power plant and due to that reason all Unit 1 to 6 is lignite coal fired unit. The Unit 7 is planned as replace unit of existing aged Unit 3 and 4 and plan of EPBiH is using lignite coal as fuel for this new unit too.

c) The rated output of Unit 7 is planned as 450-500MW. This is because the capacity of Unit 3 and 4 plus growth in electricity demand.

Under here is the comparison table among the alternatives. Based on the result of comparison among the alternatives, the best optimal solution for fuel selection for Tuzla new unit is domestic lignite coal.

Table 4.3.1 Comparison of fuel selection

	Lignite coal	Coal (Imported coal)	Natural gas	Renewable energy	Basis of evaluation
Supply stability (Feasibility)	○	△	×	×	*1
Economy	○	△	×	×	*2
Environmental friendliness	△	△	○	○	*3
Overall	Optimal plan				

Source: JICA Study Team

【Legend】
○: Recommended,
△: Possible to adopt but not recommended,
×: Not realistic

【Basis of evaluation】

Supply stability of fuel (*1):

- Lignite coal;
  From the point of supply stability of fuel, it is recommended to use domestic lignite coal production.
- Coal (imported coal);
  Using imported coal is less safer of energy security and less stability compare to use domestic lignite coal. From the energy security point of view, imported coal is less recommended.
- Natural gas;
  There is no existing gas pipeline around existing Tuzla coal-fired power plant and in case using natural gas for fuel, construction of new pipeline is necessary. The constructing new gas pipeline for this Unit 7 is not realistic solution.
- Renewable energy;
  In case of generating 450-500MW with renewable energy, around 4 to 5 times more site space is required compare to the other fuel solution based on the current technology and it is not feasible to select use renewable energy for alternative.

Economy (*2):

- Lignite coal;
  The domestic lignite coal is fairly less expensive compare to imported coal and natural gas. From the point of economical point of view, it is recommended to use domestic lignite coal production. In addition, in case using domestic lignite

production, that will contribute to local employment.

- Coal (imported coal);

  Imported coal has better coal composition and due to that plant efficiency is improved and coal consumption is reduced. However unit price of imported coal is higher than lignite coal and in addition transportation cost included custom duty is added.

  From the economical point of view, it is less recommended to use imported coal.

- Natural gas;

  As mentioned at supply stability of fuel section, it is not realistic to constructing new gas pipeline for this Unit 7. Also the fuel price of natural gas has kept at high level and so even incase new pipeline is constructed, using fuel for natural gas is not feasible solution.

- Renewable energy;

  Due to instability of fuel supply and electricity generation, in case selecting the renewable energy as alternative, further backup capacity is required for stable electricity supply and this not feasible solution.

Environmental friendliness (*3):

- Lignite coal;

  Compare to the other alternatives (natural gas, renewable energy) lignite coal is less environmental friendly. From the environmental friendliness point of view, to use domestic lignite coal production is less recommended.

- Coal (imported coal);

  The plant efficiency is improved compare to lignite coal however compare to the other alternatives (natural gas, renewable energy) imported coal is less environmental friendly and from the environmental friendliness point of view, to use imported coal is also less recommended.

- Natural gas;

  Compare to the lignite coal and imported coal, the plant efficiency is higher. From the environmental friendliness point of view, to use natural gas is recommended.

- Renewable energy;

  Compare to the other alternatives (lignite coal, imported coal and natural gas), the renewable energy solution is the most environmental friendly. From the environmental friendliness point of view, to use the renewable energy is the most recommended.

【Overall】

Though environmental friendliness is worst, considering supply stability, energy security and economy, as an overall evaluation using domestic lignite coal production is the optimal solution.

BiH aims to join EU and so the project of Tuzla coal-fired power plant Unit 7 is plan to comply with EU environmental regulation and Energy 2020, which is EU's ambitious energy strategy. Based on these backgrounds to minimize environmental impact, the Tuzla coal-fired power plant Unit 7 should be planned based on the USC technology with using latest air quality control systems. Under here is the comparison table between zero option (no new unit but continuous use of existing Unit 3 and 4), sub-critical technology (Sub-C), super critical technology (SC) and USC technology.

Table 4.3.2 Comparison of coal-fired technology (*1)

	Item	Zero option (operate existing Unit 3 & 4)	Sub-critical (Sub-C)	Super critical (SC)	Ultra super critical (USC)
Specification	Plant output (MW)	Unit 3: 100 Unit 4: 200	450	450	450
Technology	SO2emission (mg / Nm3)	2058.3 (2010) 2419.7 (2011)	< 200(*3)		
	NOxemission (mg / Nm3)	335.3 (2010) 394.0 (2011)	< 200(*3)		
	Dust emission (mg / Nm3)	142.9 (2010) 149.1 (2011)	1. < 30(*3)		
Environmental and Social aspects	social aspects	0 (continuous use of existing Unit 3 and 4)	Some land acquisitions are necessary to make space for constructing Unit 7 however it is not expected the resettlement and so it is not foreseen a negative social impact. As for the detail, refer to section 8 Environmental and Social Aspects. As for the positive social impacts, it is expected the increment of local employment during construction.		
	Environmental aspects	Due to continuation of aged existing units operation, an environmental impact is larger compare to replace with new build Unit 7.	- Volume of CO2 emission & utilities (coal, water etc.) consumption; Compare to continuously operate existing units, significant decrease is expected. It is expected approximately 6% reduction comparison between USC and sub-critical (Sub-Critical) - Other emissions (SO2, NOx and dust); To apply state of the art air quality control technology makes possible to reduce significant volume of dust emission.		

Recommended optimal plan and reason	Not recommended The environmental impact is excessive compare to replace with new build Unit 7.	Not recommended BiH aims to comply Energy 2020(*2), which is EU's ambitious energy strategy. The target of regulation is applied for the country base however the Tuzla coal-fired power plant Unit 7 is required to minimize environmental impacts as project itself.	**Optimal plan** As shown on the left, to minimize environmental impact is the mandatory requirement for the project. By applying USC technology, the project achieve minimize environmental impact.

*1: The some of the figures on the above table is planned number.
*2: EU's ambitious energy strategy "Energy 2020" (20-20-20)
The EU's ambitious energy strategy, which ensure the measures of energy security and climate change mitigation, to achieve the followings by 2020.
To reduce greenhouse gas emission 20% compare to 1990 by 2020.
To increase share of renewable energy usage in the total energy consumption more than 20% by 2020.
To increase energy efficiency more than 20%.
*3: EU Directive 2001/80/EC. The actual applicable regulation will be decided through discussion with EPBiH.
Source: JICA Study Team

In case applying USC technology, it is expected high plant efficiency improvement compare to Sub-critical (Sub-C) unit. This makes significant improvement of coal, water and other utilities consumption and reduction of emission such as CO2, dust and achieve minimizing the environmental impact and this contribute economic improvement too. There is no significant deference between Sub-critical (Sub-C) unit, USC unit from the operational point of view and deference on operation and maintenance cost is rather small compare to the deference of efficiency improvement.

Based on the study, the optimal technology for the Tuzla power plant Unit 7 is applying USC technology and use lignite coal for the fuel.

4.4 Development of construction plan (Schedule)

4.4.1 Development of construction plan (Schedule)

Construction of a power plant generally starts in earnest with an instruction from the owner to the manufacturers to start work. Such instruction is called a notice to proceed (NTP).

Based on our experiences, then construction period, from NTP to the commercial operation, for the project of this size is expected around 60 months.

The following facts are mainly affect the construction schedule and necessary to study detail when actual construction schedule fix.

- Conditions of the planned construction site (topography, carrying-in route for heavy equipment, etc., ground conditions, environment of surrounding area, and so forth)
- Route and conditions for transportation of large heavy objects,
- Construction methods for buildings, etc.
- Preparations to deal with heavy equipment (crane, etc.),
- Quality of local construction companies and workers,
- Geographical conditions (weather conditions, altitude, etc.),

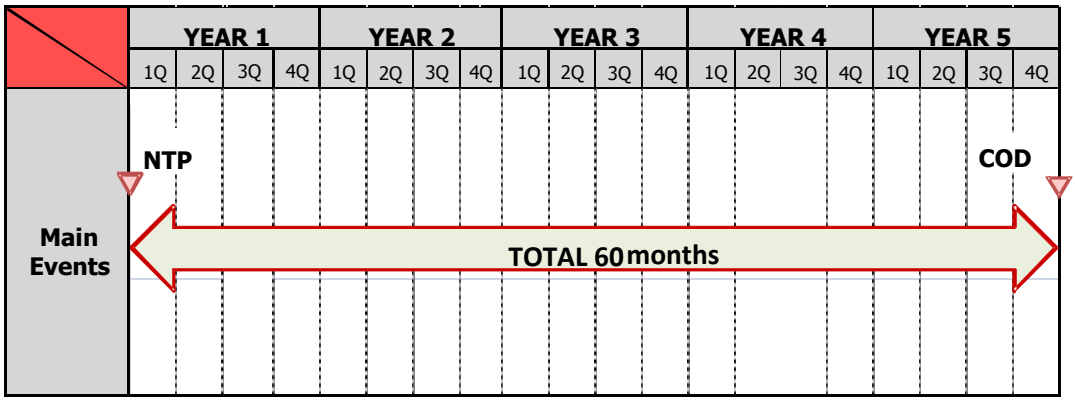


Figure 4.4.1 Construction schedule

Source: JICA Study Team

4.5 Project cost estimation

The project cost for constructing Tuzla coal-fired power plant Unit 7 with USC technology is evaluated with refers to the similar reference project (e.g. output, fuel etc.), which was contracted in 2014 in surrounding country with consideration of some adjustment on scope of supply and deference of specification etc.

The cost includes engineering, procurement, construction, financing cost (e.g. interest during construction), project cost such as advisory fee etc.

4.6 O&M cost estimation

The project management organization has been planned based on the existing one, though the detailed project organization will be planned after the project is firmly committed.

It is necessary to conduct sufficient education and training that corresponds to the new technology in order to acquire new skills for operation and maintenance, since the new unit will be a state-of-the-art high efficiency plant. In particular, education and training required for management of plant water quality, chemical analysis of fuel properties and management of plant thermal efficiency are most important, since the technology to be adopted in this project will be operated and maintained as an USC power plant. Therefore, it is necessary to perform operations after obtaining sufficient knowledge before the date of commercial operation. However, project management organization planned based on the existing one must be considered as a transitional organization until reassignment will be completed due to scrapping of old units and building of new units, since the new plant will be a state-of-the-art USC power plant that will be automated.

When analyzing the present organization corresponding to 4 units, some employees belong to common indirect departments and the remaining rest are staff for operation and direct maintenance common to 4 units. It is believed that the required number will be reduced in the future, but a natural decline will be maintained due to retirement of enrolled employees.

4.6.1 Shift of operator

The monitoring and operation in the central operation room assumes four groups of three shifts and that for the auxiliary facility will be carried out without late night work. The maintenance staff assumes a minimum staff such as patrol personnel being placed for the operation unit and major overhaul work of 4 units during an outage will be carried out over 3 months by one group.

The management of the new unit will be performed by reassignment from the existing units. Since the existing Unit 3 will be decommissioned in 2016 and the Unit 4 will be decommissioned in 2019, the appropriate number of staff can be reassigned from these units.

4.7 Proposal of the Procurement Package (Development of EPC Contract)

There is a choice to procure equipment and systems with various separate packages to reduce procurement cost however since this is first USC project in BiH and to avoid an increasing coordination work between the procurement packages and to reduce the risk of construction work delay due to such additional coordination work, it is recommended to procure equipment and systems as a large package (e.g. EPC) and to avoid delay risk of the project execution for the overall project benefit.

CHAPTER 5 STRUCTURE/FINANCING SCHEME & RISK/ECONOMICAL ANALYSIS

5.1 Proposal of the Scheme and comparisons among various options

5.1.1 Possible Schemes to implement the project

As basic schemes to implement the project, 2 typical schemes could be assumed. In this report, we call them as "SPC" scheme, and "Simple EPC" scheme, intending to better describe the difference of the role of Mitsubishi Hitachi Power Systems, Ltd.("MHPS") as EPC Contractor.

The following are the descriptions of the 2 schemes.

(1) SPC Scheme

Under the SPC Scheme, a special purpose company shall be established by the EPC Contractor (and other investors, if any). EPBiH could also be an investor in SPC, although it is not standard to do so because the position of investor may create potential conflict of interest against its another role in this Project, i.e., offtaker.

SPC so established shall design, construct, own, maintain, and operate the Unit 7 – 450MW coal fired power plant (the "Project") by executing various agreements with related parties (see the figure in the next page) which are necessary to implement the Project.

The initial construction and other initial investment costs are compensated by equity invested in, and long term financing provided to, SPC. (In this report, it is assumed that JICA's PSIF shall account for all or substantial part of the long term financing.) After the plant is completed, SPC shall operate the plant, sell the generated electricity to EPBiH pursuant to the (long term) power purchase agreement between EPBiH and SPC, and apply the generate power sales revenue for (and typically in the order of) the following payments or deposits:

- payment of operating costs
- deposit of maintenance reserves for future refurbishments;
- payment of loan interest;
- scheduled principal repayment of loan;
- replenishment (if necessary) of debt service reserve account; and
- dividend payment (to the extent permitted under the loan agreement)

It should be noted that under this scheme, to secure the sales revenue is essential. From this viewpoint, Performance guarantee (or other credit enhancement measures) for the (payment) obligation of offtaker (in this case, EPBiH) by host country government (in this case, the Government of Federation of Bosnia and Herzegovina) is usually required by the loan/equity providers. Performance guarantee, however, does not cover the risk of non-payment when (for example) the plant is shut down due to SPC side's technical failure. It is the big

difference from the "simple EPC" scheme as explained later that the performance risk of the plant is essentially born by SPC.

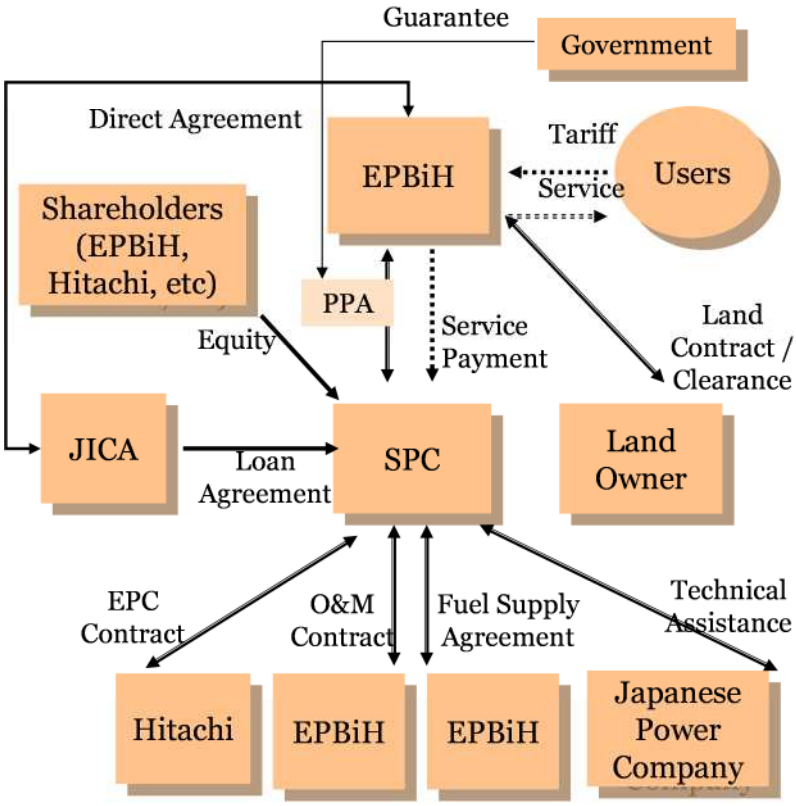


Figure 5.1.1 Possible project scheme (SPC Scheme)

Source: Study team

(2) Simple EPC Scheme

Under the "Simple EPC" Scheme, the EPC Contractor does not establish SPC (or if SPC is established, the role of SPC shall be the same as the general role of EPC contractor). The EPC Contractor shall execute the EPC Contract directly with EPBiH, and design and construct the Unit 7 – 450MW coal fired power plant. The EPC Contractor shall not own the plant, nor shall it be involved or take responsibility for operation and maintenance of the plant except assuming (general) defect liability during certain period.

The initial construction and other initial investment costs are compensated by the down payment to be made from the cash maintained the buyer of the plant (in this case EPBiH) and long term financing provided to the buyer ("Buyer's Credit"). In general cases, the Buyer's Credit is arranged by the EPC Contractor and is provided by the export credit agency located in the country of the EPC Contractor. When the plant is completed, and the ownership of the plant is transferred to the buyer, the buyer shall operate the plant, sell the generated electricity to its customers. Repayment of the Buyer's Credit must be made punctually even if the plant

has been shut down due to technical failure.

It should be noted that under this scheme, to secure the repayment of the Buyer's Credit is essential. From this viewpoint, Loan guarantee (or other credit enhancement measures) for the repayment of the Buyer's Credit by host country government (in this case, the Government of Federation of Bosnia and Herzegovina) is usually required by the export credit agencies.

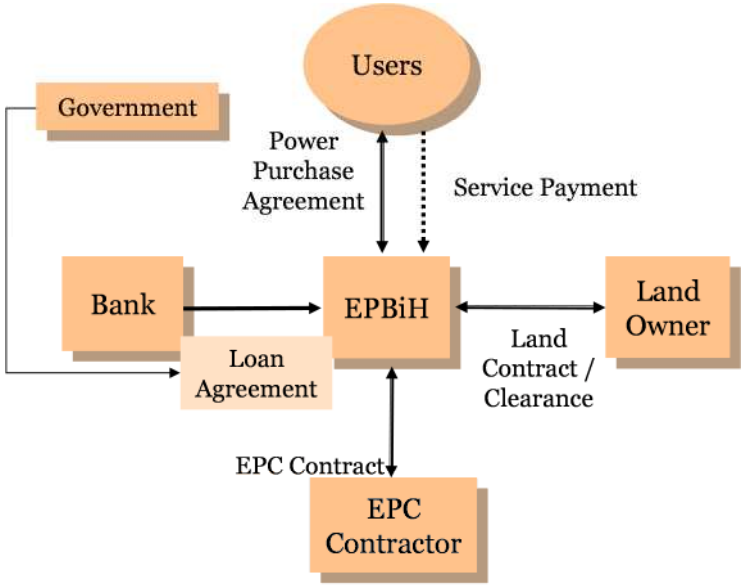


Figure 5.1.2 Project scheme (Buyer's credit)

Source: Study team

(3) Proposed Scheme

There are various merits and demerits in both of the 2 schemes described above. However, Study Team, after the following consideration from the major stakeholders' viewpoints proposes that "SPC Scheme" be the scheme which shall have more merits to the stakeholders, and be further analyzed in this report.

<Considerations from major stakeholders' viewpoints (if SPC Scheme is adopted)>

a. EPBiH

- can keep EPC Contractor (i.e., MHPS) involved and responsible for a long term after commercial operation;
- can continuously receive advanced technical assistance and transfer from Japan through cooperation in operation and maintenance of the plant;
- by co-investing in SPC, can receive investment return from the Project;
- can share the various risks of the Project with the lenders/investors of SPC;
- can obtain long term sound operation by making investors of SPC commit to the operation of the Project.

b. MHPS (EPC Contractor)

- can show its esteemed technology which is durable for long term sound operation and has advantage to its competitors;
- can show its financial or management know-how by which the Project can run in a sound manner for a long time;
- can earn reasonable investment return from the Project.

c. The Government of Federation of Bosnia and Herzegovina

- (In addition to the merits described in "a" above), can have the first large infrastructure development opportunity where the Japanese entities shall fulfil long term commitments.

d. The Government of Japan

- can have the large infrastructure development opportunity where the "package infrastructure export" shall be implemented

5.2 Role among Private/Public Sectors, and Organization Structure

Following section 5.1 where Study Team proposes that "SPC Scheme" be the scheme which shall have more merits to the stakeholders, and thus be further analyzed in this report, "SPC scheme" is regarded as the subject of analysis in this section and the following sections.

5.2.1 Relevant parties and their roles

The relevant parties of the project include; 1) EPBiH, 2) Users, 3) Shareholder/SPC, 4) Lenders (financial institutions), 5) Land owner, 6) EPC Contractor and 7) Japanese power company. Each party's roles are as follows:

(1) EPBiH

EPBiH, the largest power generation and distribution company in BiH, will be in charge of the followings;

- Off-taker: As the Off-taker, EPBiH shall sign a power purchase agreement with SPC
- Fuel Supplier: As the fuel supplier, EPBiH shall sign a fuel supply agreement with SPC
- O&M contractor: EPBiH shall sign a O&M contract with SPC
- Shareholder(If EPBiH desires)

(2) Users

Users are those who purchase electricity produced by SPC through EPBiH.

(3) Sponsor/ SPC

Sponsors are the shareholders or investors of SPC. These sponsors shall sign a shareholders agreement which stipulates (among others) their equity share, management structure of SPC, as well as actions required from each shareholder in case of disputes, financial default, and

other unusual events.

One of the prospective investors is MHPS.

(4) Lenders (financial institutions)

SPC and financial institutions shall sign loan agreements for the long-term loans required for the project. In this report, it is expected that JICA will provide their PSIF loans. The PSIF will be provided to the SPC either directly or through the local financial institutions.

(5) Land Owner

It is assumed that the Land Owner and EPBiH shall agree on a land contract/ clearance on the use of the land.

(6) EPC Contractor

SPC shall sign EPC Contract with the EPC Contractor. The EPC Contract shall specify the contractor's responsibility to complete the tasks and meet deadlines, and required technical standards and specifications. It is assumed that the EPC Contract shall be lump-sum (fixed price), date certain, and turnkey contract.

(7) Japanese Power Company

To support the long term sound operation of the plant, it is assumed that a reputable Japanese power company shall be involved in the Project as co-investor, and support the operation of the plant for a long term.

5.2.1 Organization Structure

With regard to the organization structure of the parties please refer to the figure in 5.1.1 (1) entitled "Possible project scheme (SPC Scheme)".

5.3 Risk Analysis

5.3.1 Risk Sharing

In PPP projects (where this Project is included when "SPC Scheme" is adopted), designing appropriate risk sharing structure among related parties and mitigation measures for preventing risks from realizing are crucial in order to realize a feasible project. It is particularly important that each risk is borne by the party having the best ability to manage it. In many cases, governments (or bid solicitors) may intend to transfer the risks of the project as much as projects to the private parties (i.e., SPC). But in such cases the private parties shall usually require high investment return to compensate the risks and thus the cost which governments (or bid solicitors) or users shall pay for the project may become unreasonably high. In contrast, if governments (or bid solicitors) transfer (for example) the risk of construction delay to SPC, SPC in turn shall transfer this risk to the EPC contractors, who are usually in the best position to control such risk with (theoretically) lesser cost than the cost which shall be assumed by the governments when the risk is not transferred to SPC.

Likewise, for those risks such as changes in laws/regulations, the government who has the much better ability to manage such risks can bear the risks with lesser costs.

Clear and well-balanced risk sharing benefits both governments (bid solicitors) and private parties by reducing project costs and also facilitating best efforts of each party to mitigate risks.

5.3.2 Expected Risks and Risk Management Methods under the Proposed Scheme

Table 5.3.1 shows the expected risks which may be realizes in the Project and the risk management methods for each of these risks under the proposed scheme. They are listed under four phases, namely: 1) All (applicable throughout the project period); 2) Project Development; 3) Construction; and 4) O&M. They are also categorized into the three risk factors explained in the above Table 5.3.1. The right-side columns of the matrix show the risk sharing among related parties.

Table 5.3.1 Risk Matrix

<Use of Insurance>
○: The insurance is expected to cover entire costs incurred
△: The insurance is expected to cover partial costs incurred
<Responsible Parties>
○: responsible parties for each risk
△: parties that will burden remaining costs after insurance was paid for

No	Project Phase	Risk	Details	Measures for Risk Management (by SPV or Contractors)		Actions when Faced with Imminent Risks	Responsible Parties							
				Risk Mitigation/Transfer/Share	Use of Insurance		SPV	Sponsors	Government*	Off-taker (EPBiH) **	EPC Contractor	O&M Contractor	Financial Institutions	Insurance Providers
1	All	Risk in fluctuation of interest rate	Interest rate may fluctuate and increase the SPV's obligations for interest payment.	・Borrow the loan with fixed rate directly from JICA, not from the local bank who is provided the loan by JICA.		Costs related to this risk would not occur since JICA raise the money for lending with fixed rate.								
2	All	Risk in foreign exchange	The SPV may not be able to exchange KM to JPY [or EURO] and/or other hard currencies if the banks don't have enough foreign currency assets. Such countries under trade deficit usually have difficulties in reserve for foreign currency.	・Obtain government guarantee for overseas remittance. ・Obtain insurances, such as Nippon Export and Investment Insurance (NEXI)'s Overseas Investment Insurance, which covers the loss incurred by the limitation on exchange of KM to foreign currency when investors collect the dividends and equity although the loan cannot cover this insurance.	△	Except for the costs covered by NEXI's Overseas Investment Insurance, costs related to this risk would be borne by the government.			△					○
3	All	Risk in transferring funds to overseas	The SPV may not be able to transfer funds in JPY or other hard currency/ies outside of BiH.	・Obtain government guarantee for the right to transfer funds to overseas. ・Obtain insurances, such as NEXI's Overseas Investment Insurance, which covers overseas remittance risk. Investors can collect the dividends and equity withdrawal although the loan cannot cover this insurance.		Except for the costs covered by NEXI's Overseas Investment Insurance, costs related to this risk would be borne by the government.			△					○
4	All	Risk of changes in laws and regulations	Changes in laws and regulations, including those related to tax, may cause negative impacts on the project such as increase in costs for tax payments.	・In the power purchase agreement, stipulate the condition that the increased costs caused by changes in regulations, including changes in tax rates, shall be reflected in the price of service fees (off-take fees).		Costs related to this risk would be borne by the off-taker.				○				
5	All	Risk of changes in the government's policies	The government's policies may change and cause negative impacts on the project.	・Maintain close communications with government agencies and avoid the situation which causes cost increase or minimize the impact on cost increase. ・When costs increase despite the above efforts, stipulate the condition that the increased costs caused by changes in government policies shall be reflected in the price of service fees (off-take fees) in the power purchase agreement.		Costs related to this risk would be borne by the off-taker.				○				
6	All	Risk of fuel shortages	The volume of the fuel may decrease the SPV's sales amount of electricity.	・In the power purchase agreement, stipulate the price determination mechanism in such a way to include "capacity payment" (fixed rate) portion and "variable payment" (measured rate) portion. Based on the formula, the SPV can maintain revenues from the "capacity payment" portion which covers initial investment by SPV regardless of actual sales amount of electricity although SPV cannot receive "variable payment" or the amount of "variable payment" which received by SPV will decrease.		Costs related to this risk would be borne by the off-taker.				○				
7	All	Risk of quality deterioration of fuel	The quality of the fuel may deteriorate so the SPV becomes unable to produce the electricity with the quality agreed on the contract.	・SPV can maintain the revenues from the "capacity payment" portion explained above when the deterioration of the fuel quality causes the suspension of electricity sales by SPV although SPV cannot receive "variable payment" or the amount of "variable payment" which		Costs related to this would be borne by the off-taker.				○				

No	Project Phase	Risk	Details	Measures for Risk Management (by SPV or Contractors)		Actions when Faced with Imminent Risks	Responsible Parties							
				Risk Mitigation/Transfer/Share	Use of Insurance		SPV	Sponsors	Government*	Off-taker (EPBiH) **	EPC Contractor	O&M Contractor	Financial Institutions	Insurance Providers
				received by SPV will decrease. ・In the power purchase agreement, stipulate a condition that such additional costs caused by the quality deterioration of fuel shall be reflected in the price of service fees.										
8	All	Risk of force majeure events	Force majeure events may happen and cause negative impacts on the project. Force majeure includes, but not limited to, acts of God like hurricane, flood, volcanic eruption, earthquake, etc., war (declared or not), rebellion, revolution or riot, strike, or lockout.	・Obtain insurances, such as NEXI's Overseas Investment Insurance, which covers the loss on dividends and equity incurred by the force majeure occurrences, including natural disasters, general strikes, etc. ・In the power purchase agreement, stipulate the condition that if the insurance does not cover the entire cost related to this risk, the off-taker shall compensate the remaining costs.	△	If the insurance does not cover the entire costs related to this risk, the remaining costs would be borne by the off-taker.				△				○
9	All	Risk in local infrastructure	There could be disorders in the existing infrastructure and may cause negative impacts on the project.	・In the power purchase agreement, stipulate the condition that the off-taker shall compensate the additional costs caused by the disorders of existing infrastructure.		The costs related to this risk would be borne by the off-taker.				○				
10	All	Risk in sub-contractors' obligations	A sub-contractor may have default on its obligations, and it may impact on the progress of the project.	・Investigate the conditions of potential sub-contractors and select the companies with great deal of experience before signing contract.		The costs related to this risk would be shared among the SPV and sponsors.	○	○						
11	All	Risk in supply of utility	Utility supplies (e.g., electricity, gas, etc.) may be disturbed and affect the implementation of the project.	・In the power purchase agreement, stipulate the condition that any additional costs caused by this risk shall be reflected in the service fees.		The costs related to this risk would be borne by the off-taker.				○				
12	All	Risk of information leak	Personal information may leak out, and the SPV may have to pay compensations to the affected parties.	・Establish appropriate management structure for personal information. ・Obtain an identity theft insurance. An identity theft insurance covers expenses incurred as a result of personal information leak, such as compensations for affected individuals.	○	The insurance pays for the incurred costs.								○
13	Project Development	Risk of inability to obtain enough finances	The SPV may not be able to obtain enough finances to implement the project.	・JICA shall provide the senior loan once the project is evaluated as feasible. ・Shareholders shall provide the equity/sub-loan in line with the article of shareholder's agreement which stipulates the obligation of capital paid in by shareholders and the necessity to provide sub-loan in case of financial shortage. ・In senior loan/shareholder's agreement, stipulate the indemnification clause for omission of financing.		The costs related to the omission of financing would be borne by lender or shareholder.		○					○	
14	Project Development	Risk in partner firms' financial obligations	A member firm of the consortium may have default on its financial obligations, and impact on the implementation of the project including equity.	・Limit the number of sponsors for efficient planning and management of project enterprise. ・Conclude the shareholders agreement beforehand in which the right to claim damage compensation caused by the delay or the default of capital remittance is stipulated.		Sponsors would have to provide sufficient equities and the rest of investors shall claim damage compensation in case one of the investors does not fulfill the equity remittance or incurs delay in the remittance.		○						
15	Project Development	Risk of delay in signing contracts	Signing of contracts may be delayed and affect the project's entire schedule	・Start negotiation among related parties regarding contract conditions from early stages of project development. ・Sign MOU among related parties before signing official contract.		The costs related to this risk would be shared among the SPV and sponsors.	○	○						

