Polimac Company d.o.o.
Sarajevo, Bosna i Hercegovina

RENEWABLE SOURCES OF ENERGY IN BOSNIA AND HERZEGOVINA

Sarajevo, 2021.

Polimac Company LTD

Bosna & Hercegovina

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BIOMASS, POTENTIAL TO BUILD BIOMASS POWER AND COGENERATION PLANTS IN BOSNIA AND HERZEGOVINA

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INTRODUCTION

Bosnia and Herzegovina (B&H) is a country in southeastern Europe, on the western part of the Balkan Peninsula. B&H covers a total area of 51.129 km^2. Bosnia and Herzegovina is a transition country in the process of European integrations.

This paper gives the analysis of the potential connections between renewable energy sources (RES), particularly biomass, potential to build biomass power and cogeneration plants in B&H, taking into consideration specific political structure of the state.

The process of European integrations and international signed agreements represent a chance for Bosnia and Herzegovina to follow the current trends of the European Union and thus embrace the opportunity to administer reforms which will guarantee sustainable development.

SITUATION ANALYSIS

Energy is of vital importance for the development of any country in the world and Bosnia and Herzegovina as well. Without adequate policies in the energy sector business, industrial and economic progress is not possible either.

However, regardless of how important energy is for development, it is still only a mechanism for achieving the ultimate goals – sustainable economy, clean environment, high living standards, prosperity and health of population.

The current EU trends regarding investments in renewable sources of energy are essentially complementary with sustainable development. The investment in energy efficiency in Bosnia and Herzegovina has a potential of bringing multiple profits having in mind the actual situation, and securing big revenues in a relatively short time period.

Bosnia and Herzegovina belongs to a group of countries which have a large percentage of territory covered by forest resources, which indicates a certain potential for energy production based on sustainable use of forest biomass.

In Bosnia and Herzegovina, coal has the most dominant place in the structure of the energy consumption with about 45,3%, followed by fluid fuels with about 21% and wood mass with about 20,5%. Other forms of energy (hydro energy, natural gas, and imported electrical energy) participate with about 13,1% in the total energy consumption (METROPOLI, 2012).

The process of generating, distribution and consumption of energy in Bosnia and Herzegovina is characterized by big losses. The same quantity of energy yields four times lower gross domestic product compared to any other average European Union country, and at **the same time causes twice as high pollution. Chances are that this is the right time to change the existing paradigm in the energy sector.**

BIOMASS AS A SUSTAINABLE DEVELOPMENT DRIVER

Biomass is a source of energy made from renewable organic materials, such as wood, agricultural crops or waste, and biodegradable municipal or industrial waste. Biomass can be burned directly or processed into biofuels.

The main advantage of use of biomass as a source of energy is in abundant potentials of not just purposefully cultivated plants but also waste materials in agricultural and food industry. Gases produced while using biomass can also be used in generation of energy.

Production of biomass for the purpose of energy generation implies the use of large areas, which, combined with the usual manner of farming creates, significant influence on biodiversity and the way of its production. Therefore, the use of plant remainings for the generation of electrical energy, heat and biodisel, no matter whether it is from sugar cane, rice husk, or hay or similar crops waste, waste from forest activities or plant oils production, etc., is one of the best ways to generate sustainable energy, to the extent that it does not prevent other significant ways of using agricultural waste, such as, for example, conservation of soil.

As already mentioned above bioenergy interest has been greatly increased in last period.

Thus, at present factors may influence the prospects for bioenergy:

- increases in crude oil prices,
- concerns for enhancing energy security matters, by creating de-centralized solutions for energy generation,
- concerns for climate change and global warming, but also to
- preserve non-renewable resources,
- promotion of regional development and rural diversification by creating jobs and income in usually underdeveloped rural areas,

For the developing and transition countries as Bosnia and Herzegovina, the increased deployment of modern biomass based systems, as a reliable and affordable source of energy could be part of the solution to overcoming their current constraints concerning GDP growth.

In any case, production and use of biomass should be sustainable in terms of the social, environmental and economic perspectives.

POTENTIAL OF BIOMASS ENERGY IN BOSNIA AND HERZEGOVINA

Considering that forests and forest land cover more than 50% of the territory of Bosnia and Herzegovina, they represent arguably one of the most important natural resources of this state. Regardless of the significant resource base, there is no strategic commitment in Bosnia and Herzegovina for production of fuel and energy from biomass.

Therefore, the most widespread use of wood biomass is in the form of firewood for production of heat energy, although modern technologies offer possibilities for processing wood into various products .

which have better energy efficiency than firewood. Biomass in the form of fuel wood and charcoal is currently a growing source of energy in Bosnia and Herzegovina the consumption of which is estimated at 1.464.400 tons in 2003.

Since consumption of fossil fuels has an adverse effect on the environment and the fact is that prices of other energy sources are on the constant rise, use of wood biomass for production of energy is expected to intensify in Bosnia and Herzegovina

Chart 1. Biomass Potential Mapping in FB&H and Brčko District

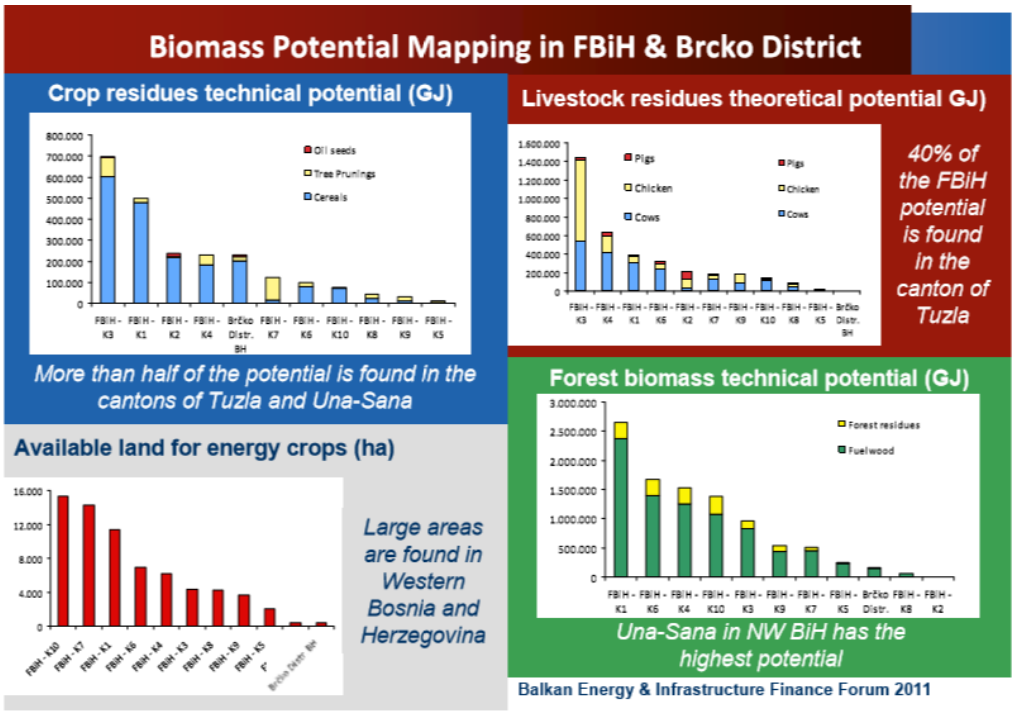


Chart 2. Biomass potential of B&H in percentage

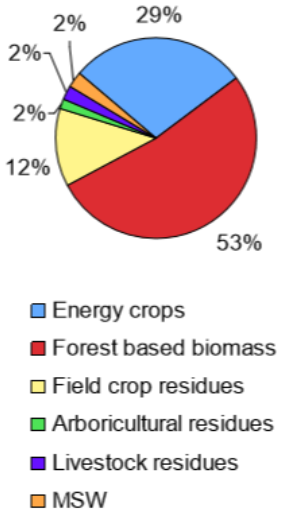


Table 1.

Estimated technical biomass primary energy potential in Bosnia and Herzegovina in 2008[2]

Biomass type	Technical Potential (PJ)	Technical Potential (GWh)
Energy crops	15.33	4258.3
Forest-based biomass	28.04	7788.9
Field crop residues	6.63	1841.7
Arboricultural residues	0.84	233.3
Livestock residues	1.3	361.1
Municipal Solid Waste	4.28	1188.9
TOTAL	**56.41**	**15672.2**

*****Energy crops are crops grown specifically for the use as fuel and offer high output per hectare with low inputs.

The results showed that a very significant energy source would be available (29% of the total biomass potential), even if only small portions of the land are used to cultivate energy crops. Although this assumption may be sensible, the fact that these types of crops are not cultivated in B&H can lead to an overestimate of the biomass potential. Therefore, energy crops are not considered in this report.

Arboricultural residues (fruits, vine) are also not considered, since their potential is only about one eighth of the potential of field crops.

In the following sections, an analysis of the biomass potential relevant to wood processing and agricultural sectors in BiH in 2015 is conducted.

Biomass potential of the wood processing and forest-based biomass

Forests and forest lands are very abundant in BIH, covering more than 50% of the territory, and are one of the most important natural resources. Despite being an excellent resource, so far there is no strategic plan to significantly increase the use of biomass for energy generation or for the production of biofuels.

The estimate of forest-based biomass shown in the Table 2 is taken from the UNDP Study from October 2014 [3], which is based on the 2012 forest production volume. The forest production volume has not changed much in the last two years so the estimates for forest-based biomass do not need to be updated.

The following percentages of the total amounts of cut wood were used in the UNDP study to assess available quantities of woody biomass in B&H: - Residue after wood cutting and processing of forest wood products – 16.3% for conifers and 11.7% for deciduous trees - Percentage of small branches (residue after wood cutting) - 15%

for conifers and 18% for deciduous trees - Percentage of stumps – 15% of the total quantity of wood - Percentage of residue and waste from production of sawn timber, veneer and furniture – 30% for conifers and 35% for deciduous trees

Table 2 Woody Biomass Theoretical Potential in BiH [3]

Woody Biomass Sources	Conifer trees (m^3)	Deciduous trees (m^3)	Theoretically Available Amount (m^3)
Firewood	1,711	1,228,441	1,230,152
Forest residues	342,181	261,154	603,334
Small branches	314,848	401,432	716,280
Stumps	354,857	200,843	649,375
Residues from wood processing industry	314,848	334,527	555,701
TOTAL	1,328,446	2,426,396	**3,754,842**

Firewood is the single largest source of woody biomass in B&H, as can be clearly seen in Table 2. In 2012, the total quantity of this type of biomass was approximately 1.23 million m^3. Firewood is typically used for the heating of households and is burned in furnaces and stoves with low energy efficiency. Despite the low efficiency, the use of fuel wood to heat households is increasing in urban areas as the prices of other energy sources are increasing. As all of this firewood is currently being used.

Stumps, small branches and other wood residue remain in the forest after wood cutting and processing and are not being collected. This residue represents the largest source of woody biomass potential and combined amounts to more than 1.9 million m^3, as shown in Table 2.

A certain amount of small branches and wood residue must remain on the ground in order to provide nutrients for the soil. Stumps are important for the stability of forest eco-systems and not all of them may be removed from the forest. A minimum amount of investment is needed for the collection of small branches and residue after wood cutting at locations with good accessibility. However, for locations difficult to access with machinery, the cost of wood residue collection can be prohibitive. It is estimated that 1/3 of the stumps, small branches and other wood residue need to be left in the forest; and from the remaining 2/3, only half is accessible for collection. Using this residue for heating, instead of for firewood, would also provide additional quantities of wood for the wood processing industry.

In the wood processing industry there are significant quantities of wood residue from production of veneer, sawn timber and furniture. As shown in Table 2 this wood residue amounts to 0.55 million m3. However, most wood processing companies in B&H use wood residue for heating factory premises and/or to dry wood. If there is any wood residue left, it is sold to companies that produce pellets and briquettes. However, instead of using this residue for production of heat only, or for pellets and briquettes, the residue could be used in CHP plants to generate the necessary heat for the production process, and also to

generate electricity. It is estimated that 80% of this existing residue could be used in CHP plants.

Stumps, small branches and other wood residue is the available unused biomass in the forest. To calculate the lower heating value of forest biomass,3 it is estimated that it has 50% moisture content. Conifer trees with 50% moisture have the density of approximately 810 kg/m3, while deciduous trees with the same moisture content have the density of approximately 1140 kg/m3. Both types of trees have approximately the same lower heating value, and for 50% moisture content the heating value is approximately 8 GJ/t. Although the wood processing residue has less than 50% moisture content, the same value of 8 GJ/t will be used as a conservative estimate. Taking into account the arguments and estimates provided in the previous sections, the available woody biomass amounts to 7.44 PJ as shown in Table 3.

Table 3 Woody Biomass Technical Potential in BiH

Woody Biomass Sources	Conifer trees (m^3)	Conifer trees (PJ)	Deciduous trees (m^3)	Deciduous trees (PJ)	Degree of availability (%)	Technical Potential (PJ)
Firewood	1,711	0.01	1,228,441	11.20	0%	-
Forest residues	342,181	2.22	261,154	2.38	33%	1.53
Small branches	314,848	2.04	401,432	3.66	33%	1.22
Stumps	354,857	2.30	200,843	1.83	33%	0.61
Residues from wood processing industry	314,848	2.04	334,527	3.05	80%	4.07
TOTAL	1,328,445	8.61	2,426,397	22.13		**7.44**

Biomass from agriculture

In the agricultural sector, a small family farm is the most common type of farm, producing mainly for its own consumption. It is estimated that over fifty percent of agricultural farms are less than 2 hectares in size. State farms are larger; but due to the unfinished privatization, they are very restricted in their operational activities.

Biomass potential from agriculture is analyzed in two sections: Biomass from field crop residue and Biomass from animal farming (livestock) residue.

Field crop residues

Two large categories of field agricultural residues can be defined: field crop residue and arboricultural residue. Field crop residue is the residue that remains in the field after the crops are harvested. It includes different parts of the plants (stems, branches, leaves, chaff and pits), varying in composition, moisture content and energy potential. Arboricultural residue is the residue that remains in the field when cultivating perennial crops (i.e., pruning of vineyards and trees). As stated previously, the energy potential of arboricultural residue is much smaller than the energy potential of field crops and will not be considered further.

The data contained in the reports from the B&H Statistical Agency determined that corn, wheat and barley account for over 95% of field crop production in B&H (corn produced for fodder is not included in these values as it is fully harvested and no significant residue remains). Based on this analysis, the estimate of biomass potential from field crop residues in B&H is calculated based on the production of these three main crops.

As can be seen in Table 4 the production of the three main field crops varies significantly from year to year. For that reason, the estimate of biomass potential from field crop residues in B&H is calculated based on the average production over the last five years.

Table 4 Production of main field crops in BiH from 2010 to 2014 [5]

Annual production in tons						
Crop	**2010**	**2011**	**2012**	**2013**	**2014**	**Average**
Corn	853,376	764,119	539,432	798,500	798,487	**750,783**
Wheat	145,412	210,004	225,137	265,152	170,055	**203,152**
Barley	50,183	65,667	65,337	70,844	48,649	**60,136**

The amount of residue was calculated using fixed values of residue production per hectare for every type of crop. In this report the amount of residue will be based on the production value, which should result in a

more accurate estimate. For the three main crops, it is estimated that the ratio of crop to residue production is approximately 1:1, meaning that for one ton of crop harvested, one ton of residue is produced. It can be concluded that from the harvest of these three crops 95% of field crop residue is produced.

It is estimated that about 1/3 of the field crop residue could be used for energy generation (heat and electricity). The other 2/3 of the field crop residue is used in livestock farming as bedding for animals or is left on the land to provide nutrients for the soil. The lower heating value for residues of these three crops is approximately the same, and its value is estimated at 14 GJ/t (15% moisture content).

In Table 5 the technical potential of the most significant crop residue is given. Corn residue accounts for approximately 74% of the energy potential of field crop residues, followed by wheat residue (20%) and barley residue (6%).

As shown in Table 5, it is estimated that 1,014,071 t of field crop residue could be annually used for energy generation. This is equivalent to 4.69 PJ or 1.7 % of the total primary energy supply in 2013.

Table 5 Production and residues of main crops in BiH

Crop	Production (t)	Residue (t)	Degree of Availability (%)	Residues available for energy generation		
				Quantity (t)	Lower heating value (GJ/t)	Technical potential (PJ)
Corn	750,783	750,783	33%	247,758	14	3.47
Wheat	203,152	203,152	33%	67,040	14	0.94
Barley	60,136	60,136	33%	19,845	14	0.28
TOTAL	**1,014,071**	**1,014,071**		**334,643**		**4.69**

Animal farming (livestock) residues

The animal farming sector in B&H has passed through a post-war transition period, resulting in a larger number of small family farms that are mostly focused on satisfying their own needs and keeping the livestock numbers at the biological minimum.

Livestock waste (manure) is an excellent source of energy if it is collected in the appropriate lagoons or large tanks. However, livestock waste can be collected and used only in intensive (stall) livestock feeding, which is used in B&H for cattle, pig and poultry farming. The animal waste can be anaerobically digested in a digester, producing biogas that can be used to generate heat and electricity.

The potential for livestock farming is B&H is excellent, since there are very large areas of suitable land not used or inhabited and close to towns; however, there are a number of market limitations. One of the most important limitations is that a large portion of meat and dairy products consumed in B&H are imported from Serbia and Croatia. Also, agricultural subsidies in B&H are small and not put to the best use as many small family (non-commercial) farms receive subsidies.

Although the number of livestock could be much greater, the energy potential of existing livestock residues is very significant. The number of cattle and pigs does not change much from year to year, as is the case with field crop production; and it is best to use the most recent available data. Larger annual variations occur in the quantity of poultry, but the energy potential from poultry is the smallest and does not affect significantly the total estimate.

The amount of biogas that can be produced from livestock farming waste (manure) varies, depending mainly on the species and weight of the animal. Within one species, the weight varies significantly and that is why a livestock unit (LSU) is used to facilitate the aggregation of livestock. A livestock unit is an animal or a group of animals weighing 500 kg. Livestock unit coefficients for livestock, based on their average weight, are given in Table 6.

Table 6 Livestock unit coefficients (8)

Species	Description	LSU coefficient
Cattle	Under 1 year old	0.4
	Between 1 and 2 years old	0.7
	Male, 2 years old and over	0.8
	Dairy cows	1.00
Pigs	Piglets having a live weight of under 20 kg	0.027
	Breeding sows weighing 50 kg and over	0.5
	Other pigs	0.3
Poultry	Broilers	0.007
	Laying hens	0.014

Biogas yield per animal LSU also varies depending on the breed of animal (for example for cows, Holstein or Guernsey) and the fodder being fed to the animal. The exact values can be determined only by manure analysis. For the purposes of this report the values given in Table 7 will be used. Biogas yield per animal LSU also varies depending on the breed of animal (for example for cows, Holstein or Guernsey) and the fodder being fed to the animal. The exact values can be determined only by manure analysis. For the purposes of this report the values given in Table 7 will be used.

Table 7 Annual biogas yield per animal

Species	LSU coefficient per animal	Annual biogas yield per LSU (Nm^3/LSU)	Annual biogas yield per animal (Nm^3/head)
Cattle	0.8	440	352
Pigs	0.15	700	105
Poultry	0.01	800	8

The number of animals in was taken from reports published by the B&H Agency for Statistics of BiH. According to the official statistics in 2014 there were 444,000 cattle, 53,000 pigs and 20.6 million poultry. The amount of biogas that could be theoretically produced is estimated to be approximately 273 million Nm3. The biogas lower heating value (LHV) estimated at 6 kWh/Nm3 or 21.6 MJ/Nm3 which corresponds to a methane content of approximately 60%.

Usage of livestock residue for energy production through anaerobic digestion is feasible only for medium to large scale intensive livestock breeding. In the statistical documents there is no data given regarding the size of animal farms so that it could be determined how many of them are large enough for biogas production to be technically feasible. Based on the fact that most animal farms are small, it was estimated that only 20% of farms are large enough and therefore, the technical potential of livestock residues is 20% of its theoretical value. The available livestock residues for energy production amount to 1.18 PJ, or 0.4% of the total primary energy supply in the country in 2013.

Table 8 Energy potential of animal waste in BiH

	Cattle	Pigs	Chicken
Animal heads	444,000	533,000	20,664,000
Biogas annual biogas yield per animal (Nm^3/head)	352	105	8
Biogas potential (million Nm^3)	156.3	55.97	165.3
Theoretical Potential (PJ)	**3.37**	**1.21**	**3.56**
Degree of availability (%)	20	20	20
Technical Potential (PJ)	0.67	0,24	0.71
Total Technical Potential (PJ)	**1.62**		

An estimate of the technical biomass potential to be used for power or CHP generation in the wood processing and agricultural sectors is shown in table below.

Table 9 Estimated technical biomass primary energy potential wood processing and agricultural sectors in BiH in 2014

Biomass type	Technical Potential (PJ)	Technical Potential (GWh)
Woody biomass	7.44	2066.7
Field crop residues	4.69	1302.8
Livestock residues	1.62	450.0
TOTAL	**13.75**	**3819.5**

The technical primary energy potential of 13.75 PJ is equal to about 5.1% of the country's total primary energy supply of 270 PJ in 2013. Woody biomass is the dominant unused biomass resource and it accounts for 56% of the unused technical potential, followed by field crop residues (35%) and livestock residues (9%).

The annual electricity conversion rate for biomass power and CHP plants varies depending on the applied technology used and installed capacity; it ranges from about 12% [10] to 36%.

SWOT ANALYSIS

SWOT analysis in Bosnia & Herzegovina

Strengths	Weaknesses
•Competitive advantages for exploitations of biomass (land, forest, climate, etc) •Pre-war experience in biomass research and exploitation (boilers, combustion research) •A lot of small and similar municipalities with developed wood processing industry (wood residues) •Very close perspective of promotional measures for bioenergy production and use.	•Bad economical and financial situation •Stagnation in further development of new biomass technology •Different competition conditions around the country •Stagnation in education and building of human capacities •No incentives for biomass/waste production and use •Complicated legislative for PPP realization.
Opportunities	**Threats**
•Employment (whole bioenergy chains) •Sustainable exploitation of all biomass sources •Growth in local heat and electricity demands •Possibility of attraction of foreign and private investors •Ecological aspects using biomass/waste •Technological development in the field of biomass/waste use (R&D) •SME industry development •Local development •Potential for EE in wood processing industry as well as agroindustry by using waste biomass from the processes. •Domestic equipment	•Unsystematic and unsustainable exploitation of forests and land, especially forest residues (wastes) •Dependence, to some extent, on imported technology •Low level of R&D and technological development •No new employment in this sector •No further and better local development •No diversification of energy supply side •No foreign investors •Lack of promotional mechanisms for bioenergy production and use •No or bad legislative framework for biomass/waste production and use

HEAT AND ELEKTRICITY MARKET OPPORTUNITIES IN B&H

**Biomass power plants generate electricity from manufacturing waste from various industries (wood processing, agriculture, livestock farming and others).*

Biomass power plants produce only electricity, while cogeneration or CHP plants produce electricity as well as heat.

Biomass energy in Bosnia and Herzegovina has an important role mostly in terms of fuel wood for production of heat energy.

This holds particularly true in the areas where the rural sector has a prominent role in the population structure, since historically the rural population in all areas was using the biomass for heating and/or cooking. Biomass in the form of fuel wood and charcoal is currently an ever increasing source of energy in B&H, whose average consumption is estimated at 1,323,286 m^3 per annum.

However, the degree of efficiency of the energy conversion devices is very low. Unlike in households, biomass consumption is low in other sectors such as, for example, agriculture, trade and industry.

Fuel wood is important mostly in the rural areas and small towns where no public heating network is available. In some areas of Bosnia and Herzegovina, the share of biomass in household heating reaches the level of up to 60% (parts of East Bosnia). As in many cases for development countries, the fuel security and rural development potential of bio fuels that tends to be of most interest.

At this micro scale sustainable development drivers are more social-economic. Strategic approach for the rural areas has to offer new opportunities, in a sense that modern village is not only as food producer, with all difficulties related to competitiveness of its products, but also competitive energy producer, or supplier, which gives new dimension of its sustainability. Most of the cities and rural households have its own heat supply systems, mainly low efficient boilers, which gives a chance to producers of the biomass boilers and HVAC equipment as well as pellet and wood chips producers.

There are some of district heating systems which have problem with sustainability because of low efficiency and use of expensive liquid fossil fuels. The analysis were shown that is possible to reconstruct some of them and switch the fuel to biomass, issuing lower prices of the heat produced as well as CER (Certified Emission Reduction) because such projects can be attractive as CDM.

There are a lot of small municipalities in Bosnia and Herzegovina with large physical potential of biomass and developed forestry and wood processing industry. It is easy to show that small municipalities in Bosnia and Herzegovina (with 10.000 to 20.000 inhabitants) with centralized wood processing industry can satisfy their all energy needs from its own wood waste, but

also start some new business activities based on the available biomass..

Some estimations has shown that 50% of forest biomass this resource could supply medium scale CHP installations (5 MWe +) delivering power to grid and heat to residential/ commercial/ industrial users. The installed capacity would be around 21 MWe and annual output would be 149 GWh and 213 GWh of electricity and heat respectively.

If half of the scenario where potential of 7,66 PJ would be available for bio-energy industry, or mediumscale CHP installations, delivering power to grid and heat to residential / commercial / industrial users, 106 MWe installed capacity that would generate 745 GWh electricity and 1.065 GWh heat annually would be supported.

Modern market opportunities offers many promotional mechanisms for bioenergy based projects. Some of them which are of the high importance has been analyzed: ESCO (Energy Service Companies) and Feed-in tariffs, because they already exists in Bosnia and Herzegovina.

Due to that some of the aspects related to promotional mechanisms will be analyzed. There are no any co-firing biomass based technologies in Bosnia and Herzegovina (except of a small demonstration unit at the Mechanical Engineering Faculty of Sarajevo), but it can became interesting because some analysis shows that use of 50% of estimated forest residues would result in the production of 149 ‘green’ GWh within existing solid fuel power facilities, which are mainly from the seventies and use low rank lignite coal.

Biomass from the wood processing industry and forestry, together with agricultural and other forms of biomass is a significant energy source and due to that deserves careful planning and estimation because it can became one of the important economy drivers.

Production and share in national heating consumption

The forestry and wood processing sector were always very important for the economy of B&H. Wood and wood waste are mostly used for heating in individual housing units. In rural areas it is the major heating fuel. The wood processing waste has never been utilised efficiently. Fossil fuels, which people use for heating in the winter months, and outdated cars on the roads are the primary sources of air pollution in B&H.

It was not possible to find data on energy consumption of heating sector. So, it was decided to use data on household energy consumption, which are presented in table 10.

Table 10. Production and share of renewable energy in national heating consumption (in PJ)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total energy demand in households	67,66	71,36	68,61	73,44	72,77	79,49	82,69	86,02	89,50
Coal	6,78	6,44	8,09	6,72	7,58	9,01	9,46	9,93	10,43
Oil products	5,73	5,74	5,09	4,10	4,16	4,07	4,27	4,49	4,71
Gas	1,41	1,38	1,27	1,55	1,60	1,92	2,04	2,16	2,29
Wood	37,95	41,73	37,64	43,81	41,71	45,84	47,67	49,58	51,56
Electricity	12,72	12,74	13,02	13,56	13,95	14,78	15,22	15,68	16,15
Heat energy	3,07	3,33	3,50	3,70	3,77	3,87	4,02	4,19	4,35
In %									
Wood	56,09	58,48	54,86	59,65	57,32	57,67	57,65	57,64	57,62
Electricity	11,28	10,71	11,39	11,08	11,50	11,16	11,05	10,94	10,83

Source: WB (2008): Energy study in BH; *author approximation on the basis of average increase rate

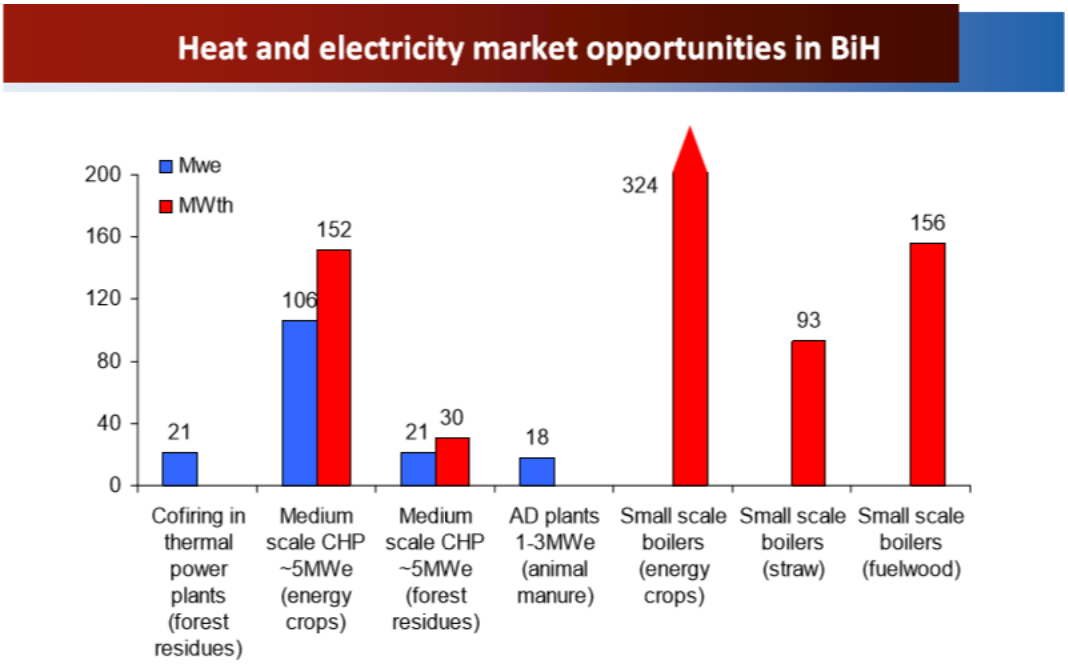
As it can be seen, around 60% of household energy consumption is satisfied by firewood. Generally speaking, the ovens are not modern, well designed and controlled, so there is problem with dust and smell, especially during the wintertime in big cities like Sarajevo, Tuzla etc.

Bosnia and Herzegovina annually is losing 21.5% of its GDP, that is more than 7.2 million dollars (more than 12 million KM), due to the high air pollution, according to the World Health Organization.

Domestic and international environmental organizations for decades warn of an alarming air pollution in B&H, which year after year is a growing problem.

In Sarajevo, then dust concentration exceeded the value of 300 micrograms per square meter, while in Tuzla, near the thermal power plant, measured and more than 1,000 micrograms. According to EU standards, in the cities to tolerate dust concentrations between 25 and 40 micrograms per square meter.

Additionally, around 11% of that need is satisfied by hydro-energy (60% of total electricity). So, the major part of household energy consumption is covered by RE.



Municipal solid waste

Municipal solid waste (MSW) refers to waste collected by or on behalf of municipalities; this mainly originates from households but waste from commerce and trade, offices, institutions and small businesses is also included.

According to the EU legislation (Directive 2001/77/EC) energy produced from the biodegradable fraction of MSW is considered as renewable and therefore organic waste, waste paper and cardboard and textiles are a source of biomass.

Due to lack of data regarding the share of the biodegradable part to the total quantities of MSW in6 iH, the biodegradable fraction of 50% found in neighboring Serbia was employed. Furthermore, a lower heating value of 7,2 GJ/t for the biodegradable part was assumed. Landfill gas. Municipal Solid Waste (MSW) production expected to reach 0,5 t/person/year (the EU 15 average). It is disposed and methane is captured and used to generate power. This assumes that, due to the location of the landfills, there are no local uses for heat.

The theoretical biogas potential estimated in this study is 4,28 PJ. In 2008, 1.367.097 t MSW was generated in Bosnia and Herzegovina, 86% of which (1.181.887 t) was collected. This is equivalent to 308 kg of collected waste per capita per year. Other sources report a higher value of waste generation at around 500 kg/ per capita/ per year. Nevertheless, it was decided to accept the number reported by the Agency for Statistics of Bosnia and Herzegovina, since it is in good agreement with waste generation rates found in other Western Balkan countries.

Table 11 shows estimated total MSW and household waste (HHW) amounts, in accordance with the methodology recommended in the SWMS , and population statistic.

	MSW generated in 1999 [Gg MSW]	MSW generated in 2010 [Gg MSW]	MSW generated in 2020 [Gg MSW]	MSW generated in 2030 [Gg MSW]
MSW in RS	724,269	1002,558	1347,354	1810,731
HHW in RS	362,134	501,278	673,676	905,364
MSW in FB&H	1138,0	1575,258	2117,015	2845,091
HHW in FB&H	569,0	787,629	1058,508	1422,546
Summary MSW	1862,269	2577,812	3469,369	4655,822
Summary HHW	931,134	1288,907	1732,183	2327,911

Taking the above into account the theoretical potential of biomass from MSW can be estimated according to the following equation:

Emsw = PpCoHo (F.5)

P population, p per capita waste generation [t/yr], Co biodegradable waste fraction in MSW [%], Ho biodegradable waste lower heating value [GJ/t].

The estimated theoretical potential amounts to 4,28 PJ or 1,9% of the country's total primary energy supply in 2008. Currently, the main option for disposal of municipal waste is still landfilling, while most of the landfills are not sanitary. Furthermore, it is estimated that there are more than 2.000 open dumps, many located near to small municipalities in rural areas.

Two regional sanitary landfills are anticipated in FBiH for 2010: "Smiljevac"- Sarajevo and "Mošćanica" - Zenica, where 10% and 8% of the total MSW collected in the FB&H would be disposed respectively. For RS, one regional sanitary landfill for MSW disposal "Ramići"- Banja Luka, is anticipated, where 16,7% of the total MSW collected in RS would be disposed.

At the sanitary landfill in Sarajevo, the collected landfill gas is used for electricity generation, while at the Zenica landfill a flare system for the combustion of landfill gas has been constructed. The combustion of landfill gas by flare is also envisaged at the future sanitary landfill in Banja Luka.

In addition to landfills, according to the initial national communication of B&H under the UN framework convention on climate change (UNFCC), incineration of 20% of MSW with energy recovery is anticipated by 2030. It is further foreseen that recycling rates will be 10% of the total household waste (HHW) in 2020 and 20% for 2030. Moreover, 50% of the recycled HHW is foreseen to be biodegradable waste.

NATIONAL POLICY AND CONCEPTS PROMOTING RENEWABLE ENERGIES

Increasing the share of renewables in the energy mix of Bosnia and Herzegovina together with the implementation of energy efficiency measures are also necessary for achieving national objectives on climate change set out in the strategy to adapt to climate change and low-emission development for BiH.

As one of the objectives of the Strategy for the period 2013-2025.is the termination of the use of fuel oil and coal for domestic heating and district heating systems and their replacement energy-efficient systems, biomass, thermal solar and geothermal energy by 2020.

The management of renewable energy sources in Bosnia and Herzegovina is the responsibility of entities (Federation of Bosnia and Herzegovina and the Republic of Serbian) and Brcko District. The National Assembly of the Republic of Serbian and Parliament of the Federation of Bosnia and Herzegovina have adopted separate laws

Analysis of the permitting procedures in Bosnia and Herzegovina (B&H) shows that for a biomass power plant to be considered planned it should have at least the Urban Permit. After a construction permit is obtained and before construction starts, a guarantee for the purchase of electricity can be obtained from the Operator for Renewable Energy Resources and Efficient Cogeneration at set feedin-tariffs.2 Feed-in-tariffs are determined by the Federation Energy Regulatory Commission (FERC) and the RepublikaSrpska Energy (RSERC).

on renewable energy sources in May 2013 and in August 2013. Action plans for the use of renewable energy sources have been adopted in both entities in 2014. 10 At the national level there is still no comprehensive promotion and development of renewable energy, and a national action plan for renewable energy sources, which requires the Energy Community Treaty, has not yet passed.

The key permits needed to be obtained for a construction of the power plant in BiH, listed in order of issuance, are:

- Urban permit
- Energy permit
- Water permit
- Construction permit
- Acquiring status of potentially qualified producer
- Initial agreement for electricity purchase from the Operator for Renewable Energy Sources and Efficient Cogeneration
- Operational license
- Electricity purchase agreement

There are currently no biomass power plants in operation in BiH that supply electricity to the grid. The only biomass power plant in operation is a 37kWe biogas pilot plant at Livac Agricultural Cooperative in the Republic of Srpska (RS), which applied in January 2015 for a license to sell the produced electricity at the prescribed feed-in-tariff (Chapter 1.1), which application was denied in June 2015.

EXISTING BIOMASS POWER PLANTS

“Livac” Agricultural Cooperative – Aleksandrovac, Municipality Laktasi, RS.

Livac Agricultural Cooperative is a dairy farm and is the only biogas-fueled CHP plant in BiH, put into operation in 2011 with installed capacity of 37kWe. The cost of construction was approximately 220,000 EUR (250,000 USD), resulting in a specific investment cost of 5946 EUR/kW. The high specific cost is the result of the fact that this was the first biogas-fueled CHP plant in BiH and even construction of the round digester presented a problem, since BiH companies did not possess the necessary equipment. The produced heat and electricity are consumed at the farm and cheese factory located at the farm. The company does not sell the electricity at the moment; however, in 2014 the Livac Agricultural Cooperative initiated a procedure to become an independent producer of electricity and sell all of the produced electrical energy. In January 2015, it submitted an application to the Regulatory Commission for Energy of the Republic of Srpska (RSERC) for a permit to become a producer of electrical energy. In June 2015, the application was denied on the grounds that the application was incomplete (not containing all required documentation). The EIA project will consider the possibility of providing technical assistance to this company to obtain the necessary documentation and become the first biomass power plant to supply electricity to the grid.