No	Project Phase	Risk	Details	Measures for Risk Management (by SPV or Contractors)		Actions when Faced with Imminent Risks	Responsible Parties							
				Risk Mitigation/Transfer/Share	Use of Insurance		SPV	Sponsors	Government*	Off-taker (EPBiH) **	EPC Contractor	O&M Contractor	Financial Institutions	Insurance Providers
16	Project Development	Risk in preparation of land	Land acquisition and site clearance, and right of way for the facility may be delayed or fail so the SPV cannot implement the project as scheduled.	・In the power purchase agreement, stipulate a condition that the government will be responsible in conducting the related procedures and letting the SPV rent the project land on schedule; otherwise, the additional costs caused by the delay or failure of these procedures shall be compensated by the government. ・Obtain government guarantee for the above provision.		The costs related to this risk would be borne by the government.			○					
17	Project Development	Risk in obtaining permits and licenses	The SPV may not be able to obtain necessary permits and licenses to start the project.	・In the power purchase agreement, stipulate the responsibility of the government to promptly issue the necessary permits and licenses.		The costs related to this risk would be shared among the SPV, sponsors, and the government.	○	○	○					
18	Construction	Risk of delay in completion of construction	Completion of construction may be delayed and affect the project's entire schedule.	・In the EPC contract, stipulate the condition that the EPC contractor shall be responsible for the delay. ・Obtain a delayed start-up insurance. Delayed start-up insurance covers the lost earnings incurred by the delay of construction with physical damages.	△	If the insurance does not cover the entire costs related to this risk, the remaining costs would be borne by the EPC contractor.					△			○
19	Construction	Risk of necessity to pay compensations to third parties during construction period	The SPV may have to pay compensations to third parties due to issues caused by the construction.	・Obtain a third party insurance. A third party insurance covers third party's claims for compensations that might be made against the SPV.	○	The insurance pays for the incurred costs.								○
20	Construction	Risk of damage caused at construction site	The EPC contractor may have to cover the damage caused by accidents at construction site.	・Obtain construction insurance and contractor's liability insurance. A construction insurance covers damage on the subject matter caused by accidents and natural disasters such as flood and typhoon and a contractor's liability insurance covers damage on property and casualty during the construction.	○	The insurance pays for the incurred costs.								○
21	Construction	Risk of defects in project facility	The constructed facility may have defects and impact on its operation and provision of services.	・In the EPC contract, stipulate the EPC contractor's responsibility for quality of the constructed facilities and set the defects liability period.		Costs related to this risk would be borne by the EPC contractor during the period stipulated in EPC contract and by the SPV after the defects liability period.	△				○			
22	Construction	Risk of increase in design and construction costs	The costs of design and construction of project facilities may increase from the original assumption. (e.g., increase in prices of construction materials, etc.)	・In the EPC contract, agree on a fixed price for the EPC work.		Increased costs would be borne by the EPC contractor.					○			
23	O&M	Risk in credibility of off-takers	Off-takers may fail to pay for the services provided by the SPV.	・Obtain guarantees from the government for the power purchase agreement		Costs related to this risk would be borne by the Government.			○					
24	O&M	Risk in fluctuation of sales amount	Sales amount of electricity may decline and cause a fall in the SPV's revenue.	・In the power purchase agreement, stipulate the price determination mechanism in such a way to include "capacity payment" (fixed rate) portion and "variable payment" (measured rate) portion. In this way, the SPV can maintain its profit from capacity payment regardless of actual off-take amount of electricity although variable payment fluctuates according to the actual sales volume.		The losses on "variable payment" portion incurred by this risk would be shared between the off-taker and SPV although the off-taker shall pay the full amount of "capacity payment".	△			○				
25	O&M	Risk in fluctuation of foreign currency exchange rate	Exchange rate of KM-JPY [or EURO] may fluctuate and cause a fall in the SPV's revenue.	・In the power purchase agreement, stipulate the price determination mechanism in such a way to include "capacity payment" (fixed rate) portion and "variable payment" (measured rate) portion. Based on the formula, changes in foreign currency exchange rate shall be reflected in the sales price.		The costs related to this risk would be borne by the off-taker.				○				

No	Project Phase	Risk	Details	Measures for Risk Management (by SPV or Contractors)		Actions when Faced with Imminent Risks	Responsible Parties							
				Risk Mitigation/Transfer/Share	Use of Insurance		SPV	Sponsors	Government*	Off-taker (EPBiH) **	EPC Contractor	O&M Contractor	Financial Institutions	Insurance Providers
	O&M	Risk of electricity obsolescence	Competitions in the market become fierce and t cause a fall in the SPV's revenue under the influence of liberalization electricity market in the region.			No one would bear the cost so long as the off-taker complies with the power purchase agreement.	-	-	-	-	-	-	-	-
26	O&M	Risk of competition	Competitors may provide service with the same off-taker and cause influences the ongoing project environment.	・In the power purchase agreement, include a provision that the off-taker shall obtain prior approval of SPV when the off-taker decides to construct a new plant and receive electricity as base-load from it.		・・・								
27	O&M	Risk of technical problems on facility during O&M period	The technologies selected for the project facility may have flaws.	・Study feasibility of the technical specifications, referring to past projects where the same technology was adopted. ・Obtain a contractors' liability insurance. A contractors' liability insurance covers the damages on property and casualty during O&M period.	△	The damages on property and casualty related to this risk would be covered by insurance and the remaining costs would be shared among the SPV and sponsors.	△	△						○
28	O&M	Risk of necessity to pay compensations to third parties during O&M period	The SPV may have to pay compensations to third parties due to the issues caused by the O&M.	・Obtain a third party insurance. A third party insurance covers third party's claims for compensations that might be made against the SPV.	○	The insurance pays for the incurred costs.								○
29	O&M	Risk of having outdated technologies	Technologies utilized in the project facilities or equipment may become outdated during the project period, so the SPV may have to make an additional investment for renovation.	・In the project contract, exclude the condition that obliges SPV to adopt new technology in case the existing technology becomes outdated as long as the supplied electricity quality is secured.		No one would bear the cost so long as the off-takers comply with the power purchase agreement.	-	-	-	-	-	-	-	-
30	O&M	Risk of inflation	Inflation may cause an increase in the SPV's expenditure.	・In the power purchase agreement, stipulate the price determination mechanism in such a way to include "capacity payment" (fixed rate) portion and "variable payment" (measured rate) portion. Based on the formula, inflation shall be reflected in the sales price.		The costs related to this risk would be borne by the off-takers.				○				
31	O&M	Risk in fluctuation of foreign currency exchange rate	Fluctuation of exchange rate of KM-JPY [or EURO] may cause an increase in the SPV's expenditure.	・In the power purchase agreement, stipulate the price determination mechanism in such a way to include "capacity payment" (fixed rate) portion and "variable payment" (measured rate) portion. Based on the formula, changes in foreign currency exchange rate shall be reflected in the sales price.		The costs related to this risk would be borne by the off-takers.				○				

5.4 Initial Investment Financial Analysis (Equity/Debt)

5.4.1 Financial sources

JICA's Private Sector Investment Finance Scheme (PSIF) and fund by private investors in the form of equity are assumed. Conditions of financing are described in 5.5.2.

5.4.2 Introduction of PSIF

(1) Outline of PSIF

Under this program, JICA shall provide long-term loan or make equity investment to private sector entities.

Its target sectors are as follows:

1. MDGs and Poverty Alleviation: Assistance with Projects for the Poor

- Enhanced financial access to the poor （microfinance and SME-finance）
- Assistance with businesses leading improvement of lives of the poor (BOP business)

2. Climate Change: To Prevent and Reduce Negative Impact to the Poor by Climate

(e.g. forestation, renewable energy, energy efficiency projects, etc.)

3. Infrastructure: To Accelerate Economic/Social Growth through Infrastructure Development

- Infrastructure for the poor (e.g. social infrastructure in education and health, rural electrification, water supply services, roads, etc.)
- Projects for Social / Economic Development （e.g. infrastructure in the sector of power, transportation, water and waste disposal, etc.）

The following figure is outline of PSIF.

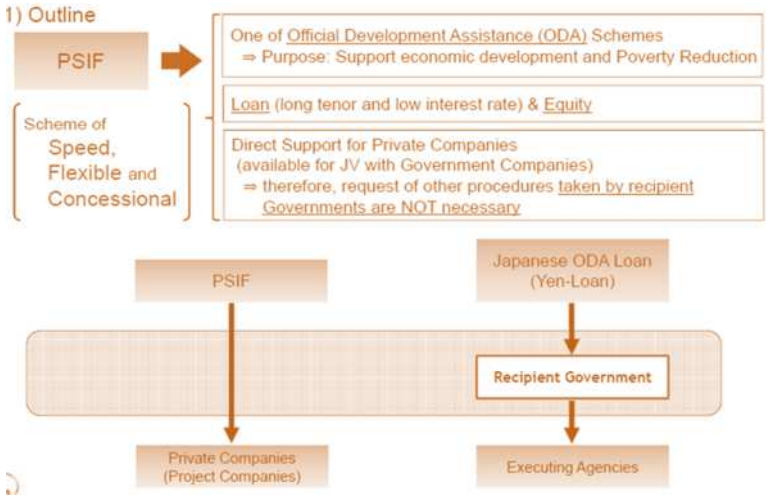


Figure 5.4.1 Outline of PSIF

Source: JICA's Scheme for Private Project (incl. PPP/BOT) Promotion (JICA Private Window), 2014

(2) Basic conditions of PSIF

PSIF is a finance tool by way of both loan and equity investment. The currency is basically Japanese Yen and maximum tenor of the loan is 25 years with 10 years grace period. The maximum share of JICA is 80% of total amount of loan. The following table is the basic conditions of PSIF and ODA loan though conditions depend on each project.

Table 5.4.1 Basic conditions of PSIF and ODA loan

	PSIF	JPN ODA Loan
Project Type	Private Project	Government Project
Financing Tool	Equity Investment / Loan	Loan
Currency	Japanese Yen (Loan) Local Currency (Equity)	Japanese Yen
Terms of Loan - Interest Rate - Repayment Period - Grace Period - Maximum Share	 Concessional Level Up to 20 years (Up to 25 years in special cases) Up to10 years 70% (80% in special cases)	(For Vietnam) Normal ODA loan: 1.4% Special Condition: 0.2% Normal ODA loan: 30 years Special Condition: 40 years 10 years 85%
Procedure	-Initiated by the private company's request -Short and simple procedures	-Initiated by official request of government of recipient countries
Security Package	-Tailor made -Sovereign guarantee is not required	-Sovereign guarantee or Government borrowing
Procurement	-Recipient of JICA's PSIF selects contractors for procurement at its discretion.	-JICA's procurement guidelines

Source: JICA(2014)

5.4.3 Necessity of the JICA loan

There are 3 major reasons. First, the lender shall take (not all but certain) commercial risks for 25 years. The possibility of obtaining project financing from domestic banks(without back finance from foreign financiers) is limited since banks in BiH at this point do not have enough capacity to provide long-term financing. Second, most of the international development banks recently tend not to finance thermal power plant projects. Third, in order to keep tariff level competitive in the electricity market in Europe, it is very difficult for SPC to pay high interest which may proposed by foreign commercial banks as a results of commercial risks for 25 years.

5.5 Project Financial Analysis

The assumptions in the financial model consist of four major components, namely, (1) business plan, (2) tax, (3) finance, and (4) revenues. Note that the analysis is calculated based on the conditions expected by those prospective investors in this study.

(1) Business Plan

1) Scheme

As proposed in section 5.1, the project was assumed to be implemented by the SPC scheme,

in which an SPC shall be established by private investors, and the SPC shall design, build, finance, operate, and maintain the plant in accordance with the project contract.

2) Currency

The currency used for calculation is EURO. Exchange rate of KM to EURO is 0.51.

(2) Tax

1) Corporate tax

The corporate tax, i.e. 10% of the profit before tax, is assumed since the first year which revenue is generated.

2) Depreciation period

Depreciation period is assumed as in the following table.

Table 5.5.1 Depreciation period and rate

Item	Period(year)	Rate(annual)
Site Preparation and Civil Works	40	2.50%
Plant & Machinery	25	4%
Other Assets	10	10%

(3) Finance

1) Financing source

The JICA's PSIF loan and equity investment by sponsors are assumed.

2) Conditions of the JICA loan

The tentative* conditions of JICA's loan are shown in the following table.

Table 5.5.2 Conditions of Loan

Currency	Japanese Yen
Maturity	25 years
Repayment	Equal principle

* Those conditions are for cash flow projection and not committed by JICA.

(4) Revenues

Revenues are consisted from revenue from tariff and revenue from heat, ash and gypsum which are produced in the process of generation.

Revenues of tariff are calculated based on the payment formula of the "Take or Pay" method which is shown in the following figure. The revenue based on this formula consists of two components, namely, capacity payment and variable payments.

SPC can receive full amount of capacity payment every year as long as the plant is available to use, while the amount of variable payment depends on volume of actual produced electricity with promised quality, as described in the following figure.

Generally capacity payments cover both capital recovery charge such as payment of loan principal and interest which finance capital investment, and charges for fixed O&M cost such as employee salary and regular maintenance costs. While variable payments cover charges for variable O&M costs such as costs which fluctuate depending on the operational rate of the facility, i.e. fuel cost.

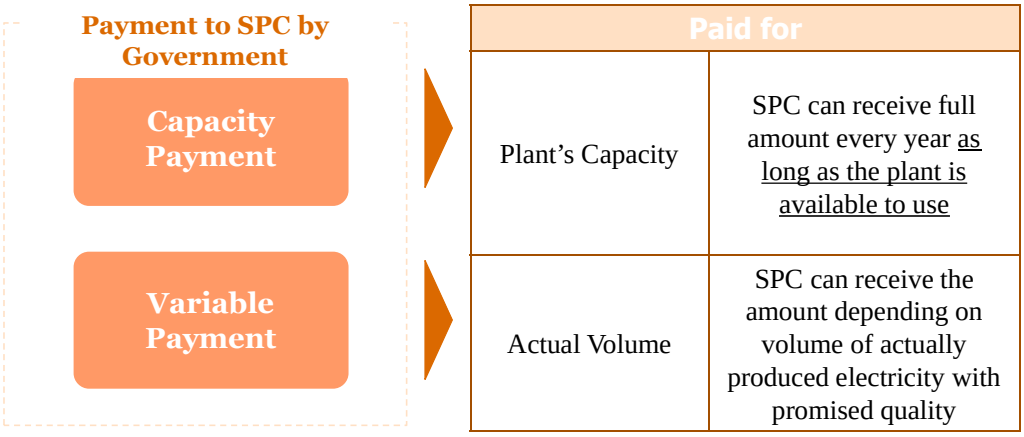


Figure 5.5.1 "Take or Pay" method

Source: JICA study team

CHAPTER 6 FOUNDATION OF SPECIAL PURPOSE COMPANY, PREPARATION OF RELATED CONTRACT TERMS AND DRAFTING OF TERM SHEETS

This chapter is intentionally deleted due to the commercially confidential matter.

CHAPTER 7 PROJECT IMPLEMENTATION PLAN

7.1 Project implementation Organization Chart

The below structure which involves the establishment of a special purpose company (SPC) design, construct, operation and maintenance during the project period of 25-30 years. The project will be funded though project finance scheme and Elektroprivreda Bosne i Hercegovine (hereinafter called as EPBiH) holds majority of shares (e.g. two-thirds of shares) and partner(s) hold the rest of the shares.

Mitsubishi-Hitachi Power Systems, Ltd. (hereinafter called as MHPS) studied a possibility of participation as a partner from Japan.

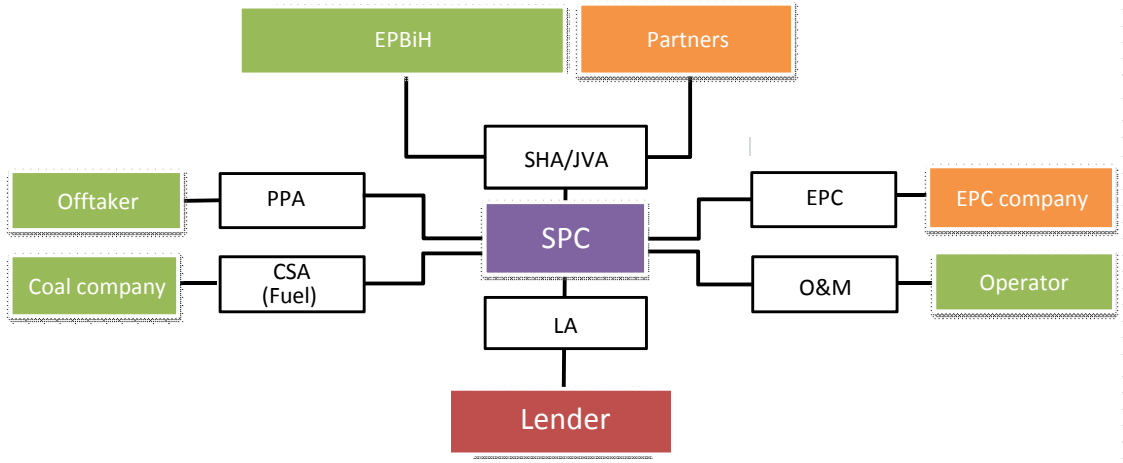


Figure 7.1.1 Business scheme

PPA: Power Purchase Agreement CSA: Coal Supply Agreement
SHA/JVA: Share Holders Agreement / Joint Venture Agreement LA: Loan Agreement

7.2 Project Implementation Schedule

The period from FS to construction is scheduled for approximately 7 years (18 to 24 months for FS and due diligence + 60months for construction). The operation period is expected to be 25 to 30 years.

Calendar Year	Year 1	Year 2	Year 3	Year 4	・・・	Year 7	・・・	Year 32-37
(1)FS/Due Diligence	■	■						
(2)Plant Construction			■	■	■	■		
(3)Plant Operation							■	■

Figure 7.2.1 Project Implementation Schedule

7.3 Operation & Maintenance Structure

SPC carry out procure and construct equipment and systems for power plant and procure fuel and operate & maintenance as shown below figure.

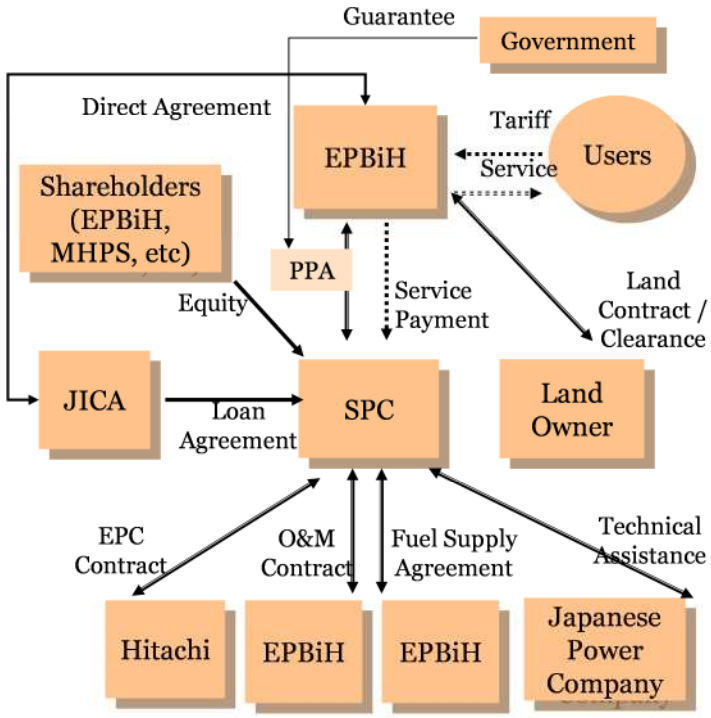


Figure 7.3.1 Business scheme

7.3.1 Organization structure of SPC

The planned business implementation organization of SPC is shown as below figure.

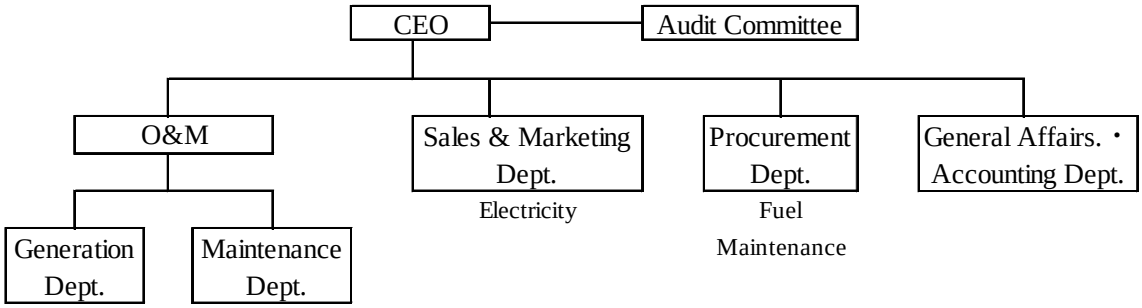


Figure 7.3.2 Business implementation organization

7.3.2 Organization structure of EPBiH

(1) Overview

EPBiH is a state electricity company established in 1945 under a special law, and supplies approximately 40% of the electricity consumed in BiH. Its major businesses

include power generation and distribution, power supply, stable supply of electricity to the domestic electricity market and export of electricity. It became a public company in 1993 in accordance with the law on public company, registered as a stock company in 2004, and is now a listed company with 90% of its shares owned by the Ministry of Energy, Mining and Industry of Federation of Bosnia and Herzegovina (FMEMI) and 10% by minority shareholders, such as financial institutions.

Table 7.3.1 Company Summary of EPBiH

Head Office Location	Vilsonovo šetalište Str., 15, Sarajevo 71000, Bosnia and Herzegovina
Subsidiaries, etc.	Rudnici uglja Kreka d.o.o. (coal mining company (Tuzla) 100% RMU Kakanj d.o.o. (coal mining company (Kakanj)) 100% RMU Zenica d.o.o. (coal mining company (Zenica)) 100% RMU Breza d.o.o. (coal mining company (Breza)) 100% RMU ðurñevik d.o.o. (coal mining company (ðurñevik)) 100% RU Gračanica d.o.o. (coal mining company (Gornji Vakuf - Uskoplje)) 100% RMU Abid Lolić d.o.o. (coal mining company (Bila)) 100% Hotel Makarska (tourism, catering company) 96.20% Eldis tehnika d.o.o. (consumer electronics)100% Iskraemeco d.o.o. Sarajevo (measuring instrument company) 57.5%
Number of Employees	Stand-alone: 4,939, Group: 14,746 (as of Dec 31, 2012)
Major Financial Data (KM 000) (as of Dec 31, 2012)	Sales: 907,675 (stand-alone), 962,676 (group) Profit after tax: 7,087 (stand-alone), ▵34,161 (group) Total assets: 3,411,500 (stand-alone), 4,040,501 (group) Owners' equity: 2,897,678 (stand-alone), 3,084,021 (group)

Source: Annual Report of EPBiH

EPBiH's goal is to improve the quality of electricity supply, maintenance, renovation and modernization of existing facilities, increasing the installed distribution and production capacity, the use of renewable energy sources, environmental protection, education about energy efficiency potentials which lie in CHP electricity and heat and implementation of EU standards.

EPBiH formed in accordance with the law on public companies as well as provision of the Law on companies. Its corporate bodies are the Company Assembly, the Supervisory Board, the Management and the Audit Committee.

Figure 7.3.3 EPBiH Management Structure

Source: Annual Report of EPBiH

(2) Branch offices

Under the headquarters there are eight branches comprised of major three power stations and five power distribution stations.

・ TPP Tuzla:

Construction of the complex of the thermal power plant was realized in several stages in the period between 1959 and 1978. Generation of electricity began in 1963 with the commissioning of unite 1 with 32 MW capacity. Increase in installed capacity in TPP "Tuzla" came with the construction and commission of the following generation units: 1964 Unit 2 (32MW), 1966 Unit 3 (100MW), 1971 Unit 4 (100MW), 1974 Unit 5 (200MW), Unite 6 (215MW). Unite 1 and 2 were permanently decommissioned and electricity is now produced in TPP Tuzla in thermal power units 3, 4, 5 and 6. Now it has 715 MW capacity with average annual generation of electricity around 3,100 GWh. Annual coal consumption is about 3.3 million tons of coal. Besides the generation of electricity for the EES, TPP "Tuzla" also produces and supplies thermal energy for district heating of the towns of Tuzla and Lukavac and steam for the industry and industrial water for immediate environment. The generation facilities of the thermal power plant "Tuzla" are located in the coal basin Kreka-Banovići, which is the largest coal basin in BiH, and has significant geological reserves of lignite and brown coal, which enable reliable and long-term quality supply of coal for thermal power plant.

・ TPP Kakanj：

TPP Kakanj has 450 MW (without 32 MW units) with annual generation of electricity about 2,300 GWh. The construction of thermal power plant was carried out in the period between 1947 and 1988. Generation of electricity began in 1956 with the commissioning of Units 1 and 2 and increased Unit 3 and 4 in 1960, Unit 5 in 1969, Unit 6 in 1977 and Unit 7 in 1988. Units 1, 2, 3 and 4 were decommissioned and now generation of electricity in "Kakanj" is done using thermal Unit 5, 6 and 7. The

improvements were made after the war, which includes reconstruction and modernization of units 5 and 6 (110MW) and partial reconstruction of Unit 7 (230MW) and the cooling system of Units 5 and 6. Besides the generation of electricity TPP "Kakanj" produces and delivers thermal energy for district heating of Kakanj and additionally supplies slag and ash to the cement factory "Kakanj". TPP "Kakanj" is located on the left bank of the river Bosna in Central Bosnia coal basin, which has significant geological reserves of brown coal.

- HPPs on Neretva:

Area of the river Neretva basin is one of the most important in BiH from the standpoint of energy. Hydropower plants on the Neretva river basin managed by EPBiH are HE "Jablanica", HE "Grabovica" and HE "Salakovac" Hp "Jablanica" is the first and largest power plant on the river Neretva. It was buil in in two phases from 1947 to 1955 and from 1955 to 1958. Electricity production in HPP "Jablanica" began in February 1955. After the construction it was the largest hydropower facility in the former Yugoslavia. Comprehensive revitalization of HPP (six generators and related equipment) was completed in 2008. Revitalization of the installed capacity increased from 150 MW to 180 MW and life time of the HPP was extended for the next 30 to 40 years. Reservoirs of the Hydro Power Plant cover the Neretva River and all its tributaries upstream of Jablanica. Construction of the 85 feet high arch-gravity dam, just below the mouth of the river Rama into Neretva created a reservoir with maximum length of 30 kilometers, which stretches along the Neretva River to the town of Konjic, and along the river Rama to the village of Gračac. The shortest route between the lake and the machine room in Jablanica takes water to the turbines through two tunnels, about two kilometers in length with maximum drop of 111 meters. Hydropower "Grabovica" has a 60 m high concrete gravity dam with 114 MW (two units) producing 334 GWh on average annually. HP "Salakovac" is a 70m high gravitation dam with 210 MW, producing 410 GWh on average annually.

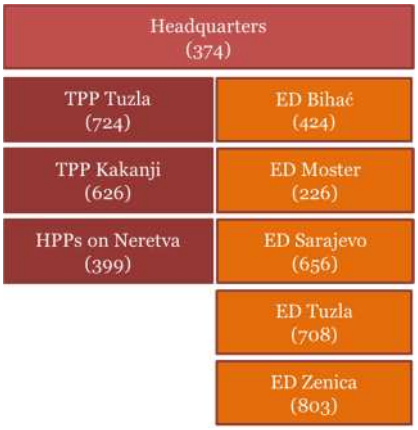


Figure 7.3.4 Structure of Branches

*( ) is number of employees at year-end 2011

Source: Annual Report of EPBiH

Table 7.3.2 Summary of Distribution Arm (# of customer,000)

Distribution	# of Customers	Area
ET Sarajevo	212	Stari grad, Centar, Novo Sarajevo, Novi Grad, Ilidža, Vogošća, Hadžići, Ilijaš i Goražde
ET Tuzla	176	Banovići, Čelić, Gračanica, Gradačac, Kalesija, Kladanj, Lukavac, Srebrenik, Sapna, Tuzla, Teočak i Živinice
ET Zenica	186	Breza, Doboj, Kakanj, Maglaj, Olovo, Tešanj,Vareš, Visoko, Zavidovići, Zenica, Žepče, Travnik, Bugojno, Novi Travnik, Gornji Vakuf, Donji Vakuf, Busovača, Fojnica i Vitez.
ET Bihać	97	Bihać, Bosanska Krupa, Cazin, Velika KladuKladuša, Bužim, Bosanski Petrovac, Ključ i Sanski Most
ET Mostar	36	Jablanica, Konjic I Mostar

Source: Annual Report of EPBiH 2012

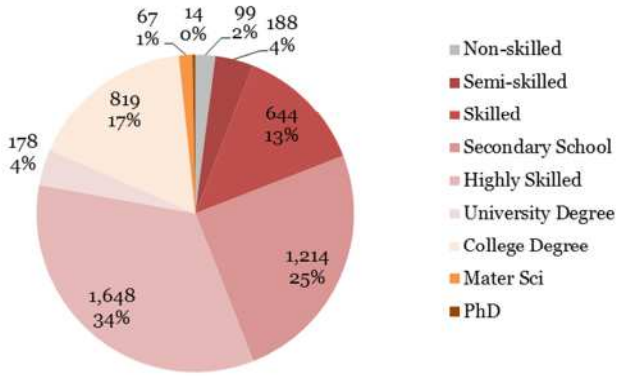


Figure 7.3.5 EPBiH Employee by Qualification at 2011 year-end

Source: Annual Report of EPBiH 2011

Figure 7.3.6 EPBiH Organization Structure

*( ) is number of employees at year-end 2011

Source: Annual Report of EPBiH 2011 Short Version

7.4 Set Project Monitoring Index for the Project

The project will be assessed through its 1) quantitative and 2) qualitative effect. For the quantitative effect, quantitative indicators (operational and effectiveness indicators) will be proposed for the base line and for the target year (2 years post-project completion).

Operational indicator will verify the status of the projects' operation and maintenance. Following indices are considered for the thermal power plants' operational index:

Operational Index	Definition	Purpose
Plant Net Output (MW)	-	Confirmation of performance maintenance status, and level of energy saving
Availability (%)	= Annual energy production / (Planned output x Annual operation hours) x 100	Confirmation of validity of the initial operation plan
Plant Net Efficiency (%)	= (Annual electricity production in transmission network x 860)/Annual fuel consumption x Fuel Energy Deposition) x 100	Confirmation of performance maintenance status and level of energy saving (1kWh=860kcal)

Effectiveness indicators are indices for measuring the project results and the following indices are considered:

Effectiveness Indicator	Definition	Purpose
Annual electricity production in transmission network	-	Confirmation of expected electricity production
Annual CO2 emissions	-	Confirmation of expected environmental load

For qualitative indicators, number of beneficiaries and internal date of return (EIRR, FIRR) will be calculated.

CHAPTER 8 ENVIRONMENTAL CONSIDERATION

The EIS (Environmental Impact Study) for construction of Unit 7 has already been prepared by EPBiH in November 2009 based on the Law on Environmental Protection (Official Gazette No. 33/03, 38/09). It was approved by the Federal Ministry of Environment and Tourism in March, 2011. On the other hand, this project is classified under the thermal power plant sector under JICA Guidelines for Environmental and Social Considerations (April, 2010, hereafter referred to as "JICA Environmental Guidelines") and categorized as "Category A." Thus, the existing EIS and NEDO report shall be reviewed for satisfaction of the JICA requirements and additional study conducted, as required.

8.1 Introduction

This chapter summarizes the study result for EIA (Environmental Impact Assessment) with the available data and information which were acquired by February 2014. The result based on JICA Environmental Guidelines and shown in this chapter will be suggestions for the project proponents, not the requirement. Regarding the items whose impact is difficult to be predicted and assessed, the points to be confirmed for JICA Environmental Guidelines will be shown. The project proponents already held the public communications and completed their necessary procedure for EIA. Thus, this study shall refrain from causing the local people any conflicts or confusions before the financing institution and policy are decided. For that reason, the stakeholder meeting which is required in this study period by JICA Environmental Guidelines had not been implemented by the discontinuation of study, February 2013.

8.2 Scope of the Environmental and Social Considerations Study

The scope of environmental and social considerations study is the main unit 7 and its related facilities in the planned site area as shown in Table 8.2.1.

The environmental and social considerations for sub-projects related to TPP Unit 7 which are the re-routing of railway in TPP Tuzla, construction of transmission line, renovation and expansion of the substation, rehabilitation and expansion of coal mine, and construction of ash disposal sites, are not focused in this study since the outline of those projects were not elaborated during the period of this study.

Table 8.2.1 Scope of the Environmental and Social Considerations Study

Item	Content
Summary	The target project is the construction of a new 450MW power unit (Unit No. 7) at the Tuzla Power Station, which shall replace the existing Units No.1-No.4 (32+32+100+200=364MW).
Main	- Gross: 450 -500 MW

specification	- Steam condition：Ultra Super Critical - Fuel: Lignite
Main facility	- Steam generator - Steam turbine and generator - Environmental equipment (Flue Gas Desulphurization and dust collection) - Balance of Plant (outside facilities) - Cooling tower - Electrical/control units - Others related facilities (expansion of coal storage yard, limestone storage facility, extension of railway from coal mining)

Source：Feasibility Study for the construction of a super critical lignite coal fired power station in Bosnia and Herzegovina, March 2013, New Energy and Industrial Technology Development Organization (NEDO)

8.3 Environmental and Social Baseline

8.3.1 Social and Economic Baseline

(1) State of BiH

BiH is located in the Balkans, in the southeast of Europe, and is bordered with Croatia, Serbia and Montenegro. It is close to the Adriatic, but the coast line is limited. Most of the country is mountainous area. Population is around four million which is composed of Bosniaks, Serbians and Croatians. Other general information is shown in the following table.