Livno, Esco Eco Energijad.o.o. – In 2012, FERC issued a Preliminary Permit for construction of a biomass CHP plant at the “District Heating Company Livno” to the ESCO Eco Energija Company from Livno. The planned electrical capacity of the plant is 1,250 kW and the estimated annual production of electricity would be cca 10.3 GWh. ESCO Eco Energija Company plans to continue with the construction of the biomass plant in the near future.

MG Gold BH – DonjiZabar, Municipality DonjiZabar, RS.

MG Gold BH is the first biogas power plant in BiH that has received a guarantee for the purchase of electricity at the set feed-intariff after the plant is put into operation (it is under construction at the moment). The power plant will have 989 kWecapacity, with a planned annual production of 8.275 MWh of electricity. The estimated cost of the biogas power plant is 3 million EUR (3.4 million USD), resulting in a specific investment cost of 3033 EUR/kW. This low cost is a result of the fact that the investor did not buy the technology and know-how from a foreign company specializing in biogas, but developed the design on its own in cooperation with local companies. MG GOLD owns a farm with cows, pigs and chickens and over 250 hectares of irrigated land. The feedstock for the biogas plant will be manure from the farm and corn silage. An irrigation system will be used to spread the liquid fertilizer (digestate) produced in the process of biogas production, which greatly reduces the costs of fertilizing the land. The company owns sufficient feedstock to run the plant, making it independent of outside supply.

CONCLUSION

Renewable sources sector in the Bosnia and Herzegovina has good prospects because, as we have already said, Bosnia and Herzegovina has a huge potential that has not been used yet, and as such represents an ideal opportunity for promotion of foreign investment in our country because, as it is well known, the level of utilization of renewable energy sources in individual countries reaches up to 98 % of the total potential both in Europe and worldwide.

With better organization and promotion of renewable energy sources, there are great opportunities for development both in this sector and the entire country.

This sector has a potential to provide a basis for the development of the country for future generations because of the longterm strategic development of the EU, the interest of foreign investors, positive impact on other sectors, such as tourism, environmental protection, improvement of agriculture and energy efficiency (especially heating in households), employment opportunities, importing new technologies, innovative small businesses and the cooperation between the private and public sectors.

Success of biomass based projects depends on the understanding of the stakeholders on the all levels which have to understand biomass resource base, its purposes and potential use in some other competitive branches, benefits and disadvantages of use of such material for energy purposes on sustainable manner. All these aspects point strongly to the importance of coordination and coherence of policies directing the supply and use of biomass for different purposes.

Polimac Company d.o.o.

Sarajevo, Bosna i Hercegovina

HYDRO POWER PLANTS &

SMALL HYDRO POWER PLANTS

IN BOSNIA AND HERZEGOVINA

Sarajevo, 2020

Polimac Company LTD

Bosna & Hercegovina

2020

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Overview- Hydro Power Plant “Janjići”

Location of facility: the river Bosna, the area of municipality Zenica
Type of facility: run of dam power plant
Installed capacity: 13.3 MW
Annual production: 68 GWh

Investment

Investment: 68.5 million KM
Financing: Loans and funds of JP EPBIH

Project status

Completed activities:

- Feasibility Study

Activities in progress:

- Drafting Preliminary Design for HPP Janjići
- Consulting Services: Study of Fauna Baseline Survey and Social Impact Assessment Study (ESIA)

Future activities:

- Development of Concept Design and the Environmental Impact Study

Overview- Hydro Power Plant “Una Kostela-Annex”

Location of facility: the river Una, existing HPP “Una Kostela” are of the municipality Bihać,
Type of facility: run-of derivation power plant
Installed power: 6.46 MW
Annual production : 21.42 GWh

Investment

Investment: 20.1 million KM
Financing: Loans and funds of JP EPBIH

Project status

Completed activities:

- Analysis of hydraulic performance and energy effects of the second phase of reconstruction of HPP “Una Kostela” and “HPP Una Kostela Annex” - Study on expansion
- Study of the environmental discharge based on Una river investigations at the site of HPP Una Kostela

Activities in progress:

- Drafting and Review of Preliminary Design for reconstruction and expansion

Future activities:

- Environmental Impact Assessment
- Ensuring the approval of the competent authorities for the reconstruction and expansion

Environment and Energy / Environment / Your Voice:

- Hydropower_Project_Una-Kostela_Bihac.pdf

Overview- Hydro Power Plant “Ustikolina”

Location of facility: the river Drina, Bosnian-Podrinje Canton – Goražde
Type of facility: run-of dam power plant
Installed power: 60.48 MW
Annual production: 236.80 GWh

Investment

Investments: 270 million KM
Financing: Loans and funds of JP EPBIH

Project status

Completed activities:

- Preliminary design Phase I without the site investigation works
- Environmental permit

Activities in progress:

- Ensuring the approvals of the competent authorities for the investigation works

Future activities:

- Carrying out the site investigation works aimed at completing the Preliminary Design

Hydro Power Plant “Kovanići”

Location of facility: the river Bosna, Zenica-Doboj Canton
Type of facility: run-of dam power plant
Installed capacity: 13.3 MW
Annual production: 65 GWh

Investment

Investment: 68 million KM
Financing: Loans and funds of JP EPBIH

Project status

Activities in progress:

- Drafting Feasibility Study including Site Investigation works

Future activities:

- Upon completion of the Feasibility Study it will be prepared and submitted request/unsolicited proposal for obtaining concessions

Hydro Power Plant “Čaplje”

Location of facility: the Sana River, area of Sanski Most
Type o facility: run-of dam power plant
Installed power: 11.63 MW
Annual production: 56.82 GWh

Investment

Investments: 64.5 million KM
Financing: Loans and funds of JP EPBIH

Project status

Completed activities:
Geological and geotechnical, geophysical and seismological site investigation works project for Preliminary design of HPP Čaplje, Energoinvest Energoinžinjering, Sarajevo, July 2012

Activities in progress:
Ensuring the approval of the competent authorities for performing site investigation works

Future activities:
Performing site investigation works

Hydro Power Plant “Babino Selo”

Location of facility: the river Vrbas, municipality Donji Vakuf
Type of facility: run-of derivation power plant
Installed net electric power: 11,5 MW
Electricity generation: 59.9 GWh annually

Total investment cost: 22.2 million EUR
Civil Works: 13.6 million EUR
Equipment: 7.1 million EUR
Other costs: 1.5 million EUR

Project status

Completed activities:

- The Feasibility Report including an Environmental and Social Impact Assessment (ESIA) will be funded through a WBIF grant (750.000 EUR)
- The consent to perform research works has been obtained from the Council of Municipality Donji Vakuf

Activities in progress:

- Development of Feasibility Study
- Study of hydro potential of Vrbas River completed
- PRESENTATION OF PRELIMINARY ENVIRONMENTAL IMPACT ASSESSMENT
  Presentation of "Preliminary Environmental Impact Assessment" and "Plan of stakeholders participation in project" will be held on 04/26/2016 at 13.00 in the hall of

the Donji Vakuf Municipality, all in context of Feasibility Study drafting.

- These documents can be downloaded below:

  ENVIRONMENTAL AND SOCIAL SCOPING STUDY.pdf
  STAKEHOLDER ENGAGEMENT PLAN.pdf
  PROJECT INFORMATION FLYER.pdf

Hydro Power Plant “Kruševo & Zeleni Vir”

Location of facility: the river Bioštica, the area of municipality Olovo
Type of facility: HPP Kruševo is peak HPP; HPP Zeleni Vir is compensation HPP
Installed power: HPP Kruševo / HPP Zeleni Vir – 10.97 / 2.36 MW
Annual production: HPP Kruševo / HPP Zeleni Vir – 30.76 / 9.64 GWh

Investment

Investment: HPP Kruševo + HPP Zeleni Vir – 33.75 + 9.63 million EUR
Financing: Loans and funds of JP EPBIH

Project status

Completed activities:

- The Technical Report of hydropower usage of the river Bioštica
- The Economic and Financial Analysis for HPP Kruševo with HPP Zeleni Vir
- The Study of hydropower usage of the river Bioštica in the municipality of Olovo with The Conceptual design of hydropower plants
- WBIF approved 1.0 million EURO for drafting the Feasibility study with the site investigation works on level of preliminary design and the Environmental impact assessment
- Performed technical survey and demining the area that is planned for the construction of HPP Kruševo with Zeleni Vir

Future activities:

- Drafting Preliminary design including Environmental Impact Assessment

6 HYDRO POWER PLANTS ON BOSNA RIVER

Project title: 6 Hydro Power Plants on the Bosna River: HPP Begov Han, HPP Zelece, HPP Potklecka polja, HPP Dolina, HPP Globarica, HPP Komsic

Location : The project spans over the area of three municipalities: Zepce (HPP Begov Han, HPP Zelece and HPP Globarica) Zavidovici (HPP Potklecka polja, HPP Dolina) Maglaj (HPP Komsici)

Installed net electric power : 90 MW
Electricity generation: 375,58 GWh
Investment & Technical documentation status : Project concepts and pre-feasibility studies All the conditions for obtaining concessions are fulfilled.
Project schedule: The construction phase is 5 years. With the current price of electricity (0.05 EUR per kWh), the annual income is 18 779 000 EUR. Based on that, return of investment (ROI) period is under 8 years.
Total investment cost : 150 million EUR
Form of cooperation with foreign partner : Sale of company, loans, strategic partner or joint venture

HPP BILEĆA,Trebišnjica river

Location: Bileća, Trebišnjica river

Type: Run – of – river

Installed net electric power: 33 MW

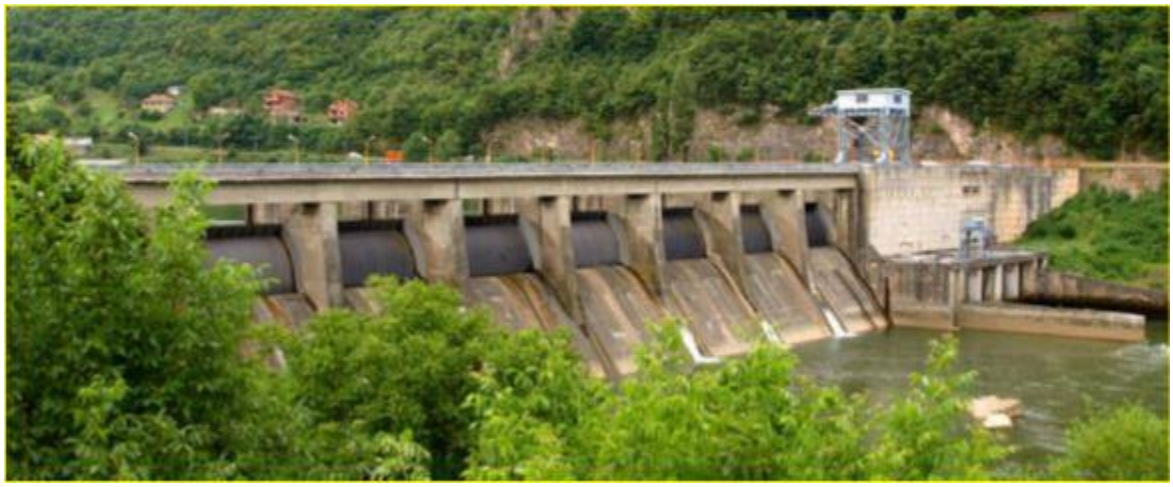
Electricity generation: 116 GWh annually

Total investment cost: 48 million EUR

Civil Works: The feeder tunnel Fatnicko field - Bileca with total length of 15.6 km was built

Investment & Technical documentation status: Preliminary Design and Study of Justification (2008)

HPP DRINA I,DRINA II, DRINA III



HPP DRINA I

Type: Run – of – river
Installed net electric power: 93 MW
Electricity generation: 396 GWhannually
Total investment cost: 155 million EUR

HPP DRINA II

Type: Up-to-dam
Installed net electric power : 93 MW
Electricity generation: 396 GWhannually
Total investment cost: 171 million EUR

HPP DRINA III

Type: Up-to-dam
Installed net electric power: 93 MW
Electricity generation: 396 GWhannually
Total investment cost : 198 million EUR

Investment & Technical documentation status: Document: “Usage of Hydro Power Potential of Upper Drina &Sutjeska” as well as Conceptual Design and the Preliminary Study of Justification completed.

HPP HAN SKELA, Jajce

Location: Jajce, Vrbas River
Type: Run – of – river
Installed net electric power: 2x6 =12 MW
Electricity generation: 52 GWhannually
Total investment cost: 29.50 million EUR
Civil Works: 12.38 million EUR
Equipment: 10.09 million EUR
Other costs: 2.03 million EUR
Investments schedule (€ million): 2013 : 11.8 ; 2014: 17.8
Investment & Technical documentation status: Prefeasibility Study completed

HPP VRLETNA KOSA, Jajce

Location: Jajce , Ugar River
Type: Run – of – river
Installed net electric power: 2x5.6 = 11.2 MW
Electricity generation: 22.538 GWh annually
Total investment cost: 6.93 million EUR
Civil Works: 3.68 million EUR
Equipment: 2.18 million EUR
Other costs: 1.07 million EUR
Investments schedule (€ million) : 2016: 2.77 2017: 4.16
Investment & Technical documentation status : Prefeasibility Study completed

HPP IVIK, Jajce

Location: Jajce, Ugar River
Type: Run – of – river
Installed net electric power: 2x5.6 = 11.2 MW
Electricity generation: 21.883 GWhannually
Total investment cost : 6.93 million EUR
Civil Works: 3.68 million EUR
Equipment: 2.18 million EUR
Other costs: 1.07 million EUR
Investments schedule (€ million): 2015 : 2.77 2016: 4.16
Investment & Technical documentation status: Prefeasibility Study completed

PUMPED STORAGE POWER PLANT (PSPP) KABLIĆ, Livno

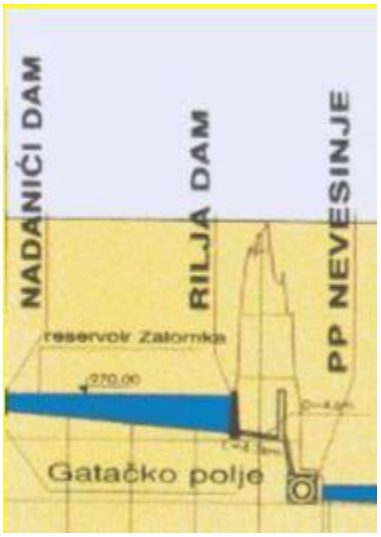
Location: Glamočko and Livanjsko field

Type: Pumped Storage Power Plant
Installed net electric power: 2x26 = 52 MW
Electricity generation: 73.44 GWhannually
Total investment cost: 58.42 million EUR
Civil Works: 30.00 million EUR
Equipment: 24.44 million EUR
Other costs: 3.98 million EUR

Investments schedule (€ million):	2015	2016	2017
	14.60	26.30	17.52

Investment & Technical documentation status : Prefeasibility Study completed 2010

HPP NEVESINJE, ZALOMKA RIVER



Location: Zalomka River, Nevesinje

Type: Run – of – river

Installed net electric power: 60 MW

Electricity generation: 100 GWh annually

Total investment cost: 100 million EUR

Investment & Technical documentation status : Preliminary Design and Study of Justification

HPP UGAR UŠĆE, Jajce

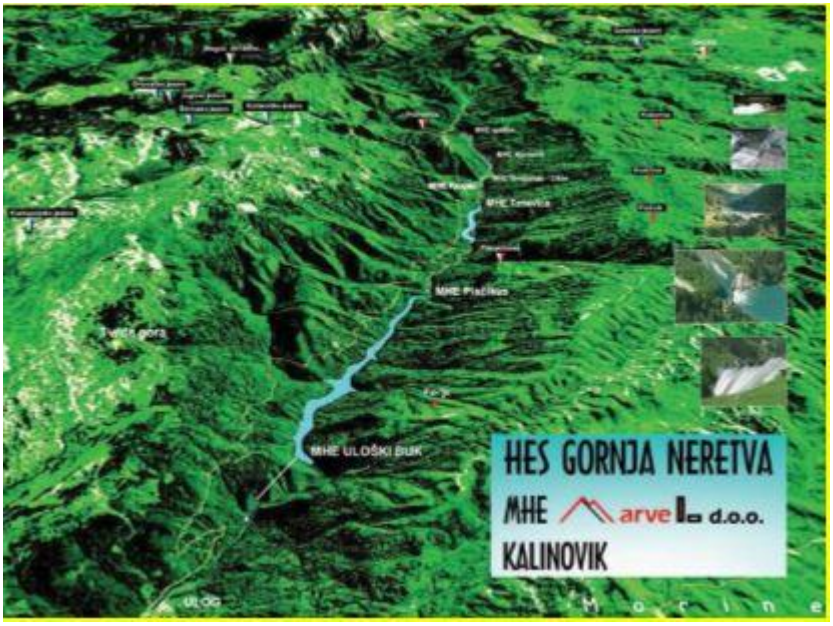
Location: Jajce, Vrbas River
Type: Run – of – river
Installed net electric power: 2x5.8 = 11.6 MW
Electricity generation: 33.188 GW h annually
Total investment cost: 12.87 million EUR
Civil Works: 8.94 million EUR
Equipment: 2.05 million EUR
Other costs: 1.88 million EUR
Investments schedule (€ million):

2014	2015
5.15	7.72

Investment & Technical documentation status: Prefeasibility Study completed

SMALL HIDRO POWER PLANTS

HPP HES “GORNJA NERETVA



Location: Municipality of Gacko and Municipality of Kalinovik

Type: Derivational, 7 small hydro power plants

Installed net electric power: 14,396 MW

Electricity generation: 53,40 GWh

Total investment cost: 28.50 million EUR

Civil Works: 16.50 million EUR

Equipment: 9.00 million EUR

Other costs: 3.00 million EUR

Approvals status: 3 small HPP in Gacko municipality: all documentation for approval completed up to the phase of getting the building permit 4 small HPP in Kalinovik municipality, Environmental study in the procedure of approval

Investment & Technical documentation status : Complete Concept Design and Study of Economic Justification

SHPP “MARIN MOST”, PROZOR RAMA

Location: Prozor/Rama

Type: SHPP

Installed net electric power SHPP: Capacity 2.470 kW

Electricity generation Possible annual production: 12.109 MWh

Total investment cost : 4.000.000 EUR

Approvals status: Study on Environmental Impact Assessment in MHE Marin most

Investment & Technical documentation status: Process of obtaining zoning approvals

Project schedule: Implementation period: 2 years

Project payback period: 7 years

MHPP ''IVANČICA'', BUSOVAČA

Location: Busovača Municipality, Central Bosnia Canton Federation of BiH
Type: Mini Hydro Power Plants
Installed net electric power: Derivational Mini Hydro Power Plants nominal power of 0,498 MW and annual production of 1.8 GWh of electricity

Total investment cost: The total project is 0,82 million EUR , the estimated annual income of 110,000 EUR

Approvals status: The main project - under construction

Investment & Technical documentation status:
The concession contract signed with the Canton Central Bosnia on 30 years. Conceptual design and Economic exploitation plan with Environmental impact assessments - made.

Project schedule Implementation period: 2 years Project payback period: 8 years

MINI HPP “PONOR“, MRKONJIĆ GRAD

Location: Ponor river, Municipality of Mrkonjić Grad

Type: Mini hydro power plants “PONOR“
Storage capacity: 2.8 million m3

Installed net electric power: 10 MW
Electricity generation: Ey 53,33 GWh/per year

Total investment cost: 28 million €
Civil Works: 25 million €
Equipment: 2 million €
Other costs: 1 million €
Approvals status: Feasibility Study

Investment & Technical documentation status:
Preliminary Study, Economic and Technical Analysis Business Plan Study on hydrology Topographic survey
Project schedule: The planned period of project implementation - 3 years The planned period of return - 9 years Projected revenues - 3,394,700 € / year

SMALL HPP “GLAVICA“, SIPOVO

Project title: Small Hydro Power Plant “Glavica“ on Pliva river
Sector : Energy
Location: Municipality of Sipovo
Location description: Pliva river is a left tributary of Vrbas river, with a length of 33 km. HPP accumulation will be positioned on downstream part of the river and SHPP Glavica on its upstream part, just above town of Sipovo.
Company description: Project owner/developer: BBB Ltd Sipovo
Project status: Ready for Implementation
Project description: Technical solution enables secure energy production on high level achieving aboveaverage energy production of 9. 5 G Wh. Water inflow is stable and constant (with average value of 22.1 m3/s in more than 45% of the time annually) on treated site.

Financial indicators: IRR = 13.8%; B/C = 1. 47; ROA = 3.1; ROE = 16.65

Estimated total investment cost: 3 100 000 EUR
Inputs provided by local partner: 300 000 EUR
Inputs required from foreign partner : 2 800 000 EUR
Form of cooperation with foreign partner: Joint venture

SMALL HPP KRUSCICA 1, VITEZ

Project title : Small hydro power Plant “Kruscica 1”

Location : River Kruscica, Vitez Municipality

Installed net electric power : Installed power 0.662 MW

Electricity generation: Annual production 2.7 GWh

Investment & Technical documentation status : Concession Agreement Approvals and Construction permit obtained

Total investment cost : 1.8 million EUR

Inputs provided by local partner : 300 000 EUR Obtaining the construction permit

Inputs required from foreign partner: 1.5 million EUR Financing the project and takeover part of the company from the owner of the concession.

Form of cooperation with foreign partner : Joint Venture Financing the project, with participation in profit during concession period of 30 years in amount of 70%.

SMALL HPP MEDNA SKLOP, MRKONJIC GRAD

Location: Mrkonjic Grad Municipality, Medljanska river

Type: SHPP

Installed net electric power: Installed Power: 0.89 MW

Electricity generation: Annual production: 4,364 GWh

Total investment cost: 1.613 million EUR

Civil Works: 0.929 million EUR

Equipment: 0.500 million EUR

Other costs: 0.184 million EUR

Approvals status: All approvals issued Main project approved

Investment & Technical documentation status: Obtaining urban permits in progress

SMALL HPP SOKOCNICA, MRKONJIC GRAD

Location : Mrkonjic Grad Municipality, Sokocnica River

Type: SHPP

Installed net electric power: Installed Power: 0.75 MW

Electricity generation: Annual Production: 3,426 GWh

Total investment cost: 1.215 million EUR

Civil Works : 0.641 million EUR

Equipment : 0.474 million EUR

Other costs: 0.100 million EUR

Approvals status : All approvals issued Main project approved

Investment & Technical documentation status : Obtaining urban permits in progress

SHPP “TOPLICA 3”, KISELJAK

Location: Lepenica, Kiseljak

Type: SHPP

Installed net electric power: Installed Capacity 619 kW

Electricity generation Ey: Possible annual production 2.980 MWh

Total investment cost: 1.500.000 EUR

Approvals status: Study on Environmental Impact Assessment in MHE Marin most

Investment & Technical documentation status: Process of urban permit obtaining

Polimac Company d.o.o.

Sarajevo, Bosna i Hercegovina

SOLAR POWER PLANTS

IN BOSNIA AND HERZEGOVINA

Sarajevo, 2020

Polimac Company LTD

Bosna & Hercegovina

2020

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GENERAL INFORMATION

Energy has a major impact on the growth and development of the economy of each country, primarily through technological development and the increasing competitiveness of the economy. Energy is a generator of development in the technological, economic, scientific and educational terms.

The energy supply is essential for the sustainability of economic development of the countries of the Western Balkans, especially due to the fact that it is a large number of relatively small economies.

From the perspective of the European Union, SEE region has been identified as a major transit region for gas, oil and electricity. World Bank research shows that the lack of energy and energy demands throughout the region will be dramatically increased in the near future.

Energy sector is one of the most powerful in B&H, with long tradition, huge potentials and opportunities for further development and investment.

According to the latest data, B & H is at first place in the region concerning the export of electricity. The export of electricity in 2014 was 5,997 GWh.

In the last three years, BiH was ranked as 24th in the world in the export of electricity, while Germany occupied first place.

In the last few years a significant growth of foreign investment in Bosnia and Herzegovina

Energy sector, has recorded. Foreign investors have recognized the potential of this sector in B&H, and also the B&H Public Companies producing electricity, invest substantial means in order to this sector enable sustainable development and growth.

WHY INVEST IN ENERGY SECTOR OF B&H?

- Energy Community Membership
- Favorable Feed-in-tariffs for RES power plant
- Low operating costs and competitively priced & qualified human capital
- Energy Reserves and Potentials

2006 B&H ratified the Treaty Establishing the Energy Community, which provides the creation of the biggest internal market in the world for electricity and gas, signed between European Union on one side,

and eight Contracting Parties: Albania, Bosnia and Herzegovina, Kosovo, Macedonia, Moldova, Montenegro, Serbia and Ukraine.

Seventeen countries have the status of Participants and directly participate in the work of the Energy Community bodies: Austria, Bulgaria, Czech Republic, Croatia, Cyprus, Finland, France, Germany, Greece, Hungary, Italy, the Netherlands, Poland, Romania, Slovakia, Slovenia and the United Kingdom.

Armenia, Georgia, Norway and Turkey have observer status in the Energy Community bodies.

The main goals of the Energy Community are:

• Creation of a stable and single regulatory framework and market space

• Providing of reliable energy supply

• Attracting investments in the electricity and gas sectors.

• Implementation of energy efficiency

• Utilization of renewable sources.

ENERGY RESERVES AND POTENTIALS

Bosnia and Herzegovina is endeavored with significant and diverse indigenous natural energy re-sources that are still untouched or only partly exploited, such as:

• The main energy resource of B&H is coal (brown coal and lignite), with estimated reserves of 6 billion tons (average annual coal consumption for electricity production is about 8 million tons)
• The hydropower potential is 6000 MW which locates B&H on the eight place in Europe and currently installed capacity of 2 054 MW represents 36% of total hydro potential ,
• According to the extensive researches, there is significant wind energy potential which is estimated at 2000 MW
• Raw material resources for the bio-mass energy are extremely favorable, including approximately 1.5 million m3 of forest / wood industry residues (all wood waste, sawdust, chips, and chipped technical wood), etc.
• Potential for exploitation of geo-thermal and solar energy are available too, but have not been sufficiently explored and exploited
• Preliminary research surveys of oil and gas, had indicated the presence of promising deposits on a number of sites in B&H (off-balance sheet reserves are estimated at about 50 million tons of oil.

B&H energy sector encompasses the following main subsectors:

• Coal

• Electric power

• Oil & Natural gas

POWER GENERATION

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

Gross electricity production in Bosnia and Herzegovina was 1328 GWh in August 2017, and it decreased by 5.4% compared to August 2016. In total gross electricity production hydro power plants participated with the share of 22.5% and thermal power plants with 77.5%

NEW POWER GENERATION PROJECTS DEVELOPMENT

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

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

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

ENVIRONMENT FOR INVESTMENT

The energy sector is central to the Bosnia and Herzegovina (BiH) economy and considered its greatest long-term development potential, since the country is a surplus generator and one of only two countries in the South East Europe region that exports electricity.

BiH has significant reserves in fossil fuels and potential in renewables, especially hydropower, where only an estimated one third of the total potential is being used currently. Almost no significant generation

infrastructure has been built in more than 25 years; the aging infrastructure reduces the security of BiH's energy supply and threatens its revenue-generating surplus electricity exports.

As a result, the country must focus on a major overhaul of its existing plants and the development of new generation capacity. BiH has extraordinary potential for the substantial expansion of generation if it can attract the needed investment.

Since hydropower is the most under-utilized natural resource, the expansion in construction of both small and a large (Drina River) hydro power plants could be the most significant. The construction and operation of this additional generation capacity would create many new jobs, which are sorely needed in BiH.

At present, the number of private investors in BiH is low despite the country's great potential and several other factors that make the country an attractive destination for investors, such as competitive labor cost, low corporate taxes, and convenient (close) access to major European consumer markets.

Some investors have succeeded in completing their projects, while others have had their projects stalled for years.

Authorization Framework

EU Authorization Framework: The Berger Study

The Berger Study covers data on permitting from a survey of 13 EU Member States: Austria, Denmark, France, Germany, Hungary, Ireland, Italy, the Netherlands, Poland, Slovenia, Spain Sweden and the UK. Although the Berger Study is focused on transmission permitting process, the basic authorization permitting processes and steps for both transmission and generation are the same.

As noted earlier in the text, the Berger Study established a generic framework for the authorization process. The meaning of the phrase "the authorization of energy projects" for the purpose of the Berger Study includes the development of a project from the identification of the need for expanding the energy infrastructure to the start of construction of an energy infrastructure project.

The four steps typical for the authorization framework of energy infrastructure projects in all EU member states are defined, as illustrated in the figure below. The four identified steps are as follows: 1) the definition of projects of public interest; 2) spatial planning; 3) the actual permitting procedure; and 4) securing the land or the right to use the land required to construct and operate the facility.

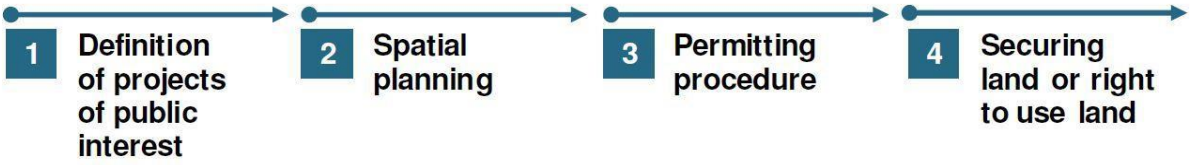


Figure 1: The Berger Study – Authorization Framework

1. Definition of projects of public interest: In many countries, the government or the Parliament identifies the need for expanding the energy infrastructure (transmission or generation facilities). Energy infrastructure projects for which legislation was passed or incorporated in planning documents are considered to be of public interest.

2. Spatial Planning: The spatial planning procedure includes two steps: 1) deciding on the location of planned energy infrastructure projects or the route they follow; 2) deciding on whether and how to adjust the existing spatial plan to be compatible with official spatial planning documents. In practice, these two steps are often inseparably linked. With regard to the first step, the location and/or route must in many countries be compatible with official spatial planning documents. The spatial plan determines for what purpose land may be used. In the process of detailing the location and/or route of the planned energy infrastructure project, the results of an Environment Impact Assessment (EIA) also play a significant role. With regard to the second step, the following considerations apply: for land to be used for building and operating energy infrastructure, the spatial plan must first be adapted to reflect the location of the energy infrastructure or its approximate route. Adapting the spatial plan can be done by decision of the legislator, and/or through a separate spatial planning procedure at a regional or local level.

3. Permitting Procedures: At its most fundamental level, the basic authorization framework for permitting energy infrastructure generally consists of a permitting procedure. The permitting procedure for the construction and operation of energy infrastructure (i) examines its technical characteristics, safety, environmental and social impact on the basis of detailed application documents compiled and submitted by the developer; (ii) examines and considers comments from stakeholders (the relevant authorities, NGOs, interest groups, people affected and the general public); and (iii) the responsible authority decides whether permit(s) will be issued.

4. Securing land, or the right to use land: The developer needs to obtain the land (or the right to use the land) required for construction and operation of the project. Affected landowners receive financial compensation.

The Berger Study tracks what it considered to be the eight key challenges to permitting procedures, noting in general that public opposition and complex permitting procedures are the most important causes of delays, at least from the perspective of investors (developers).13 The key challenges are as follows:

1. Number of Processes and Process Steps: The risk of duplicated work (meaning that the same documents are checked and assessed by two or more different levels of jurisdiction) and the risk of inconsistency between decisions, decreases with fewer processes and process steps. Further, the simpler the process, the less time the authority and the developer need to invest in coordinating interfaces between the different processes. The Berger Study indicates that Italy has one process, Germany two processes, and Hungary up to seven processes, five of the seven authorities being on more than one level.

2. Processes in Parallel or in Sequence: When one process step requires the result of another step as input means that the two processes cannot be performed in parallel, which increases the complexity of and time to complete the process.

3. Number of institutions having the competence for the issuance of permits and approvals: The number of authorities involved in the permitting process impacts the complexity of the permitting process: the more streamlined and transparent the process, usually meaning fewer authorities, the shorter and more efficient the process tends to be. Whereas in England and Wales, the Netherlands, and Italy only one authority holds overall responsibility for the permitting procedure, in Poland more than ten authorities may be responsible for a single process and no single institution has overall responsibility for driving the procedure and controlling the quality of output. Hungary and Slovenia have 4-5 responsible authorities; and France, Germany Denmark and Sweden have 2-3.16

4. Involving and Informing Stakeholders. The EIA Directive17 makes mandatory the involvement of authorities that are likely to be concerned by a project because of their environmental responsibilities or local and regional competences. Similarly, to ensure the effective participation of the public concerned, the public must be informed by appropriate means “early in the environmental decision-making procedures.”

5. Application Documents. The documents submitted as part of the permit application are crucial to the permitting procedure, as they are utilized during the public consultation and provide the basis for the permit. Interestingly, the EIA Directive requires a non-technical summary of the project application that can be understood by non-experts. Approximately 80% of the documentation submitted with the application consists of environmental documents and analyses, which typically take two years or more to prepare.

6. Resources. The lack of resources – both technical (technical, environmental and legal) and processhandling (experience with permitting processes, working with stakeholders and communications) in the responsible permitting authorities – causes delay in permitting processes.

7. Duration. Duration of the permitting process holds back many infrastructure investments and causes additional costs for developers in terms of financing arrangements and under-utilized resources or equipment. The Berger Study found that the average length of the procedure is more or less four years.

8. Cost. Both the permitting authority and the developer incur costs during a permitting procedure. The main cost driver for the authority was personnel, particularly during the public consultation stage, and at

the permit issuance stage. From the developer's point of view, costs can accumulate due to delay resulting from penalties from construction companies and unused equipment and unrealized cash flows.

Authorization Framework in BiH

According to the Constitutional organization of Bosnia and Herzegovina, the jurisdiction for conducting processes and steps within the authorization framework for the development of infrastructure projects is divided among different government levels in Bosnia and Herzegovina (the state, entity, and BD).

A typical authorization framework, as defined by the Berger Study, which includes four steps: 1) definition of project of public interest; 2) spatial planning; 3) permitting procedure; and 4) securing the land or right to use the land, can be identified at the entity level.

Thus, the permitting procedure for the development of energy infrastructure projects as the core part of the authorization framework is primarily regulated at the entity level: the Federation of BiH (FBiH), and the Republika Srpska (RS).

Further, due to the division of competences between the Federation BiH and its ten (10) cantons, established by the FBiH Constitution,23 many relevant permitting areas in FBiH are regulated by both FBiH and cantonal legislation (e.g., concessions, spatial planning). Consequently, the permitting procedure in FBiH is conducted at the FBiH and/or cantonal level. In contrast, the permitting procedure in the RS is more centralized at the entity level.

Local authorities are also involved in some specific permitting processes and steps in both entities. Although the typical authorization framework (as defined by the Berger Study) is implemented at the entity level, the issuance of some important approvals and permits are within the competence of the state level institutions/bodies, such as concessions in cases when the law authorizes the state to issue concessions, and connection to the transmission network (110 kV, 220 kV, and 400 kV).

The role of the state-level institutions in implementing energy infrastructure projects is likely to become more prominent given that almost all planned and bigger energy infrastructure projects will have an inter-entity and/or inter-state (regional) element (i.e., construction of hydro power plants on rivers running through both BiH entities and between countries such as the HPPs on the Drina River or transmission from BiH to Serbia and Croatia), for which the jurisdiction is at the state level pursuant to the BiH Constitution.

The role of the state level institutions in the permitting procedure is particularly important in light of the future implementation of Projects of Energy Community Interest (PECI), which are planned to be constructed on the territory of BiH and its neighboring counties, Serbia and Croatia. Specifically, the Energy Community (EnC) Ministerial Council adopted a list of Projects of Energy Community Interest (PECI) on October 24, 2013, including seven projects on BIH territory, with a total estimated value of EUR 1.627 billion for five electricity generation plants24 and EUR 28.8 million for two transmission lines, one to

Croatia and one to Serbia. Thus, seven PECI projects located on the BiH territory are currently on the EnC list.

Out of those seven, five projects relate to the construction of new energy facilities, and two relate to construction of transmission to neighboring countries, Croatia and Serbia.

Moreover, the EnC Ministerial Council adopted the Decision on Implementation of the Regulation (EU) No. 347/2013 on Guidelines for Trans-European Energy Infrastructure in the EC (Regulation 347) on October 16, 2015. Regulation 347 established a comprehensive framework for speeding up and simplifying the permitting procedure for construction of Projects of Common Interest (PCI) in the EU as well as for the distribution of costs between the Member States. Since October 16, 2015, the measures prescribed by Regulation 347 are binding for all signatories of the Energy Community Treaty, including BiH, and applicable to implementation of the PECI projects.

BiH is, therefore, obliged to harmonize its legislative and regulatory framework (laws, regulations and administrative procedures) with the adapted text of Regulation 347, by December 31, 2016. The promoters of PECI projects and all respective institutions in BiH are required to secure the fastest possible legal treatment in their implementation.