Table 8.3.1 General Information on BiH

Item	Summary
Capital	Sarajevo (Population is approximately four million)
Location	Southeast of Europe (bordering with Croatia, Serbia and Montenegro)
Area	51,209km2 (almost equal to Tohoku Region, Japan)
Topography	Flat, forest area in the northern region while most of the country is mountainous land Southwestern part is close to the Adriatic, although coast line is only 20km.
Population	Estimated at 3.80 million (almost equal to Yokohama City, Japan)
Religion	Islam, Serbian Orthodox Church, Catholic and others
Ethnic groups	Bosniaks, Serbs, Croats and others
Language	Bosnian, Serbian and Croatian (official languages)
Currency	Convertible mark (BAM)
Climate	Temperate zone Further inland, the climate becomes more continental
Natural disaster	Damage caused through drought and flood

Source : Feasibility Study for the construction of a super critical lignite coal fired power station in Bosnia and Herzegovina, March 2013, New Energy and Industrial Technology Development Organization (NEDO)

(2) Tuzla Cantonal Area

Tuzla is located in the northeastern part of BiH. The north and south is surrounded by hills. The city area is located along the Jala River which flows from the east to west. The city was developed as an industrial city due to its rich mining resource including coal and rock salt. Tuzla Canton is the second most populous area and its current main industries are coal mining, power plant and soda factory. Other general information on Tuzla Canton is shown in the table below. The thermal power plant is located in Kraka Mjesna Zajednica (Mjesna Zajednica meaning “local community”), Tuzla Municipality, Tuzla Canton, FBiH under BiH.

Table 8.3.2 Basic Information on Tuzla Canton

Item	Summary
Location	Northeastern part of BiH
Area	2,649.0 km²
Population	Estimated at approximately 503,000. Composed of approx. 455,000 (approx.90%） of Bosniaks, approx. 27,000 (approx.5%) of Croats, approx.16,000 (approx.3%）of Serbs, and approx. 5000 other people (approx.1%) Note) Data estimated by the Federal Bureau of Statistics in 2005. The first censes survey was conducted after the end of the Bosnian War at end- 2013.
Population density	189.8 people/km2
Main industries	Mining, power plant, soda factory, etc. Note) Employed workers by industry in Tuzla Canton are approx. 13 % mining, approx. 5 % chemical industry, and approx.4 % metal and electricity.
Natural disaster	Flood, land slide etc.

Source of statics data： Tuzla Cantonal website http://www.vladatk.kim.ba/privreda

8.3.2 Natural Environment

(1) Climate

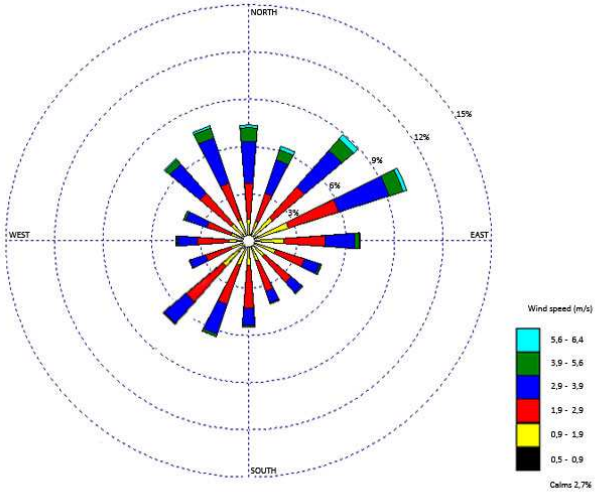
The area of the project site belongs to the central part of the continental climate zone. Located adjacent to the Central Bosnian Mountains and the Pannonian Region, the climate is affected by the rise and fall of land. The region is also characterized by cloudy weather which is frequently seen in winter. In addition, the area experiences frequent fogs. The number of foggy days amount to 50 to 75 days per year, and the phenomenon can be seen almost every month. Statistics on weather observed at the Tuzla Meteorological Observatory are shown in the table below (10-year average from 2000 to 2009).

Table 8.3.3 Meteorological Parameters (Monthly Average for 2000 to 2009)

	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Average
Temp. (degrees C)	0.2	2.3	6.8	11.5	16.3	19.4	21.1	20.9	15.5	11.9	6.8	1.6	11.2
Precipitation (mm)	55.2	48.5	66.1	75.3	68.1	126.9	92.0	81.8	89.7	78.6	68.0	68.2	934.4
Wind Speed (m/s)	1.0	1.0	1.2	1.0	0.8	0.9	0.9	0.8	0.8	0.9	1.2	1.0	1.0

Source：Feasibility Study for the construction of a super critical lignite coal fired power station in Bosnia and Herzegovina, March 2013, New Energy and Industrial Technology Development Organization (NEDO)

Wind rose is showing characteristics of the wind in Tuzla in Figure 8.3.1. East and west wind directions are predominant due to effect of topography. Portion of classified wind speed blow 3.0 m/s is predominant which shows the general wind speed in Tuzla is relatively small.

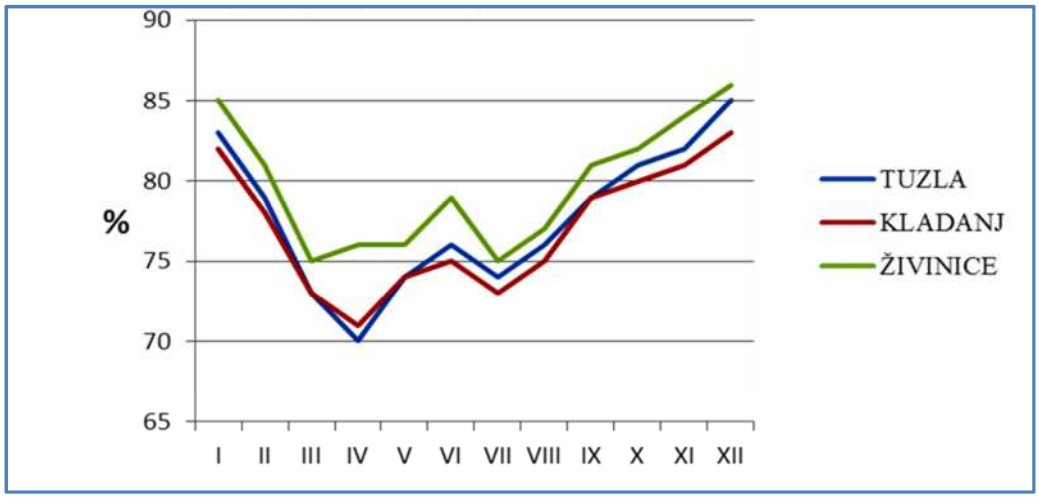


Source：Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Figure 8.3.1 Wind rose[*1]

*1. Wind direction is shown in 16 directions as same as map and frequency of its appearance is shown in the length of bar. Wind speed is classified by color and frequency of its appearance is shown in the length of color.

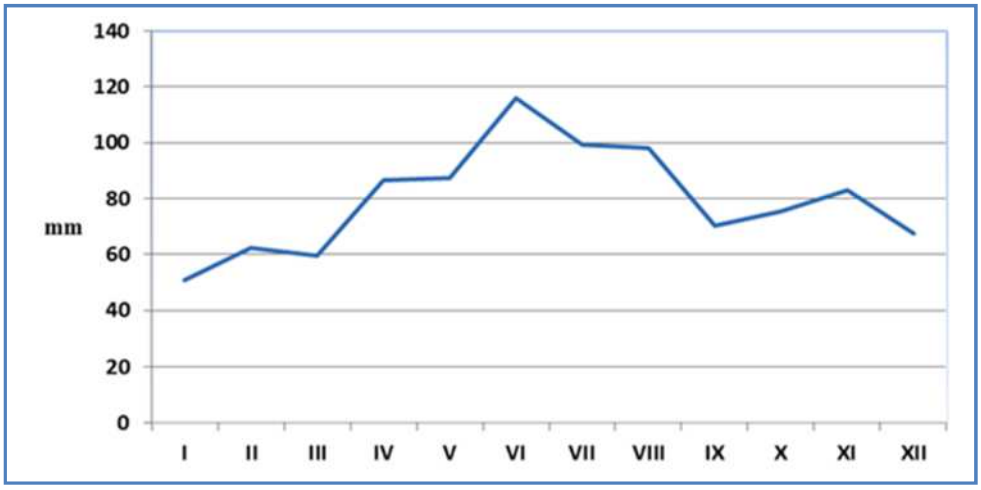
Annual distribution of monthly average of relative humidity is shown in Figure 8.3.2. It is high relative humidity from autumn to winter corresponding to the seasonal haze occurs frequently.



Source：Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Figure 8.3.2 Annual distribution of monthly relative humidity

Annual distribution of monthly average of precipitation is shown in Figure 8.3.3 and Table 8.3.4. The amount of precipitation is large in warm seasons and small in cold seasons. The heavily polluted season is corresponding to small precipitation season approximately.



Source：Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Figure 8.3.3 Annual distribution of monthly precipitation

Table 8.3.4 Annual distribution of monthly precipitation for 2001 to 2010 (l/m2)

Period 2001-2010	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual sum
Tuzla	60	52	66	80	99	148	100	88	95	81	67	68	1004

Source：Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Note: When unit of precipitation (l/m2) is converted to mm, 1.0 l/m2=1mm.

Monthly and annual average of cloud cover is shown in Table 8.3.5 and monthly and annual average of hazy days is shown in Table 8.3.6 and Figure 8.3.4.

Table 8.3.5 Monthly and annual average of cloud cover

Weather station	Months												Average annual
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Tuzla	7.1	6.6	6.2	5.8	5.8	5.4	4.2	3.7	4.4	5.4	7.2	7.6	5.8

Source： ：Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Note: Cloud cover is kind of indicator for amount of cloud. When all of the sky is covered with cloud, cloud cover is 8.0. When there is no cloud in the sky cloud cover is 0 (zero).

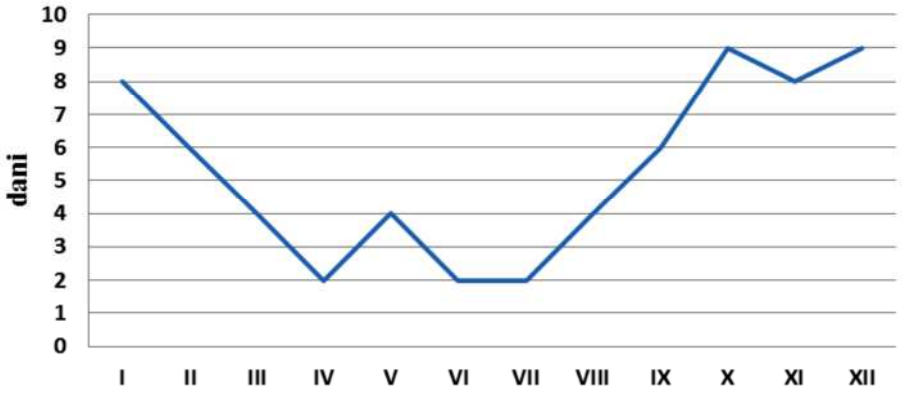
Sunny days are predominant in the summer and cloudy days, including rainy days, are predominant in winter. From autumn to winter, in cold seasons, the number of hazy days is increasing. These seasons are almost corresponding to high concentration season of air pollution such as PM2.5 and SO_2, and the relation to combustion of coal for heating is highly considered.

Table 8.3.6 Monthly average of hazy days

Month(s)	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annualy
Tuzla	8	6	4	2	4	2	2	4	6	9	8	9	64

Source：Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Note: In meteorology visibility in haze is less than 10 km and more than 1.0 km and visibility of fog is less than 1.0km, But in FBIH haze may include visibility less than 1.0km.



Source：Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Figure 8.3.4: Monthly average of hazy days

(2) Topography and Geological Features

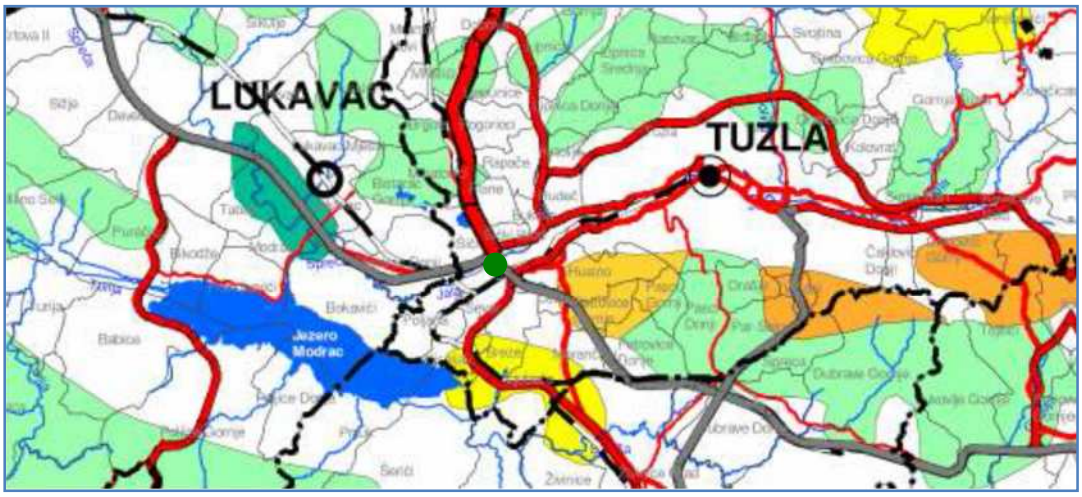
Tuzla Canton where the project site is located is one of the federal provinces located in the northeast of the capital, Sarajevo, FBiH. The region is a basin surrounded by mountains, and Tuzla City spreads approximately 40km to the east-west. The Tuzla Power Plant is located in the plains on the west side of the city center. An artificial lake, Lake Modrac is located about 5- 9km southwest of the power plant. Jala River runs by the existing power plant, and flows into Spreca River originating from Lake Modrac. The planned site for the construction of the power plant faces the main road.

(3) Natural Environment

In the vicinity of the construction site of Unit 7, there are no nature reserve areas. There are scenic spots and parks by the Modrac lakeside, away 5-9km southwest and around the city of Tuzla, about 5km east-northeast.

(4) Flora

In the area of Tuzla Canton, no forest area has not been placed under the protection of the law. In this area the most common forest is the forest of sessile oak and hornbeam (Querco-Carpinetum) (Figure 8.3.5).



[Legend] yellow: sessile oak forests, green: sessile oak forests and hornbeam forests, ochre: sessile oak and Turkey oak forests, orange: beech forests, dark green: English oak and common hornbeam
Source: Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

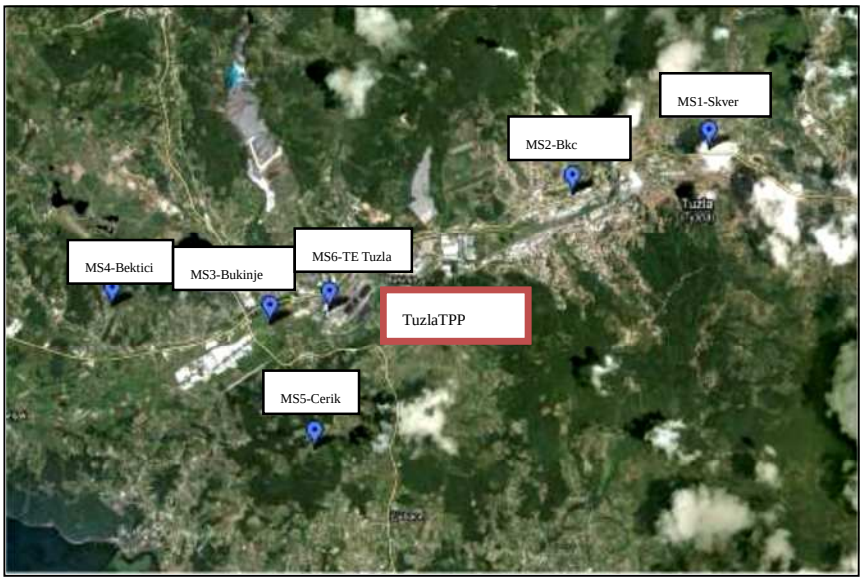
Figure 8.3.5: Forest vegetation in the vicinity of the TPP Tuzla

(5) Fauna

The project area is already industrialized and there are no natural habitats of animals. The "Environmental Impact Assessment TPP Tuzla Unit 7, November 2009" states that there are no rare species that have been registered for protection in the vicinity of the project site. In this Study, it was reviewed and confirmed. On the other hand, on the location of the Modrac Lake at the 10 km distance from Tuzla, there is a protected natural area of fauna, the habitat of egret. The protected bird species are white egret (Egretta alba) and purple heron (Ardea purpurea).

(6) Air Quality

Air quality monitoring for SO_2, NOx and PM2.5 is conducted at 6 monitoring sites in Tuzla Canton using auto continuous monitors. Monitoring points are as shown below.



Source：Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Figure 8.3.6 Distribution of Ambient air quality monitoring station in Tuzla Canton

Source：Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Figure 8.3.7 Ambient air quality monitoring station in Tuzla Canton

The air quality environmental standards in FBiH and EU are shown in Table 8.3.7, 8.3.8 and 8.3.9. In existing EIA (2009) environmental standards in FBiH was applied. But after that time it is going to be adjusted to EU standards. Especially hourly standards of SO_2 and hourly, daily and annual standards of NO_2 are schedule to be strengthened gradually to be reached to same values of EU on 1st January 2021.

Table 8.3.7 Time table of Environmental Standards to be Strengthened for SO_2 (µg/m^3)

Year	2009	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Hourly average (not to allow to exceed 24 times a year)	500	485	470	455	440	425	410	395	380	365	350

Daily average	240	125	125	125	125	125	125	125	125	125	125
Annual average	90	50	50	50	50	50	50	50	50	50	50

Source：Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Table 8.3.8 Time Table of Environmental Standards to be Strengthened for NO_2 (μg/m^3)

Year	2009	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Hourly average (not to allow to exceed 24 times a year)	300	222.5	220	217.5	215	212.5	210	207.5	205	202.5	200
Daily average	140	121	117	113	109	105	101	97	93	89	85
Annual average	60	58	56	54	52	50	48	46	44	42	40

Source：Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Table 8.3.9 Environmental Standards in (FBiH and EU) and Enforcement Day

Sampling period	Limit value in the Federation of B&H	Limit value in EU	Tolerance limits in the Federation of B&H	Tolerance limits in EU	Deadline for reaching the limit in the Federation of B&H	Deadline for reaching the limit in EU
Sulfur dioxide (SO_2)						
One hour	350 μg/Nm^3 Not to be exceeded more than 24 times a calendar year	350 μg/Nm^3 Not to be exceeded more than 24 times a calendar year	150 μg/Nm^3 (43%)	150 μg/Nm^3 (43%)	January 1, 2021	Already in force since 1 January 2005
One day	125 μg/Nm^3 Not to be exceeded more than 3 times a calendar year	125 μg/Nm^3 Not to be exceeded more than 3 times a calendar year	None	None	January 1, 2021	Already in force since 1 January 2005
Calendar year	50 μg/Nm^3	-	-	-	1 January 1, 2021	-
Nitrogen Dioxide (NO_2)						
One hour	200 μg/Nm^3 Not to be exceeded more than 18 times a calendar year	200 μg/Nm^3 Not to be exceeded more than 18 times a calendar year	50 % on 1 January 2010, decreasing on 1 January 2012 and every 12 month thereafter by equal annual percentage to reach 0% by 1 January 2021.	50 % on 19 th July 1999, decreasing on 1 January 2001 and every 12 months thereafter byequal annual percentages to reach 0% by 1 January 2010	January 1, 2021	January 1, 2010
One day	85 μg/Nm^3	-	47 % on 1 January 2010, decreasing decreasing on 1 January 2012 and every 12 month thereafter by equal annual percentage to reach 0% by 1 January 2021.	-	January 1, 2021	-
Calendar Year	40 μg/Nm^3	-	50% on 1 January 2010 decreasing on 1 January 2012 and every 12 months thereafter by equal	50% on 1 190July 1999,decreasing on 1 January 2001 and every 12 months thereafter	January 1, 2021	

Sampling period	Limit value in the Federation of B&H	Limit value in EU	Tolerance limits in the Federation of B&H	Tolerance limits in EU	Deadline for reaching the limit in the Federation of B&H	Deadline for reaching the limit in EU
			annual percentages to reach 0% by 1 January 2021	byequal annual percentages to reach 0% by 1 January 2010		
Carbon Monoxide(CO)						
Eight hours	10 mg/m^3	-	-	-	January 1, 2016	-
One day	5 mg/m^3	-	-	-	January 1, 2016	-
Calendar year	3 mg/m^3	-	-	-	January 1, 2016	-
Particulate matter $PM_{2,5}$						
Calendar year	25 µg/Nm^3	-	-	-	January 1, 2021	-

Source：Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Warning and alarm of air pollution episode in FBiH are designed at three levels shown in Table 8.3.10.

Table 8.3.10 Number of air quality for episodic situation in Tuzla

Particulate matter	Determined hourly values (µg/m^3)		
	Alacrity	Warning	Alarm
Sulfur Dioxide (SO_2)	350	-	500
Nitrogen Dioxide (NO_2)	200	-	400
Ozone (O_3)	-	180	240

Source：Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

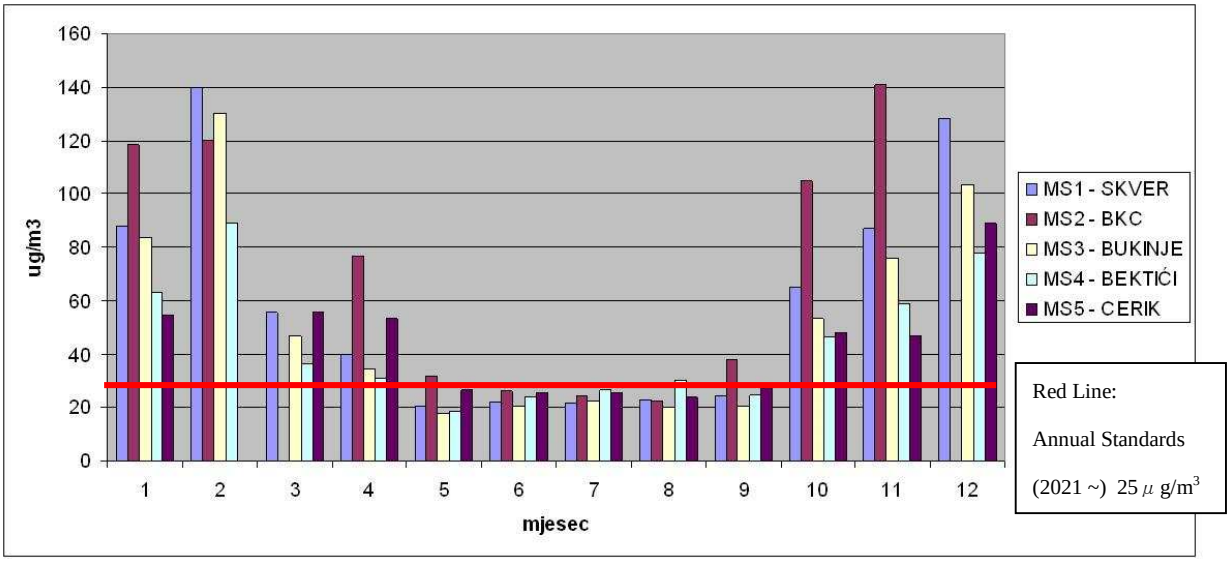
The total number of hourly intervals which concentration exceeds the mentioned three levels by each monitoring stations in December 2012 is shown in Table 8.3.11. Air pollution of SO_2 is most serious in general, and especially at Monitoring Station 2, MS2 - BKC (Bosnian cultural center), it is 68 hours to exceed environmental standards and 18 hours to exceed alert level. It is judged as very serious condition.

Table 8.3.11 the total number of hourly intervals which concentration exceeds the mentioned three levels (Dec 2012)

NUMBER OF HOURLY INTERVALS IN THE MONTH WHEN THE CONCENTRATION OF POLLUTANTS EXCEEDED THE VALUE OF THE EPISODE															
EPISODES	MS1 - SKVER TUZLA			MS2 – BKC (Bosnian cultural center) TUZLA			MS3 - BUKINJE TUZLA			MS4 - BEKTIĆI TUZLA			MS5- CERIK TUZLA		
	alacrity	warning	alert	alacrity	warning	alert	alacrity	warning	alert	alacrity	warning	alert	alacrity	warning	alert
SO_2	23	–	0	68	–	18	11	–	0	19	–	1	0	–	0
NO_2	1	–	0	0	–	0	0	–	0	0	–	0	0	–	0
O_3	–	0	0	–	0	0	–	0	0	–	0	0	–	0	0

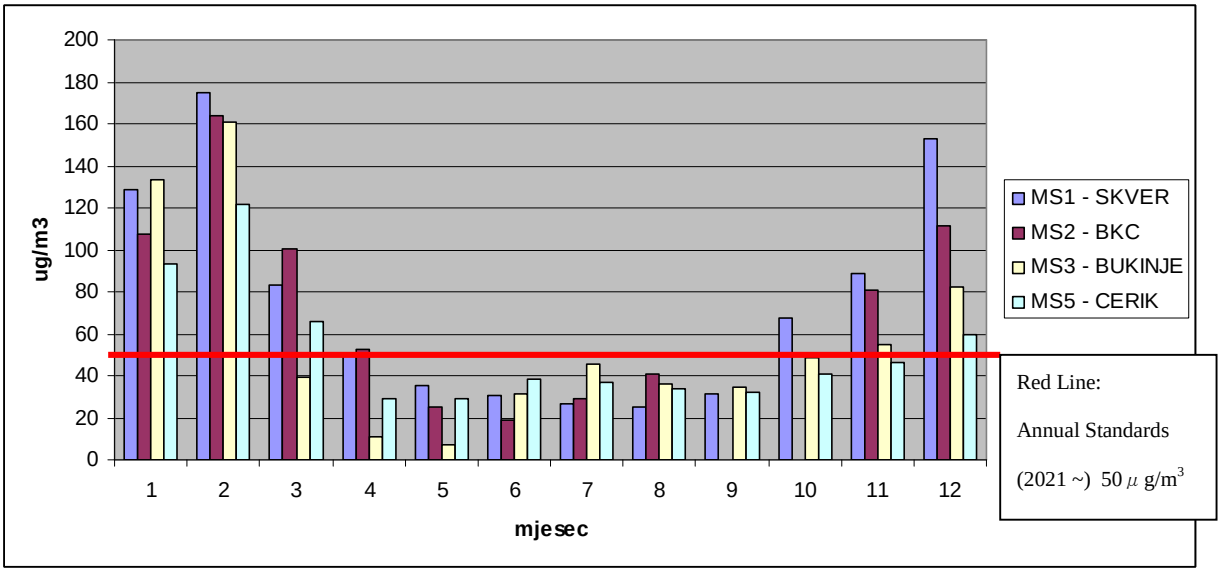
Source : Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Consecutively, the monthly average of PM2.5, SO_2 and NO_2 concentrations and its annual environmental standards in Tuzla in 2010 at each monitoring stations are summarized in Figure 8.3.8, 8.3.9 and 8.3.10. In each figure the red horizontal lines indicates annual environmental standards.



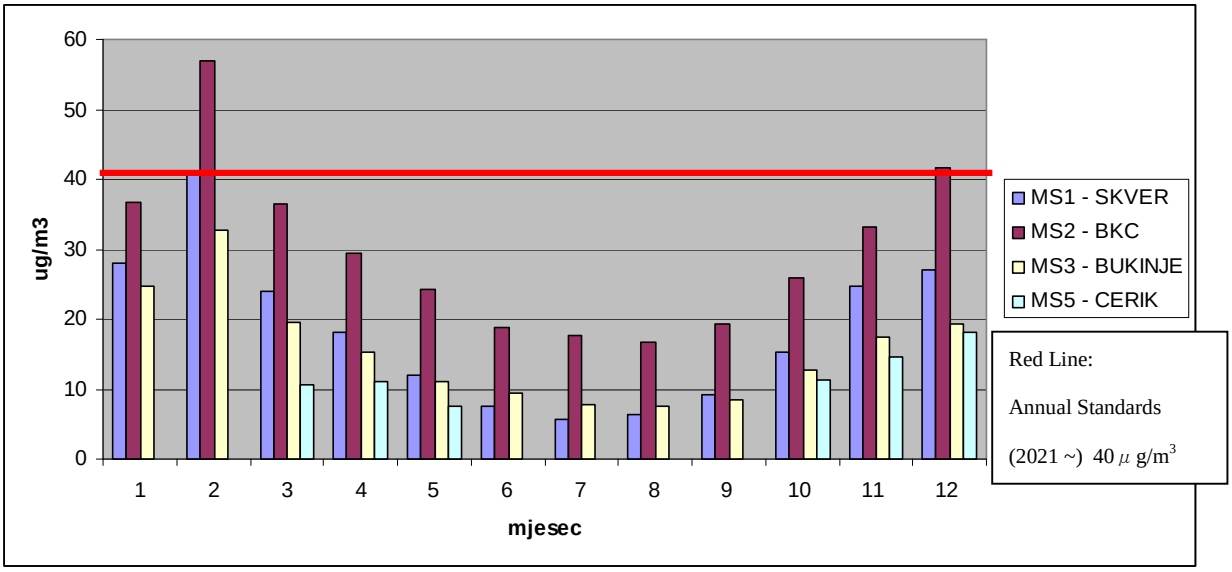
Source : Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Figure 8.3.8 Monthly average of PM2.5 concentration and environmental standards at monitoring stations in Tuzla in 2010



Source : Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Figure 8.3.9 Monthly average of SO_2 concentration and environmental standards at monitoring stations in Tuzla in 2010



Source : Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Figure 8.3.10 Monthly average of NO_2 concentration and environmental standards at monitoring stations in Tuzla in 2010

Furthermore, annual average concentration of PM2.5, SO_2 and NO, and environmental standards, and 98 percentile value of daily means at monitoring stations in Tuzla for the period of 2008 to 2010 are summarized in Table 8.3.12.

Table 8.3.12 Indicators of annual concentrations of PM2.5, SO_2 and NO_2 at monitoring stations in Tuzla for the period 2008-2010

Year	Pollutant	Unit	Annual Limit value In B&H	Daily Limite Value	MS1-SKVER		MS2-BKC		MS3-BUKINJE		MS4-BEKTIĆI		MS5-CERIK	
					average	98th percentile	average	98th percentile	average	98th percentile	average	98th percentile	average	98th percentile
2010	PM2.5	µg/Nm^3	25	-	60	253	70	176	52	204	44	164	43	156
	SO_2	µg/Nm^3	50	125	75	259	73	272	57	283	-	-	52	139
	NO_2	µg/Nm^3	40	85	18	54	30	68	15	38	-	-	12	22
2009	PM2.5	µg/Nm^3	25	-	61	161	85	291	57	193	34	139	44	109
	SO_2	µg/Nm^3	50	125	70	284	82	289	61	242	-	-	54	176
	NO_2	µg/Nm^3	40	85	26	59	29	61	18	46	-	-	14	51
2008	PM2.5	µg/Nm^3	25	-	58	294	68	304	62	259	-	-	41	161
	SO_2	µg/Nm^3	50	125	112	398	59	202	48	203	-	-	41	102
	NO_2	µg/Nm^3	40	85	7	32	23	36	3	17	-	-	22	35

*1. The digits with yellow marker in Table indicate that those digits are exceeding annual environmental standards of PM2.5 (25 μ g/m^3) and/or that of SO_2 (50 μ g/m^3) or 98 percentile values of SO2 are exceeding environmental standards of daily average (125 μ g/m^3) .

*2. Besides, when existing EIA was conducted in 2009, 90 μ g/m^3 was effective as annual environmental standards of SO_2 in of FBiH.

*3. 98 percentile value: it is closely related to long term, i.e. annual, evaluation of environmental standards. Among all daily average data, 98% of data counting from smallest data is 98 percentile value. If this value is lower than daily environmental standards, it is regarded that air quality comply environmental standards by long term evaluation.

Among 5 air quality monitoring station, MS4-BEKTICI is disqualified from baseline data due to large portion of missing data. The long term evaluation was conducted with 4 monitoring stations.

Regarding PM2.5 annual average (Table 8.3.12), among 12 data, 12 out of 12 data is exceeding annual environmental standards (25µg/Nm^3), for 3 years data of the period of 2008 to 2010. But in 2009 there were no available environmental standards of PM2.5 in FBiH, when the existing EIA was conducted.

Regarding SO_2, 10 out of 12 data is exceeding annual environmental standards (50µg/Nm^3) except the data of MS3-BUKINJE and MS5-CERIK in 2008, for 3 years data of the period of 2008 to 2010.

By means of another evaluation method using 98 percentile value, 11 out of 12 data is exceeding daily environmental standards (125µg/Nm^3) except MS5-CERIK in 2008, for 3

years data of the period of 2008 to 2010.

While on the other hand regarding NO_2, 12 out of 12 data comply annual environmental standards (40μg/Nm^3),for 3 years data of the period of 2008 to 2010. And also by means of another evaluation method using 98 percentile value, 12 out of 12 data comply daily environmental standards (200μg/Nm^3, it will be effective from 1st of January 2021), for 3 years data of the period of 2008 to 2010.

In addition, MS2 - BKC (Bosnian cultural center) station is about 5km away from TPP Tuzla in direction of the east-northeast , and it is more away from the potential influence distance (2 ~ 4km) from stack of unit 5 (stack height 100m) and unit 6 Unit (stack height 165m) of TPP Tuzla in general. In view of the stack height and position, therefore it is difficult to identify course of pollution to TPP only. Furthermore, MS1-SKVER station is located 500 ~ 600 m to the east from MS2 further away from TPP Tuzla, it suggested that the cause of air pollution in the Tuzla region are complex pollution from many pollution sources.

Considering the frequency of warning and alert of air pollution in winter, long term evaluation by annual environmental standard and 98 percentile value, it could be concluded that Tuzla area including Unit 7 is heavily polluted area by air pollution especially winter season.

(7) Water Quality

Wastewater from the coal mine, domestic wastewater from the surrounding area, industrial wastewater, and power plant wastewater flows into the Jala River, a wastewater destination for the existing power plant, without going through the clarification process and water quality of the river does not meet the standards. Photographs (in September 2013) are shown in the figure below.

Jala River in front of TPP

Jala River in Tuzla City

Source：JICA Study Team

Figure 8.3.11 Jala River (September 2013)

The results of water quality in 2004 and 2005 sampled upstream at the confluence of the Jala and Spreca Rivers (6-7km downstream west from the power plant) are also shown in the table below. The monitoring result of BOD_5, COD, SS, TDS, ammoniac nitrogen does not satisfy with the standard for class of water III.

Table 8.3.13 Samples of Water Quality for Jala River（2004, 2005）

BASIC INDICATORS	Unit	Determined values	TLV (threshold limit values) (water class3)*
Dissolved oxygen	mg/l	6,5	4,0
Oxygen saturation	%	68,1	50-75 (115-125)
Five-day biochemical oxygen demand (BOD_5)	mg O_2/l	82,0	7,0
Chemical oxygen demand (COD from $KMnO_4$	mg O_2/l	101,2	20,0
Chemical oxygen demand (COD) Bichromate method	mg O_2/l	247,7	-
Suspended solids	mg/l	288,4	80,0
Dry mass in filtered water	mg/l	4.529,6	1.500,0
pH value	mg/l	8,7	6,0-9,0
Electrical conductivity E	µS/cm	5.640	-
Visible waste	-	Small pieces of waste	bez
Noticeable odor	-	strong-undefined	bez
ADDITIONAL INDICATORS			
Water temperature	^{0}C	20,9	-
Turbidity	NTU	910	-
Ammonia (N)	mg/l	3,30	0,5
Nitrite (N)	mg/l	0,058	0,5
Nitrate (N)	mg/l	0,520	15
Chlorides	mg/l	2.268,8	-
Stimulus	m^3/s	2,90	-

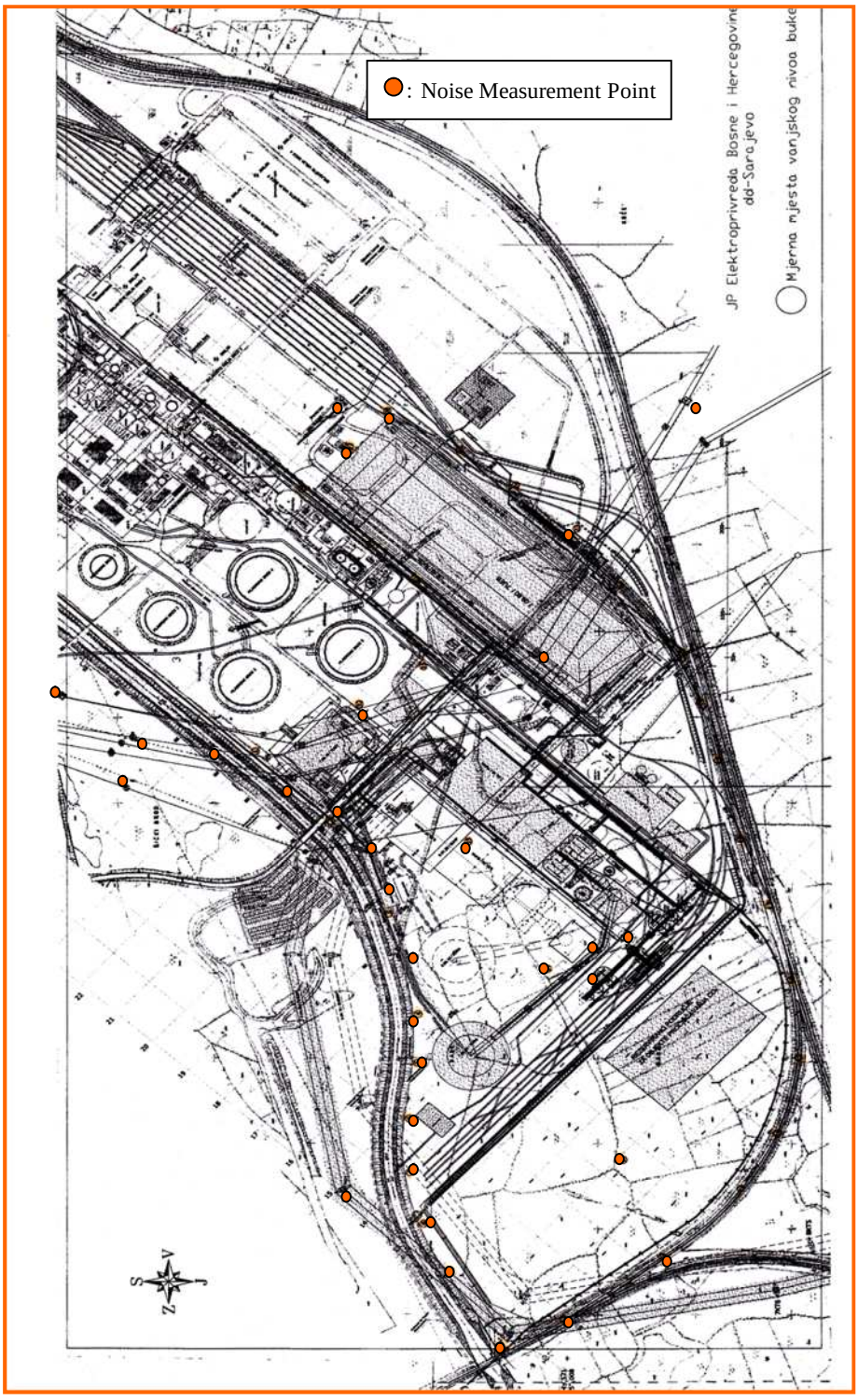
*1. TLV - Regulation on Water Classification and Coastal Waters of Yugoslavia within Socialist Republic of Bosnia and Herzegovina (Official Gazette of SR B&H No 19/80) and Regulation on Watercourse Classification (Official Gazette of SR B&H, No. 42/67) .
TLV sets the allowable concentrations of water parameters for four classes of water body. The water body of this sampling point is categorized as "Class III". In this classification, Class I stands for the best water quality. On the other hand, the Government of the FBiH adopted the Decision on Characterization of Surface Waters and Groundwater, Reference Conditions and Parameters for Assessing Water Status and on Water Monitoring (Official Gazette of FBiH, No. 1/14) in December 2013.

Source：Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

(8) Noise

The noise standard of FBiH, monitoring point of noise at the boundary of TPP and the result of noise monitoring are shown in Figure 8.3.12 – Figure 8.3.13 and Table 8.3.14 – Table 8.3.15. The planned construction site is categorized as an industrial area, though there are several private houses in the vicinity. If the noise standards for Zone VI "Industry, warehouse, service and traffic area without apartments" (70 dB for day period and night period) is applied to as indicated in the existing EIA report, it can be considered that the current sound level meets with the environmental requirement. On the other hand, according to EPBiH,

there is the possibility of application of stricter standard which is the Class IV "Trading, business and residential area by traffic lines and warehouses without heavy transport" (60 dB for day period and 50 dB for night period).



Source: EPBiH

Figure 8.3.12 Monitoring Location for Sound Level

Source：EPBiH

Figure 8.3.13 Aerial Photo of Monitoring Location for Sound Level

Table 8.3.14 Noise Standards of the FBiH (Unit: dB (A))

Area (zone)	Purpose of the area	Maximum permissible external noise level (dBA)		
		15 min Leq		Peak level
		Day	Night	L1
I	Hospital / spa area	45	40	60
II	Tourist / recreation area	50	40	65
III	Housing areas, areas for educational institutions, public green areas, recreation areas	55	45	70
IV	Commercial and business areas, residential areas and residential areas along transport corridors, non-heavy transport warehouse area	60	50	75
V	Business and administrative area, commercial /craft / service areas (utility services)	65	60	80
VI	Industrial and warehouse areas, service areas and uninhabited traffic area	70	70	85

Source：Environmental Impact Assessment TPP Tuzla Unit 7, November 2009, Rudarski Institute d.d. Tuzla

Table 8.3.15 Noise Measurement Results at the Boundary of the Existing Facility(July, 2011)

No.	Sound level: L_{eq} dB (A)		Coordinate of monitoring point
	Day period	Night period	
1.	66.9	65.5	X: 6548135 Y:4930717
2.	64.6	62.8	X: 6548087 Y:4930678
3.	54.2	51.7	X: 6547988 Y:4930624
4.	53.8	53.2	X: 6547904 Y:4930601
5.	48.6	47.4	X: 6547844 Y:4930590
6.	48.3	47.2	X: 6547788 Y:4930592
7.	53.3	49.4	X: 6547740 Y:4930595
8.	50.7	48.4	X: 6547674 Y:4930603
9.	49.1	45.5	X: 6547631 Y:4930591
10.	54.6	50.4	X: 6547458 Y:4930499
11.	53.8	51.8	X: 6547494 Y:4930443
12.	52.8	51.5	X: 6547563 Y:4930428
13.	51.3	50.9	X: 6547745 Y:4930428
14.	52.3	49.9	X: 6547765 Y:4930375
15.	52.6	49.8	X: 6547841 Y:4930305
16.	52.9	49.6	X: 6547900 Y:4930206
17.	54.3	49.2	X: 6547979 Y:4930220
18.	51.2	48.3	X: 6548061 Y:4930250
19.	49.5	47.2	X: 6548190 Y:4930284
20.	52.8	50.3	X: 6548239 Y:4930304
21.	54.3	52.5	X: 6548274 Y:4930320
22.	54.0	53.3	X: 6548251 Y:4930308
23.	57.1	54.4	X: 6548387 Y:4930403
24.	58.3	55.8	X: 6548439 Y:4930463
25.	58.9	56.7	X: 6548448 Y:4930522
26.	59.2	57.8	X: 6548544 Y:4930606
27.	59.8	58.3	X: 6548516 Y:4930674
28.	60.5	57.4	X: 6548470 Y:4930716
29.	62.8	60.4	X: 6548412 Y:4930654
30.	64.4	63.2	X: 6548354 Y:4930581
31.	64.6	64.0	X: 6548270 Y:4930525
32.	68.4	66.7	X: 6548187 Y:4930615
33.	54.8	52.1	X: 6547946 Y:4930234
34.	47.7	46.8	X: 6547639 Y:4930524
35.	45.2	47.8	X: 6547809 Y:4930495
36.	47.3	45.8	X: 6547509 Y:4930787

Source: EPBiH

8.4 Legal and Institutional System of FBiH

8.4.1 Regulations related to the EIA

The EIA process and procedure in FBiH are regulated by Article 53-64 of the Law on Environmental Protection (Official Gazette of FBiH, No. 38/9 and 33/03) and its bylaw (Rules on plants for which environmental impact assessment is mandatory and plants that can be built and operated with the environmental permit, Official Gazette of FBiH, No.19/04). The other regulations for each environmental sector such as the natural environment, air protection, water protection and so on are also set as shown in the table below.

Table 8.4.1 Summary of Regulation of FBiH related to EIA and Environmental Protection

No.	Title	No. of Official Gazette of FBiH	Summary
Basic Law – Environmental protection			
1.	Law on Environmental Protection	38/09; 33/03	This Law regulates: - conservation, protection, reconstruction and improvement of ecological quality and capacity of environment, as well as quality of life; - measures and conditions of management, conservation and rational usage of natural resources; - legal measures and institutions for conservation, protection and improvement of environmental protection; - financing activities regarding environmental and voluntary measures ; and - rights and obligations of relevant institutions on different levels. This Law gives legal basis for environmental impact assessment process and issuance of environmental permit.
EIA			
2.	Bylaw on projects which are subject to obligatory environmental impact assessment (EIA) and facilities which may be constructed and operated only with a valid environmental permit	19/04	This bylaw provides a list of activities and industrial facilities subject to mandatory EIA and permitting procedures at FBiH level, as well as activities and facilities that undergo individual evaluation concerning the EIA requirement.
Basic Law – Nature protection			
3.	Law on nature protection	66/13	This Law regulates jurisdiction of bodies performing activities in nature protection, general nature protection measures, evaluation of acceptability of certain projects in nature, types of habitats and ecologically important areas, protection of wild birds, protection and conservation of biodiversity, forest ecosystems, karst ecosystems, water habitats and wetlands, protection of maritime and coastal natural values, establishment of European ecological network, especially of protected areas – Natura 2000, transboundary traffic of protected wild species, protection measures for minerals and fossils, protected natural values, damage compensation, incentives, access to information and public participation, promoting education in nature protection, etc.
4.	Bylaw on content and manner for preparation of plan for protected areas management	65/06	The main objective of the Plan is establishing conditions, solutions, manners and procedures for establishment of long-term system for protection of biodiversity, landscape value and management system following principles of sustainable usage of natural, cultural and other goods.
Basic Law – Water protection			
6.	Law on water protection	70/06	This Law regulates water management on the territory of FBiH. Water management comprises of: water protection, usage of water, protection

No.	Title	No. of Official Gazette of FBiH	Summary
			from adverse water activity and arrangement of watercourse and other waters. This Law also regulates: water quality and public water quality, water objects, legal entities and other institutions in jurisdiction of certain water management issues and other issues. The purpose of this Law is assurance of water management with objectives: 1. reduction of water pollution, acquirement of good water condition and preventing degradation of water; 2. acquirement of sustainable water usage; 3. assuring fair access to water; 4. encouraging social and economic development; 5. ecosystem protection; 6. decrease of flood risks and other negative water impacts; 7. assuring public participation in decision making related to waters; 8. preventing and solving conflicts related to protection and usage of waters; 9. complying with obligations from international agreements for Bosnia and Herzegovina
7.	Decree on conditions for waste water discharge into natural recipients and public sewerage system	04/12	This Decree regulates: collection, treatment and discharge of urban surface waters, conditions for collection, treatment and discharge of industrial waters into sewerage or surface water and emission limit values during their discharge into natural recipients or public sewerage systems.
Basic Law – Air protection			
8.	Law on air protection	33/03	This Law regulates technical conditions and measures for prevention or reduction of emission into air, planning air quality protection, special emission sources, emission inventory, air quality, supervision and fees for breaches for individuals and legal entities. Authorized federal and cantonal bodies are obliged to assure public participation during preparation of spatial planning documents and other plans affecting air quality, air quality policies and action plans on air, determining locations, permitting procedures and emission sources` inspection.
9.	Law on amendments of the law on air protection	04/10	
10.	Bylaw on air quality monitoring	12/05	This Law regulates establishment and performance of air monitoring with the following objectives: 1) obtaining air quality indicators regarding its impact on humans, ecosystems, buildings in order to evaluate state and effects of measures for limitation of air pollution and recovery of consequences; 2) obtaining data in order to comply with requirements of international agreements, exchange of data on air quality and transboundary transfer of pollutants; 3) determining tasks for institution authorized for monitoring system guidance
11.	Bylaw on emission limit values for combustion plants	03/13	This bylaw prescribes emission limit values from combustion plants and ways for operators of combustion plants to fulfil their obligations. It gives definition of small, medium and large combustion plants for all types of fuels, including biomass and sets emission limit values for each of them, differing new and existing plants, as required by LCP Directive (2001/80/EC) of EU and IE Directive (2010/75/EU).
12.	Bylaw on monitoring emission of air pollutants *Note: Ministry is preparing a new bylaw on monitoring emission of air pollutants*	12/05	This bylaw regulates obligations of operators to perform emission measurements, or emission monitoring from facilities and stationary pollution sources depending on types of facility, pollutants, sampling methodology, averaging, measurement, evaluation of measurement results, and conditions to be met by the person/institution that measures (monitors) emission. Purpose of emission monitoring is to prove that facility complies with emission limit values prescribed by this bylaw or by environmental permit, and to obtain data for emission register.

No.	Title	No. of Official Gazette of FBiH	Summary
13.	Bylaw on way of performing air quality monitoring and defining types of pollutants, limit values and other air quality standards	01/12	Air quality monitoring comprises of: 1) criteria for determination of minimum number of measuring points and sampling locations in case of fixed measurements and in case when fixed measurements are amended by indicative measurements, or modelling in dependence of purpose of surface, content and capacity; 2) measurement methodology and air quality evaluation (reference measuring methods and criteria for concentration evaluation); 3) requirements regarding data used for air quality evaluation; 4) providing quality data for air quality evaluation (as required by BAS ISO/IEC 17025); 5) scope and content of information on air quality evaluation. Air quality requirements are: 1) limit values of pollutants in ambient air; 2) upper and lower evaluation thresholds of pollutants in air; 3) boundaries of tolerance and tolerant values; 4) concentration endangering for human health and concentration for public discloser (warning thresholds and alarm thresholds); 5) critical levels of pollutants in air; 6) target values, national and long-term objectives; 7) deadlines to comply with emission limit values.
Basic Law – Noise			
14.	Law on protection from noise	110/12	This law regulates allowed noise level, protection measures, ways of measuring noise, noise limit values depending on ambient, space purpose, and time of the day (day or night), in order to protect human health, working and living environment and environment in general.
Basic Law – Waste management			
15.	Law on waste management	33/03; 72/09	This Law regulates: - all waste categories; - all types of activities in waste management; Provisions of this Law apply to: - waste generated during research works, extraction, treatment or usage of minerals and quarrying; - liquid waste; - animal waste and other non-hazardous materials of natural heritage that may be used in agriculture purposes; Provisions of this Law do not apply to: radioactive waste, gases released to atmosphere, and wastewater.
16.	Bylaw on waste categories with lists	09/05	This bylaw regulates waste categories with lists, in accordance with waste characteristics and activities generating waste and obligation for their usage. Waste is categorized in 20 groups. Waste groups and individual waste names are marked with six digits key numbers. First two digits refer to activity generated waste, other two digits refer to process generating waste and last two digits refers to process from which waste originates.
17.	Bylaw on the content of the plan of adjustment of waste disposal for the existing facilities for treatment and waste disposal and activities undertaken by the authorised body	09/05	This Rulebook defines the content of the Adjustment Plan for waste management for existing treatment and disposing facilities requiring environmental permit. It comprises of corrective measures that are by the owners opinion necessary to be undertaken in order to comply with specific conditions to reduce impacts on human health and environment.
Others			
18.	Law on electricity in Federation of Bosnia and Herzegovina	66/13	This Law regulates functioning of the electro energy sector, development of electricity market, regulating market, general conditions for electricity supply, planning and development, construction, reconstruction and maintenance of electro-energy objects,

No.	Title	No. of Official Gazette of FBiH	Summary
			supervision over law enforcement, etc. Some objectives of the Law are: - provision of continuous, safe and quality supply of electricity buyers; - incentives for domestic and foreign investments; - economic and rational electricity usage; - energy efficiency; - preventing monopole; - environmental protection; - usage of renewable energy resources.
19.	Law on spatial planning and land use at the level of Federation of Bosnia and Herzegovina	02/06, 72/07, 32/08, 4/10	This Law regulates: planning of land use in FBiH through implementation of planning documents land usage, supervision over implementation, fees.
20.	Decree on arrangement of construction site, obligatory documentation on the construction site and participants in construction	48/09	This Decree gives guidelines of organizing construction site in order to protect workers, local population, and environment, taking into consideration all other bylaws in force.

Source: JICA Study Team

On the other hand, BiH proceeds the transposition of EU Directive on environmental sector for EU accession as well as the other sector. The key EU Directives in the field of environmental regulations and its corresponding regulation of BiH/FBiH are shown in the table below. For example, the transposition scores for the IPPC Directive (Dir. 2008/1/EC) have been reported that it was scored 60% for FBiH and 65 % for RS (EC IPA 2007 Programme for BiH Project "Support to BiH Water Policy", Strategy for Transposition of the Legislation BiH with the EU Water Acquis, 2011).

Table 8.4.2 Major EU Directives in the Field of Environmental Regulations and its Corresponding Regulation of BiH/FBiH

Directive	Transposed Act / Rules / Regulation
Directive on Environment Impact Assessment (85/337/EEC) amended with Directives 97/11/EC and 2003/35/EC	- The Law on Environmental Protection (Official Gazette of FB&H 33/03, 38/ 09). - Rules on plants for which environmental impact assessment is mandatory and plants that can be built and operated with the environmental permit (Official Gazette of FB&H, No. 19/ 04).
Directive on integrated pollution prevention and pollution control 2008/1/EC	- The Law on Environmental Protection (Official Gazette of FB&H 33/03, 38/ 09). - Rules on plants for which environmental impact assessment is mandatory and plants that can be built and operated with the environmental permit (Official Gazette of FB&H, No. 19/ 04) - Rules on the requirements for applying for environmental permit for plants and facilities that have been issued permits before the entry of the Law on the Protection of the Environment into force (Official Gazette of the Federation B&H 45/ 09). - Rules on the adoption of best available techniques that achieve environmental quality standards (Official Gazette of FB&H 92/ 07)

Directive on environmental information (2003/4/EC)	- The Law on Environmental Protection (Official Gazette of FB&H 33/03, 38/ 09). - Law on Free of Access to Information (Official Gazette FB&H 32/01)
Directive on Waste (2006/12/EC)	- The Law on Waste Management (Official Gazette of FB&H 33/03, 72/ 09) - Rules on issuing permits for activities of small economy in the Waste Management (Official Gazette 9/05) - Regulation that govern the operators and waste producers reporting obligations on the implementation of monitoring programs, monitoring and record keeping under the terms of License (Official Gazette of FB&H 31/ 06)
Hazardous Waste Directive (91/689/EEC), as amended Directive 94/31/EC and Regulation (EC) 166/2006	- The Law on Waste Management (Official Gazette of FB&H 33/03, 72/ 09) - Regulation of selective collection, packaging and labeling of waste (Official Gazette of FB&H 38/ 06) - Regulations specifying the handling of hazardous Waste that is not on the list of waste or whose content is unknown (Official Gazette of FB&H 33/03) - Ordinance on waste categories with lists (Official Gazette FB&H 9/05)
Water Framework Directive (2000/60/EC), as amended Decision 2455/2001/EC	- The Law on Water (Official Gazette of FB&H 70/ 06) - Ordinance on limit values of hazardous and harmful substances in industrial waste water before their discharge into the public sewer system, or to another receiver ("Official Gazette" , no. 50/ 07) - Regulation on conditions for discharging wastewater into natural recipients and public sewerage system (Official Gazette of FB&H No. 4/ 2012)

Source：Project for implementation of the Regional Program of environmental reconstruction in Southeastern Europe funded by the European Commission and implemented by the REC for South Eastern Europe, Report on the monitoring of the progress of Federation B&H and the Report on monitoring the progress of RS (2008)

8.4.2 Related Organizations

The key organizations related to EIA on this Project are shown in Table 8.4.3. The EPBiH as a project proponent prepared EIA. FMOET reviewed it and issued the environmental permission.

Table 8.4.3 Main Organizations Related to EIA

Organization	Role
Elektroprivreda BiH, EP BiH d.d.	In the case of TPP Tuzla Unit 7, EP BiH is Investor. As an Investor, it approaches to the Ministry (Federal ministry of Environment and Tourism) with application for environmental permit. When the Ministry acknowledges that EIA is necessary, Investor approaches one of the consulting companies authorized by the Ministry for EIA Study preparation.
Federal Ministry of Environment and Tourism	The Ministry is in charge of the entire administrative process, it organizes disclosure of the EIA Study, and stakeholder meeting (public hearing). The Ministry issues environmental permit in the form of Decision. It is issued in following ways: - issuing Decision for environmental permit (when EIA is not required); - issuing Decision for environmental permit after finalized preliminary EIA in cases when only preliminary EIA is required; and - issuing Decision for environmental permit after approved EIA Study.
Water agency for the river basin of the Sava river	Issues water consents, monitors water management, collects fees for water pollution
Federal Ministry for Spatial Planning	Issues urban consents and construction permits
Federal Fond for Environmental Protection	Collects fees for air pollution, on the basis of the Decree on establishing fees for air pollution, water pollution and exhast gases from vehicles. Each company which exceeds emission limit values set in this Decree pays certain amount (on the basis of calculation) to the Fund, and that money is then distributed to Federation (30%) and Cantons (70%) through financing of environmental protection projects of interest for local community,

	Canton, Federation, etc.

Source: JICA Study Team

8.4.3 Environmental Standard

The standard and limit value for each environmental item such as ambient air, emission gas and wastewater etc. is set as shown in Table 8.4.4. The detail description of standard is indicated in the following section of each impact assessment and annex 1.

Table 8.4.4 Standards for Each Environmental Item

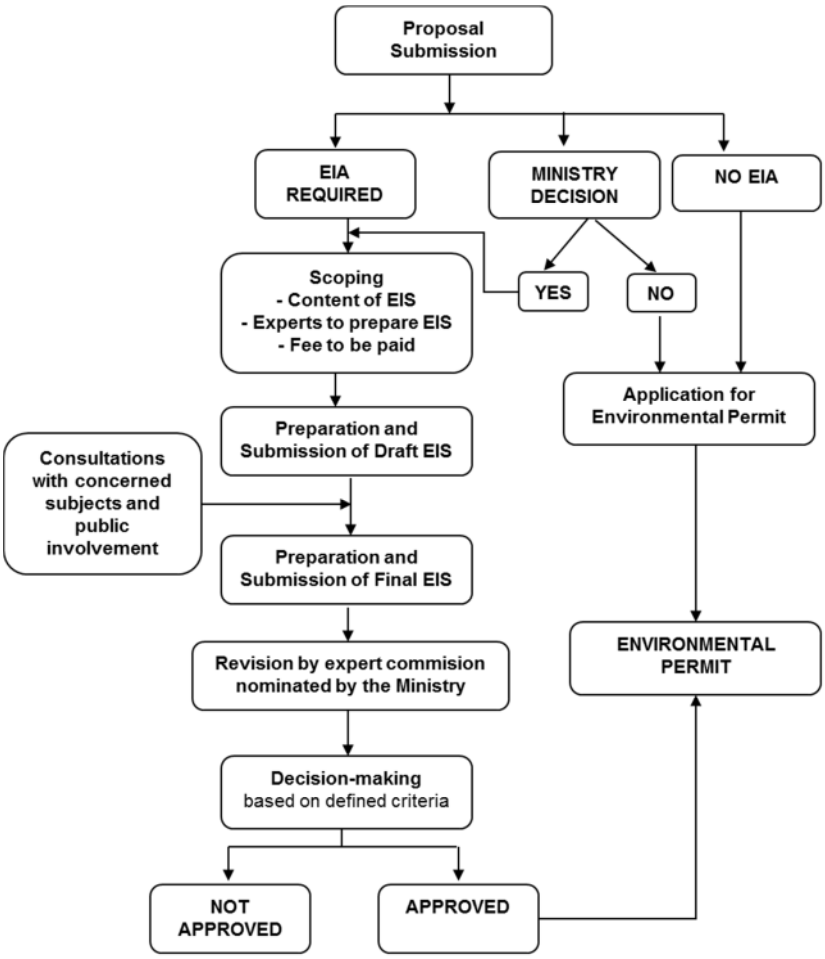
Item	Contents
Ambient air quality	By OG of FBiH 01/12, the air quality standards for sulphur dioxide, nitrogen oxide, PM10, benzene, carbon monoxide .etc are stipulated..
Emmission	Official Gazette of FBiH 03/13 shows the emission limit values for combustion plants for SO2, NOx, and PM10.
Wastewater discharge	Decree on conditions for waste water discharge (OG FBiH 04/12) into natural recipients and public sewerage system set the requirement* for BOD, COD and TSS. There is also another requirements for discharges from urban waste water treatment plants to sensitive areas which are subject to eutrophication and other checmicals.
Noise and vibration	Law on protection from noise (OG FBiH 110/12) regulates the allowed noise level depending on ambient, space purpose, and time of the day (day or night), in order to protect human health, working and living environment and environment in general.

* Emission limit values for discharges of treated waste water from urban waste water treatment plant into natural recipient (Secondary treatment)
Source: JICA Study Team

8.4.4 EIA Procedure of FBiH

(1) Procedure

The following flowchart shows the EIA procedure in FBiH. In this chart, the EIA report is called EIS (Environmental Impact Study).



Source：JICA Study Team

Figure 8.4.1 EIA Procedure in BiH

(2) Contents of EIS

The following descriptions are the basic contents in EIS.

1. Description of proposed project:
   - 1.1. Description of physical characteristics of entire project and conditions to use land during construction and operation of the facility foreseen by the project
   - 1.2. Description of main characteristics of production process, nature and quantities of materials in use;
   - 1.3. Estimation by type and quantity of expected waste and emissions (pollution of water, air, soil, noise, vibrations, heat, radiation, etc.) resulting from foreseen production process
2. Description of environment that might be affected by the project:
   - 2.1. Data on population,
   - 2.2. Data on flora, fauna, watercourses, air quality, soil,
   - 2.3. Climate characteristics of the area
   - 2.4. Existing material goods, including cultural-historical and archaeological heritage,
   - 2.5. Landscape description,
   - 2.6. Specific elements determined by preliminary EIA
   - 2.7. Description of possible significant impacts of the project (any direct, indirect, secondary, cumulative, short-term, medium-term and long-term, permanent or temporary, positive and negative impacts)
   - 2.8. Impact on population,
   - 2.9. Impact on flora, fauna, watercourses, air quality, soil,
   - 2.10. Impact on climate conditions,
   - 2.11. Impact on material goods, including cultural-historical and archaeological heritage,
   - 2.12. Impact on landscape,
   - 2.13. Inter relation of above listed factors,
   - 2.14. Specific impacts of the project determined by preliminary EIA
   - 2.15. Description of methods foreseen for environmental impact assessment,

4. Description of measures to mitigate adverse impacts – measures for prevention, reduction, or mitigation of any adverse impact.
5. Outline of main alternatives – description of alternatives and of reasons for which they have been selected, taking into consideration environmental impacts.
6. Non-technical resume
7. Indication of difficulties – information of experienced difficulties during preparation of the EIA Report caused by technical, know-how, or financial deficiency.

Figure 8.4.2 Basic Contents of EIS

(3) Public Involvement of the Existing EIA

In accordance with Article 36 of the Law on environmental protection, authorized ministry will ensure public participation in EIA process and in permitting procedure. During evaluation of the EIA Report, authorized ministry informs and invites public to stakeholder meeting (public hearing) via their web site “www.fmoit.gov.ba”, and in some cases via newspapers. It also discloses the Report (Non-technical resume) for comments. Public may send their comments, suggestions, remarks, etc. to authorized ministry not later than 30 days from public disclosure. Authorized ministry organizes public hearing in the vicinity of the project location and informs the public at least 15 days before the meeting. Authorized ministry prepares the record from the meeting within three days.

8.4.5 Past Procedure of EIA for this Project

EIA for Unit 7 is required as combustion facilities with a capacity of more than 50 MW is listed under the bylaw as projects subject to obligatory EIA, and as facilities which may be constructed and operated only with a valid environmental permit. Thus, EPBiH has already conducted an EIA and acquired an environmental permission issued by the federal government.

In accordance with the Law on Environmental Protection, Article 56, if the specification of the project is amended by more than 25% and causes significant impact on the environment, the EIA should be re-submitted. Specific criteria for "more than 25% amendment" is stipulated as an "increase of more than 25% in 1) production (output), 2) water use, 3) energy 4) use (amount of coal), 5) space usage, or 6) emission/waste generation." This Project does not anticipate to amend the plan by more than 25% from the original plan for which the EIA was approved, so that a re-approval of EIA is not required. In addition, the stakeholder meeting was held by FMOET in process of EIA in accordance with their regulations as indicated above.

8.5 Alternative Analysis

As described in 4.3, the alternative analysis was conducted and compared.

8.6 Scoping

8.6.1 Scoping Result

The likely impact without any mitigation measures etc. are considered and the scoping plan is shown in the below Table.