Some of the measures that need to be included into the legislative framework in BiH are as follows:

i) the designation of the status of the "highest state importance" to PECI projects and their prioritized treatment in the permitting procedure, including spatial planning and the Environmental Impact Assessment (EIA);

ii) the designation of one state institution (body) that will be responsible for enabling and coordination of the permitting procedure for PECI projects in line with one of the three proposed schemes (i.e., integrated, coordinated, collaborative);

iii) definition of the procedure for implementation of PECI projects, which will consist of two parts (two procedures), the combined duration of which cannot last longer than three (3) years and six (6) months. PECI projects are of crucial importance for the sustainability of the BiH energy system, increased security of supply, and connecting the BiH energy market with the markets of the EnC Treaty signatory countries, and the EU Member States.

Furthermore, the role of the state level institutions in the permitting procedure for the development of energy infrastructure projects needs to be considered in light of the size and volume of investment: namely, credible financial institutions, ability to provide a high level of funds, and request for guarantees for the repayment of their loans. A previous experience with a similar project in the energy sector in 2011, when the Italian investor SECI ENERGIA negotiated the construction of the HPPs Middle Drina (one of the projects from the PECI list) with the RS and then BiH authorities showed that international financial institutions are likely to request guarantees from the state, and not the entity, because of the Constitutional competences of the state in granting concessions comprising inter-state and inter-entity elements.

Hence, despite the fact that the entity level authorization framework is the main focus of this report, the relevant part of the authorization framework and permits pertaining to the construction of energy infrastructure projects at the state level are highlighted in this Chapter. Given its special status, the key features of the BD authorization framework are also included.

State Level

The authorization framework at the state level, as well as at the entities and BD levels, is presented using the Berger framework, which consists of the four typical steps. In addition, the types of Project Documentation that an investor needs to develop and present to the relevant authorities at the different stages of the permitting procedure in the entities and BD are also identified under this chapter, since they are generic and applicable to all government levels in BiH.

Step 1 - Designation of Status of a "Public (General) Interest": The state level authorization framework entails a few steps and processes relevant to the implementation of an energy infrastructure project in BiH. However, the legislative framework governing those steps and processes is not well developed. First, the procedure for designation of status of a "general (public) interest" to an energy infrastructure project (or any other project) at the state level is not defined by any law or regulation.

Also, no regulation authorizes a body or an institution to designate such status. The BiH Law on Concessions prescribes the requirement for an "assessment of whether a general (public) interest exists," and defines it as the responsibility of a competent state ministry where a bidder submits its proposal for a concession for which there was no public invitation (unsolicited proposal). However, the BiH Law does not identify the authorized body or institution tasked to designate such status nor does it prescribe the procedure for it.

Further, the legal framework at the state level does not define how such public interest is harmonized or coordinated with the entity public interest and that of other government levels in BiH. The procedure of determining the public interest is provided by entity laws: examples are the laws on entity governments, laws on spatial planning and construction and laws on expropriation.

Step 2 - Spatial Planning: The adoption of a Spatial Plan at the BiH level is not prescribed by the existing legislative framework. The adoption of Spatial Plans are the competences of Entities and BD; thus, this activity is stipulated by the respective entity and BD legislation. There has been no attempt thus far to coordinate the development or to harmonize Spatial Plans of entities and/or other government levels.

Step 3 – Permitting Procedures: There are two procedures at the state level that the investor is required to complete in order to develop an energy infrastructure project in BiH: the first procedure includes obtaining a concession from BiH, provided the state and not another level of government is authorized to grant such concession, and the second procedure pertains to the connection of new facilities to the transmission network.

Concessions: The BiH Law on Concessions is one of the fourteen laws on concessions in BiH. Apart from the BiH Law on Concessions, there are two entity laws on concessions, ten cantonal laws, and the BD Law on Concessions. These laws are not harmonized and are often contradictory. The abundance of laws on concessions has been identified as a major obstacle for the development of the area of concessions in BiH by a comprehensive review conducted by OECD/SIGMA, funded by the EU (the OECD/SIGMA/EU Review). Although the review was carried out in the period 2008-2009, its findings are still relevant, since there have been a few changes to the legislative framework and practice in granting concessions in BiH. The OECD/SIGMA/EU Review identifies flaws in the system of concessions in BiH and highlights discrepancies with the EU Directives.

The term concession is a very broadly defined by Article 3 of the BiH Law on Concessions as the "right granted by a Conceding Party30 to provide the construction of infrastructure and/or services and to exploit natural resources under terms and conditions agreed on by a Conceding Party and Concessionaire."

Article 4 of the BiH Law on Concessions prescribes the authority for the BiH Council of Ministers to make decisions on the type and subject of the concession to be granted, subject to approval by the BiH Parliamentary Assembly. As to the institutional structure in the area of concessions at the state level, the BiH Commission for Concessions is established and functions as an independent regulatory legal entity, which, pursuant to the BiH Law on Concessions, has an important role in the procedure for granting concessions. Finally, the BiH Law prescribes two methods for granting concessions: 1) public tender, and 2) unsolicited proposal.

The BiH Law on Concessions was adopted in 2002, while the BiH Commission on Concessions commenced its work in 2005. No concession has been granted by BiH thus far. Besides a complex political structure and continued debates over the competencies of the state and entities, many other pending issues contribute to the inefficiency of the concession-granting process at the state level. One of them is an ambiguity of the provisions of the BiH Law on Concessions.

As noted earlier in the text, the BiH Law on Concessions does not define a body or a procedure for the designation of a public (general) interest in the process of granting concessions. As an example, the state level Ministry for Foreign Trade and Economic Relations (MOFTER) received an unsolicited proposal for the construction of two mini hydro power plants (request submitted to MOFTER by the RS authorities), but the concession was not granted because it could not be established which body should make a decision that proposed projects satisfy a "public interest test" – the BiH Council of Ministers or a competent ministry. Further, the most disputed issue is related to competences for concession granting or, more specifically, whether the state or an entity is competent to grant concessions. The insufficiently clear wording of Article 1, read in conjunction with Article 6 of the Law on Concessions, contributes to a variety of interpretations.

Article 1 of the BiH Law on Concessions defines the competences of the state in the following way: "This Law sets forth the conditions under which local and foreign legal persons may be granted concessions

that are under the jurisdiction of Bosnia and Herzegovina, pursuant to the Constitution32 and laws of Bosnia and Herzegovina and where it concerns the representation of the international subjectivity of Bosnia and Herzegovina, as well as in the cases where concession property extends to the Federation of Bosnia and Herzegovina and the RS for providing infrastructure and 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."

Article 6 of the BiH Law on Concessions further prescribes that the BiH Commission for Concessions functions in the capacity of the Commission for Granting Concessions of Bosnia and Herzegovina when it performs duties and gives authorizations pertaining to concessions that fall under the exclusive competence of Bosnia and Herzegovina. In addition, the BiH Commission for Concessions functions in the capacity of a Joint Commission for Granting Concessions pertaining to concessions that do not fall under the exclusive competence of BiH, and in disputes arising from concession granting between BiH and/or Republika Srpska.

Article 1of the BiH Law on Concessions does not distinguish "exclusive competences of BiH" from those "that are not exclusive." However, the functioning of the BiH Commission for Concessions in Article 6 is derived on this basis. Although the exclusive competences of BiH can be drawn implicitly from the reading of Article 1 and are sufficiently clear, the investment projects initiated in the past showed that there was not a common understanding of what the "exclusive competences" of the state in granting concessions are. First, there was a disagreement over the issue when the unsolicited proposal was submitted by a local power utility EP BiH to MOFTER to construct a hydro power plan on the Drina River (HPP Tegare). An administrative dispute was initiated, which ended in a BiH Court decision that the state was competent for the issuance of the concession in that case. Similarly, it was raised again when an Italian investor - SECI ENERGIA was involved in negotiation for the same project with the RS and BiH authorities.

A different understanding generated by the interpretation of Article 2 with regard to competences of the state to grant concessions, which fall under category of "unexclusive competences of BiH" or "joint competences of BiH and other government levels" is even more apparent. The understanding of the meaning of what should be included under the wording "when property extends to the Federation of BiH and Republika Srpska . . ." is the focus of debate. One interpretation advocates that such wording should be interpreted to encompass any case of the construction of generation facilities on rivers that flow through both entities.

According to proponents of this interpretation, the construction of a hydro power plant on any part of the river that runs through both entities affects the entire river's flow and impacts both entities, and therefore, BiH Institutions should be authorized to grant concessions in those cases. On the other hand, another group of proponents supports a narrow interpretation, under which the BiH Institutions should be authorized to grant concessions only if a generation facility is to be built directly on an inter-entity border, or within a few meters distance from an inter-entity border; in all other cases, concessions are in

the jurisdiction of the entities. To sum up, the implementation of a concession project that requires the approval of government levels in addition to BiH, is likely to be stalled for years.

Finally, it needs to be noted that many other issues are closely related to the inability of the system for concessions to function at the state level. Some are of a political nature, such as the lack of cooperation between the state and entities; resistance to reaching political compromises over projects that would be located on the territory of both entities; missing strategies and/or parallel and often conflicting strategies at the state and entities levels; and an undefined inter-entity border. In addition, unresolved issues over state-owned property, land registries that are not up-to-date, the organization of state level structures, and the lack of capacities, expertise and financial resources of the state level institutions, are important factors to consider.

Connection to the Grid: The Transmission Company "Elektroprenos BiH," headquartered in Banja Luka (Transco BiH), was established by the Law on Establishing the Company for Transmission of Electric Power in Bosnia and Herzegovina. The main competences of Transco BiH include electricity transmission, maintenance, construction and expansion of the electricity transmission network in BiH. This is the only company for the transmission of electric power in the BiH market. Transco BiH operates at the state level, and its activities are regulated by the State Electricity Regulatory Commission (SERC).

Depending on the installed capacity, an electric power facility requires a connection either to transmission or distribution network of Bosnia and Herzegovina. Transco BiH is the only company authorized for the issuance of permits for connection to the transmission network in BiH.

The connection procedure is regulated by the Connection Rules (Rules)38 adopted by SERC. The technical aspects of the connection are prescribed by the Independent System Operator in BiH (ISO BiH) and approved by SERC in the Grid Code.

The Grid Code prescribes the procedure as follows:

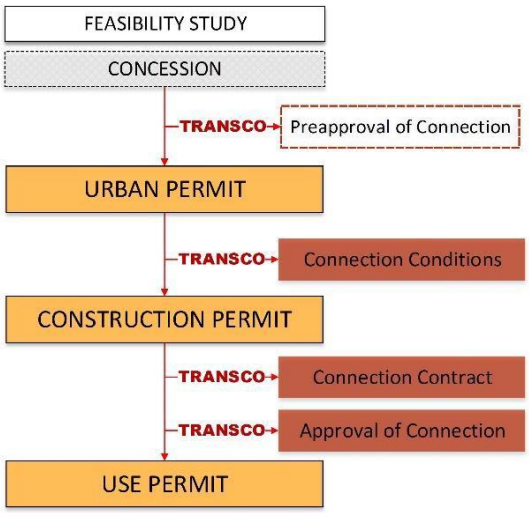
1. Connection of new facilities to the transmission network at 400, 220 and 110 kV;

2. Connection of facilities to 35, 20, 10 and 6kV medium voltage level at 110/x kV substations of the Transmission Company;

3. Existing facilities in case of an increase in granted capacity, upgrade or reconstruction of facilities;

In order to connect new facilities to the transmission network, reconstruct or upgrade existing capacities, an investor must obtain the documents and approvals from Transco BiH throughout the permitting procedure. The role of Transco BiH and stages of the issuance of the connection approvals and documents in relation to the Urban Permit and the Connection Permit are illustrated by Figure 2, and explained in the text below.

Figure 2: BiH level – Transco: Documents and Approvals



1. Conditions for Connection of the User to the Transmission Network (Connection Conditions)

The Connection Conditions define the minimum technical, construction and operation criteria that must be fulfilled for an investor to connect to the transmission network. This is a document that contains the necessary technical parameters for a connection to the transmission network in accordance to the Grid Code, such as: basic user data, location of connection, granted capacity, technical conditions for the billing-metering point nominal voltage and validity period.

The Connection Conditions define the technical criteria required by a Project Analysis of the Technical Solution for Connection (Project Analysis). The Project Analysis is a document prepared by Transco BiH (or other competent institution) on the basis of technical standards prescribed by the ISO BiH.

Application for the issuance of Connection Conditions must be accompanied by an urban permit40 issued by a competent authority in an entity. Connection Conditions are to be issued by Transco BiH within 90 days from the day of application.

Sometimes authorities competent for the issuance of an urban permit in entities (entity level ministries and/or local authorities – municipality (RS) and canton/municipality (FBiH)) require a preapproval permit for connection to confirm the possibility of connection to the transmission network. If required, Pre-approval for Connection may be issued by Transco BiH.

2. Connection Contract

A Connection Contract is signed between an investor and Transco BiH after the issuance of a construction permit and includes the terms specified under the conditions for connection. The Contract regulates technical, legal and economic conditions for connection to the network and other details of connection construction, such as: work and equipment for construction of connection, connection fees, and technical parameters for the connection point, ownership relations, and the like. The Connection Contract also determines future relations in regard to operation and maintenance of the connection.

3. Approval of Connection

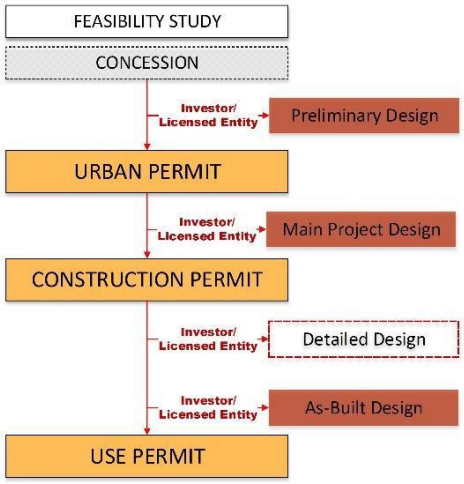
After a facility has been constructed, an on-site inspection is performed by the Transco BiH. If an investor has completed all technical and legal conditions stipulated by the Contract, then the Transco BiH will issue an Approval of Connection. This is the final approval for connection to the network and includes all relevant data, such as nominal voltage of the connection point; granted capacity; annual consumption and generation of electricity; technical characteristics of the billingmetering point; equipment parameters, and the like. The Approval of Connection verifies that all aspects of connection to the transmission network have been met in accordance to the Rules and Grid Code.

Step 4 - Securing Land, or the Right to Use Land: There are no laws or procedures at the state level that would facilitate the acquisition or the right to use land or construct on land in the development of energy infrastructure projects in BiH. The laws regulating property and other subject matters are adopted at the entity and BD level.

Project/Technical Documentation: Legislation in both entities and BD requires development of the Project/Technical Documentation, and prescribes the same type of documentation. Both terms – project and technical documentation – are used to identify the same type of documentation, and therefore have the same meaning throughout BiH. Thus, an investor needs to develop project documentation for the planned construction of a generation facility and submit it to the competent entity/BD institutions, along with the applications for the most important permits in the permitting procedure: the Urban Permit (FBiH)/Location Conditions (RS), and the Construction Permit. The Project/Technical Documentation comprises architectural drawings, documents and studies, which illustrate the concept and the use of the facility and provide technical solutions for the construction.

The deeper the investor gets into the permitting procedure, the more detailed Project Documentation is required. The types and stages of the development of Project Documentation in the permitting procedure in relation to the Urban Permit (FBiH)/Location Condition (RS) and the Construction Permit are illustrated by Figure 3 and explained in the text below.

Figure 3: Development of Project Documentation - Types and Stages



The types of Project Documentation that an investor needs to develop as the permitting procedure progresses are as follows:

1. Preliminary Project Design:

The Preliminary Project Design comprises harmonized architectural drawings, documents and studies, which outline the basic architectural, functional and technical solutions for a planned facility on the specific location. The Preliminary Project Design must be prepared before an Urban Permit (FBiH)/Location Conditions (RS) is sought, and it becomes part of the issued Urban Permit or Location Conditions.

2. Main Project Design:

The Main Project Design includes harmonized architectural drawings, documents and studies, which outline (provide) technical solutions for the planned facility, ensuring that the key terms and conditions for construction are met. The Main Project Design must be developed in accordance to the Urban Permit/Location Conditions and consistent with the Preliminary Project Design. Depending on the type of generation facility and proposed technical solutions, the Main Project Design comprises the following sections: i) architectural designs; ii) construction designs; iii) installation design, iv) technological process design; and v) steps for the installation of equipment. The Construction Permit is issued on the basis of the Main Project Design.

3. Detailed Project Design

The Detailed Project Design is a further-developed type of Project Documentation, which is required only if detailed drawings and textual explanation could not be provided under the Main Project Design, given the type of facility and other specific circumstances related to the construction. The Detailed Design elaborates technical solutions in detail and must be developed in line with the Main Project Design.

4. As-Built Design

The As-Built Design is an addition to the Main Project Design, which includes all changes and adjustments that occurred during the process of construction. The modifications should be in line with the Construction Permit. The technical inspection of the facility, which precedes the issuance of the Use Permit, is performed on the basis of the As-Built Design.

ENTITY LEVEL AUTHORIZATION FRAMEWORK: FEDERATION OF BIH (FBIH)

Step 1 - Designation of Status of a "Public (General) Interest": In a formal legal sense, the energy infrastructure projects in FBiH can get "public (general) interest" status. In compliance with legal provisions, the public interest is determined in a concession granting procedure as a "the grant of a concession in the public interest," as well as in an expropriation procedure, which includes the "construction in the public interest for expropriation purposes." In the case of expropriation, the public interest in FBiH is determined by the Law on Expropriation. All government levels in FBiH can determine projects in the "public or general interest" in accordance with their jurisdiction. Whether a project is in the public interest of FBiH is determined by the FBiH Government, and of a particular canton by the cantonal government.

Step 2 - Spatial Planning: There is no Spatial Plan for FBiH. The FBiH Spatial Plan Proposal (20082028), was discussed by the FBiH Parliament, but it has not been adopted yet. Until the adoption of the FBiH Spatial Plan, the Spatial Plan of the Socialist Republic of BiH (SRBiH) for the period from 1981 to 2000 has been applied, where it has not been contrary to the FBiH Constitution. The SRBiH Spatial Plan envisaged the construction of hydropower and thermal power plants but did not foresee the construction of non-conventional renewable energy power plants. Given that the Spatial Plan of SRBiH was adopted back in 1981, for the entire territory of BiH, which had no entities, Cantons, and the BD, it is not clear to what extent such plan has been or, indeed, could have been implemented. In addition, there are local spatial plans that have been adopted at the lower government levels. Some of the 10 Cantons in FBiH have adopted a Spatial Plan (Sarajevo Canton, Zenica-Doboj Canton, Tuzla Canton, Una-Sana Canton, Bosnia-Podrinje Canton and HerzegovinaNeretva Canton), while other Cantons do not have Spatial Plans. Also, some municipalities in FBiH have Spatial Plans and some do not.