Table 8.6.1 Environmental Scoping Matrix

Category	No	Item	Rating		Reason
			Planning/Construction Phase	Operation Phase	
Pollution Control	1	Air pollution	B-	A-	Construction phase：Construction equipment etc. would cause tentative air pollutions pollution. Operation phase: The plant output of Unit 7 will be 450 -400 MW and it is more than 300 MW of total output of Unit 3 and Unit 4. Thus, if any measures against air pollution are not taken, serious adverse impact would be expected. On the other hand, if the FGD (flue-gas desulfurization) and ESP (electrostatic precipitator) are installed, SO_2 emission (per unit volume) might decrease to 8-10%, NOx decrease to 50-60% and dust decrease to 20%. It will be confirmed during the survey.
	2	Water pollution	B-	B-	Construction phase：Water discharged from the construction site, construction equipment, vehicle and construction camp would cause a water pollution. Operation phase: Effluent from Unit 7 will be discharged to Jala river after the treatment. The impact of water pollution will be assessed after fixing of the design of effluent treatment facility.
	3	Waste	B-	B-	Construction phase: Construction waste including residue soil and wood would cause a negative environmental impact. Operation phase: The disposal site and method for the waste of ash and burning residue are not decided and there are some candidate disposal sites. The advanced disposal method will be used. The impact will be assessed during this study in confirmation of the situation.
	4	Soil contamination	B-	B-[*1]	Construction phase：Soil contamination may occur due to leakage of oil from construction vehicles or equipment. Operation phase：This project is the replacement of the thermal plant, but the location of disposal site and the disposal method are not fixed. The impact by disposal will be accessed.
	5	Noise and vibration	B-	A-	Construction phase: Noise and vibration would be caused by construction works and construction vehicles/equipment Operation phase： The resident who lives near the boundary of Unit 7 might be annoyed by the noise from the dropping of cooling water in the cooling tower. The school and hospital etc. are not confirmed near the boundary of Unit 7.
	6	Ground subsidence	D	D	The project does not have any factor which may cause ground subsidence in terms of project location and construction method.
	7	Offensive odor	D	D	The project does not have any factor which may cause offensive odor in terms of project location and construction method.
	8	Bottom sediment	D	D	The project does not have any factors which may impact the bottom sediment in terms of project location and

Category	No	Item	Rating		Reason
			Planning/Construction Phase	Operation Phase	
					construction method.
Natural Environment	9	Protected area	D	D	There are no national parks or protected areas in or near the project area.
	10	Flora, fauna and biodiversity	C-	C-	Construction phase/Operation phase: The existence of rare animals and plants near the planned site and surrounding will be confirmed in this survey. Also, the impact on the environment in Moderac lake and downstream caused by taking and discharging of water will be considered.
	11	Hydrological situation	D	C-	Construction phase: The project does not have any factors of construction which may cause an impact on flow of river water and river bed. Operation phase : If Unit 7 needs the new bridge crossing the river in front of the TPP and the bridge footing is built in the river water, the water flow might be changed. The impact will be assessed after confirmation of the site and design. The impact on Hydrological features in Modrac lake and downstream caused by taking and discharging of water will be considered.
	12	Topography and geographical features	D	C-[*2]	The project is the replacement of the thermal power plant and does not have a plan of the large-scaled cut earth and earth fill. Thus, little impact is expected on topography and geographical features. However, the mine may be impacted in terms of topography and geography, and this will be considered.
Social Environment	13	Resettlement/Land acquisition	B-	D	Planning phase: The replacement of the thermal plant involves with the land acquisition including the acquisition of the private land. The number of affected people will be eighty-eight. In addition, the illegally built house was found in the site of TPP. The consideration for this family who has the house shall be taken.
	14	Poverty group	C	C±	Planning phase: The extent of impact will be estimated after it is confirmed if the land owner includes the poverty group or not. Operation phase: The extent of impact will be estimated after it is confirmed if the land owner includes the poverty group or not.
	15	Indigenous and ethnic people	D	C±	It seems that the indigenous and ethnic people do not live in and around the project site. However, the impact will be assessed after the confirmation of the site situation.
	16	Local economy such as employment and livelihood, etc.	B+	D	The project is the replacement of the thermal power plant and does not have a significant impact on the local economy, but the job growth is expected during the construction of new thermal plant.
	17	(Surrounding) Land use and utilization of local resources	D	B+	The local resources of the coal mine will be utilized effectively in the long term.
	18	Water usage or water rights	C	C-	Construction phase: The impact by muddy water might be occurred during the construction if the river water etc. around the project is used.

Category	No	Item	Rating		Reason
			Planning/Construction Phase	Operation Phase	
					Operation phase: The water to be used in Unit 7 will be taken from the Modrac lake which is approx. 9km southwest of Modrac lake. The amount used is indicated in the existing EIA and this study will confirm if the amount will be complied with. The drainage volume will also be confirmed. The effect on water use for Modrac Lake and downstream through taking or discharging water will be investigated.
	19	Existing social infrastructures and services	B-	B+	Construction phase: The traffic jam will be expected during construction. Operation phase: This project is the replacement of the thermal plant and little impact on the existing social infrastructures and services is expected. The positive impact by growth of power-generating capacity will contribute to increasing of the supply power and the central heating power.
	20	Social institutions such as social infrastructure and local decision-making institutions	D	D	The generated power will be connected to the national grid. The impact on social institutions such as social infrastructure and local decision-making institutions is not expected.
	21	Maldistribution of benefit and damage	C-	C-	The maldistribution of benefit and damage to the certain resident is not expected. However, regarding to the land acquisition of Unit 7, some of land owners or land users might have more impact than the others.
	22	Local conflict of interests	C	C-	The only 20% of land has been acquired and there is some possibility of local conflict of interests, but it has not appeared. The impact will be assessed after the confirmation of site situation.
	23	Historical and cultural heritage	D	D	There is no historical and cultural heritage around the project site.
	24	Landscape	D	C-	Operation phase: The facility of boiler, turbine and cooling tower will increase, but this is the extension of the existing plant and little impact is expected. The impact will be assessed after the finalization of a detailed design.
	25	Gender	C	C±	Negative impact on gender is not expected, but the impact will be assessed based on hearings and confirmation.
	26	Children's right	C	C±	Negative impact on children's right is not expected, but the impact will be assessed based on hearings and confirmation.
	27	Hazardous infectious diseases such as HIV/AIDS	B-	D	Construction phase: This project will not involve a large scaled construction, but the infectious diseases might be developed because of the inflow of workers.
	28	Occupational environment including occupational safety	B-	C-	Construction phase: The consideration for the occupational environment will be necessary. Operation phase: The particular work which involves the negative impact on the workers during operation is not planned, but the impact will be assessed based on the

Category	No	Item	Rating		Reason
			Planning/Construction Phase	Operation Phase	
					confirmation of the occupational safety management system.
Others	29	Accident	B-	C-	Construction phase: The accident during construction shall be prevented. Operation phase: The lignite coal will be transported by railway and ash will be transported by closed conveyer. Thus the transportation accident is not expected, but the impact will be assessed based on the confirmation of safety measurement and accident record.
	30	Cross-boundary impact and climate change	C-	C-	The CO2 emission per unit (t/MWh) will decline dramatically because of the improvement of plant efficiency. On the other hand, the power generation increases and total CO2 emission will be equivalent or modestly increased, though the detail specification of Unit 7 will be specified in this survey. The cross-boundary impact and climate change will be little, but the impact will be assessed based on the detail plant design.

A-: Significant negative impact is expected, if any measure is not implemented against the impact
A+: Remarkable effect is expected due to the project implementation itself and environmental improvement caused by the project.
B-: Negative impact is expected to some extent, if any measure is not implemented against the impact
B+: Some effect is expected due to the project implementation itself and environmental improvement caused by the project.
C+/-: Extent of positive/negative impact is unknown (Further examination is needed, and the impact could clarified as the study progresses)
D：No impact is expected

*1, *2：The impact of soil contamination and topography and geographical features is related to the subproject of Unit7 so that those impact will be assessed apart from main facility of Unit7.
Source：JICA Study Team

8.6.2 TOR of EIA Study

Based on the draft scoping result, the content of existing EIA will be updated and the likely impact will be recalculated and reassessed. Considering the project plan and environmental status investigated through the existing information and site visiting, the likely impact on the environment to be caused by project implementation will be studied. The impact during and after the construction will be assessed. Tasks assumed for the impact assessment are described in the following table:

Table 8.6.2 Summary of the impact assessment

Field of Study	Contents
Air Quality	(1) Confirmation of most recent concentration of air pollutants as described in the EIA report (2009) (2) Verification of simulation results of air pollutants in the EIA report (2009) (3) Verification of simulation model used for air pollutant prediction in the EIA (2009), re-simulation if necessary (4) If authorized simulation model for short-term average, i.e. one hour, is not available, Gaussian model should be used for long-term, i.e. one year average evaluation. (5) Reconfirmation of air quality standards specified in the EIA report (2009) If height of outlet, volume of flue gas, velocity and temperature of flue gas, and exhaust intensity of air pollutants differ from the conditions in the EIA report (2009), re-simulation and re-evaluation to be conducted
Noise and vibration	(1) Sensitive receptor survey: Sensitive receptor such as schools, hospitals and religious facilities will be identified that are located within 60 to 100 m from site boundary of No.7 unit through site reconnaissance or satellite image (2) Land use survey: Land use conditions will be identified for land located within 60 to 100 m from site boundary of No.7 unit, through site reconnaissance or maps on land use (3) Noise and vibration : Verification of noise simulation/calculation results in the EIA report (2009). Re-simulation/calculation of noise, if necessary
River water quality and temperature	(1) Collection of the latest monitoring data on water temperature, pH, EC, water flow, DO, turbidity, SS, BOD, COD and coliform for the main rivers in the target area (Spera river and Jala river, as of now) (2) Review and verification of the prediction result in the existing EIA, as necessary.
Waste	(1) Information on amount of waste and status on disposal will be updated as needed
Desk-top review and hearing survey	(1) Additionally, existing data on natural environment and fauna and flora will be updated, if needed (2) Interview with national experts will be conducted, if necessary

Source：JICA Study Team

8.7 Summary of Environmental and Social Impact Assessment

The environmental and social impact is predicted for the items selected in the scoping matrix. The item for pollution control such as air pollution, noise, discharged water is prioritized and required to describe the quantitative prediction as much as possible considering the feature of coal-fired power plant so that the summary of those predictions are indicated in this section. On the other hand, the impact on the surrounding nature is very limited since the project site is located in the industrial zone of Tuzla city, the site is not categorized in the protected area, and the site is located in the exiting TPP and the acquired land at the near TPP. Regarding the social impact, its impact is assessed qualitatively referring the similar or past project experience. Thus, these results of prediction for natural environment and social environment are summarized in section 8.8 together with the result of assessment. Because it became difficult to get the detail design of unit 7 from contractor of construction, this supplemental EIA was conducted based on information collected by JICA Study Team on Tuzla Coal-fired Power Plant Project until February 2014, information from existing EIA (2009) and

"Feasibility Study for the construction of a super critical lignite coal fired power station in FBIH, NEDO, 2013"

8.7.1 Air quality

In existing EIA which has been approved in 2009 by FMOET, only effect of unit 7 was calculated without consideration of background level of air pollution. Hourly average concentration has been calculated and evaluated, it was concluded that SO_2 and NO_2 exceeded hourly environmental standards of FBiH (2009) in some small area. Simulation seemed to be conducted by way of trial, because hourly average simulation has not been authorized for EIA, it is still scientific research stage. Therefore, the study team has attempted to confirm 1) Type of simulation model which has been used, 2) Condition of various emission data and assumptions, 3) Confirmation of taking into account of background levels of air pollution. Unfortunately a company in Slovenia, which was in charge of atmospheric dispersion model in the existing EIA went bankrupt and an engineer in charge could not be found.

Therefore, in our study, SO_2 and NO_2 which had been identified were selected to recalculate and taking account of latest levels of background levels of air pollution in 2009 to 2012, the annual average values were recalculated by using AERMOD model which was authorized by US EPA, and then results were evaluated.

In the plan of operation by EPBiH, it is scheduled to stop operation of unit 3 and 4 when unit 7 will start operation at same time. In our recalculation, emission from existing Unit 3, 4, 5 and 6 are considered as existing contributor to present air pollution concentration and the following two cases are considered in future condition.

Case A) Unit 5, 6 and 7 are in operation, unit 3 and 4 are stopped.

Case B) only unit 7 is in operation, unit 3, 4, 5 and 6 are stopped. (As same as existing EIA 2009)

As environmental standards for evaluation, EU environmental standards were adopted as criteria of evaluation.

Although it is severer than FBiH standard, but it will be in enforcement at least 1st January 2021. It is safety side of evaluation for residents. Regarding SO_2, environmental standards of EU for daily average and annual average are seemed to be already adopted.

Table 8.7.1 Comparison of Environmental Standard

Environmental Standard （Annual average concentration）	SO2 (μg/m3)	NO2 (μg/m3)
Environmental Standard applied to existing EIA 2009	90	60
Environmental Standard applied from 2021 which shall be severer that existing standard (The report prepared by Bosnia based environmental company explains that New standard for SO2 has been already introduced in FBiH)	50	40

Source: JICA Study Team

Conditions of recalculation and results are as follows.

(1) Target air pollutants

SO_2 and NO_2, because it was pointed to exceed environmental standards at small area in existing EIA.

(2) Annual background concentration of air pollutants（Table8.7.2）

Regarding SO_2, the level of concentration exceeds environmental standards (50μg/m^3) at 4 stations out of 5air quality monitoring stations.

Regarding NO_2, the level of concentration comply environmental standards (40μg/m^3) at 5 stations out of 5air quality monitoring stations.

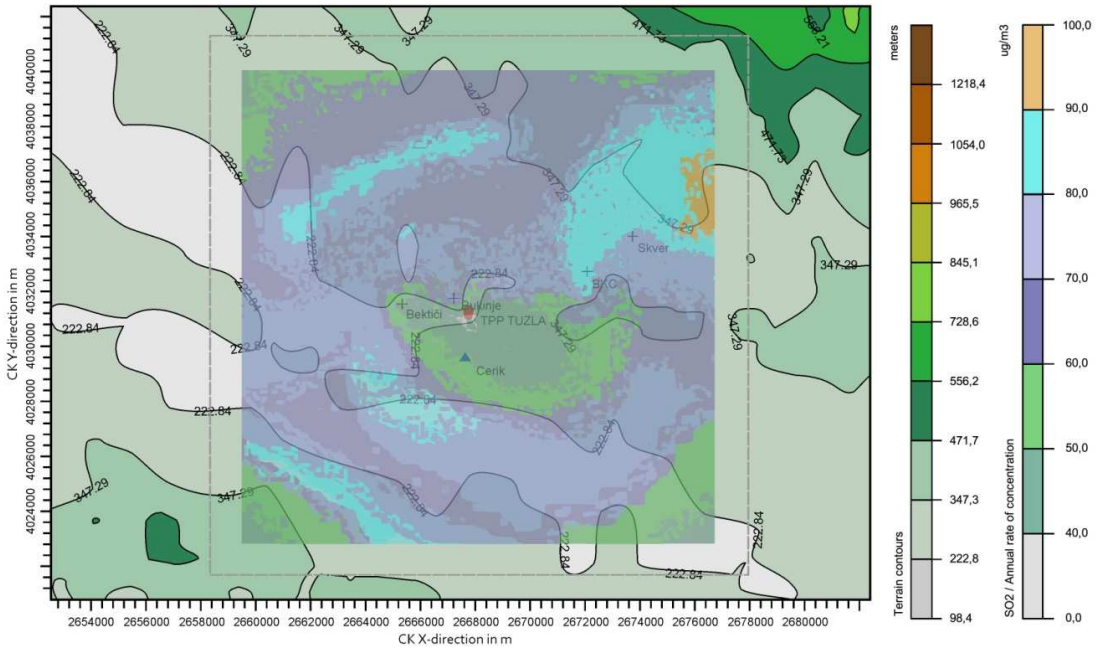
Table 8.7.2 Background concentration of pollutants at monitoring stations (Average of past several years)

	SO_2 (μg/m^3)	NO_2 (μg/m^3)
MS1 Skver	75.1	29.7
MS2 BKC	87.0	32.7
MS3 Bukinje	70.3	21.1
MS4 Bektici	47.4	14.7
MS5 Cerik	58.5	33.0

Source: JICA Study Team

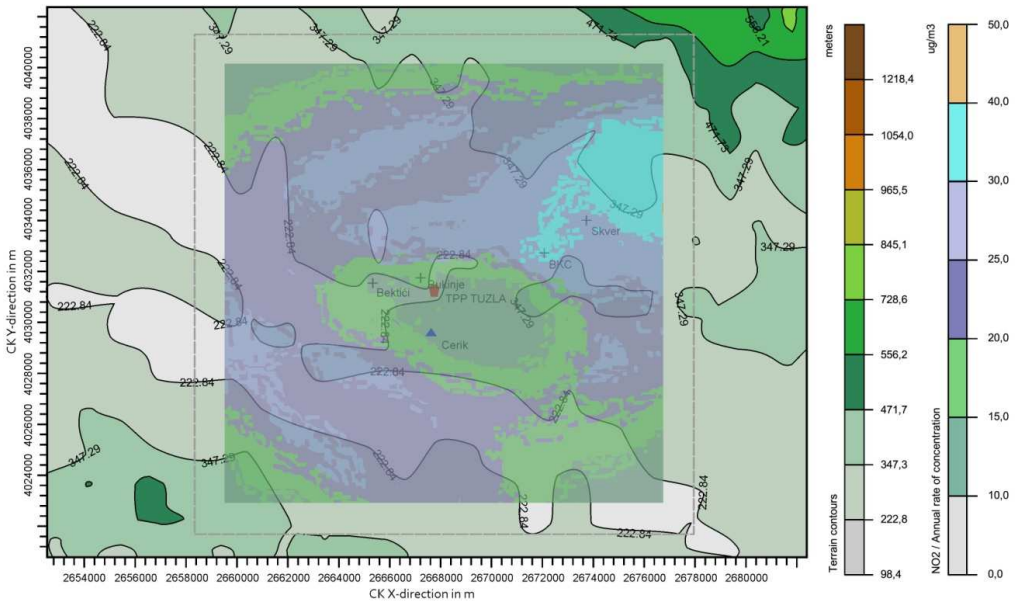
(3) Case A（Unit 5, 6 and 7are in operation）（Figure 8.7.1, 8.7.2 and Table 8.7.3）

When case A compared with present condition, unit 3, 4, 5 and 6 are in operation, concentration of SO_2 will decrease by 4 to 5 μ g/m^3, and the ratio of decrease SO_2 will be 4 to 11%. And as for concentration of NO_2, it will decrease by 2 to18 μ g/m^3,the ratio of decrease NO_2 will be 7 to 55%. Although remarkable decrease will be accomplished, 4 monitoring stations out of 5 stations will not be able to comply with annual environmental standards of SO_2 (50μg/m^3). But NO_2 comply with environmental standards of NO_2 (40μg/m^3) at all stations.



Source : Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Figure 8.7.1 SO_2 concentrations in case of units 5, 6 and 7 of TPP Tuzla are in operation



Source : Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Figure 8.7.2 NO_2 concentration in case of units 5, 6 and 7 of TPP Tuzla are in operation

Table 8.7.3 Calculated concentrations at monitoring stations in future in case Unit 5,6 and 7 of TPP Tuzla are in operation

Ambient air quality monitoring station	Annual average concentration（Unit 5, 6, 7are in operation）		Annual average concentration（Unit 3, 4, 5, 6 are in operation）	
	SO_2 (μg/m^3)	NO_2 (μg/m^3)	SO_2 (μg/m^3)	NO_2 (μg/m^3)
MS1 Skver	71.1	27.3	75.1	29.7
MS2 BKC	82.1	30.1	87.0	32.7
MS3 Bukinje	67.5	19.7	70.3	21.1
MS4 Bektici	42.3	12.8	47.4	14.7
MS5 Cerik	53.7	14.9	58.5	33.0

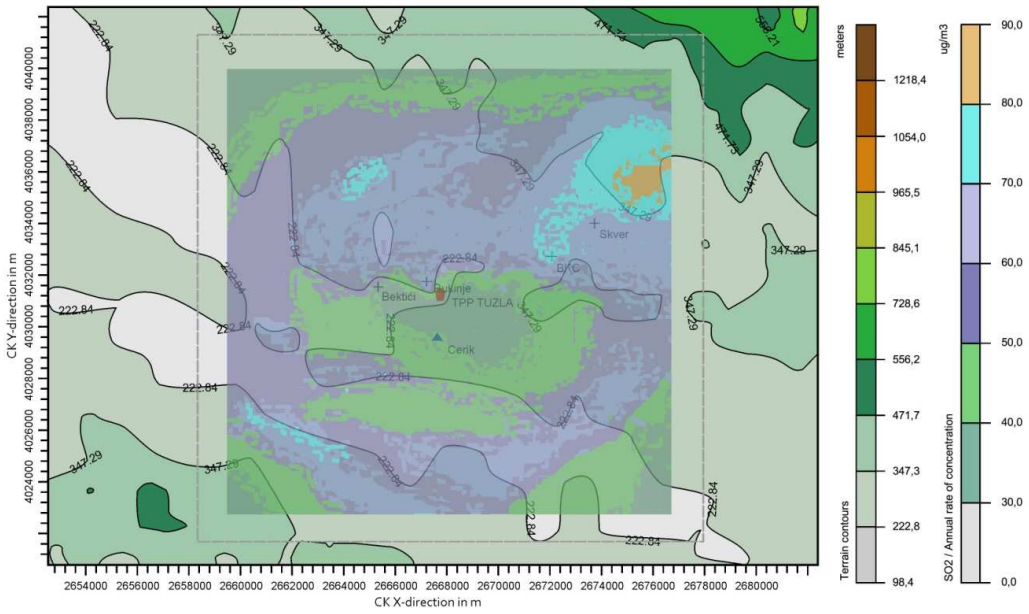
Source : Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

*1. Note: *1. The digits with yellow marker in Table indicate that those digits are exceeding annual environmental standards of SO_2（50 μ g/m^3）.

*2. Note *2. when existing EIA was conducted in 2009, 90 μ g/m^3 was effective as annual environmental standards of SO_2 in of FBiH.

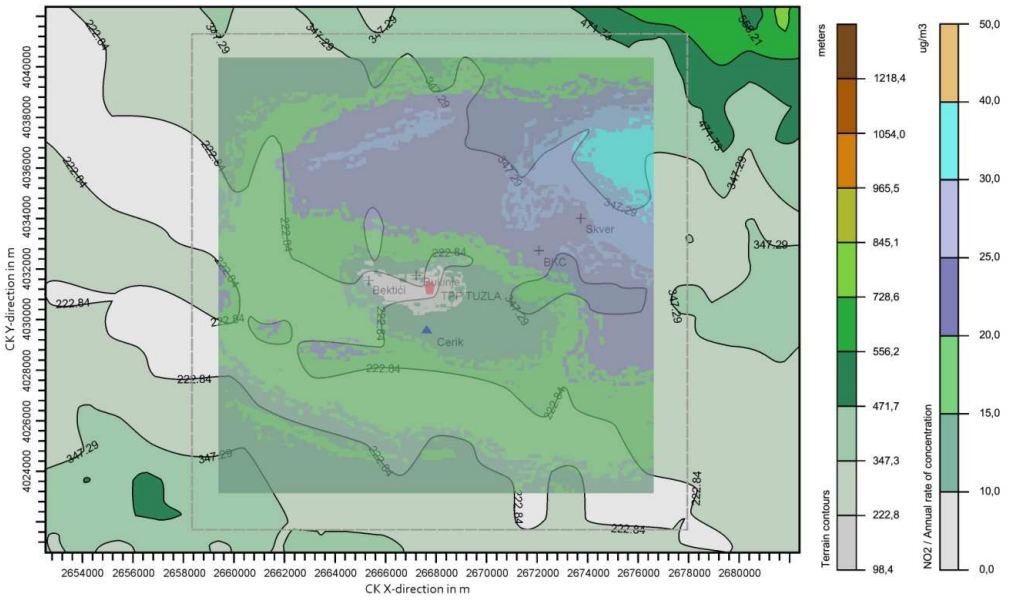
(4) Case B（only Unit 7 is in operation）（Figure 8.7.3, 8.7.4and Table8.7.4）

When case B compared with present condition, unit 3, 4, 5 and 6 are in operation, concentration of SO_2 will decrease by 8 to 10 μ g/m^3, and the ratio of decrease SO_2 will be 10 to 19%. And as for concentration of NO_2, it will decrease by 7 to 20 μ g/m^3,the ratio of decrease NO_2 will be 23 to 60%. Although remarkable decrease will be accomplished, 3 monitoring stations out of 5 stations will not be able to comply with annual environmental standards of SO_2 (50μg/m^3). But NO_2 comply with environmental standards of NO_2 (40μg/m^3) at all stations.



Source : Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Figure 8.7.3 SO_2 concentrations in case of only unit 7 of TPP Tuzla is in operation



Source : Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

Figure 8.7.4 NO_2 concentrations in case of only unit 7 of TPP Tuzla is in operation

Table 8.7.4 Calculated concentrations at monitoring stations in future in case only Unit 7 of TPP Tuzla is in operation

Ambient air quality monitoring station	Annual average concentration（Only Unit 7 is in operation）		Annual average concentration（Unit 3, 4, 5, 6 are in operation）	
	SO_2 (μg/m^3)	NO_2 (μg/m^3)	SO_2 (μg/m^3)	NO_2 (μg/m^3)
MS1 Skver	65.3	22.8	75.1	29.7
MS2 BKC	78.6	24.6	87.0	32.7
MS3 Bukinje	62.5	14.3	70.3	21.1
MS4 Bektici	38.3	8.9	47.4	14.7
MS5 Cerik	48.5	13.2	58.5	33.0

Source : Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

*1. Note: *1. The digits with yellow marker in Table indicate that those digits are exceeding annual environmental standards of SO_2 （50 μ g/m^3）.

*2. Note *2. when existing EIA was conducted in 2009, 90 μ g/m^3 was effective as annual environmental standards of SO_2 in of FBiH.

8.7.2 Noise

The result of calculation to predict the sound level in the existing EIA report (2009) is shown in Table 8.7.5 provided that unit 7 is in operation.

Table 8.7.5 Result of Predictive Calculation of Noise Level

Day time/Night time	Noise level dB(LAeq)		
	Calculated	ClassVI standard(Industrial)	Class IV Standard(Commercial and business areas, and residential areas)
Day Time	58	70	60
Night Time	58	70	50

Source: Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

As shown in the existing EIA report, in case that the noise standard for Class IV "Industry, warehouse, service and traffic area without apartments" (70 dB for day period and night period) is applied to, the predicted result complies with the environmental standard. However, if the stricter standard of the Class IV "Trading, business and residential area by traffic lines and warehouses without heavy transport" (60 dB for day period and 50 dB for night period) is applied to, as EPBiH suggested its possibility, the following additional detail study will be required; 1) measurement of sound level near the receptor's house before construction 2) confirmation of designed specification of the noise source(equipment or facility etc.) and its building, such as the materials and thickness of the wall and windows, 3) numerical simulation based on the specification of detailed design, and 4) consideration of noise-reduction measurement for the receptor's house. In this study period, the further study was not implemented since the detail specifications required for those further studies were not available.

8.7.3 Water quality, Soil and Waste

The impact forecast for water quality, soil and waste is referred to the result of existing EIA report, because the available information was limited. The impact on water quality during the construction and operation is predicted as follows.

Table 8.7.6 Predicted Impact on Water Quality

Construction stage of Unit 7	Predicted impact
Preliminary works and construction	Pollution of surface and underground water due to disposal of waste on the site and random spillage or leakage of oil and fuel from working machinery.
Works of the site for the construction of foundation pit	In the excavation of foundation pits of blocks facilities that are on the ground water levels, direct pollution could occur (in the case of impact of groundwater or higher rainfall in the foundation excavation, there is a possibility of large quantities of water in the pit).
Operation stage of Unit 7	**Predicted impact**

Waste water	Impact on the quality of Jala River and indirectly on underground water is expected. However, the quality of water discharging to the Jala River will comply with the EU regulations. Thus, there is little possibility of degrading of water quality of river. On the other hand, the heat water (30 degrees C, as a designed value) might cause some impact on the river. However, the water quality receiving waste water is not so vulnerable originally due to the water pollution. Meanwhile the detail information on the quality and volume of waste water was not available in this study period.
Transportation of mixture of combustion products(stabilizer)	Less consumption of raw water

Source：Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

The impact on soil at construction / operation stage was expected as shown in the following table.

Table 8.7.7 Predicted Impact on Soil

Construction stage of Unit 7	**Predicted impact**
Preparatory works and works on the construction site of unit 7	- Soil contamination as a result of the influence of defective machinery (as a result of accidental spills or leaks of oil and fuel from operating machinery). - Impacts on the soil due to taking of overlay materials. - Degradation of soil due to the occupation of land and use of heavy equipment. Erosion processes due to removal of humus.
Operation stage of Unit 7	**Predicted impact**
Operation of Unit 7	- Changes of soil quality in case of longer shutdown of devices for purification of flue gases, due to increased emissions of flue gas from the block. Given that the best available techniques (BAT) are selected, emissions will be lower than the legally permissible so changes in soil quality will be low. Rating of impact is based on the compliance with measures to mitigate adverse impacts on the soil.
Transport and disposal of the products of combustion	- Contamination of land as a result of disposal of stabilizers, accidental spill. The spread of dust in the surrounding soils results in a distortion of the quality of the land. - Degradation of soil due to the occupation of land. - Change of relief because the landfill. - Impacts on the soil due to taking of overlay materials.

Source : Rudarski Institute d.d. Tuzla, Draft Final Report on Environmental and Social Survey for PPP Feasibility study on Tuzla 7 Power Plant Project in FBIH, 2014

In addition, the impact on waste was expected as shown below.

Table 8.7.8 Predicted Impact on Waste

Construction stage of Unit 7	**Predicted impact**
- Uncontrolled dumping of construction waste at the construction site or the environment. - Generation of hazardous waste. - Mixing different categories waste. - Large amount of excavated soil due to	- Pollution of the environment (water, air, soil, landscape etc.) - Occupation of land

excavation of foundations	
Operation stage of Unit 7	**Predicted impact**
- Collection of waste. - Waste storage at the location	Environmental pollution (water, soil, air, landscape) due to emissions, taking of area.
- Waste transport.	Environmental pollution (water, soil, air, landscape). Less consumption of raw water used for stabilizers transport.
- Disposal /treatment	- Potential environmental pollution such as water, soil, air, landscape - There is no waste water - percolating water due to less amount of water in the stabilizer (17% of water)

Source: JICA Study Team

8.8 Draft Environmental and Social Impact Assessment

8.8.1 Summary of Draft EIA

The each impact before and during construction and during operation is assessed tentatively. The tentative result of assessment based on the available data during this study period is shown in Table 8.7.1. In case that this project is realized based on JICA Environmental Guideline, result of assessment will be reviewed and revised as needed in accordance with the updated project detail design.

On the other hand, it should be noted that this assessment is the tentative result prepared by JICA Study Team. The authorized and legally-effective documentation in FBiH is the existing EIA report and environmental permission issued by FMOET.