At present, certain power facilities are envisaged by the existing spatial planning documents in FBiH (such as the hydropower plants in the upper-Neretva River – Bjelimici, Glavaticevo and Konjic), but some are not. Also, the construction of (hydro) energy facilities is possible in some areas in accordance with the current spatial plans because the land use is broadly defined. However, the size and type of such facilities is often not defined by this plan, which prevents their construction.

The adoption and harmonization of Spatial Plans at all government levels in BiH is of critical importance for the construction of energy infrastructure projects, since an urban permit, which is one of the key permits in the permitting procedure, cannot be obtained unless generation or transmission facilities are included in the existing spatial planning documents.

At present, only certain power facilities are included in the existing spatial planning documents in FBiH (such as the hydropower plants in the upper-Neretva River – Bjelimici, Glavaticevo and Konjic). Also, the construction of (hydro) energy facilities is possible in some areas in accordance with the current spatial plans, because the land use is broadly defined; however, the size and type of such facilities is often not defined by this plan, which prevents their construction.

Step 3 - Permitting Procedure: The permitting procedure is the core part of the authorization framework in FBiH. The permitting procedure for the construction of energy infrastructure facilities in FBiH is conducted at the FBiH and/or cantonal level, depending on the type and size of a facility as well as the competences. This applies for all processes and steps within one permitting procedure. In practice, this means that the investor might obtain some permits at the level of the Federation and other(s) at the cantonal level. The lack of legislative clarity that pertains to the issue of jurisdiction for the issuance of certain permits is often stressed by investors as the major cause of delays in the permitting procedure.

There are a number of documents (e.g., permits, approvals, consents, certificates) that the investor (developer) must acquire through different processes and process steps in order to begin the construction and complete an energy infrastructure project. Those processes and steps are governed by laws and regulations from the different sectors/areas (e.g., concessions, spatial planning, construction, water management), which are usually adopted on both the Federation and cantonal levels. Typically, the laws regulating the subject areas at the Federation level and those adopted at the cantonal level are not harmonized. The most illustrative example is the area of concessions. Thus, Article 3 of the FBiH Law on Concessions defines the “energy facilities that can be subject to concessions,” among other public goods, in the following way:

“. . . 2. Use of river flows and other water in the areas or the interest of two or more Cantons;
3. The construction of hydro power facilities of installed capacities over 5 MW;
4. The construction and use of hydro accumulations in the areas or interest of two or more Cantons;
5. Research or use of energy and other mineral resources. . .”

Interestingly, the above cited Article 3 of the FBiH Law on Concessions does not envision granting concessions for the construction of plants using renewable energy sources (RES), such as a solar, biogas, wind, and biomass or cogeneration plants.

On the other hand, cantonal laws on concessions define the list of public goods and/or types of energy facilities that can be subject to concessions in a non-uniform manner, different from the FBiH Law on Concessions. As an example, Article 7 the Law on Concessions of Herzegovina-Neretva Canton, prescribes the list of public goods/generation facilities, among others, for which a concession can be granted, including those using renewable energy sources (RES), in the following way:

"b) use of water and water goods for: . . . .
5) Production of electricity of installed capacities up to 5 MW, ...
c) Exploration of energy and other mineral resources, including salt and salt water as defined by other law, ...
h) Exploitation of non-metal mineral sources, including all secondary mineral resources defined by other law, ...
n) and for the construction of the energy facilities:

1) Wind power up to 5MW of installed capacities per production unit and wind parks,
2) Cogeneration facilities of up to 5 MW of installed capacities,
3) Solar power plants between 20 kW and 5 MW of installed capacities."

In addition, the laws governing various sectors pertaining to a permitting procedure across the Federation are not harmonized between themselves. For example, there is no generic or standard term used as a single reference for an "energy infrastructure facility/project" or "generation facility." Moreover, no precise definition of the term is provided in any law, so it is often unclear what types of generation facilities are subject to regulation. In fact, each sectoral law defines energy infrastructure facilities differently. Thus, in the legislation governing spatial planning and construction, reference is made to "construction buildings and works" and "building complex," without defining what kind of buildings are encompassed by those terms. Further, the terms "hydro power facilities" and "hydro accumulations" are used in the sector of concession at the Federation level, without clear reference to other types of generation facilities. Finally, other sectoral laws refer to a "generation facility" as an "electro-energy object," again without defining this term.

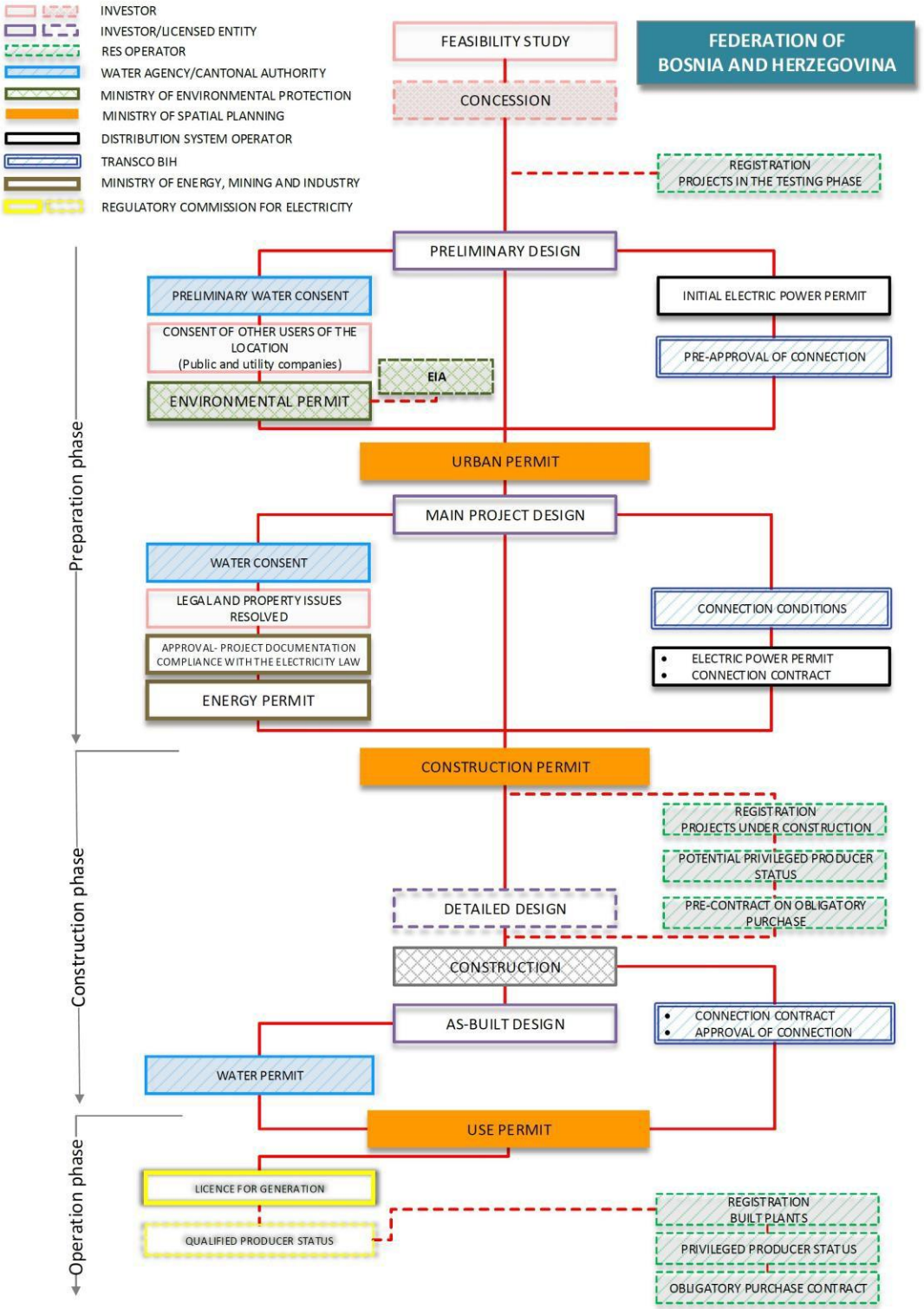
Typical processes and steps of a generic permitting procedure for the construction of a generation facility in the FBiH are illustrated by Figure 4 and explained in this chapter. Although all described processes and steps are required by laws and regulations, the two most important permits are: 1) the Urban Permit, and 2) the Construction Permit. The majority of other permits/approvals and consents are obtained as a precondition for the issuance of these two permits.

Further, the issuance of some permits consists of multiple steps and/or the issuance of progressive administrative decisions/acts as the permitting procedure progresses, which lead to the issuance of a final permit from that category. For example, a Water Permit is acquired at the end of the process (before the issuance of the Use Permit), but only after the Preliminary Water Consent and the Water Consent for that facility had been issued earlier in the procedure. All those water acts are issued by the same authority – the Water Management Agency – in the same permitting procedure and following the collection of required information. The Preliminary Water Permit contains the conditions and methods of use of water, and the documentation requirements; the Water Consent confirms the submission of the required documentation; and the Water Permit defines the operational conditions and disposal of waste.

In order to clearly illustrate this process in this Report, when necessary for clarity and coherence, the respective permits are grouped and presented on the basis of category and/or the institution competent for their issuance (e.g., water, connection to distribution network, RES production), rather than in the exact order of their collection as illustrated by Figure 4. In addition, each category of permit is identified by the same pattern and color in the diagram; for example, all water acts are colored in blue and illustrated by a diagonal pattern. Where a category of permits is described, for context and clarity at the beginning of that section, a process diagram containing the permitting process in such category in relation to the two main permits – the Urban Permit and Construction Permit – has been extracted from the overall diagram in Figure 4.

Since some procedural steps are optional and depend on the legal requirements for the type and size of generation facility and/or whether the competent authority deems the procedure necessary (e.g., concession, EIA), such procedure is presented in Figure 4 by dotted lines. A solid line is used to identify the required procedural steps that an investor must take.

Figure 4: FBiH – Permits and Competent Institutions



Concessions: In order to construct a certain type of energy infrastructure facility in the FBiH, such as a power plant in the FBiH, it might be necessary for an investor to acquire a Concession. A Concession can be granted at the level of FBiH, or, as stated in the 2002 FBiH Law on Concessions, at the cantonal level pursuant to the respective Cantonal Laws.

The legislative framework governing Concessions in FBiH, which includes the FBiH Concessions Law and 10 cantonal laws on concessions is not harmonized, particularly concerning the requirements for construction of RES generation. Thus, whether a Concession is required for the construction of a wind power plant, a solar power plant, a biomass or a biogas power plant varies from one Canton to another.

The FBiH Office for Audit conducted a performance audit on concessions, and developed a Report entitled "Performance Appraisal – Management of Concessions in the Federation of Bosnia and Hercegovina" (the Performance Report), dated February 2011. The Performance Report highlighted the need for the harmonization of cantonal laws on concessions (and other laws governing the areas that can be subject to concessions) with the FBiH Law on Concessions, as well as EU Directives pertaining to Concessions. No harmonization has been conducted thus far.

FBiH level: The FBiH Law on Concessions does not specify at which stage of the permitting procedure a Concession must be acquired, if mandatory. Most investors, however, request a Concession at an early stage of the process, immediately after the development of a Feasibility Study and prior to an application for the Urban Permit. Thus, in the flow chart, illustrated by Figure 4, a step for acquiring a Concession is included at the beginning of the permitting procedure.

The term "Concession" is defined by the FBiH Law on Concessions somewhat differently than by the state law: "The right to perform an economic activity through the use of natural resources, the resources in public use, and the performance of an activity in the public interest pursuant to this Law."

Article 3 of the FBiH Law on Concessions stipulates the list of objects or areas that may be subject to Concessions, including the energy resources. Further, Article 6 of the FBiH Law on Concessions prescribes the projects for which the FBiH Government has the authority to grant Concessions, including energy infrastructure facilities. Article 6, in pertinent part, reads as follows:

"2. use of river flows and other water in the areas or in the interest of two or more Cantons;
3. the construction of hydro power facilities of installed capacities over 5 MW;
4. the construction and use of hydro accumulations in the areas of interest for two or more Cantons;"

The Amendments to the FBiH Law on Concessions, passed in 2006, added a new requirement for the FBiH Government when deciding on Concessions under Article 6 of the FBiH Law on Concessions: namely, if a Concession has an impact predominantly on one municipality, a prior approval from the Municipal Council of the local community is also required.

The FBiH ministries, or other bodies designated by the FBiH Government to grant Concessions, play the role of Conceding Parties in the Concession Process. Competent ministries and bodies have the prime responsibility for the determination of a potential Concession, preparation of responses to unsolicited proposals, and for implementing procedures for approving Concessions, including negotiations with potential Concessionaires. In order to initiate the procedure for Concessions, listed under Article 6 of the FBiH Law on Concessions, FBiH Government prior approval is required. The entire procedure is subject to control by the FBiH Government and the FBiH Commission for Concessions, which is established as a professional and permanent body, similar to the BiH Commission for Concessions.

A Concession Contract can be concluded for a period of up to 30 years. Exceptionally, the period can be extended to a maximum of 50 years.

According to the 2014 Annual Report of the FBiH Commission for Concessions (the Annual Report), a total of two (2) Concessions have been granted at the FBiH level thus far:
1) hydro power plant (HPP) Vranduk – EP BiH (2012); and
2) HPP Janjici – EP BiH (2014).

The Annual Report noted that HPP Mostarsko Blato – that was already constructed by EP HZHB - requested a Concession in 2013 retroactively because it could not get an operational license from the Federation Energy Regulatory Commission (FERC), but the procedure has not been completed yet.

Cantonal level: Apart from the laws, many cantons have adopted their own cantonal regulation defining the Concession Procedure, authorities, and other Concession matters. Consequently, each Canton has its own structure and procedure governing the area of Concessions, different from other Cantons. In addition, a lower level of authority in each canton is each individual municipality, which also has its own local government and regulations affecting certain aspects of Concessions.

The Performance Report pointed out to the issue of transparency by stating that, “Although explicitly favored by the laws on concessions, there is a little evidence of the transparency of the process. The laws on concessions allow granting Concessions on the basis of unsolicited proposals, without public tender, which is not in line with best EU practise and Directives.”

Also, there is no public Registry of Concessions granted in FBiH nor a system for monitoring their realization (execution) and payment of fees. Further, there is no mechanism for recording the number of submitted applications for Concessions or information on granted Concessions that have not been realized. Very little information is available on the internet.

The laws on concessions in FBiH do not prescribe the deadlines for the implementation of the procedure pertaining to granting a Concession. The majority of Concessions have been granted through the procedure based on an unsolicited proposal. According to the Performance Report, the main factors

influencing the length of the procedure are pending approvals from the Municipal Council and late approvals of a Concession by the competent bodies.

Furthermore, the OECD/SIGMA/EU Review pointed out that: “The most worrying fact is that laws enable a bidder to prepare a Feasibility Study for the Concession, instead of requiring its development from a Conceding Party. This applies to both procedures: public announcement (tender) and unsolicited proposals. Through transfer of this task from the Conceding Party to the bidder, the definition of requirements of the Conceding Party is done by its future partner, who is by default extremely interested to be selected to be the private partner on the specific project, and, therefore, has a vital interest in presenting the needs and benefits of the Conceding Party in very positive sense. The preparation of the Feasibility Study, including environmental impact assessment (EIA), is usually the key task of the competent authority. The Feasibility Study contains specificities, which enables the authority to compare and evaluate the received bids.”

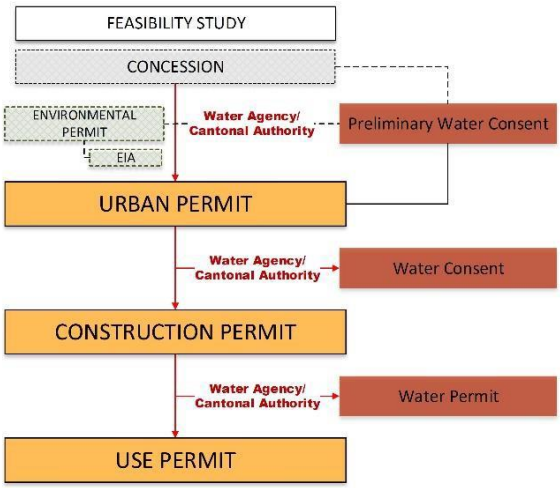
Since there is no public registry of concessions issued in FBiH, it cannot be established how many Concessions in the energy sector have been granted at the cantonal level to date. The OECD/SIGMA/EU Review noted that at the time their expert team was assessing the area of Concessions in BiH (2008 – 2009), approximately 300 Concessions had been granted at the cantonal level, mainly to local enterprises. There were a few exceptions including concessions for mini HPPs to Dutch and German companies.

Concession Fees comprise two types of payments. The first type of payment is a lump sum, which needs to be paid immediately after the Concession Contract is concluded, and cannot be less than 1.5% of the total planned investment. The second type of payment is paid as an annual fee, calculated on the basis of generated revenue.

Water Acts:

In order to acquire the right to use water by the new generation facility, an investor must go through different steps to acquire administrative documents, which will gradually lead to the final stage of obtaining a Water Permit. As the permitting procedure progresses, the competent authorities require more detailed information. The authorities make and issue administrative decisions – water acts along with this process. Figure 5 below identify the stages and the order of the issuance of water acts in relation to the Urban Permit and the Construction Permit.

Figure 5: FBiH - Water Acts – Consents and Permits



Water acts are administrative documents through which water use and water waste are defined. The issuance of these water acts is regulated by the FBiH Law on Water54 and the FBiH Regulation on Content, Form, Terms and Method of Issuance and Maintenance of Water Acts (the FBiH Regulation on Water Acts).

There are three types of water acts that are required to be obtained for any use of water or disposal of water waste by certain commercial activities, including energy facilities,56 which extends the volume of a general (ordinary) use of water, regardless of its impact. Thus, along with the permitting procedure for the construction of a new generation facility, the investor needs to obtain the following three water acts:

a. Preliminary Water Consent
b. Water Consent
c. Water Permit

a) Preliminary Water Consent: The Preliminary Water Consent is an administrative act, which defines the conditions for the right to use water and the allowed methods of such consumption, as well as the terms that need to be fulfilled by the investor's documentation for the construction of new or the reconstruction or removal of existing facilities that can permanently, temporarily or occasionally have an impact on the water regime. The issuance of a Preliminary Water Consent is mandatory for all energy facilities and is sought in the process of acquiring an Environmental Permit or an Urban Permit.

Also, if a Concession is required for the construction of the specific generation facility, the Preliminary Water Consent needs to be obtained prior to the Concession.