Table 8.8.1 Tentative Result of Environmental Impact Assessment

Category	No	Item	Scoping		Tentative Evaluation		Reason
			BC/DC	OP	BC/DC	OP	
Pollution	1	Air pollution	B-	A-	B-	A-	[BC/DC] According to the existing EIA report, the impact is assessed qualitatively and it is considered that the air pollution by particulate matter (PM10, PM2.5), NOx, CO, and BTX (benzene, toluene, xylene) will occur due to construction machinery and transportation of materials. Since the concrete construction plan including the number and description of construction vehicles etc. has not been decided yet in this study period, the result of existing report can be referred to, in this study. [OP] As a result of review of the existing EIA, SO_2 and NO_2 emission was calculated considering the latest EU environmental standard and comprehensive impact including the effect of operation of Unit 5 and 6. Though the replacement of the old units will definitely decrease the total emission of pollutants, in case that Unit 5, 6 and 7 are in operation, the EU environmental standard of SO_2 at 4 out of 5 monitoring places in Tuzla City will not be achieved as a regional inclusive impact, while the impact of total emission will be lower than the current situation. Even in case of only Unit 7 are in operation, 3 out of 5 monitoring places in Tuzla City will not meet environmental standards, while ambient concentration of SO_2 will be decreased from 10 to 19 % of current concentration.
	2	Water pollution	B-	B-	B-	B-	[BC/DC] Water discharged from the construction site, construction equipment, vehicle and construction camp would cause water pollution. However, the impact is expected to be limited because it is the temporary and the water discharging from the construction site will be treated by septic tanks or setting basin. [OP] Effluent from Unit 7 will be discharged to Jala river after the treatment. However, t he impact of water pollution and thermal water will be limited because the effluent water quality will be sufficient with the water quality requirement.
	3	Waste	B-	B-	B-	B-	[BC/DC] Construction waste including residue soil and wood would be generated. However, the impact of the construction waste will be limited due to the regulation on the construction site which requires the reduction and utilization of waste. The rest of waste will be disposed to the existing dumping sites. [OP]

Category	No	Item	Scoping		Tentative Evaluation		Reason
			BC/DC	OP	BC/DC	OP	
							Solid residuals of the process (slag, ash), sludge and liquid waste will be generated. However, the waste will be treated adequately in accordance with Law on Waste Management and the impact will be limited.
	4	Soil contamination	B-	B-[*1]	B-	B-	[BC/DC] Soil contamination may occur due to leakage of oil from construction vehicles or equipment. However, the impact will be limited and temporary. [OP] Soil contamination may occur due to the accident of leakage of oil or waste from the equipment or facilities. However, the impact will be limited and temporary. On the other hand, the impact by the disposal site of ash will be assessed separately after the disposal method and location are fixed.
	5	Noise and vibration	B-	A-	B-	A-	[BC/DC] Impacts of noise and vibration by construction machineries are expected to be limited because those impacts will occur temporarily and locally. [OP] The sensitive facilities such as school and hospital etc. are not confirmed near the boundary of Unit 7. However, The resident who lives near the boundary of Unit 7 might be annoyed by the noise from the dropping of cooling water in the cooling tower. Impacts of noise and vibration are expected to be limited if the adequate measures at sound source and receptors will be undertaken.
Natural Environment	10	Flora, fauna and biodiversity	C-	C-	D	D	[Flora] - [BC/DC] No significant negative impact is expected since the area is reserved for construction within the existing Thermal Power Plant and idle land. The construction work will not involve the large-scale logging operation of trees. - [OP] No negative impact is expected. For the surrounding area, the operation of unit 7 will have the favorable effects on flora due to reduction of emission of SO_2 and other pollutant as a secondary impact. [Fauna] - [BC/DC] There are grassy areas within the boundaries of the thermal power plant where small mammals, reptiles, birds and insects live. The noise from contraction work might disturb the present species. However, it will be the temporary impact and not large scale. - [OP] Discharge of waste water will be reduced and cleaned, which will have a positive effect on the quality of Jala River. Pollution of air also will be reduced. There will be no negative impact on fauna. Rather than, it will have a positive impact as a secondary effect.

Category	No	Item	Scoping		Tentative Evaluation		Reason
			BC/DC	OP	BC/DC	OP	
	11	Hydrological situation	D	C-	D	D	[OP] The project does not have any factors of construction which may cause an impact on flow of river water and river bed.
	12	Topography and geographical features	D	C-*2	D	D	[OP] The project is the replacement of the thermal power plant and does not have a plan of the large-scaled cut earth and earth fill.
Social Environment	13	Resettlement/ Land acquisition	B-	D	B-	D	- [BC/DC] The detail result of study for land acquisition is shown in Chapter 9. The land owners with official ownership are mainly affected to some extent by land acquisitions. On the other hand, the private structure which is recognized as an illegal occupation by EPBiH was confirmed. If the Project complies with JICA Environmental Guidelines, the more details such as a host of house, his/her family structure, legal right, status of use shall be confirmed. The land acquisition and compensation have been dealt with by the Project Proponent in accordance with relevant regulations.
	14	Poverty group	C	C±	C	D	- As a current situation, it has been said that there is the standard of about 19, 5% of BiH population below the general poverty line (approx 25% in the RS and 16% in the FBiH). Population below the poverty line is mostly: children, low-educated people, old and weary people, displaced persons, population on welfare, the unemployed and rural population. - [BC/DC] In case of this Project, it should be confirmed if the land which provides the poverty people's livelihood is acquired by the Project or not. As explained in chapter 8, the baseline survey for land acquisition could not be implemented during this study period. If the Project complies with JICA Environmental Guidelines, the extent of impact will be evaluated after the detail survey of poverty group among the people affected by land acquisition. - [OP] It is predicted that the operation of Unit 7 has no component which causes the adverse impact on poverty group.
	15	Indigenous and ethnic people	D	C±	C	D	- As a current situation, the ethnic dimensions of poverty, it is almost certain that the Roma are the largest ethnic minority in BiH. The Roma have the lowest level of education and employment rate. Almost Roma have no health insurance and very small number of the Roma has a formal education. - [BC/DC] For the same reason as poverty group, the extent of impact will be evaluated after the detail survey of ethnic group among the affected people by land acquisition, if the Project complies with JICA Environmental Guidelines.

Category	No	Item	Scoping		Tentative Evaluation		Reason
			BC/DC	OP	BC/DC	OP	
							- [OP] It is predicted that the operation of Unit 7 has no component which causes the adverse impact on indigenous and ethnic people.
	18	Water usage or water rights	C	C-	D	D	- [BC/DC] The impact by muddy water described in the scoping stage is discussed in the item of impact on water pollution. The Project does not plan the groundwater pumping for construction. The adverse impact on water usage is not been predicted. - [OP] The 1,050 m^3/h of water for Unit 7 will be supplied from the Modrac Lake which is approx. 9km southwest of Tuzla City. The estimated amount of water supply is 1050 m^3/h. However, the total usage of water will not be almost changed after the unit7's operation since the existing old units will be replaced by the unit 7. It is planned that the waste water from unit 7 will be recycled and reused. The impact on water usage by water use and discharge is not predicted.
	19	Existing social infrastructures and services	B-	B+	B-	B+	- [BC/DC] The road (M4 Dreznik-Sicki Brod) which passes TPP Tuzla is one of the main roads in Tuzla city. According to the latest official data provided by the Public Company Road of FBiH Roads, Ltd from 2009, the value of AADT (average annual daily traffic) on this motorway section is over 15.000 vehicles. During the construction period, the access of the local population to their houses, work places etc. might be difficult due to the increased construction vehicle. The environmental quality may temporarily be reduced by the traffic load.
	21	Maldistributio n of benefit and damage	C-	C-	C-	D	- [BC/DC] Until the land acquisition is completed, some of land owners or land users might fell inequality of profits because the price of compensation for the land acquisition still has been negotiated with each land owners though it is based on the unit price of compensation. - [OP] Since the Project proponent had a lot of discussions with the local communities, the maldistribution of benefit or damage is not anticipated during the operation phase.
	22	Local conflict of interests	C	C-	C	D	- [BC/DC] Same as above "Maldistribution of benefit and damage" - [OP] The Project proponent had a lot of discussions with the local communities. The local conflict of interests is not anticipated during the operation phase.
	24	Landscape	D	C-	D	C-	- [OP] Since the detailed design had not been finalized during this study period, the impact will be assessed in the further study phase.
	25	Gender	C	C±	D	D	- Negative impact on gender is not expected considering the property of Project.
	26	Children's	C	C±	C	D	- [BC/DC]Basically negative impact on children's right is not expected. However, the consideration shall

Category	No	Item	Scoping		Tentative Evaluation		Reason
			BC/DC	OP	BC/DC	OP	
		right					be provided for children labor not to be hired to work during construction phase, though the Labor Law (OG of FBiH, No. 43/99, 32/00, and 29/03) prohibits the child labor younger than 15 ages. - [OP] The negative impact on children's right is not expected.
	27	Hazardous infectious diseases such as HIV/AIDS	B-	D	B-	D	- As a current situation, the significant risk of hazardous infectious diseases around the project area has not been confirmed by the available data. - [BC/DC] Preventive measures against infectious disease shall be considered if the Project hires many employees from the other area for construction works and it has risk of spread of hazardous infectious diseases.
	28	Occupational environment including occupational safety	B-	C-	B-	B-	- [BC/DC] Working conditions and safety in construction shall be considered. The risk of general occupational health and safety will be avoided or minimized by the compliance with the Regulation on the Construction Site and obligatory documentation on the site. It is necessary to anticipate and implement measures for the protection of human health of workers as well as measures against air pollution, protection from excessive noise, and others. - [OP] Working conditions and safety in operation also shall be considered. The following risk is considered as a major adverse impact in addition to the general terms of occupational health and safety. ✓ Exposure to dust at coal storage yard and coal transportation system etc. ✓ Occupational exposure to electric and magnetic fields (EMF) at main transformer, equipment, and connecting high-voltage transmission lines etc. ✓ Occupational exposure to heat during operation and maintenance of combustion units, pipes, and related hot equipment. ✓ Occupational exposure to noise caused by turbine generators and auxiliaries and so on. ✓ Electrical hazards for workers by energized equipment and power lines ✓ Fire and explosion risks. In particular, fire and explosion hazards increase as the particle size of coal is reduced. Particle sizes of coal that can fuel a propagating explosion occur within thermal dryers, cyclones, etc. and other process or conveyance equipment.
Others	29	Accident	B-	C-	B-	B-	- [BC/DC] Occupational accidents and traffic accident are anticipated due the operation of construction machinery and increase of traffic volume. Adequate measures are required. - [OS] Occupational accidents and environmental accidents are expected. In accordance with requirements of the Regulations on the content of the report on the safety, TPP Tuzla has developed the internal and external intervention plans to prevent major accidents (Report on the safety). The plan defines procedure for measures in order to prevent the emergence and spread of major accidents. In terms of the plan, major

Category	No	Item	Scoping		Tentative Evaluation		Reason
			BC/DC	OP	BC/DC	OP	
							accident is an incident caused by uncontrolled leaking or burning of chemicals, oil, gases and liquid fuels. In the operation phase of unit 7 of TPP Tuzla, existing measures will be applied, in accordance with the plan, which should be supplemented after construction of unit 7. By those measures, such impact will be avoided or minimized.
	30	Cross-boundary impact and climate change	C-	C-	D	C-	[BC/DC] There will be no significant impact source of green house gas except for the limited operation of construction vehicle and machines. [OP] The CO_2 emission per unit (t/MWh) will decline dramatically because of the improvement of plant efficiency. On the other hand, the power generation increases and total CO2 emission will be equivalent or modestly increased. The detail prediction can be implemented after the specification of Unit 7 is specified.

Note: BC: Before Construction, DC: During Construction. OP: Operation Phase
A-: Significant negative impact is expected, if any measure is not implemented against the impact
A+: Remarkable effect is expected due to the project implementation itself and environmental improvement caused by the project.
B-: Negative impact is expected to some extent, if any measure is not implemented against the impact
B+: Some effect is expected due to the project implementation itself and environmental improvement caused by the project.
C+/-: Extent of positive/negative impact is unknown (Further examination is needed, and the impact could clarified as the study progresses)
D : No impact is expected

: Rated as A-, B- or C

Source: JICA Study Team

8.9 Mitigation Measures

The mitigation measures to avoid or minimize the adverse impact as much as possible are proposed as shown in the following table regarding the items which was assessed as A-, B- or C in the table 8.8.1, in case that this Project implements according to JICA Environmental Guidelines.

As for the social impact, the appropriate measures stipulated by the each related law and regulation will be conducted. EPBiH already have the similar experience in the Vranduk hydro-power plant project loaned by EBRD. In Vranduk project, they developed the occupational health and safety management and action plan of health and safety in the local communities.

On the other hand, it should be noted that these measures are the tentative one prepared by JICA Study Team and the authorized and legally-effective documentation in FBiH is the existing EIA report and environmental permission issued by FMOET.

Table 8.9.1 Draft Mitigation Measures to be Proposed

Category	No.	Item	Phase	Draft Measures
Pollution	1	Air pollution	BC/DC	- Exhaust gases from construction machinery and transportation of materials will affect air quality. Using newly produced construction machinery and vehicles for transportation of materials will reduce total amount of emissions.
			OP	- It is necessary to adopt regional heating system with SO_2 treatment to Tuzla city. Because even emission of Unit 7 meets emission standards of EU (EU Directive: 2010/75/EU), some monitoring place of Tuzla city may exceed environmental standards, especially in winter when air quality environmental standards of EU will be adopted in January 2021..
	2	Water pollution	BC/DC	- Adoption of the septic tanks or setting basin. Water discharging from the construction site will decrease water pollution.
			OP	- Waste water will be treated with best available technology.
	3	Waste	BC/DC	- Earth work plan of the Project will be designed so as to minimize cutting and filling volume as much as possible.
			OP	- Adoption of pipe conveyor, covered with pipe completely, from the Thermal Power Plant to landfill point. - Landfill will be conducted with best available technology.
	4	Soil contamination	BC/DC	- Prevention of solid and liquid waste from infiltrating into ground
			OP	- Prevention of solid and liquid waste from infiltrating into ground
	5	Noise and vibration	BC/DC	- Construction work at the sensitive time such as night for the receptors shall be avoided - Noise control techniques such as using sound absorptive materials in walls will be designed as necessary.
			OP	- Noise insulation work to private house nearby is most effective to noise control.
Social Environment	13	Resettlement/Land acquisition	BD/DC	- The Project proponent shall implement the land acquisition, compensation and involuntary resettlement if needed in accordance with relevant law and regulations. - The procedure and actual situation of land acquisition etc. shall be

				monitored in accordance with the land acquisition and compensation plan to be prepared by the Project proponent.
	14	Poverty group	BC/DC	The item of poverty group is outside scope of the existing EIA. The following additional measures can be proposed; - The census and socio-economic survey of people affected by the land acquisition will be conducted and the appropriated measures shall be proposed if needed. - The detail mitigation measures will be suggested as a component of land acquisition and compensation plan to be prepared in the further study phase as described in chapter 8.
	15	Indigenous and ethnic people	BC/DC	Same as poverty group
	19	Existing social infrastructures and services	BC/DC	- Traffic order or facilitator shall be provided near the gate of construction site during the construction period for smoother transportation.
	21	Maldistribution of benefit and damage	BC/DC	This item of impact is outside scope of the existing EIA. The following additional measures can be proposed; - The procedure of land acquisition shall be conducted in accordance with the land acquisition and compensation plan to be prepared in the further study phase.
	22	Local conflict of interests	BC/DC	ditto
	24	Landscape	OP	The measures will be considered after the detail deign is fixed and the following detail is clear: - Level of damage of individual landscape elements in space - The degree of involvement of landscape related to facilities or infrastructure in the area.
	26	Children's right	BC.DC	- The adult labor should be hired for the construction work for compliance with the regulations.
	27	Hazardous infectious diseases such as HIV/AIDS	BC/DC	This item of impact is outside scope of the existing EIA. The following additional measures of infectious disease will be planned if the actual work arrangement might cause the spread of hazardous infectious diseases; - Plan for prevention of infectious disease from spreading - Training plan for workers
	28	Occupational environment including occupational safety	BC/DC	Consideration of working conditions and safety in construction will be planned in accordance with the regulation on the construction site. The safety management plan at the site to be prepared and managed by the contractor will include those measures as mentioned in the existing EIA.
			OP	Consideration of working conditions and safety in operation will be planned. The following measures will be suggested as an example, in addition to the general measures suggested by environmental, health and safety guidelines. ✓ Dust: use of dust control equipment to keep dust below applicable guidelines ✓ Non-ionizing radiation: Identification of potential exposure levels in the workplace, identification of safety zones and Training of workers ✓ Heat: Regular inspection and maintenance of pressure vessels and piping ✓ Noise: Design of generators to meet applicable occupational noise levels etc. ✓ Electrical hazards: Use of voltage sensors prior to and during working, Provision of electrical safety training etc. ✓ Fire and Explosion Hazards: Proper maintenance of boiler safety controls, Regular cleaning of the facility to prevent accumulation of

				coal dust etc.
Others	29	Accident	BC/DC	- The plan for prevention of accidents and assessments of risk and incidents during the construction will be prepared by the contractor in cooperation with the project owner in accordance with the regulations on the construction work.
			OP	- In the context of protection of human and property, measures and activities to prevent environmental accidents and emergency rehabilitation measures will be undertaken in the internal documents of TPP Tuzla.
	30	Cross-boundary impact and climate change	OP	- It is better to replace Unite 5 and 6 to Unit 8 which plant efficiency equal to Unit7. Because CO_2 emission per unit (t/MWh) will decline dramatically due to the improvement of plant efficiency.

Source: JICA Study Team

If this Project implements according to JICA Environmental Guidelines, the environmental management system will be discussed with the project proponent and developed to fulfill the mitigation measures after the organization arrangement is made. Then, the monitoring plan for the environmental management plan including the person in charge, frequency, item, costs for monitoring etc. will be discussed considering the adequacy and feasibility of the monitoring.

8.10 Stakeholder Meetings

EIS was already submitted on 8 December 2009 and the public communication was held by FMOET on 5 April 2010, the public meeting was announced on the website, newspaper etc. The representative from FMOET, Tuzla Municipality, surrounding local communities, NGO, and residents etc. were participated (Table 8.10.1). The contents of the discussion recorded in the minutes of meeting showed the Q and A of the project plan and existing disposal site for ash waste.

Table 8.10.1 Summary of Public Consultation in 2010

Item	Contents
Date	5 April 2010
Place	Tuzla thermal power plant
Participants	- Federal Ministry of Environment and Tourism - Department of Environmental Protection , Tuzla Municipality - local community of Bukinje - local community of Šićki Brod - local community of Husino - EPBIH - Mining Institute（consulting firm） etc. Total 50 participants
Agenda	- - Explanation of legal procedure of environmental permission - Presentation of objectives of construction of unit 7 - Presentation of project design of unit 7 - Presentation of result of draft EIA - Q &A/ Discussion
Q & A /Comments	[Questions for construction of unit 7] - The comment from resident which indicates that some items are missed in the draft EIA -> EPBiH explained that today's presentation is just one part of EIS and the pointed contents are included in EIS. EPBiH will show the contents as required. [Comments for the existing thermal plant and related facilities] - The comment from someone from local community insists the health damage around the existing ash disposal site. - The comment from someone from the other local community indicates the objection of the new disposal site to be constructed. -> EPBiH explained that the new unit7 will decrease the adverse environmental impact on the surrounding.

Source: Summarized by JICA Study Team based on the minutes of stakeholder meeting prepared by FMOET, 2010

The impact assessment and development of mitigation measures are contained in the existing EIS and the key impacts are already considered. This study planned to confirm the updated data, detailed plan, the adaptation of the new environmental standard and its reflection to the facility's design. Then, the first stakeholder meeting at the scoping stage was planned to discuss the additional items of scoping matrix as follows.

Table 8.10.2 Plan of Stakeholder Meeting at the Scoping Stage for this Project

Item	Contents
i) Name	1st Presentation on Tuzla Coal-fired Power Plant Project with Public Discussion
ii) Organizer	EPBiH and JICA Study Team
iii) Style	Round table style and seminar style
iv) Date	End of January 2014
v) Place	In Tuzla city
vi) Objective	- Explanation of updated construction plan of power plant and the technology of facilities to satisfy the latest environmental standards. - Suggestion of scope of environmental and social consideration study - Sharing of result of draft scoping - Correction of the opinions of participants
vii) Expected Participants	Key member of panelist or round table - Representatives of Tuzla Municipality - Representatives of local communities around Tuzla TPP(Kraka、Sicki Brod、Bukinje, Husino etc.) - Experts from university etc. Observers - Residents around TPP Tuzla - Representatives of business enterprise around TPP Tuzla - Others Note) As for the local NGO, their opinions will be collected at the separate meeting.
viii) Method of invitation	The following tool will be used by the one week before the meeting. - Invitation letter to the related organization - Invitation letter to the local communities - Poster on the board in the local communities
ix) Number of expected participants	Approx. 50

Source: Summarized by JICA Study Team based on the minutes of stakeholder meeting prepared by FMOET, 2010

8.11 Check list

The preliminary Environmental Check List for JICA Environmental Guidelines is shown in annex 2.

1. Air quality

Comparison of requirements of Directive 2008/50/EC on ambient air quality and cleaner air for Europe with Bylaw on way of performing air quality monitoring and defining types of pollutants, limit values and other air quality standards (OG of FBiH 01/12) of Federation of Bosnia and Herzegovina

1.1. Limit values for protection of human health

Averaging period		Limit value		Margin of tolerance		Date by which limit values is to be met	
EU	**FBiH**	**EU**	**FBiH**	**EU**	**FBiH**	**EU**	**FBiH**
Sulphur dioxide (SO2)							
One hour		350 µg/m³, not to be exceeded more than 24 times a calendar year	350 µg/m³, not to be exceeded more than 24 times a calendar year (500µg/m³, before)	150 µg/m³ (43 %)	150 µg/m³ (43 %)	Already in force since 1 January 2005	1 January 2021
One day		125 µg/m³, not to be exceeded more than 3 times a calendar year	125 µg/m³, not to be exceeded more than 3 times a calendar year (240µg/m³, before)	None	None	Already in force since 1 January 2005	1 January 2021
Calendar year		-	50 µg/m³ (90µg/m³, before)	-	-	-	1 January 2021
Nitrogen oxide (NO2)							
One hour		200 µg/m³, not to be exceeded more than 18 times a calendar year	200 µg/m³, not to be exceeded more than 18 times a calendar year	50 % on 19 July 1999, decreasing on 1 January 2001 and every 12 months thereafter by equal annual percentages to reach 0 % by 1 January 2010	50 % on 1 January 2010, decreasing on 1 January 2012 and every 12 months thereafter by equal annual percentages to reach 0 % by 1 January 2021	1 January 2010	1 January 2021
One day		-	85 µg/m³	-	47 % on 1 January 2010, decreasing on 1 January 2012	-	1 January 2021

Averaging period		Limit value		Margin of tolerance		Date by which limit values is to be met	
EU	**FBiH**	**EU**	**FBiH**	**EU**	**FBiH**	**EU**	**FBiH**
					and every 12 months thereafter by equal annual percentages to reach 0 % by 1 January 2021		
Calendar year		40 µg/m³		50 % on 19 July 1999, decreasing on 1 January 2001 and every 12 months thereafter by equal annual percentages to reach 0 % by 1 January 2010	50 % on 1 January 2010, decreasing on 1 January 2012 and every 12 months thereafter by equal annual percentages to reach 0 % by 1 January 2021	1 January 2010	1 January 2021
PM_{10}							
One day		50 µg/m³, not to be exceeded more than 35 times a calendar year	50 µg/m³, not to be exceeded more than 35 times a calendar year	50%	50 % on 1 January 2010, decreasing on 1 January 2012 and every 12 months thereafter by equal annual percentages to reach 0 % by 1 January 2021	Already in force since 1 January 2005	1 January 2021
Calendar year		40 µg/m³	40 µg/m³	20%	20 % on 1 January 2010, decreasing on 1 January 2012 and every 12 months thereafter by equal annual percentages to reach 0 % by 1 January 2021	Already in force since 1 January 2005	1 January 2021

Averaging period		Limit value		Margin of tolerance		Date by which limit values is to be met	
EU	**FBiH**	**EU**	**FBiH**	**EU**	**FBiH**	**EU**	**FBiH**
Benzene							
Calendar year		5 µg/m³	5 µg/m³	5 µg/m³ (100 %) on 13 December 2000, decreasing on 1 January 2006 and every 12 months thereafter by 1 µg/m³ to reach 0 % by 1 January 2010	100 % on 1 January 2010, decreasing on 1 January 2012 and every 12 months thereafter by equal annual percentages to reach 0 % by 1 January 2016	1 January 2010	1 January 2016 [1]
Carbon monoxide							
Maximum daily eight hour mean[2]		10 mg/m³	10 mg/m³	60%	60 % on 1 January 2010, decreasing on 1 January 2012 and every 12 months thereafter by equal annual percentages to reach 0 % by 1 January 2016	Already in force since 1 January 2005	1 January 2016
Lead							
Calendar year		0.5 μ g/m³	0.5 μ g/m³	100%	100 % on 1 January 2010, decreasing on 1 January 2012 and every 12 months thereafter	Already in force since 1 January 2005. Limit value to be met only by 1 January 2010 in the immediate	1 January 2016 [3]

[1] Limit value to be met only by 1 January 2016 in the immediate vicinity of the specific industrial sources situated on sites contaminated by decades of industrial activities. In such cases. the limit value until 1 January 2015 will be 1.0 µg/m³. The area in which higher limit values apply must not extend further than 1000 m from such specific sources.

[2] The maximum daily eight hour mean concentration will be selected by examining eight hour running averages. calculated from hourly data and updated each hour. Each eight hour average so calculated will be assigned to the day on which it ends i.e. the first calculation period for any one day will be the period from 17:00 on the previous day to 01:00 on that day; the last calculation period for any one day will be the period from 16:00 to 24:00 on that day.

[3] Limit value to be met only by 1 January 2016 in the immediate vicinity of the specific industrial sources situated on sites contaminated by decades of industrial activities. In such cases. the limit value until 1 January 2015 will be 1.0 µg/m³. The area in which higher limit values apply must not extend further than 1000 m from such specific sources.

Averaging period		Limit value		Margin of tolerance		Date by which limit values is to be met	
EU	**FBiH**	**EU**	**FBiH**	**EU**	**FBiH**	**EU**	**FBiH**
					by equal annual percentages to reach 0 % by 1 January 2016	vicinity of the specific industrial sources situated on sites contaminated by decades of industrial activities. In such cases, the limit value until 1 January 2010 will be 1.0 µg/m³. The area in which higher limit values apply must not extend further than 1 000 m from such specific sources.	
$PM_{2.5}$ – stage 1							
Calendar year		25 µg/m³	20 % on 11 June 2008, decreasing on the next 1 January and every 12 months thereafter by equal annual percentages to reach 0 % by 1 January 2015	25 µg/m³	20 % on 31 December 2011, decreasing on the 1 January 2013 and every 12 months thereafter by equal annual percentages to reach 0 % by 1 January 2021	1 January 2015	1 January 2021
$PM_{2.5}$ – stage 2							
Calendar year		20 µg/m³	20 µg/m³			1 January 2020	1 January 2024

2. Emissions to air from large combustion plants

Comparison of 2001/80/EC Directive on large combustion plants and 2010/75/EU Industrial Emission Directive with Bylaw on emission limit values for combustion plants (Official Gazette of FBiH 03/13)

2.1. Emission limit values from existing large combustion plants firing solid fuels (coal)

Rated thermal input	50-100 MWth	100-500 MWth	>500 MWth
EMISSION LIMIT VALUES SO_2 (mg/m^3)			
Official Gazette of FBiH 03/13	2000	Interpolation decrease from 2000 to 400 mg/m^3	400
2001/80/EC[4]	2000	Interpolation decrease from 2000 to 400 mg/m^3	400
2010/75/EU	400	250	200
EMISSION LIMIT VALUES NOx (mg/m^3)			
Official Gazette of FBiH 03/13	600	600	500
2001/80/EC	600	600	500 (200[5])
2010/75/EU	300	200	200
EMISSION LIMIT VALUES PM_{10} (mg/m^3)			
Official Gazette of FBiH 03/13	100	100	50
2001/80/EC	100	100	50
2010/75/EU	30	25	20

[4] ***Where the emission limit values above cannot be met due to the characteristics of the fuel. a rate of desulphurisation of at least 60 % shall be achieved in the case of plants with a rated thermal input of less than or equal to 100 MWth. 75 % for plants greater than 100 MWth and less than or equal to 300 MWth and 90 % for plants greater than 300 MWth. For plants greater than 500 MWth. a desulphurisation rate of at least 94 % shall apply or of at least 92 % where a contract for the fitting of flue gas desulphurisation or lime injection equipment has been entered into. and work on its installation has commenced. before 1 January 2001.***

[5] ***From 1 January 2016***

2.2. *Emission limit values from new large combustion plants firing solid fuels (coal)*

Rated thermal input	50-100 MWth	100-300 MWth	>300 MWth
EMISSION LIMIT VALUES SO_2 (mg/m^3)			
Official Gazette of FBiH 03/13	400	250	200
2001/80/EC[6]	850	200	200
2010/75/EU	400	200	150 (200[7])
EMISSION LIMIT VALUES NOx (mg/m^3)			
Official Gazette of FBiH 03/13	300	200	200
2001/80/EC	400	200	200
2010/75/EU	300 (400[8])	200	150 (200[9])
EMISSION LIMIT VALUES PM_{10} (mg/m^3)			
Official Gazette of FBiH 03/13	30	25	20
2001/80/EC	50	30	30
2010/75/EU[10]	20	20	10

[6] ***Where the emission limit values above cannot be met due to the characteristics of the fuel. a rate of desulphurisation of at least 60 % shall be achieved in the case of plants with a rated thermal input of less than or equal to 100 MWth. 75 % for plants greater than 100 MWth and less than or equal to 300 MWth and 90 % for plants greater than 300 MWth. For plants greater than 500 MWth. a desulphurisation rate of at least 94 % shall apply or of at least 92 % where a contract for the fitting of flue gas desulphurisation or lime injection equipment has been entered into. and work on its installation has commenced. before 1 January 2001.***

[7] ***in case of circulating or pres-surised fluidised bed combustion***
[8] ***in case of pulverised lignite combustion***
[9] ***in case of pulverised lignite combustion***
[10] ***minimum rate of desulphurisation for combustion plants: 50-100 MWth 93%; 100-300 MWth 93% and >300 MWth 97%.***

3. Wastewater discharge

Comparison of Decree on conditions for waste water discharge (OG FBiH 04/12) into natural recipients and public sewerage system on Urban wastewater treatment (91/271/EEC).

This Directive is transposed into national legislation in percentage of 93%.

3.1. Requirements for discharges from urban waste water treatment plants of the Directive. The values for concentration or for the percentage of reduction shall apply.

Parameters	***Concentration***		***Minimum percentage of reduction[11]***	
	EU Directive	***FBiH Decree***	***EU Directive***	***FBiH Decree***
Biochemical oxygen demand (BOD_5 at 20°C) without nitrification[12]	25 mg/l O_2	25 mg/l O_2	70-90 %	70-90%
Chemical oxygen demand (COD)	125 mg/l O_2	125 mg/l O_2	75 %	75 %
Total suspended solids	35 mg/l	90%	35 mg/l	90%

3.2. Requirements for discharges from urban waste water treatment plants to sensitive areas which are subject to eutrophication. One or both parameters may be applied depending on the local situation. The values for concentration or for the percentage of reduction shall apply

Parameters	***Concentration***		***Minimum percentage of reduction[13]***	
	EU Directive	***FBiH Decree***	***EU Directive***	***FBiH Decree***
Total phosphorus	2 mg/l P (10000-100000 p.e.) 1 mg/l P (more than 100000 p.e.)	2 mg/l P (10000-100000 p.e.) 1 mg/l P (more than 100000 p.e.)	80 %	80 %
Total nitrogen	15 mg/l N (10000-100000 p.e.) 10 mg/l P (more than 100000 p.e.)	15 mg/l N (10000-100000 p.e.) 10 mg/l P (more than 100000 p.e.)	70-80 %	70-80 %

[11] Reduction in relation to the load of the influent

[12] The parameter can be replaced by another parameter: total organic carbon (TOC). or total oxygen demand (TOD) if a relationship can be established between BOD5 and the substitute parameter

[13] Reduction in relation to the load of the influent

3.3. Surface water quality to be met by certain classes of surface water

Član 3.

Vode iz prethodnog člana moraju po svojim fizičkim, hemijskim, biološkim i radioaktivnim osobinama (svojstvima) odgovarati sljedećim uslovima:

Red. broj	Pokazatelj Indicator	Klasa I	Klasa II	Klasa III	Klasa IV
1	2	3	4	5	6
1.	Rastvoreni kiseonik u mg/litar najmanje (ne primjenjuje se na podzemne vode i prirodna jezera)	8	6	4	3
2.	Zasićenost kiseonikom u procentu: - saturacija - supersaturacija	90 do 105 -	75 do 90 105 do 115	50 do 75 115 do 125	30 do 50 125 do130
3.	Petodnevna biohemijska potrošnja kiseonika pri temperaturi 20°C(BPK) u mg O_2/litar, do	2	4	7	20
4.	Hemijska potrošnja kiseonika (HPK) iz KM 04 mg 02/litar, do	10	12	20	40
5.	Stepen saprobnosti prema Liebmanu (ne primjenjuje se na podzemne vode i prirodna jezera	oligosap-robni	mezosap-robni beta-alfa	mezosap-robni alfa-beta	alfa m mezosap-robni do polisapro-bni
6.	Stepen biološke produk-tivnosti (primjenjuje se samo na jezera)	oligo trofni	umjereno eutrofni	-	-
7.	Suspendovane materije u mg/litar, do	10	30	80	100
8.	Suvi ostatak filtrirane vode u mg/litar, do - za površinske vode - za podzemne vode: na kršu van krša	350* 350 800	1000 1000 1000	1500 1500 1500	1500 - -

Conditions for water of certain clas

Dilluted O_2

Saturation with O_2

BOD_5

COD

Saprobity

Biological productivity

Susp. matter

Dry remains of filtrated water

pH

waste material

colour

smell

coliformic bacteria

toxic matter

radioactivity

9.	pX vrijednost	6,8-8,5	5,8-8,5	6,0-9,0	6,0-9,0
10.	Vidljive otpadne materijale	bez	bez	bez	bez
11.	Primjetna boja	bez	bez	slabo primjetna	-
12.	Primjetni miris	bez	bez	slabo primjetni	-
13.	Najvjerovatniji broj koliformnih klica u litru vode, do	1000	100.000	200.000	preko 200.000
	- za kupanje	-	20.000	-	-
14.	Toksične materije, izmjena temperature i drugi pokazatelji štetnosti	Ne smiju se nalaziti ni u jednoj klasi izna dpropisane granice			
15.	Stepen radioaktivnosti u Bq/1	Ukupna aktivnost tečnih radioaktivnih otpadnih materija koje se u toku jedne godine mogu izliti u rijeku izračunava se po slijedećem obrascu			

$$\frac{F}{Q} \quad \frac{Ai}{(MDK)\,i}$$

gdje je:

Ai = ukupna aktivnost i-tog radio nuklida koja se ispušta u rijeku u toku jedne godine u Ci;

(MDK) i = najveća dozvoljena koncentracija i-tog radionuklida u vodi za piće za pojedince koji ne rade sa izvorima jonizujućih zračenja Ci/m³;

maximum allowed conc.

Q = prosječni godišnji protok rijeke u m³;

F = faktor sigurnosti rezerve, koji je neminovan broj i zavisi od radioekoloških i hidrodinamičkih uslova rijeke, od broja i položaja izlivnih mjesta, od radijacione situacije u riječnom slivu, kao i od drugih podataka, a određuje se tako da se obezbijedi zaštita od jonizujućih zračenja

3.4. Limit values of substances and quality parameters for industrial wastewaters

	Parameter	Uniit	*Limit values of substances and quality parameters for industrial wastewaters discharged into*	
			Surface waters	**Public sewerage system**
	1	**2**	**3**	**4**
A General parameters				
1	Maximum temperature	^{0}C	30	40
2	pH		6.5 - 9.0	6.5 - 9.5
3	Suspended matter	ml/l	0.5	10.0
4	Total suspended matter	mg/l	35.0	400.0
B Inorganic parameters				
1	Aluminij, Al	mg/l	3.0	3.0
2	Antimon, Sb	mg/l	0.3	0.3
3	Arsen, As	mg/l	0.1	0.1
4	Bakar, Cu	mg/l	0.5	0.5
5	Barij. Ba	mg/l	5.0	5.0
6	Bor, B	mg/l	1.0	10.0
7	Cijanidi slobodni	mg/l	0.1	0.1
8	Cijanidi ukupni	mg/l	0.5	10.0
9	Cink, Zn	mg/l	2.0	2.0
10	Fluoridi	mg/l	10.0	20.0
11	Hlor slobodni	mg/l	0.2	0.5
12	Hlor ukupni	mg/l	0.5	1.0
13	Hloridi	mg/l	250.0	250.0
14	Hrom šestovalentni, Cr^{6+}	mg/l	0.1	0.1
15	Hrom ukupni, Cr	mg/l	0.5	0.5

16	Kadmij, Cd	mg/l	0.1	0.1
17	Kalaj, Sn	mg/l	2.0	2.0
18	Kobalt, Co	mg/l	1.0	1.0
19	Mangan, Mn	mg/l	1.0	1.0
20	Molibden, Mo	mg/l	1.0	1.0
21	Nikal, Ni	mg/l	0.5	0.5
22	Olovo, Pb	mg/l	0.5	0.5
23	Selen, Se	mg/l	0.1	0.1
24	Srebro, Ag	mg/l	0.1	0.1
25	Sulfati, SO_4	mg/l	200.0	300.0
26	Sulfidi, S	mg/l	0.1	1.0
27	Sulfiti, SO_3	mg/l	1.0	10.0
28	Talij	mg/l	0.5	0.5
29	Vanadij	mg/l	0.5	0.5
30	Volfram	mg/l	5.0	5.0
31	Željezo. Fe	mg/l	2.0	2.0
32	Živa, Hg	mg/l	0.01	0.01

Annex 2 Environmental Checklist: 11. Thermal Power （1）

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been officially completed? (b) Have EIA reports been approved by authorities of the host country's government? (c)Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) Yes. (b) It has been approved by FMOET in March 2011. (c) The Project proponent will comply with the issued environmental permit. (d) Environmental permit has been obtained as a review of study of EIA.
	(2) Explanation to the Public	(a) Are contents of the project and the potential impacts adequately explained to the public based on appropriate procedures, including information disclosure? Is understanding obtained from the public? (b) Are proper responses made to comments from the public and regulatory authorities?	(a)The public debate as a stakeholder meeting was held on the 5th April 2010. The announcement was published in advance. The related documentation was available to the public from FMOET and on their web page. The various stakeholders attended the meeting. (b) The minutes of meeting does not indicate the improper responses. .
2 Mitigation Measures	(1) Air Quality	(a) Do air pollutants, such as sulfur oxides (SOx), nitrogen oxides (NOx), and soot and dust emitted by power plant operations comply with the country's emission standards? Is there a possibility that air pollutants emitted from the project will cause areas that do not comply with the country's ambient air quality standards? (b) In the case of coal-fired power plants, is there a possibility that fugitive coal dust from coal piles, coal handling facilities, and dust from coal ash disposal sites will cause air pollution? Are adequate measures taken to prevent the air pollution?	(a) Air pollutants such as sulfur oxides (SOx), nitrogen oxides (NOx), and soot and dust emitted by power plant operations comply with the country's emission standards and EU's Emission standards. But ambient air quality at present dose not meet EU ambient air quality standards. EU ambient air quality standards will be adopted as the country's ambient air quality standards on 1st January 2021. Most probably even without existing power plants, Unit 3, 4, 5 and 6, some palace of Tuzla city exceeds EU's environmental standards. (b) Yes
	(2) Water Quality	(a) Do effluents including thermal effluents from the power plant comply with the country's effluent standards? Is there a possibility that the effluents from the project will cause areas that do not comply with the country's ambient water quality standards or cause a significant temperature rise in the receiving waters? (b) In the case of coal-fired power plants, do lactates from coal piles and coal ash disposal sites comply with the country's effluent standards? (c) Are adequate measures taken to prevent contamination of surface water, soil, groundwater, and seawater by the effluents?	(a) Yes, effluents will comply with country's and EU's standards. And no possibility of exceed water quality (b) Yes. It will be. But coal ash disposal site is not selected from among 4 candidates. (c) Yes
	(3) Wastes	(a) Are wastes, (such as waste oils, and waste chemical agents), coal ash, and by-product gypsum from flue gas desulfurization generated by the power plant operations properly treated and disposed of in accordance with the country's standards?	(a) Yes. But coal ash disposal site is not selected from among 4 candidates. The impact by the disposal site of ash will be assessed separately after the disposal method and location are fixed.
	(4) Noise and Vibration	(a) Do noise and vibrations generated by the power plant operations comply with the country's ambient standards, and occupational health and safety standards? (b) In the case of coal-fired power plants, are the facilities for coal unloading, coal storage areas, and facilities for coal handling designed to reduce noise?	(a) If noise standards of class VI is applied, it will comply with standards. But if noise standards of class IV will applied, there is a possibility to exceed a standards. (b) yes

Annex 2 Environmental Checklist: 11. Thermal Power （2）

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
	(5) Subsidence	(a) In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence?	(a) No. It is not designed to use groundwater.
	(6) Odor	(a) Are there any odor sources? Are adequate odor control measures taken?	(a) There is no odor sources.
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) Site is not located in protected area.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate environmental protection measures taken to reduce the impacts on ecosystem? (d) Is there a possibility that the amount of water (e.g., surface water, groundwater) used by the project will adversely affect aquatic environments, such as rivers? Are adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms? (e) Is there a possibility that discharge of thermal effluents, intake of a large volume of cooling water or discharge of lactates will adversely affect the ecosystem of surrounding water areas?	(a) No (b) No (c) N/A (d) No Water will be taken from lake which has enough reserve amounts. (e) Thermal effluents will discharge into jala river. But water of Jala river consists of waste water with no aquatic organs. So there is no possibility to affect ecosystem of surrounding water.
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on relocation and compensation given to affected persons prior to resettlement? (c) Is the resettlement plan, including proper compensation, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Does the resettlement plan pay particular attention to vulnerable groups or persons, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples? (e) Are agreements with the affected persons obtained prior to resettlement? (f) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (g) Is a plan developed to monitor the impacts of resettlement?	(a) Regrind a part of area for construction site, the owner or user of the structure and land has not been confirmed. If this Project is financed by JICA, it will be dealt with in accordance with JICA Environmental Guidelines. (b) As for the acquisition of land, the compensation was(will be) given in accordance with FBiH's regulation. (c) The compensation and related measures have been dealt with FBiH's regulation. If this Project is financed by JICA, the procedure should follow JICA Environmental Guidelines. (d) The vulnerable groups or persons will be confirmed in the detail survey for resettlement plan in the future if this Project is financed by JICA. (e) Yes. The agreements are obtained in accordance with FBiH's regulation. (f) The organizational framework and the necessary budget to satisfy with FBiH's regulation are secured by Project proponent. If this Project is financed by JICA, they will be discussed with the Project proponent for additional measures as needed. (g) The monitoring plan will be discueesed with the Project proponent if this Project is financed by JICA.

Annex 2 Environmental Checklist: 11. Thermal Power （3）

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
4 Social Environment	(2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary? (b) Is sufficient infrastructure (e.g., hospitals, schools, roads) available for the project implementation? If existing infrastructure is insufficient, is a plan developed to construct new infrastructure or improve existing infrastructure? (c) Is there a possibility that large vehicle traffic associated with the project will affect road traffic in the surrounding areas? Are adequate measures considered to reduce the impacts on traffic, if necessary? (d) Is there a possibility that diseases (including communicable diseases, such as HIV) will be introduced due to immigration of workers associated with the project? Are adequate considerations given to public health, if necessary? (e) Is there a possibility that the amount of water used (e.g., surface water, groundwater) and discharge of thermal effluents by the project will adversely affect existing water uses and uses of water areas (especially fishing)?	(a) The significant affect on the living conditions is not expected, but the detail study for socio-economic conditions and the measures will be necessary if the Project is financed by JICA in the future. (b) The sufficient infrastructure is available. In addition, the project owner has many programs to support the local communities to improve their infrastructure such as roads. (c) The surrounding traffic volume might be increased due to the construction vehicles. Traffic order or facilitator shall be provided for smoother transportation. (d) The significant risk of hazardous infectious diseases around the project area has not been confirmed by the available data. However, the preventive measures against infectious disease shall be considered if the Project hires many employees from the other area for construction works and it has risk of spread of hazardous infectious diseases. (e) The Project does not plan the groundwater pumping for construction. The adverse impact on water usage is not been predicted. Regarding the operation phase, the estimated amount of water supply is 1050 m3/h. However, the total usage of water will not be almost changed after the unit7's operation since the existing old units will be replaced by the unit 7. It is planned that the waste water from unit 7 will be recycled and reused. The impact on water usage by water use and discharge is not predicted.
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage sites? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) No.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) The impact will be assessed in the further study phase since the detailed design had not been finalized during this study period.
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts? (d) If necessary, is health and safety education (e.g., traffic safety, public health) provided for project personnel, including workers?	(a) yes. (b) There is very small possibility to affect ecosystem, but if it is, adequate measure will be taken. (c) It can be considered that one of key adverse impacts on the social environment would be caused by the land acquisition in this Project. The adequate measures will be suggested in the further study after this Project complies with JICA Environment Guidelines. (d) The training programs of safety management etc. are suggested for the case of JICA's project.
	(2) Accident Prevention Measures	(a) Are adequate accident prevention plans and mitigation measures developed to cover both the soft and hard aspects of the project, such as establishment of safety rules, installation of prevention facilities, and equipment, and safety education for workers? Are adequate measures for emergency response to accidental events considered? (b) In the case of coal-fired power plants, are adequate measures planned to prevent spontaneous combustion at the coal piles? (e.g., sprinkler systems).	(a) The accident prevention measures are mentioned in the existing EIA report. (b) The adequate measures are planned in the existing EIA report.

Annex 2 Environmental Checklist: 11. Thermal Power （4）

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
5 Others	(3) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) Are the items, methods and frequencies included in the monitoring program judged to be appropriate? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(a) The monitoring plan will be developed in the further study if this Project is financed by JICA. (b) ditto (c) ditto (d) ditto
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Power Transmission and Distribution Lines checklist should also be checked (e.g., projects including installation of electric transmission lines and/or electric distribution facilities). (b) Where necessary, pertinent items described in the Ports and Harbors checklist should also be checked (e.g., projects including construction of port and harbor facilities).	(a) N/A (b) N/A
	Note on Using Environmental Checklist	(a)In the case of coal-fired power plants, the following items should be confirmed: ・Are coal quality standards established? ・Are the electric generation facilities planned by considering coal quality? (b) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, and global warming).	(a) Yes, they are. (b) There is a small possibility of CO2 emission may contribute global warming. But it is difficult to confirm its extents scientifically.

1) Regarding the term “Country’s Standards” mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are made, if necessary.
In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan' experience).
2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which it is located.

CHAPTER 9 SOCIAL CONSIDERATION

The new unit of thermal power plant requires the land acquisition for a part of the construction site. The land acquisition is ongoing in accordance with the legal procedure in FBiH. In this Study, the draft Land Acquisition and Compensation Plan (LACP) was planned to be prepared in accordance with JICA Environmental Guidelines (2010). This chapter summarizes the basic policy of draft LACP to be proposed by JICA Study Team.

9.1 Introduction

This chapter was prepared based on the data collected until January 2014. During this study period, the direct contact or communication with landowners and expected PAPs (Project Affected People) was unfeasible. For this reason, the full scale of baseline survey which consists of census survey, asset survey and socio-economic survey were not implemented. Instead, the interview survey for representatives from surrounding communities was conducted to confirm the general situation of the area. Also the only existing data and available information provided from EPBiH were used for the Study. It should be noted that the proposed compensation policy and any other plans or suggestions in this tentative LACP are the basic proposal for the Project when it shall follows JICA Environmental Guidelines (2010). In case that this Project complies with JICA Environmental Guidelines (2010), this LACP should be reviewed and developed by the project proponents and other stakeholders.

9.2 Necessity of Land Acquisition and Resettlement

The land area for new thermal power plant is specified in the Spatial Plan of Tuzla City. The planned construction site is located at the open space on the west side of the existing thermal plants so that some of the EPBiH's land and the existing utilities can be used for TPP Unit7 effectively.

9.3 Institutional and Legal Framework

9.3.1 Related Regulation

The procedure for land acquisition in FBiH is mainly stipulated under the Law on Expropriation[1] (Official Gazette of FBiH, no.70/07, 6/10). Law on expropriation was adopted in 2007 and it regulates the conditions for expropriation, establishing public interest, the procedure for expropriation of real property, and the compensation to be paid for

[1] The original term is "ZAKON O EKSPROPRIJACIJI" in Bosnian and it is translated as "law on expropriation" in English in FBiH. In this case, the meaning of "land expropriation" includes the transfer of land ownership or rights of any property based on the agreement between the owner or right holder and the project proponent etc. In this report, the term of "expropriation" is used synonymously with "acquisition".

expropriated property. It also addresses grievances and handling disputes, and eligibility for compensation.

Another Law important for land acquisition process is the Law on Construction Land of Federation of Bosnia and Herzegovina (Official Gazette of FBiH, no. 67/05), which governs the process when there is no transfer of ownership, but only of right to use the subject land.

The other main related laws are Law on Legal Ownership Relations of FBiH (Official Gazette of FBiH no. 6/98) and Law on Obligations of FBiH (Official Gazette of FBiH, no. 2/92, 13/93, and 13/94). The summary of related laws is described in the Table below.

Table 9.3.1 Laws on Land Acquisition

Regulation	Gazette No.	Summary
BiH Expropriation Law	70/07, 6/10	In FBiH, acquisition of real property in public interest, is regulated by the FBiH Expropriation Law, whereas the implementation of expropriation procedures is dealt with by municipal administrations. The Expropriation Law regulates the conditions (establishing public interest), the procedure for expropriation (acquisition) of property for construction of facilities in the public interest and the compensation for expropriated (acquired) property. It also addresses the issues of grievances and disputes handling, and, to a limited extent, compensation eligibility. Some of the key sentences of this law are as follows; Article 12 For expropriated asset, owner is entitled to compensation in other asset. In case the user of expropriation is unable to assure such asset, is has to pay compensation in money which equals market values of the asset expropriated. Prior owner of business premises subject of expropriation is entitled to other business premises as his ownership, provided by the user of expropriation. Article 21 The proposal for expropriation may be submitted by expropriation beneficiary after the established public interest in the construction of the building or works. The proposal for expropriation shall be submitted to the municipal administration Article 42 If the residential building (or apartment) is the subject of expropriation, user of the expropriation has to assure necessary accommodation (certain number of premises, electricity, water supply, etc.). Temporary accommodation may last 18 months maximum, counting from the day of eviction. User of expropriation is obliged to provide previous owner with the adequate building or apartment, if not agreed otherwise. Article 45 Compensation for expropriated asset usually equals

		with similar asset of the same market value in the same municipality or town, which enables the owner to have the same benefits as by using the expropriated asset. For illegally constructed buildings builder is not entitled to compensation Article 54 Prior owner has right for compensation for lost benefit from prior usage of the asset (if there was no expropriation) for the period between expropriation is finalized and receipt of replacing asset (or until deadline for financial compensation). The formal owner of a business structure is entitled to compensation for that structure (cash or replacement property) and for loss of income until he/she is able to restore business activities.
Law on Construction Land of FBiH	67/05	Article 61 allows for the legalization of illegally constructed structures on construction land in state ownership on which a structure has been built. This article enables the subsequent issuing of a permit for construction by the Municipal Council in accordance with the Law on Spatial Planning. Article 16 allows the Municipal Council to expropriate city construction land in private ownership; the rights of the previous owner are regulated in detail by Article20.
Law on Legal Ownership Relations of FBiH	6/98	The Law on Legal Ownership Relations regulates the conditions and manner of acquiring, using, protecting and termination of ownership rights, usufruct rights, lien rights, possession and ownership rights of foreign nationals in the FBiH. The Law emphasizes that ownership rights may only be limited or taken away in public interest, stating that the owner is entitled to full compensation in such cases (Article 6).
Law on Obligations of FBiH	2/92, 13/93, 13/94	In relation to tenants in the affected project area, their status is regulated by this Law. According to the law, the tenant must vacate the residential structure/apartment within eight days from the notice, unless otherwise specified by the tenancy agreement.

Source：JICA Study Team

9.3.2 Land Ownership System in FBiH

The planned site includes the private land which is owned by landowners who have a legal ownership and the public land which is possessed by leaseholders. FBiH has dual land administration system of ownership right of land and real estate which is based on cadastre and land registry. Cadastre is the cadastral maps and records based on the cadastral survey. On the other hands, land register which is kept in land registry office of municipal court contains data on land ownership and other real property rights. The problems on land ownership system regarding the land acquisition of this Project are listed as follows.

- Different land surveying before and after 1971 (when new state on the terrain was recorded from the plane), which among other things caused problems because of different marking of the same parcel, i.e. two different numbers for the same land plot.
- The problem is that in many cases data in the cadastre and registry is not harmonized, or

the real owner of the land is not written in the land registry office. It is necessary to harmonize because there is some difference due to confusion in wartime.

- Taking into consideration that culturally there is no praxis on signing testament and leaving the clear situation on immovable ownership after someone`s death, many problems are caused when all successors have to be identified and found in order to buy off the land from them.

9.3.3 Related Organization

While land acquisition and expropriation is regulated on the entity level, but implemented on municipal level. Department for geodetic and legal-owner ship affairs of Tuzla Municipality conducts the expropriation process. The Tuzla Municipality established commission for expropriation process which consists of the Head of the process, the minutes keeper and the geodesy expert.

9.3.4 Procedure of Expropriation

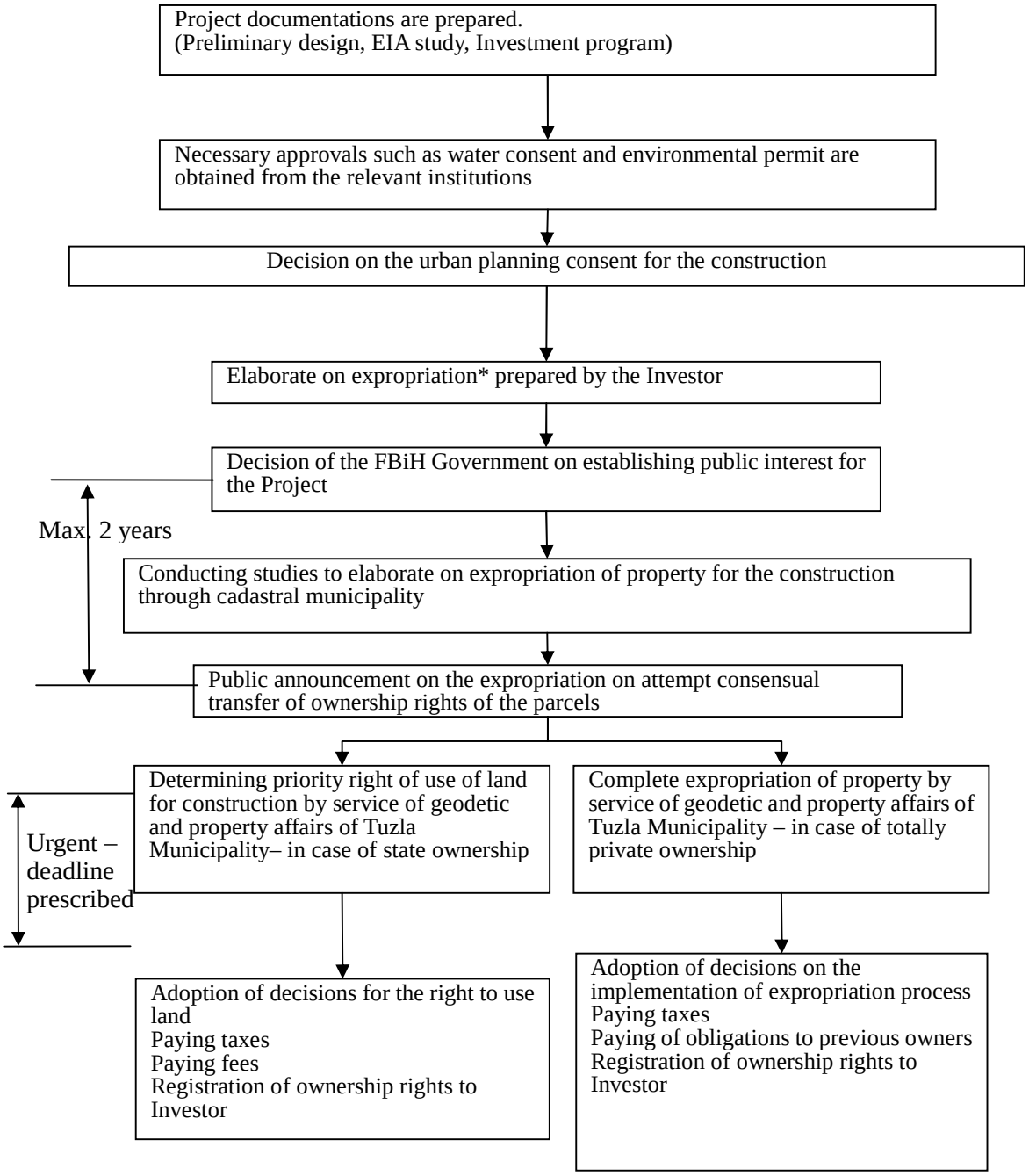
9.3.4.1 General Procedure

The expropriation procedure comprises the following steps:

- Property can only be expropriated upon the receipt of a Decision on establishing public interest from a relevant authority (in this case the Tuzla Municipality) or less frequently by enacting a dedicated law. Public interest can be achieved for projects such as construction of transport infrastructure, economic, utility, administrative, defence, health, educational and cultural facilities. Expropriation may be carried out for the needs of FBiH, cantons, cities, municipalities, public enterprises and public institutions, unless otherwise prevented by the Law.
- Upon the establishment of Public Interest, the expropriation beneficiary (EPBiH in this case) is obliged to invite affected property owners to negotiate a prior amicable sale-purchase agreement and to attempt to reach an agreement with the interested owners.
- If negotiations fail the expropriation, beneficiary will submit a proposal for expropriation to the relevant Municipal Administration for Ownership Affairs, in this case Service of geodetic and ownership affairs of Tuzla Municipality. The proposal for expropriation may be submitted by expropriation beneficiary after the established public interest in the construction of the building or works. The proposal for expropriation shall be submitted to the municipal administration.(Article 21, Law on Expropriation). The proposal for expropriation of property must be specified: 1) the expropriation, 2) The property proposed for expropriation, 3) the owner and possessor of the property and 4) facility, or works for which it is proposed expropriation (Article 22, Law on Expropriation). The Municipal Administration is obliged to notify the owner of the property of the submitted proposal for expropriation.

- The Municipal Administration will invite the owner of the property to a hearing to determine the expropriation fact[2].
- The Municipal Administration will issue a Decision on Expropriation. When the Decision on Expropriation becomes enforceable, the Municipal Administration is obliged to hold a hearing to determine the compensation for the expropriated property through an agreement with the beneficiary and the land owner.
- If no agreement on compensation is reached within two months of the validity of the Decision on Expropriation, the Municipal Administration submits the valid Decision together with other relevant documents to the competent Court.
- The land owner has right to give their complaints after receiving the decision document. Any complaints must be made in written form and submitted to the Municipality. Complaints will be passed on to the Federal Administration for Property, Legal Affairs Geodesy and Cadaster where complaints will be assessed to review the legality of the complaint and to ensure it is addressed in the proper manner. If the complaint is accepted, it will bring back to Municipality.If any complaints are not delivered after 15 days of Decision, land owner, Municipality and EPBiH meets and have hearing to determine the compensation for the expropriated property. Once the agreement on compensation has been signed EPBiH has 30 days to provide the money into the bank account that has been nominated by the PAP upon signing the agreement.
- If the landowner does not agree the offered compensation, the landowner will offer the counter offer. If EPBiH will accept it, they get agreement and if not, the landowner can bring this conflict to the courts.
- Formal transfer of legal title in the land register is carried out on the basis of a valid Decision on Expropriation and proof of payment of compensation or proof that the owner acquired ownership of a replacement real property.
- If the land owner is died, the successor bring “death certificate” to Court. Court issues the confirmation if successor gets agreement about the partitioning of land to be inherited. And successor goes to municipality and municipality will issue new ownership certificate.

[2] At this point evaluators will make a census of the property and value the land, structures, and crops on the land



*) "Expropriation Elaborate" is the term used for the study carried out to determine the amount of compensation required for expropriation. (Draft Land Acquisition and Compensation Framework for Vranduk Hydropower Project, EBRD, September 2013)

Figure 9.3.1 Flowchart of the land acquisition process

9.3.4.2 Legal Procedure of illegally constructed buildings

Legalization of illegally constructed buildings is regulated on cantonal level. In Canton Tuzla it is a Law on conditions and procedures for legalization of illegally constructed objects (Official Gazette of Tuzla Canton 10/2011). The legalization process comprises the following steps:

- Application for legalization by the owner within a time period established by the cantonal regulations (typically one year),
- Review by municipal and cantonal bodies in charge of spatial planning and construction,
- Decision on supplemental urban permit,
- Decision on construction permit and usage permit in accordance with the Law on Spatial Planning.

9.3.5 Compensation for Property

Only owners, occupants and users of affected land and structures at the time of the cut-off-date[3] with fully recognized ownership rights are eligible for compensation and/or assistance. According to Article 31 of the Expropriation Law, compensation, in the form of cash compensation or replacement property, must be provided to land owners prior to the formal transfer of ownership of the expropriated property unless a specific agreement is made between the involved parties. All compensation costs shall be borne by the expropriation beneficiary. The Expropriation Law states that compensation should be provided at market value (Article 12). Compensation rate for expropriated agriculture, construction and urban construction land is determined in cash according to market price of such land. The Law sets out in detail how compensation must be determined for buildings, orchards and vineyards, forest land and timber, agricultural, construction and urban land. Article 45 of the Expropriation Law states that expropriation of informal (illegitimate, illegal) structures entails no compensation and that the owners of such structures must remove them within a timeframe agreed upon with the municipal department in charge of expropriation. Otherwise they will be required to pay the costs incurred in removing the structures.

9.3.6 Procedure of Evaluating of Property

The real values of property is evaluated by expert commission for establishment of real value of immovable which consist of six members: president, four members and technical secretary in accordance with Rulebook for work of Expert commission for establishment of real value

[3] As OP 4.12 states, "Normally, this cut-off date is the date the census begins. The cutoff date could also be the date the project area was delineated, prior to the census, provided that there has been an effective public dissemination of information on the area delineated, and systematic and continuous dissemination subsequent to the delineation to prevent further population influx" (endnote 21).

of immovable issued by Municipality of Tuzla. Procedure of establishing real value, prescribed by this Rulebook, is based on estimation of market value of immovable. Market value is a financial amount for immovable to be exchanged on the market. Procedure of establishing market values is taken in five steps:

- checking and collection of data on immovable;
- collecting data on similar immovable on the market;
- estimation of market value of subject immovable;
- making corrections to estimated market value in dependence of prices of similar immovable; and
- establishing final estimation of market value.

Criteria for establishing real value are different for different immovable, as follows:

- for land: location: size, position, shape, access road and vicinity of main roads, terrain configuration, pollution, climatic area, natural surroundings, purpose of land use, land quality, etc.
- for housing facilities: location, pollution, climate area, natural surroundings, position, size, storeys, infrastructure quality, vicinity of main roads, vicinity of health, cultural, educational and other important facilities, connection to sewerage, electrical grid, heating, legacy (permits), etc.
- for apartments: location, pollution, climate area, natural surroundings, position, size, storeys, infrastructure quality, vicinity of main roads, vicinity of health, cultural, educational and other important facilities, quality of construction, etc.
- for business facilities: location, vicinity of main roads, access road, parking, natural surroundings, position, size, storeys, quality of construction, maintenance, purpose, etc.

On the other hand, compensation fee for fruit trees and vineyard is set for:

- Fruit trees and vineyards bearing fruits – compensation equals income of that tree for number of years necessary for maturity of those trees;
- Fruit trees and vineyards that have not begun to bear fruits – compensation equals costs of supply, planting and growing those seedlings.

Compensation for expropriate forest land equals compensation fee for the closest pasture of same position.

9.3.7 Policies and Regulations related to Vulnerable Groups

The federation and Canton specify some regulation for vulnerable groups as follows;

<Laws on Federal level>

- Law on pension and disability insurance of Federation of BiH (Official Gazette of FBiH 29/98, 49/2000, 32/2001, 75/2005, 59/2006);

- Law on basis of social protection, protection of civil victims of war and protection of families with children (Official Gazette of FBiH 36/99, 54/2004 and 39/2006);
- Low on professional rehabilitation, training and employment of persons with disability (Official Gazette of FBiH 2010).

<Laws on Cantonal level>

- Law on basis of social protection, protection of civil victims of war and protection of families with children (Official Gazette of Tuzla Canton, 12/00, 5/02, 13/03, 8/06 and 5/12)
- Rulebook on manner and the process of obtaining the right for compensation instead of salary for woman mother, i.e. for other person with permanent employment during absence for reasons of pregnancy, labour, and/or child nurture (Official Gazette of Tuzla Canton No. 13/2011 and 14/2012)

The personal and family circumstances of the property owners, as well as their reliance on the land for their livelihood, are taken into account when determining the compensation entitlements (Article 47 in Law on expropriation). This Article addresses vulnerable households and livelihood restoration by allowing for compensation beyond the market value of the lost asset, based on a case-by-case assessment of personal and familial circumstances of the affected owner.

On national level, the Law on protection of rights of national minorities (Official Gazette of BiH, No. 12/03) was adopted in 2013 which stipulates protection of rights and equality of all 17 national minority groups living in BiH.

9.3.8 Past Example of Land Acquisition and Resettlement

The representative similar electricity projects which had the resettlement and land acquisition activities in BiH are listed as follows.

- Construction of the new lignite fired TPP in Stanari, RS;
- Construction of the new HPP Vranduk, FBiH; and
- Construction of the new HPP Ulog, RS.

9.3.9 JICA's Policy

The key principle of JICA policies based on World Bank OP 4.12 is summarized as follows.

- Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives.
- When, population displacement is unavoidable, effective measures to minimize the impact and to compensate for losses should be taken.
- People who must be resettled involuntarily and people whose means of livelihood will

be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels.