If a Preliminary Water Consent is requested in the Concession Process or in the process of acquiring the Environmental Permit, then such request needs to be submitted by the institution/body competent for granting a Concession or for the issuance of the Environmental Permit. However, in case those two processes are not required for that type of a generation facility by the law, then an investor is obligated to request an issuance of the Preliminary Water Permit.

The new FBiH Regulation on Water Acts, adopted recently in 2015, requires a Water Study for the Issuance of the Preliminary Water Consent, which is a new requirement. The Water Study needs to be prepared by the authorized legal entity that is included in the official list of authorized entities.
The issued Preliminary Water Consent is valid up to three years, during which period the request for Water Consent must be submitted.

b) Water Consent: The Water Consent is the second step in acquiring a final water permit. The Water Consent verifies that the documentation submitted by the investor with the request for the issuance of Water Consent meets the terms and conditions defined by the Preliminary Water Consent and water regulations.

A Water Consent needs to be obtained in the permitting process for the construction or reconstruction of all facilities for which the Preliminary Water Consent is required and issued in the previous stage. A Water Consent needs to be acquired before the issuance of a Construction Permit.

c) Water Permit: The Water Permit defines the purpose, the method and conditions for the use of water, the terms and condition for disposal of water waste and solid and liquid waste, and other terms and conditions as necessary.

A Water Permit certifies that the terms defined by a Water Consent are met. A Water Permit is issued on a temporary basis, up to a maximum of 15 years. The acquired rights to use water or the release of water waste by one investor cannot be transferred to another.

Institutions/bodies that are competent to issue Water Acts are defined by Article 139 of the FBiH Law on Water. Competences are divided between the FBiH and cantonal authorities, or more specifically, between the two FBiH Agencies for Water Management: the Agency for Sava Basin and the Agency for the Adriatic Sea Basin on the one hand (Water Management Agencies), and the Cantonal Ministries competent for the issuance of Water Acts on the other. Competencies for the issuance of water acts between Water Management Agencies and competent Cantonal Ministries are divided on the basis of the rivers' categories, among other criteria. Thus, Water Management Agencies are, for example, in charge of the issuance of water acts related to the construction of HPPs on bigger rivers falling under

Category 1 (for example, the Bosna, Neretva, Drina and Una Rivers), while Cantonal Ministries are authorized to decide a water request for the construction of HPPs on the rivers under Category 2 (smaller rivers), and up to 5 MW of installed capacity.

Consent of Other Users of the Location: In order to apply for an Urban Permit, the investor must also obtain written approvals (consents) from all users operating at the location (users operating on the soil and space above the location site) where a generation facility will be constructed (Users). In accordance with the Law on Spatial Planning and Land Utilization of the FBiH (Law on Spatial Planning), an Urban Permit specifies urban and technical conditions for a specific location. These conditions are determined and evaluated on a case-by-case basis, depending on the number of Users at the location.

Consents of Users usually include consents issued by Telecom Companies, Gas Companies, Public Road Management Companies, Water, Sewerage and other Utility Companies. Each User must issue a written consent separately and define the conditions, if necessary, that must be met if a generation facility is to be constructed at the site.

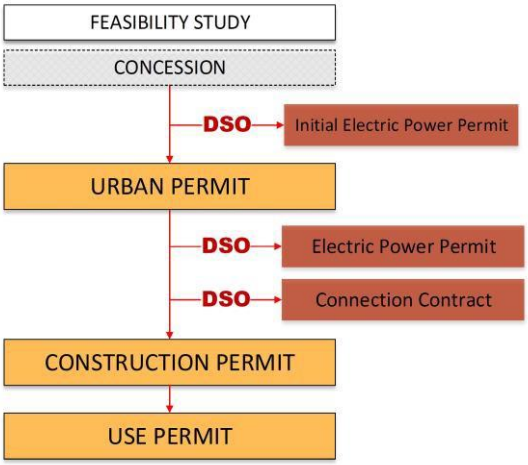
Connection to the Distribution Grid (Network): Before a Construction Permit is issued for a generation facility of low and medium voltage, the investor must have two permits for connection to the distribution grid: an Initial Power Permit and an Electric Power Permit.

The Initial Power Permit must be requested and issued at the beginning of the permitting procedure and prior to the request for the Urban Permit, while the Electric Power Permit must be issued prior to the start of construction, or, more specifically, before the Construction Permit is obtained.

Both permits are issued by the Distribution System Operator (DSO) at the request of an investor as illustrated by Figure 6 below. The DSO is a legal entity licensed for power distribution activity.

At present, there are two public utility companies licensed for power distribution in the FBiH – EP BiH and EP HZHB. Based on the issued Electric Power Permit, a Connection Contract is signed between the investor and DSO.

Figure 6: FBiH – Stages of Connection and Permits Issued by DSO



Initial Electric Power Permit: As defined by the General Conditions for Electricity Supply (General Conditions), the Initial Power Permit is issued as a confirmation that the planned facility can be connected to the power distribution grid in accordance with the power conditions and planned development for that specific area. In this permit, the DSO will also evaluate the effects of the planned generation facility on the distribution network.

The investor must submit an application for the issuance of this document, which contains all the necessary data that the DSO requires in order to determine all aspects of the connection to the distribution network, such as the data on the investor and the facility, purpose, capacity and annual consumption of electricity, list of appliances, and the like. Within 30 days following the date of the receipt of the "completed application," the DSO will issue the Initial Power Permit (if the decision is positive), which contains the information on installed power, and technical and other general conditions for the connections.

The period of validity of the Initial Electric Power Permit is one year; however, it can be extended for one additional year.

Electric Power Permit: Documents submitted with the application for the Electric Power Permit enables the DSO to estimate the economic and technical aspects of the connection. At this stage, the DSO also requires the relevant part of the Main Project Design or Detailed Design in addition to other documents.

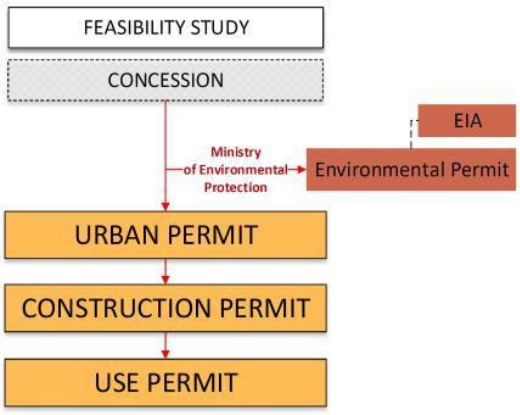
The DSO is obliged to decide upon the request for the Electric Power Permit within 30 days following the day of the receipt of a completed application. Typically, the Electric Power Permit contains the following: data on the applicant, installed capacity, the type of primary energy, voltage levels, the technical data, such as data on billing and the metering point, data on the connection point. This permit is not issued for a specific period of time, but it provides a mandatory time-frame in which the investor will have to sign the Connection Contract with the DSO.

The Connection Contract is based on the data specified by the Electric Power Permit, which contains the following basic information: data on both contracting parties, the subject, technical aspects of the connection point, ownership status, deadline for the construction of connection point, and the deadline for connection to the distribution network. The investor also has to pay connection fees, while the DSO is obliged to construct the connection point within 30 days from the date of signing the Connection Contract. According to the General Conditions, connection points are constructed and owned by the DSO.

The actual connection to the distribution network is performed after the works inside the facility have been completed and the construction of the connection point has been finalized.

Environmental Permit: An Environmental Permit is required as a precondition for the issuance of an urban permit for all generation facilities for which an Environmental Impact Assessment (EIA) is compulsory.

Figure 7 illustrates at what stage the Environmental Permit is issued in the FBiH permitting procedure:



The FBiH Regulation on Plants and Facilities that regulates the requirement for an EIA defines the types of generation and other energy infrastructure facilities that require an EIA. In addition to determining the types of plants and facilities for which an EIA is compulsory and thus cannot be constructed without an Environmental Permit, the FBiH Regulation on Plants and Facilities also determines the jurisdiction of FBiH in issuing an Environmental Permit for a certain category of projects, including those from the energy sector. Thus, according to Article 4(a) of the FBiH Regulation on Plants and Facilities, an EIA is mandatory for the following:

"3. Thermal plants and other facilities of 50 MW of installed capacity and over,
4. Facilities for production of hydro-power energy over 5 MW of installed capacity for the individual facility, or 2 MW for several facilities located within distance less than 2 km from each other,
5. Construction of power lines: -110 kV, if they are a part of the transmission network, -220 kV and more."

For the generation facilities and other energy objects listed under Article 4(a), an Environmental Permit is issued by the FBiH Ministry for Environment and Tourism (the FBiH Ministry for Environment) after the EIA is conducted.

Further, the BiH Regulation on Plants and Facilities also defines a second group of plants and facilities from the energy sector, for which the FBiH Ministry for Environment is authorized to issue an Environmental Permit after the FBiH Ministry for Environment has assessed in each individual case whether an EIA is necessary. Article 6 prescribes generation facilities that fall into this category, as follows:

"4. Facilities for the use of wind power for the production of electricity (wind miles) of 2 MW of installed power or 4 converters,
5. Hydro-power facilities up to 1 MW of installed capacity."

The procedure for obtaining an environmental permit in case of construction of a hydro-power plant up to 1 MW of installed capacity on the territory of FBiH includes the following two steps:
i) the FBiH Ministry for Environment makes a preliminary assessment on whether an EIA is required; and
ii) if the FBiH Ministry for Environment decides that the EIA is required, then the investor (developer) is obliged to complete an EIA Study within six months from the date of the issuance of the Ministry's opinion.

Articles 12-19 of the FBiH Regulation on Plants and Facilities define the content of the EIA Study. The list of legal entities authorized for the development of EIA Studies is available on the Ministry's web site. The FBiH Ministry for Environment manages a public consultation process pertaining to the EIA Study, which is conducted at locations closest to the proposed construction site.

The investor who seeks an Environmental Permit must have previously obtained a Preliminary Water Permit. The FBiH Ministry for Environment's decision on an Environmental Permit is a final administrative act, meaning that an appeal is not allowed to the second instance administrative body.

However, a dissatisfied party can initiate an administrative dispute before a competent court in FBiH. An Environmental Permit is valid for five (5) years. Environmental court cases are still rare, although there have been several "heated public debates."

Some cantons in FBiH have cantonal laws on environmental protection. Article 2 of the FBiH Regulation on Plants and Facilities prescribes that Cantonal Ministries competent in the environmental area will issue Environmental Permits for plants and facilities for which an EIA is not required, as well as for those that are beyond installed capacities and parameters prescribed by the FBiH Regulations on Plants and Facilities, or those that are not listed by it.

Urban Permit: The Urban Permit is one of the main (key) permits in the permitting procedure for the construction of a generation facility. Through issuance of an Urban Permit, a competent body at the respective government level (FBiH, Canton, or municipality), certifies that the construction of a specific plant or a facility is in line with spatial planning documents and other terms and condition envisioned for that area (location), as well as other pertinent laws and regulations.

When requesting an Urban Permit, the investor is obliged to submit a Preliminary Design, together with other previously obtained permits.

Article 40 of the FBiH Law on Spatial Planning and Land Utilization (the FBiH Law on Spatial Planning) prescribes the competences for the FBiH Ministry for Spatial Planning in issuing Urban Permits. Thus, the FBiH Ministry for Spatial Planning is authorized to issue Urban Permits in the following cases:

"1.) Facilities and works covering the territories of two or more Cantons
2.) Facilities and works in the interest of FBiH in the areas and locations that are important for FBiH
3.) On inter-state borders
4.) Free zones
5.) Facilities and activities that can have an impact on the environment, life and health of FBiH Citizens
6.) Facilities and works in the interest of and importance for FBiH
7.) Facilities and works in the areas of national monuments."

Article 40 also stipulates that the FBiH Ministry for Spatial Planning is obliged to obtain an opinion from the cantonal authorities prior to the issuance of an Urban Permit.

The issuance of an Urban Permit for generation facilities other than those listed in Article 40 of the FBiH Law on Spatial Planning and Land Utilization is within the competence of Cantons (cantonal and/or

municipal authorities), and therefore such procedure is defined by cantonal laws on spatial planning and construction.

An Urban Permit determines the urban and technical requirements for a specific generation facility, which the investor must meet, including the terms and conditions specified under previously obtained permits, such as the Preliminary Water Permit, the Environmental Permit, the Initial Electric Power Permit, Consent of Other User of the Location, and Pre-approval of Connection.

The FBiH Law on Spatial Planning and cantonal laws on spatial planning and construction allow the competent authorities to request other documents, if necessary. Thus, the FBiH Law for Spatial Planning prescribes that the Ministry may request submission of "other documents depending on the complexity of construction."

The Urban Permit is valid for one year, during which period the Construction Permit must be requested. Approval of Project Documentation – Compliance with the Electricity Law: A new process step in the permitting procedure for the construction of generation facilities, was introduced by the FBiH Law on Electricity,adopted in 2013. Specifically, Article 101, paragraph 1, of the FBiH Law on Electricity provides that investors are required to acquire an Approval of the Project Documentation Regarding Compliance with the Electricity Law and other Regulations from the FBiH Ministry for Energy, Mining and Industry (FMERI). The investor modifies and develops Project Documentation throughout the permitting procedure.73 In this stage, the Project Documentation is developed as the Main Project Design. The Approval of the Project Documentation, or the Main Project Design, by FMERI must be obtained before the application for a Construction Permit is submitted to the authorities that are competent to decide on a request for a Construction Permit.

As an example, the Review of the Project Documentation (the Main Project Design) for the construction of the generation facilities for which FBiH has competence includes the following:

" a) Level of harmonization of the Project Documentation with regulatory, technical and other regulations, standards, technical norms and recommendations governing the area of construction of generation facilities that are of importance for FBiH;
b) Complexity of the Project Documentation;
c) Technical Revision;
d) Procedures of the development of Project Documentation."

In addition, the Review of Project Documentation for the generation facilities that use renewable energy resource as their primary source of energy, is checking the documentation's harmonization with the Action Plan for the Use of Renewable Energy Resources in FBiH (the Action Plan for RES), issued by FMERI in May 2014.

Energy Permit: The Energy Permit is defined by the FBiH Law on Electricity as an administrative act issued by FMERI in the permitting procedure that precedes the construction and/or reconstruction of a generation facility. The FBiH Law on Electricity prescribes the competences of FMERI in issuing energy permits for all generation facilities, including those that are within Cantonal competences. Article 78 of the FBiH Law on Electricity, prescribes that FBiH is authorized for the construction of the following generation facilities:

"1) Hydro-energy objects above 5 MW of installed capacity and a few subsequent hydro-energy objects, each above 2 MW of installed capacity, and 2 km distance from each other;
2) Thermal-plants and other combustion facilities with heat output of 50 MWt and over;
3) Generation using wind power over 2 MW of installed capacity;
4) Generation using solar power of 1 MW of installed capacity and over;
5) Other generation of 5 MW or over."

Further, Article 78 prescribes that Energy Permits for the construction of generation facilities, listed under the above-cited paragraph (3), of installed capacities of 30 MW or over, are issued by FMERI, following the approval by the FBiH Government and the FBiH Parliament. However, for the construction of generation facilities of less of 30 MW of installed power, FMERI needs only FBIH Government approval.

The FBiH Regulation on Procedure, Criteria, Form, and Content of the Request for the Issuance of Energy Permit for Construction of New and Reconstruction of Existing Generation Capacities (the FBiH Regulation on Energy Permit)76 regulates all details required for the issuance of an Energy Permit, including the deadlines for the issuance and public consultation process.

Hence, Article 22 of the FBiH Regulation on Energy Permit prescribes that FMERI is required to finalize the Energy Permit request within three (3) months from the date of its notification that the request has been completed, unless FMERI decides that two (2) additional months are needed to complete the procedure. Also, Article 23 of the FBiH Regulation on Energy Permit defines issues such as drafting the Energy Permit, informing the public, and gathering comments.

FMERI issues a permit in the form of a certificate consisting of the Energy Permit and the terms and conditions for its issuance. The Energy Permit can be issued for a maximum of a five (5) year period.

Construction Permit: After the investor has acquired an Urban Permit, Water Consent, Energy Permit, Electric Power Permit and developed the Main Project Design for the construction of the generation facility, then it can request a Construction Permit. The Construction Permit is one of the main permits in the permitting procedure in addition to the Urban Permit. In addition to the abovelisted documentation, one of the preconditions for obtaining a Construction Permit is that property and legal issues at the construction site have been resolved.

As a rule, the authorities that have issued an Urban Permit in an earlier phase of the permitting procedure are authorized for the issuance of the Construction Permit for that generation facility, as well as for the Use Permit at the later stage. Thus, the FBiH Ministry for Spatial Planning is competent to decide on a request for Construction Permit of the generation facilities listed in Article 40 of the FBiH Law on Spatial Planning, while competent Cantonal Ministries are competent to decide on the request for a Construction Permit for the facilities defined by the Cantonal Laws.

The competent authority for the issuance of a Construction Permit (FBiH/Canton) is obliged to determine whether the Main Project Design is developed in accordance with the terms and conditions defined by the previously-issued Urban Permit for that facility. A Construction Permit will expire if construction works do not commence within one year following the final date of the issuance. However, the Construction Permit can be extended for an additional year, if the delays can be justified.

With regard to the construction of energy generation projects, especially bigger HPPs and thermal plants, investors usually approach the construction of those facilities sequentially, building one part of the facility first, and then the other parts at later stages. In such case, the investor must request a Preliminary Consent for the Construction of a Part of the Facility Complex. Such approval is prescribed by Article 61 of the FBiH Law on Spatial Planning and can be issued for one or more facilities that are part of the planned facility complex. The Preliminary Consent for Construction of a Part of a Facility Complex determines the parts of a "facility complex," their functional or/technological connections, and the order of issuance of an individual approval for construction of them. The Urban Permit for the entire facility complex must be obtained before the Preliminary Consent for Construction of the Part of the Facility Complex is requested.

Use Permit: After the generation facility has been constructed, or a part of such facility, which is a separate economic or technological unit that can be utilized, it can become operational, provided the investor has obtained a Use Permit. The request for the issuance of a Use Permit must be accompanied with the previously obtained Construction Permit. A Use Permit is issued after a technical inspection of the facility is performed. Competent authorities are required to perform a technical inspection within 30 days following the date of the submission of a request.
A facility for which a Construction Permit is not issued or which has no Use Permit cannot be registered in the land registry.

License for Electricity Generation: In order to perform activities in the electricity market after the construction of a generation facility has been completed, the investor must first obtain a License from the FBiH Regulatory Commission for Energy (FERC). The proceedings related to the license application, criteria, conditions and license contents are defined by the Licensing Rules issued by FERC.