- Compensation must be based on the full replacement cost4 as much as possible.
- Compensation and other kinds of assistance must be provided prior to displacement)
- For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. It is desirable that the resettlement action plan include elements laid out in the World Bank Safeguard Policy, OP 4.12, Annex A.
- In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people.
- Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans.
- Appropriate and accessible grievance mechanisms must be established for the affected people and their Above principles are complemented by World Bank OP 4.12, since it is stated in JICA Guideline that "JICA confirms that projects do not deviate significantly from the World Bank's Safeguard Policies". Additional key principle based on World Bank OP 4.12 is as follows.
- Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits.
- Eligibility of Benefits include, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying.

[4] Description of "replacement cost" is as follows.

Land	Agricultural Land	The pre-project or pre-displacement, whichever is higher, market value of land of equal productive potential or use located in the vicinity of the affected land, plus the cost of preparing the land to levels similar to those of the affected land, plus the cost of any registration and transfer taxes.
	Land in Urban Areas	The pre-displacement market value of land of equal size and use, with similar or improved public infrastructure facilities and services and located in the vicinity of the affected land, plus the cost of any registration and transfer taxes.
Structure	Houses and Other Structures	The market cost of the materials to build a replacement structure with an area and quality similar or better than those of the affected structure, or to repair a partially affected structure, plus the cost of transporting building materials to the construction site, plus the cost of any labor and contractors' fees, plus the cost of any registration and transfer taxes.

Source: JICA

- Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based.
- Provide support for the transition period (between displacement and livelihood restoration.
- Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc. For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared.
- In addition to the above core principles on the JICA policy, it also laid emphasis on a detailed resettlement policy inclusive of all the above points; project specific resettlement plan; institutional framework for implementation; monitoring and evaluation mechanism; time schedule for implementation; and, detailed Financial Plan etc.

9.4 Gap between the Official FBiH Regulations and JICA Guidelines

FBiH regulations and the JICA Environmental Guidelines (2010) are compared as shown in Table below. These gaps shall be filled in by the appropriate measurement to be suggested in thus Survey.

Table 9.4.1 Gap between Comparison and Verification of the FBIH System and JICA Environmental Guidelines

Item	JICA Guidelines	Laws of FBiH	Gap between the FBiH System and the JICA Environmental Guidelines	Bridge the gap between the FBiH System and the JICA Environmental Guidelines
1.Support for socially vulnerable people	Appropriate consideration must be given to vulnerable social groups such as women, children, the elderly, the poor, and ethnic minorities.(JICA GL p29)	Where monetary compensation is given, in addition to the established compensation fee, additional compensation is to be calculated with consideration of the affected person's personal and family circumstances whereby more vulnerable affected persons receive higher compensation (Article 47 of the Expropriation Law) . This Article addresses vulnerable households and livelihood restoration by allowing for compensation beyond the market value of the lost asset, based on a case-by-case assessment of personal and familial circumstances of the affected owner.	The consideration for the vulnerable people is specified in FBiH's law as well as JICA Guideline.	Follow both the JICA Environmental Guideline and the local legislation
2. Assistance for restoration and improvement of living standard	Host countries must make efforts to enable people affected by projects and to improve their standard of living, income opportunities, and production levels, or at least to restore these to pre-project levels. (JICA GL p30)	For expropriated asset, owner is entitled to compensation in other asset. In case the user of expropriation is unable to assure such asset, the owner has to pay compensation in money which equals market values of the expropriated asset.	Both policies take into consideration the compensation to restore their livelihood.	The project will comply with the JICA Environmental Guidelines' policy and FBiH regulation.
3. Assistance for loss of business and income	Host countries must make efforts to enable people affected by projects and to improve their standard of living, income opportunities, and production levels, or at least to restore these to pre-project levels.(JIAC GL p30)	The formal owner of a business structure is entitled to compensation for that structure (cash or replacement property) and for loss of income until he/she is able to restore business activities. (Article 54, Law on Expropriation)	Both policies take into consideration the compensation to their business condition.	The project will comply with the JICA Environmental Guidelines' policy and FBiH regulation.

Item	JICA Guidelines	Laws of FBiH	Gap between the FBiH System and the JICA Environmental Guidelines	Bridge the gap between the FBiH System and the JICA Environmental Guidelines
4. Compensation based on full replacement cost	Prior compensation, at full replacement cost, must be provided as much as possible. (JICA GL p30)	According to FBiH legislation (Article 12 in Law on Expropriation), compensations are paid only by market values not by replacement values (market value plus costs of transaction).	FBiH legislation foresees adequate compensations either in replacing assets or in financial compensation in line with JICA Environmental Guidelines. On the other hand, the compensation is evaluated based on the market price, not the full replacement cost.	Values for land and structures shall be provided at replacement cost (market value plus transactional costs) rather than market value, as much as possible.
5. Eligibility of non-title holders	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported by project proponents etc. in a timely manner. (JICA GL p30) Illegal occupants are to be provided with resettlement assistance.	Only owners, occupants and users of affected land and structures at the time of the cut-off-date with fully recognized ownership rights are eligible for compensation and/or assistance. Illegal occupants have no right to receive any compensation.	People who do not have the official ownership of the property or land is not eligible for the compensation or resettlement assistance in accordance with FBiH's law.	Illegal occupants shall be provided with resettlement assistance and eligible for the compensation.
6. Public participation into planning and implementation of resettlement plan	Appropriate participation by affected people and their communities must be promoted in the planning, implementation, and monitoring of resettlement action plans and measures to prevent the loss of their means of livelihood. (JICA GL p30)	Only consultations prescribed by the Law are held in cases private property, when user of expropriation calls land owners for the agreement on compensation for expropriation asset. Though the engaged affected people have negotiation in preparation of compensation, there are no legal provisions on participation of affected people in planning, implementation, and monitoring of resettlement action plans and there is no provision in the legislation prescribing preparation of Resettlement Action Plans	FBiH's law does not ensure that the affected people participate in the planning, implementation and monitoring of resettlement action plan	The project will comply with the JICA Environmental Guidelines' policy.
7. Grievance mechanism	Appropriate and accessible grievance mechanisms must be established for the affected people and	Under FBiH law once the decision on expropriation is made the land owners will be given a 15 day period from the date that the document has been	The land owner has a chance to claim their grievance after the issue of decision for	The grievance for the decision for the expropriation will be dealt by

Item	JICA Guidelines	Laws of FBiH	Gap between the FBiH System and the JICA Environmental Guidelines	Bridge the gap between the FBiH System and the JICA Environmental Guidelines
	their communities. (JICA GL p30)	received to raise grievances. This official grievance period allows land owners to send grievances on the decision for expropriation. These grievances will be officially registered and their legal merit will be assessed and accepted or dismissed. If there is a disagreement regarding the decision's proposed compensation for the land, the land owner has an opportunity to comment or ask for a change during the hearing. Once the agreement on compensation is signed the land owner does not have any further legal recourse to submit a grievance on the decision or the price except through legal remedies	expropriation. On the other hand, the Project proponent is not obliged to set the grievance desk for the entire project period is not mentioned by law.	FBiH law. In addition, the comprehensive grievance desk or contact point shall be provided to receive and handle any complains on land acquisition and compensation for an entire project period.
8. Monitoring	Appropriate follow-up plans and systems, such as monitoring plans and environmental management plans, must be prepared; the costs of implementing such plans and systems, and the financial methods to fund such costs, must be determined.. (JICA GL p28)	There are no such or similar provisions in local legislation.	FBiH laws do not ensure that the monitoring system for land acquisition procedure is provided.	The project will comply with the JICA Environmental Guidelines' policy.

Source：JICA Study Team

9.5 Basic Information surrounding Project Area

9.5.1 Land Use

The following table indicates the current condition and use of land in diameter of 2 km from Tuzla TPP. Agriculture land, forest, degraded land (existing waste disposal) and land for building (residential areas) are the representative land use. Figure 9.5 1 shows a part of Tuzla Canton Spatial Plan 2005-2025. Main land use around the TPP is industrial zone, woods, agriculture land and so on. The planned construction site of TPP Unit7 has been unused and just wilderness as shown in next photo

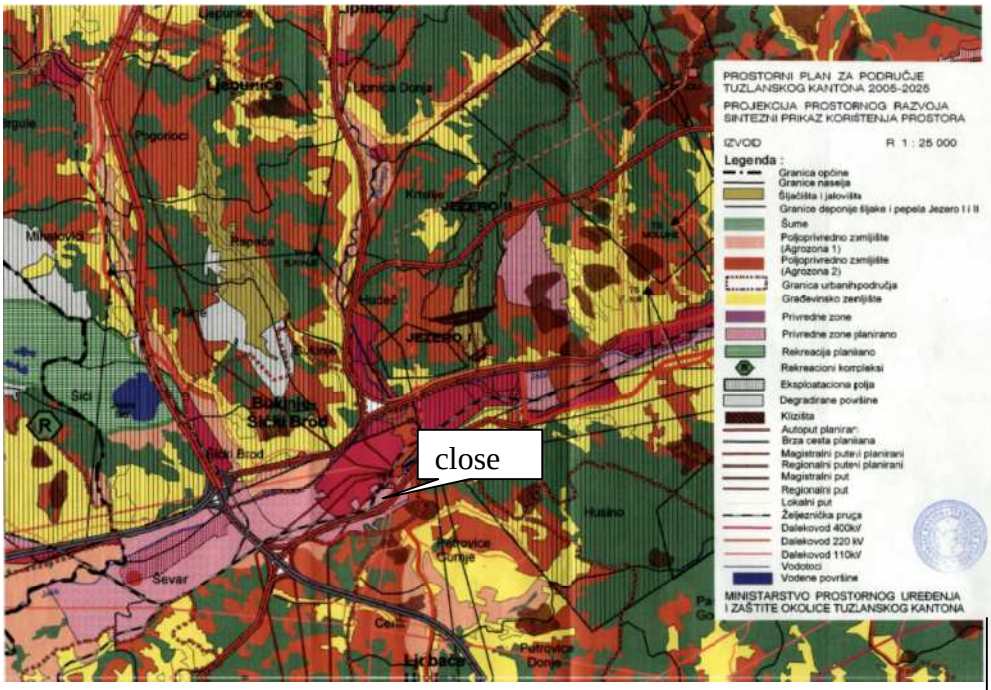
Table 9.5.1 Current Condition and Use of Land in Diameter of 2 km from Tuzla TPP

Use of land	Total area (%)
Land for building (residential areas)	15.0
Forests (low and medium woods)	19.8
Degraded land (existing waste disposal)	16.0
Agriculture land (II agro zone, class Ivb, V and VI)	31.5
Industrial land (industrial facilities)	12.5
Land used for infrastructure (roads,railways)	5.2

Source：JICA Study Team

Source：Taken by JICA Study Team on Tuzla Coal-fired Power Plant Project (PPP Infrastructure Project), September 2013

Photo：Landscape of the Land to be Acquired



close up

SPATIAL PLAN FOR TUZLA CANTON 2005-2025:
PROJECTION OF SPATIAL DEVELOPMENT
SUMMARY PRESENTATION OF LAND USE
EXCERPT

Legend:
Municipal border
Residual area border
deposit site
deposit site border Jezero I and II
woods
agriculture land
agriculture land
border of urban area
land for construction
industrial zone
projected area for industrial zone
projected area for recreation
recreational facilities
mining fields
degraded areas
landslides
projected highway
projected area for fast road
projected main roads
projected regional roads
Main road
Regional road
Local road
Railway
Transmission line 400 kV
Transmission line 220 kV
Transmission line 110 kV
Watercourses
Water areas

PROSTORNI PLAN ZA PODRUČJE
TUZLANSKOG KANTONA 2005-2025
PROJEKCIJA PROSTORNOG RAZVOJA
SINTEZNI PRIKAZ KORIŠTENJA PROSTORA
IZVOD R 1 : 25 000
Legenda :
Granica općine
Granice naselja
Šljačišta i jalovišta
Granice deponije šljake i pepela Jezero I i II
Šume
Poljoprivredno zemljište (Agrozona 1)
Poljoprivredno zemljište (Agrozona 2)
Granica urbanih područja
Građevinsko zemljište
Privredne zone
Privredne zone planirano
Rekreacija planirano
Rekreacioni kompleksi
Eksploataciona polja
Degradirane površine
Klizišta
Autoput planirani
Brza cesta planirana
Magistralni putevi planirani
Regionalni putevi planirani
Magistralni put
Regionalni put
Lokalni put
Željeznička pruga
Dalekovod 400kV
Dalekovod 220 kV
Dalekovod 110kV
Vodotoci
Vodene površine
MINISTARSTVO PROSTORNOG UREĐENJA
I ZAŠTITE OKOLICE TUZLANSKOG KANTONA

TUZLA CANTON MINISTRY FOR URBAN PLANNING
AND ENVIROMENT PROTECTION

Source: Tuzla Canton Spatial Plan 2005-2025

Figure 9.5.1 Land Use in the Area around TPP

9.5.2 Socio-economic Conditions in the Project Area

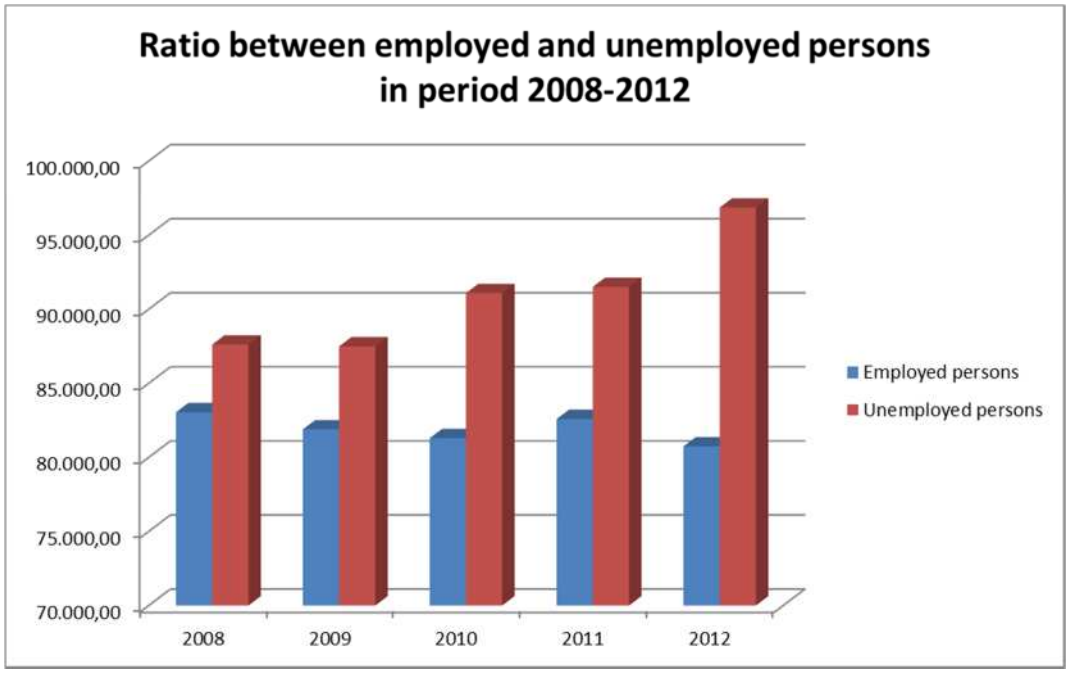
9.5.2.1 General Data

Statics data on social economic conditions in Tuzla Canton is shown in Table below. In the municipality of Tuzla, number of employed persons has been decreasing since 2008 and number of unemployed persons has been increasing much higher, as shown in Figure below. The high unemployment rate is one of the biggest social issues in Tuzla as well as in FBiH.

Table 9.5.2 General Data on Tuzla Canton

Item	Value
Surface in km^2	2.649
Municipalities	13
Settlements	382
Population	499.099
Natural population growth	802
Population density	188,4
Net salary in KM	735
GDP in mil. KM:	2.554
GDP per capita in KM	5.117
Import in mil. KM	1.258
Export in mil. KM	980
Investments in mil. KM	404

Source: Progress Report for Environmental and Social Survey for PPP Feasibility Study on Tula 7 Power Plant Project in the Federation of Bosnia and Herzegovina, 2013



Source: Progress Report for Environmental and Social Survey for PPP Feasibility Study on Tula 7 Power Plant Project in the Federation of Bosnia and Herzegovina, 2013

Figure 9.5.2 Ratio between Employed and Unemployed in Period 2008-2012

Table 9.5.3 Number of Employment and the Average Salary for the Representative Sector in Tuzla Canton

Activities	Average number of employees				Average salary(KM/month)			
	2009	2010	2011	2012	2009	2010	2011	2012
Agricultural, hunting and forestry	1.236,00	1.243,00	1.248,00	1.041,00	617,74	658,77	666,45	676,63
Mining and quarrying (extraction)	8.002,00	7.904,00	7.578,00	8.431,00	809,74	833,15	873,14	878,56
Processing industry	18.426,00	18.502,00	18.582,00	18.429,00	493,32	509,32	519,75	525,97
Production and supply -electricity, gas and water supply	2.720,00	2.744,00	2.694,00	2.568,00	1.242,11	1.243,46	1.251,37	1.288,97
Public administration /Social security	5.234,00	5.239,00	5.289,00	5.184,00	1.012,25	1.022,18	1.047,33	1.044,62
Other utilities / Public and private service activities/utilities	1.797,00	1.901,00	1.995,00	1.837,00	709,87	722,14	694,05	713,11

Source: http://www.fzs.ba/Podaci/03.pdf, Federal Bureau of Statistics, FBiH, Tuzla Canton (confirmed on 24th, July 2014)

9.5.3 Minority Groups

There are total 17 minority groups in BiH. The largest minority group is Roma. In comparison with the total population of BiH, the estimated percentage of Roma is 2.2%. Roma population in BiH is traditionally facing the challenges of social exclusion. This is partially caused by the reasons of racial discrimination but also by the objective consequences of the latter, the self-imposed isolation of Roma within their own communities. The real dimension of social exclusion of Roma could be observed from several illustrative data. Only 3% of Roma have permanent jobs, the most source of income is the income from selling the secondary raw materials (for 29% of Roma) and begging (19%), while 76% of Roma have never enrolled or finished the elementary school.

9.5.4 Gender Issues

Males and females are generally treated equally with respect to property ownership. Male and female siblings mostly get equal shares from inheritance and women can decide on how to use their property. Women have a say in decisions at household level, especially in relation to children's welfare, education and marriage, and resource allocation.

Lack of employment opportunities appeared to be the main concern of women in the area.

Women complain that working as agricultural labor is their only option which means seasonal and small-scale work.

9.6 Scope of Resettlement and Land Acquisition Impact

Instead of the questionnaire survey for the land owners and users, the available data from EPBiH and information heard from the surrounding communities were provided to describe some part of the population census, asset inventory and socio-economic situation in the surrounding area, as a tentative result.

The general socio-economic conditions were confirmed by the interviews conducted with representatives of four communities surrounding TPP. The results were summarized in the below Table. It is confirmed that there are some vulnerable people including a minority such as Roma, single-female-household, elderly single household, poverty people and so on.

Table 9.6.1 Summary of General Socio-economic Conditions in the area around TPP

Category	Item	Result/Content
Basic information of the questionnaire		
Name of community		Local communities: Sicki Brod, Bukinje, Kreka and Husino
Date of data collection		December 2013 / January 2014
Result of questionnaire survey		
Demography	Number of village in the community	25
	Number of total people living in the community	22,338
	Number of female living in the community	13,016
	Number of family in the community	8,118
	Number of household in the community	6,819
	Demographic by age groups	- 0-5 (age): 700 - 6-12 :1,245 - 13-20 3,553 - 21-59 :12,440 - Above 60 : 4,400
	Wealth	- Very well off : 718 families (9 % in families) - Sufficiently well off : 2,935 (37%) - Poor with some land :1,920 (24%) - Poor with no land : 2,420 (30%)
	Disadvantaged families	- Single female head: 1,714 families (13%) - With no labor (only children and elderly) : 1,714 (13%) - With infirmed/elderly only(who can not work) :1,335(10%) - Landless : 2,860 (21%) - Others: 5800(43%)
	Ethnicity	- Bosnian :17,162 (20% - 90% of total) - Serbian :601 (There is no Serbian in 2 communities) - Croatian :3,851 (35%-70% of total) - Roma:554 - Others:170
Livelihoods	Income level of household	- 0-500 KM/month: 85% - 500-1000 KM/month:10% - 1000-2000 KM/month:3% - 2000-4000 KM/month:2%
	Main sources of employment	Agriculture, Small-scale trading(shops , stalls) , Transportation, Government service, Factory work, Industry (e.g. mining)
	Main agriculture product	Corn, wheat , grass , potato, tomato, lettuce, spinach, bean
Health and	Infectious disease such as HIV/AIDs	No data or no answer

infrastructure	Electricity supply in the community	100%
	Water supply	- Tap water (Public Water supply system) : 90% of households - Well: 5% - Other:5%
	Sewage	- Public sewage : 70 % of households - Individual small sewage system : 30%
	Toilets	- Flush toilets : 99% of households - Bucket toilets : 1%
Communication, literacy and education	language	Bosnian , Serbian, Croatian, English, German
	Percentage of adult who can speak Bosnian/Serbian/Croatian	100%
	Rate of literacy	- 80% in total - 90% in women
	Education levels	- Technical or Higher training : 5% (50% in Female) - Finish high school : 30% (40% in Female) - Finish Primary school :50% (40% in Female) - No schooling :15% (40% in Female)

Note) The data is based on the answer from the representative of communities. Some of figures would be speculation.

Source：JICA Study Team

9.7 Confirmation of Past Procedures of Land Acquisition for the Project

9.7.1 Past Expropriation Process

The expropriation of property in accordance with the provisions of Articles 21 and 22 of the Law on Expropriation FBiH (Official Gazette No. 79/07) has been carried out by EPBiH and Tuzla Municipality.

9.7.2 Cut-off date

In this Project, 25th September 2012 can be proposed as a Cut-off date because the letter of ”Requirement for conducting studies expropriation of property for construction of block 7”was sent to Tuzla Municipality by EPBiH on that day. This letter ensures that the land to be expropriated is fixed and land owner or possessor cannot transfer their ownership after that day.

9.7.3 Compensation Unit Value

In accordance with the Expropriation Law, the independent valuer selected from a court appointed list of experts and appointed by Tuzla Municipality assessed the assets. Under the Expropriation Law the compensation should be paid for the market value of the property.

On the other hand, some landowners have not agreed the rate of compensation or condition of the expropriation. For example, they require EPBiH to expropriate not only the parcel which EPBiH needs to but also other parcels which EPBiH does not need.

9.8 Proposal of Tentative Policy and Framework of Land Acquisition for the Project

9.8.1 Tentative Basic Policy

It is considered that the Project proponent is capable for the compliance with the international standard's requirement for social considerations in terms of the finance, organization and capacity of enforcement due to the past experience of preparation of the land acquisition and compensation framework and so on. On the other hand, the result of this Study showed that there are some gaps between FBiH regulation and JICA Environmental Guidelines with respect to the eligibility for the people without official ownership and compensation unit etc. In case that the Project is pursuant to JICA Environmental Guidelines, the restoration measures to reconcile the gaps shall be discussed with the Project proponent to build consensus and avoid the turbulence in the local communities.

Taking into consideration the above points of concern, JICA Environmental Guidelines, the tentative policies of land acquisition and involuntary resettlement to be applied for the Project are described as follows in accordance with JICA Environmental Guidelines and based on the result of gap analysis between the official FBiH regulation and.

1) Land and property acquisition shall be avoided or minimized as much as possible when feasible by identifying possible alternative project designs.
2) PAPs losing assets, livelihoods or resources shall be compensated and/or assisted in timely manner based on the agreement with LACP.
3) All PAPs living, working, doing business in the project area at the time of cut-off date will have entitlement of compensation and/or assistance.
4) Eligibility of benefits include, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying.
5) Compensation on loss of assets shall be provided with replacement cost in order to compensate for their livelihoods, standards of living, or income opportunities, or at least to restore them to their pre-project levels.
6) The transition period between displacement and livelihood restoration shall be supported.
7) Appropriate organization and administrative arrangements shall be ensured for preparation, implementation and retroactive measures of land acquisition and resettlement in timely manner.
8) Appropriate reporting (including auditing and redress functions), monitoring and evaluation mechanisms, will be identified and set in place as part of the land acquisition and resettlement management system.

9) Appropriate grievance mechanism shall be established.
10) PAPs will be involved in the process of developing and implementing LACP.
11) The lost assets shall be compensated and/or assisted retroactively when the compensation in past for the lost assets is identified as an inappropriate one as compared to the above basic policy.

9.8.2 Tentative Entitlements Matrix/ces

The entitlement matrix which identifies the appropriate compensation and rehabilitation for losses of assets is proposed as Table below. As for the legal owner with valid ownership papers or proof of ownership regarding the land acquisition for this Project, there are no agricultural activities in the unused land. Thus, the compensation in money is considered as a reasonable compensation rather than the land-based one. Land occupier without valid title will also be eligible for compensation and/or assistance if they were occupying the area at the time of the cut-off-date.

Table.9.8.1 Proposed Entitlements Matrix

Type of Loss	Application	Entitled Person	Compensation Policy
Loss of land	All land losses	a) Legal owner with valid ownership papers or proof of ownership	Cash compensation for acquired land at full replacement cost
		b) PAPs without valid title	Cash compensation for acquired land at full replacement cost Entitled to take part in the income restoration program Those people who have started using the land after the cut-off date will not be entitled to any compensation or assistance.
		c) leaseholder	Reimbursement for un-expired lease period
Loss of perennial plants & trees	Affected plants and trees	Owner of affected plants and trees	Cash compensation equivalent to market value on the basis of type, age & productive value.
Loss of livelihood/cultivated products	Agricultural products in the acquired land	Beneficiaries of the agricultural product from the acquired land	Cash compensation equivalent to the market value of crops products at the time of compensation
Loss of , or damage to, assests	Affected structures on the acquired land	Owners of the structures with or without acceptable proof of ownership over the land: with or without building permit	Cash compensation based on current market prices of materials and labor without depreciation or deduction for salvaged building materials

Type of Loss	Application	Entitled Person	Compensation Policy
Resettlement impacts on vulnerable people	Impacts to vulnerable people	Vulnerable PAPs people who are below the poverty line, female headed households, the elderly, the disabled or those with long term health problems.	In addition to other entitlements, vulnerable PAPs will be provided additional assistance for loss of livelihood and incomes. Priority in Project employment opportunities

Source：JICA Study Team

9.8.3 Proposed Measures to reconcile gaps between FBiH Laws and JICA Environmental Guidelines

The procedure of land acquisition and compensation for the Project proceeds in accordance with FBiH's law and regulation. Therefore, in this Study, the current and past policy for such process was reviewed for appropriateness. The remedial measures will be proposed for the recognized gaps between past policy and JICA Environmental policy. Some contents whose detail could not be confirmed because of the interrupted activities and restrictions of method for study will be proposed for additional study.

9.8.3.1 Validation Result

1) Land Acquisition of the Property without Legally Recognized Ownership

As the result of study, it is considered that the following items would require the remedial measures to reconcile the gaps or/and further detail investigations.

- Regarding the affected people who have the house without the recognized ownership at the site, the legal right and occupancy status at the cutoff date shall be confirmed to see if they are eligible for the compensation and assistance. If they have eligibility, the family structure, the affected property, the socio-economic status shall be investigated so that the necessary compensation and assistance can be evaluated. If the result of detail survey shows that the affected people lose the livelihood due to the land acquisition, the measures for livelihood restoration will be required.
- If it is difficult for the affected people to find the new house, it is recommended that EPBiH with the other related organization will assist the affected people to prepare the new house. The location of new house shall be selected with the consideration of their accessibility and convenience.

2) Loss of Property with Legally Recognized Ownership

It is considered that the following items would require the remedial measures to reconcile the gaps or/and further detail investigations.

- The basic compensation unit is the market value whereas JICA Environmental

Guideline sets the replacement cost which is market value plus transactional costs.

- There are no agricultural use for the acquired land and the land owners have not received income from the land. It can be considered that there is no adverse effect on the land owners' livelihood and they will be willing to handover the land because they can benefit from the compensation. However, the questionnaire survey for the land owners, the confirmation of the status of land use at the cut-off date, the validation of paid compensation and effect on their livelihood shall be recommended in the further study to evaluate the actual impact by land acquisition.

9.8.3.2 Additional Remedial Measures to be Recommended

1) Compensation based on the Replacement Cost

Values for land and structures will be provided at replacement including any registration and transfer taxes.cost rather than market value. The additional measures for the amount of the difference s need to be paid to the affected people.

2) Assistance for Livelihood Restoration

The following program can be included to the proposed measures for livelihood restoration.

- PAPs will be given the opportunities to participate in job-related trainings by the entity or local government or related organizations based on the PAPs' requirement. The further training programs will be prepared if needed.
- PAPs will be given the priority opportunities for the employment in the Project construction jobs.

3) Grievance Mechanism

A grievance mechanism shall be development to ensure that all complaints from the PAPs are appropriate dealt with and the necessary measures and consideration are taken to. In addition to the grievance period specified by Law on Expropriation, it is important that the all procedure and period for acquisition are covered by the additional grievance system if the Project requires the JICA Environmental Guidelines.

As a good practice of EPBiH, Vranduk Hydropower Project prepared the contact person and declared in their land acquisition and compensation framework that any comments or concerns can be brought to the attention of the company verbally or in writing (by post or e-mail) or by filling in a grievance form. It also mentioned that all grievances will be acknowledged within 7 days and responded to in no later than 30 days.

Based on the interview to project proponent and relevant organizations, the appropriate grievance mechanism shall be prepared using the existing system or practical operation.

4) Cost and budget

The Project Proponent, EPBiH has prepared the budget for the compensation which is necessary for their current policy. If the Project is implemented in accordance with JICA Environmental Guidelines, the additional compensation and assistance for livelihood restoration measures based on the result of above survey shall be required. In that case, the budget planning will be updated based on the revised cost estimation.-

5) Implementation Schedule

As discussed so far, the further investigation, compensation and assistance shall be required if JICA Environmental Guidelines is applied to the Project. In that case, the implementation schedule for detail planning and construction shall be updated with those considerations. On the other hand, regarding the land whose land owner was died or whose successor has not been identified, there are some difficulties because more negotiations and complicated administrative procedure are required until the completion of land acquisition. It would take more time than expected. Thus, the Project schedule shall be well managed with those considerations.

6) Monitoring

The monitoring and evaluation for entire procedure of land acquisition and compensation shall be conducted for the following purpose;

- To validate the proposed land acquisition and compensation plan
- Evaluate the implementation process and effectiveness of proposed measures

In the Vranduk Hydropower Project, the internal and external monitoring systems are prepared as shown in the following table

Table 9.8.2 Example of Proposed Monitoring Plan

Item	Internal Monitoring	External Monitoring
Monitoring procedure	EPBiH or its sub-contractor will carry out monthly internal monitoring.	To be carried out by an independent monitor.
Report form	Through the quarterly project implementation reports submitted by project proponents to JICA. In addition, EPBiH will prepare a closure report when all land acquisition and compensation procedure are completed.	Reports will be prepared quarterly.
Monitoring indicators	- Number of public meetings and consultation with PAPs - Number of completed expropriation elaborates - Percentage of land acquired - Number of compensation payments made - Values used for compensation for affected structures and other assets	- Review and verification of internal monitoring reports - Review of Resettlement Closure Reports - Identification and selection of impact indicators - Impact assessment through formal and informal surveys with the affected persons - Consultation with PAPs, officials, community leaders for preparing the

Item	Internal Monitoring	External Monitoring
	- Number and amount of payments for loss of income - Number and type of grievances received, how they are being addressed and when they have closed out.	compliance report - Assessment of resettlement efficiency, effectiveness, impact and sustainability

Source: EBRD, Land acquisition and compensation framework for Vranduk Hydropower Project

7) Stakeholder Meeting in this Study

Regarding the land acquisition process, EPBiH is continuing individual discussions with land owners eligible for compensation. Also EPBiH conducted a long series of discussion with the local communities.

If the Project is based on JICA Environmental Guidelines, the revised LACP which includes the measures to reconcile the gaps between EPBiH's law and JICA Guidelines shall be disclosed to all PAPs and their opinion should be collected and reflected to LACP.

In this Project, the following plan of the stakeholder meeting was prepared until the stakeholder meeting aborted.

Table 9.8.3 Original Plan of Stakeholder Meeting for Land Acquisition

Item	Option 1	Options 2
Form	Seminar style	Individual interview or letter form
Date	Feb. 2014	Feb. 2014
Place	Meeting room in Tuzla city	Destination to visit
Objective	Explanation of the summary of Project plan Explanation of Draft Land Acquisition and Compensation Plan Collection of comments from land owners	
Target	Land owners in Tuzla	Land owners outside of Tuzla
Well-recognized method	Sending of invitation letters by one week of meeting	Sending of letters

Source：JICA Study Team