An investor that intends to perform the activity of electricity generation has an obligation to file an application for a license from the Federation Energy Regulatory Commission. FERC is authorized to issue a License for Electricity Generation. An application is required to be submitted in the prescribed form, along with a number of documents, approvals and permits listed under Articles 22 and 23 of the Licensing Rules. Some of the documents required are as follows: Water Permit, Environmental Permit, Concession Contract (if required), Electric Power Permit and Use Permit.

A decision on the issuance of License is made within 60 days from the day of submission of the completed application, and the validity period of the license is 30 years. The License contains, among other things, the identification of the license holder, registration number, a code that is the licensee's identification in the electricity market and the validity period.

System of Incentives for Production and Purchase of Electricity from Renewable Generation and Efficient Cogeneration: In order to stimulate the production of electricity from RES and efficient cogeneration, a system of incentives for production and purchase of electricity from renewable generation has been established by the FBiH Law on the Use of Renewable Energy Sources (RES) and Efficient Cogeneration80 (the Law on RES), and supporting regulations.

In essence, all electricity end users (consumers) in FBiH are obligated to pay a surcharge for the production of electricity from RES as an incentive for RES generation, while eligible producers of electricity from RES are entitled to receive the currently valid feed-in-tariffs81 for the period of time specified under a contract signed with the Operator for Renewable Energy Sources and Efficient Cogeneration (the Operator).

The Regulation on Incentives of Electricity Production from RES and Cogeneration, Determination and Collection of Fees as Incentives (the Regulation on Incentives) passed by the FBiH Government, defines the methodology for determining incentive fees and the eligibility criteria for the status of privileged producer. The eligibility criteria are based on the installed generation capacities, as well as the type and/or technology used for the generation (e.g., solar, wind, biogas).

The Operator: The Operator acts as a non-profit entity in order to create an institutional structure for the operationalization of the system of incentives for production and purchase of electricity from renewable generation and efficient cogeneration.

Article 10 of the Law on RES defines the competences of the Operator. Some of the competences include: keeping records of the total electricity production from RES, signing preliminary contracts
and final contracts with different categories of RES generation, preparing analysis and planning of RES production, maintaining a Register of Projects, proposing rules on a balancing system in cooperation with the Independent System Operator BiH, and the like.

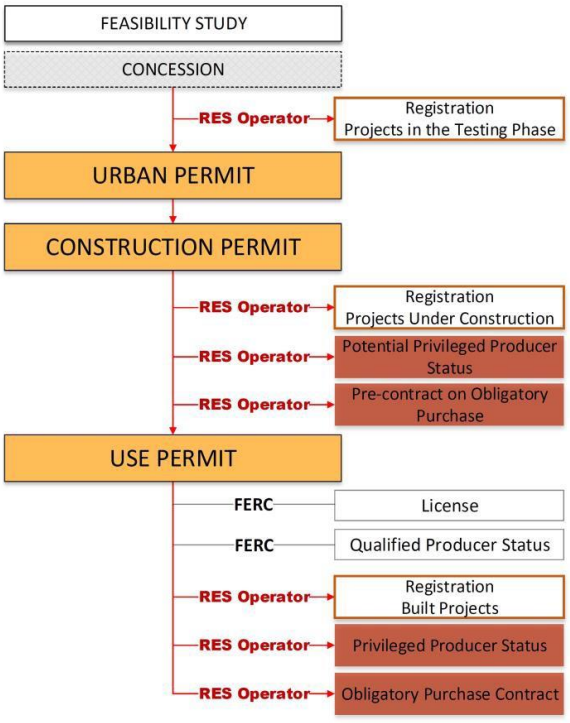
The Operator's headquarters are in Mostar, and its activities and operations are regulated and supervised by FMERI and FERC.

Incentivized production from Renewable Generations and Efficient Cogeneration: The investor who is constructing a renewable generation plant or an efficient cogeneration facility and aims to obtain an incentive for this kind of electricity production in FBiH, needs to take a few additional steps in the permitting procedure to acquire the Status of Privileged Producer.

Such status is the final document (certificate) issued by the Operator that ensures the right to incentivized production to be exercised by the investor, or more specifically the investor's right to sell the total amount of produced electricity at the guaranteed price (currently valid feed-in tariff) in the defined period of time. However, before the investor reaches this final stage, it needs to acquire different statuses during the preceding process steps. Parallel to acquiring the Status of Privileged Producer, the investor also needs to register the project in the Register of Projects.

The Steps for acquiring incentives for renewable generation and efficient cogeneration as well as the sequences (stages) of the project registration in relation to the issuance of the key permits in the permitting procedure in FBiH are illustrated by Figure 8. Each process step is further explained in the text below:

Figure 8: FBiH- Steps for Acquiring Incentives and Registration Stages for RES



Steps for Acquiring Incentives:

- Acquiring Potential Privileged Producer Status

After the issuance of an Energy Permit, the investor can apply for Potential Privileged Producer Status, which is issued by the Operator. The Status of Potential Privileged Producer and/or a Privileged Producer can be acquired only if the requested installed capacity of renewable generation falls within the allocated (prescribed) quota available for that specific type of power plant. The prescribed quota is the maximum level of installed capacity (power) of privileged renewable producers whose production is incentivized and is determined for each primary source of energy by the Action Plan for Renewable Energy Sources of the Federation BiH (the Action Plan).

The Law on RES requires that prescribed quotas be assigned in the order of the project's entry into the Registry of Projects. Acquiring the Status of Potential Privileged Producer is a precondition for a Pre-

contract on the Obligatory Purchase of Electricity. The Potential Privileged Producer, as defined by the Law on RES, means an investor who acquired that status based on the decision of the Operator and has the right to conclude a Pre-contract on Obligated Purchase of Electricity.

In its application, the investor will provide data on location of the facility, installed power, technical characteristics, source of primary energy for the production of electricity and the time-frame for the construction of the facility and connection to the grid. The Operator is obliged to decide on the application within 30 days from the date of its submission.

- Pre-Contract on Obligatory Purchase of Electricity

If the Operator approves the status of potential privileged producer for the investor, it signs a Precontract on the Obligatory Purchase of Electricity with the investor for purchasing produced electricity at the currently valid feed-in-tariffs.

The Pre-contract is a guarantee that the investor has the right to acquire the status of privileged producer, if a generation plant is built on time and in accordance with the relevant regulations. It contains information on the guaranteed price (feed-intariffs), duration of the pre-contract, maximum allowed time for the construction of the facility, technical data on the connection to the grid, and planned production of electricity. If the investor doesn't finish the construction of the facility and connection to the grid within the time specified in the Pre-contract, the potential privileged status is revoked and the Pre-Contract is terminated.

The Pre-contract is the key document that banks require to issue a loan for power plant construction and therefore highly important step for the investors.

- **QUALIFIED PRODUCER STATUS**

"Qualified Producer" is the status that must be obtained prior to the submission of the request for acquiring a Status of Privileged Producer. Namely, the Action Plan comprises two tables - Table 10. a, and Table 10. b. Table 10.b prescribes quotas for the total RES production envisioned for FBiH by 2020 (44% of total electricity production), which guarantees the obligatory purchase at currently valid Feed-in tariffs. However, Table 10.a prescribes quotas of RES production from all renewable sources. Those quotas also provide an incentive for RES generation, apart from large hydro power plant production exceeding 10 MW of installed capacity, but at a lower price than the currently valid Feed-in tariffs.

The Qualified Producer Status verifies that the producer generates electricity using waste materials or RES in an economically adequate manner, including an environmentally safe combined cycle of generation of thermal and electric power. This status is granted by Decision of FERC. In order to obtain qualified producer status, an investor must first acquire a license for generation, which is also issued by

FERC. Qualified Producer Status expires together with the license for generation. An investor has to enclose the Water Permit, the Environmental Permit and the Use Permit with its Qualified Producer Status application.

The benefits of the acquired Status of Qualified Producer are as follows:

1) Supply advantages – preference of dispatching electricity to the grid and advantage for the facilities of installed capacities less than 150 kW that can dispatch electricity without reporting their daily schedule to the Operator;

2) Right to guarantee of origin of electricity – an administrative act issued by the Operator, which proves that quantities specified in the act are produced in facilities that use RES and Cogeneration;

3) Obligatory Purchase of electricity at the reference price – a qualified producer that has not obtained the status of privileged producer or whose the status of privileged producer has expired is entitled to the obligatory purchase of electricity at the reference price, provided that its production is within the quotas assigned by the Table 10.a of the Action Plan.

The reference price is determined by the methodology defined by the Regulation on Methodology for Determination of the Reference Price of Electricity (the Regulation on Reference Price), and adopted by FERC.

- **PRIVILEGED PRODUCER STATUS**

After the status of Qualified Producer has been granted by FERC, an investor can submit an application for Privileged Producer Status to the Operator. No producer can get the Status of the Privileged Producer unless the status of the Qualified Producer is previously obtained from FERC.

The Status of Privileged Electricity Producer can be granted by the Operator to the investor that produces energy from the following types of generation plants:

a) Hydro power plants with installed capacity up to 10MW
b) Wind power plants
c) Solar power plants with installed capacity up to and including 1MW
d) Geothermal power plants with installed capacity up to and including 10MW
e) Biomass power plants with installed capacity up to and including 10MW
f) Biogas power plants with installed capacity up to and including 1MW
g) Waste power plants with installed capacity up to and including 5MW
h) Cogeneration power plants with installed capacity up to and including 5MW

After the approval of the Status of Privileged Producer, the Operator signs a Contract on the Obligatory Purchase of Electricity with the investor at the currently valid feed-in-tariff (guaranteed purchase price). In addition to the same supply advantages as provided to the Qualified Producer Status, the Privileged Producer Status grants an investor the right to sell the total amount of produced electricity at the guaranteed price (currently valid feed-in tariff) in the specified period of time.

The Guaranteed Obligatory Purchase Price (Feed-in-tariff) is the price paid to the Privileged Producer of electricity from RES during the contracted period. This price is determined by the methodology defined by the FERC's Regulation on Methodology for Determination of Guaranteed Obligatory Purchase Price of Electricity from Plants Using Renewable Energy Sources and Efficient Cogeneration.

The Guaranteed Obligatory Purchase Price or Feed-in-tariff equals the reference price multiplied by a tariff coefficient. A tariff coefficient is assigned to each type of RES plant and adjusted once every 18 months.

- Obligatory Purchase Contract

Based on the Obligatory Purchase Contract, a privileged producer acquires the right to sell electricity at guaranteed prices (currently valid Feed-in-tariff) during a period of 12 years. This Contract specifies a Guaranteed Obligatory Purchase Price, the duration of contract, technical aspects of the facility and data on the planned generation of electricity.

The Register of Projects: The FBiH Law on RES stipulates that all projects using energy from RES and Efficient Cogeneration must be registered in the Register of Projects (Register). The procedure of maintaining and updating the Register is defined by the Instructions on Managing and Updating the Register of RES Projects (the Instructions).

The Register is maintained by the Operator for the following project phases:

1. Projects in the testing phase Registration for the projects in the testing phase is mandatory when an investor is testing renewable energy potential at a specific location. If the testing of potential is not conducted, this registration is not required.

2. Projects under construction With the application for registration of projects in the construction stage, the investor must submit a valid Urban permit, Energy Permit and Construction Permit.

3. Built projects With the application for registration of built projects, the investor must submit the Use permit.

4. Abandoned projects must also be recorded in the Register; and with the application, the investor must submit a written decision on abandonment of the project.

For the each registration phase, the Operator issues a Decision on Entry in the Register, which contains the duration of the registration. After the project enters the next phase in the Register, the previous entry is deleted, so the project can only be registered in one phase at the time. Registration of Projects, at all stages, is a legal obligation for RES projects, including hydro, wind, biomass, solar and other power plants projects. The Register is a public document, available on the Operators website.

Step 4 - Securing Land, or the Right to Use Land: Before the construction of a generation facility begins, the investor must resolve all legal and property issues at the construction site. This means that the investor must either obtain the ownership of the land or acquire the right to use the land to construct on it.96 If the investor cannot reach an agreement with owners, the property can still be acquired through the process of expropriation.

According to the FBiH Law on Expropriation, property can be taken without the consent of the owner by competent authorities and designated to the public use. The property (real estate) can be expropriated completely or partially for the purposes defined by the Law on Expropriation and ". . . when it is determined that the use of the property for which the expropriation will be proposed will bring bigger benefits than was the case with the earlier use of the property."99 Property is expropriated either for government use or assigned to the third parties who have the obligation to dedicate it to the public use. Property can only be expropriated after the public interest for the construction has been declared by the competent authority.100 The procedure for the declaration of public interest can be initiated by

expropriation beneficiaries, and the Proposal for Expropriation must contain an expropriation analysis (geodetic and cadastral plan of the area of expropriation, information on real estate, the assessment of property value, the aim and purpose of expropriation and other data for determining the public interest).

A decision as to the public interest can be declared by the Government of FBiH, Cantonal Government or Municipal Government, depending on the location of the generation facility. According to the FBiH Law on Expropriation, if the generation facility is located (or construction is performed) across the areas of two or more cantons, the public interest for construction will be declared by the FBiH Government.

If the generation facility is located across the areas of two or more municipalities, the public interest will be declared by the Cantonal Government; and where the facility is only located in the area of one municipality, the public interest will be declared by the Municipal Government. However, in practice, the public interest for the construction of generation facilities are often designated at the FBiH level.

In addition to the FBiH Law on Expropriation, a legal basis for the determination of public interest can be found in the FBiH Law on Concessions. Namely, the procedure for granting concessions can also include

the designation of public interest. However, no law on concession (at all government levels) is clear as to whether the procedure for granting a concession includes the transfer of the “ownership right” or the “right to use the concession property” by the Concessionaire.

In February 2010, the Federation Government adopted a Decision on Determination of the Public Interest and Preparation for the Construction of Priority Electro-Energy Objects in FBiH, and declared the public interest for the construction of 6 thermal power plants, 17 hydro power plants and 6 wind power plants. It is notable that besides the FBiH Law on Expropriation, this Decision was based on the Law on the Government of the Federation BiH and the FBiH Law on Electricity.

Following the determination of public interest, an investor first attempts to reach an agreement with owners through negotiation. If not successful, then the investor is obliged to submit its Proposal for Expropriation to the respective municipal authorities, which are tasked with the implementation of expropriation.

A Decision on Expropriation is then made by the municipal authority and implemented through the payment of compensation fees to owners. If a land owner is not satisfied with the proposed compensation fees, then the owner has the right to initiate an administrative dispute before the competent court in FBiH (Cantonal Courts). Owners can only appeal the amount of fees before the court. The initiated administrative dispute postpones the enforcement of the Decision until such time the FBiH Supreme Court decision becomes final and binding.

Article 31, paragraph 2 of the FBiH Law on Expropriation provides an exception to this rule as follows:

"Exceptionally, following the proposal made by the expropriation beneficiary justifying the urgent acquisition of the possession of the property, the Government can decide to allow acquisition of the possession of the property to the beneficiary before the decision on expropriation becomes final and binding (enforceable)."

Article 31, paragraph 5, further prescribes that "an administrative dispute cannot be initiated against the decision of the government made under paragraph 2 of this Article."

Following the government decision under the above-cited exceptional rule, the investor can actually enter into the possession of the expropriated property before the FBiH Supreme Court decides on the final and binding amount of compensation fees. However, the FBiH Constitutional Court declared Paragraphs 2, 3 and 5 of Article 31 of the FBiH Law on Expropriation unconstitutional, or more specifically, contrary to Article 1 of the Protocol 1 to the European Convention for Human Rights (ECHR).

At the time of the writing of this report, Amendments to the FBiH Law on Expropriation were being discussed by the FBiH Parliament, including new text for Article 31.

ENTITY LEVEL AUTHORIZATION FRAMEWORK: THE REPUBLIKA SRPSKA (RS)

Step 1 - Designation of the Status of "Public (General) Interest": In formal legal terms, energy infrastructure projects in the RS can be granted the status of project of "public (general) interest," which is determined by the RS Government.

The public interest can be determined in the process of granting Concessions, if the procedure is initiated by an interested party. This procedure is prescribed by the RS Regulation on the Evaluation of the Public Interest when the procedure is initiated by an interested party (the Regulation on Evaluation of the Public Interest).

The competent RS Ministry must assess whether a public interest exists on the basis of a Feasibility Study developed for the project and a document on the Policy for Granting Concessions (the Policy Document on Concessions).

Then, the RS Commission for Concessions must approve the Ministry's assessment on the public interest and allow negotiation with the bidder. The final step includes the verification of the status of the "public interest" by the RS Government. If, however, the Concession procedure is initiated by the RS competent institution/body, then the public interest is "assumed."

The public interest can also be determined in the process of expropriation. This procedure is prescribed by the RS Law on Expropriation, which can be implemented, among other things, for the purpose of the construction or works related to energy infrastructure projects.
It is assumed that the public interest is already determined, if a separate law prescribes that the construction of specific facilities or construction works is in the public interest. The expropriation beneficiary is required to submit a Proposal for Expropriation to the RS Government, after obtaining the opinion from the Municipal Council, on whose territory the construction is planned.

Step 2 – Spatial Planning: The RS adopted the RS Spatial Plan. The RS Spatial Plan 2025 contains a map of strategic priorities, including energy infrastructure facilities.
The generation facilities from the PECI list are also included in the RS Spatial Plan: HPP Dabar, HPP Buk Bijela, HPP Foča, HPP Paunci, HPP Sutjeska, HPP Tegare, HPP Rogačica and HPP Dubravica. HPP Dubrovnik is not in the plan.

Step 3 – Permitting Procedure: The permitting procedure in the RS is more streamlined than the permitting procedure in FBiH, because of the RS centralized organizational structure, consisting only of the entity and municipal levels (without Cantons) and concentration of the competences for the issuance of required permits lies within only a few entity level ministries/institutions. In addition, the strategic framework for the implementation of energy infrastructure projects such as the RS Energy

Sector Development Strategy 2030 and the RS Spatial Plan 2025 have been adopted and are in place. However, as to the types and number of permits and consents, processes and number of process steps, the RS permitting regime is very similar to the one in FBiH, with a few distinct features.

In short, given that the spatial planning documents are rather developed in the RS, including detailed spatial planning documents, such as the zoning plan, urban plan, regulation plan, and plan of parcelization, an Urban Permit is not issued in the RS; instead, Location Conditions are issued. Further, the issuance of an Environmental Permit (if required) includes the development of a Preliminary Environment Impact Assessment (EIA) study prior to the issuance of Locations Conditions. After the Location Conditions are issued, the EIA Study is updated, provided the Preliminary EIA had determined that an EIA Study needed to be conducted. The Environmental Permit is issued in the preparatory stage for the Construction Permit. In addition, the RS Energy Regulatory Commission (RSERC) has a comprehensive mandate and plays a prominent role in the RS permitting procedure for the construction of generation facilities and other energy infrastructure projects. Its mandate includes the issuance of an Energy Permit.

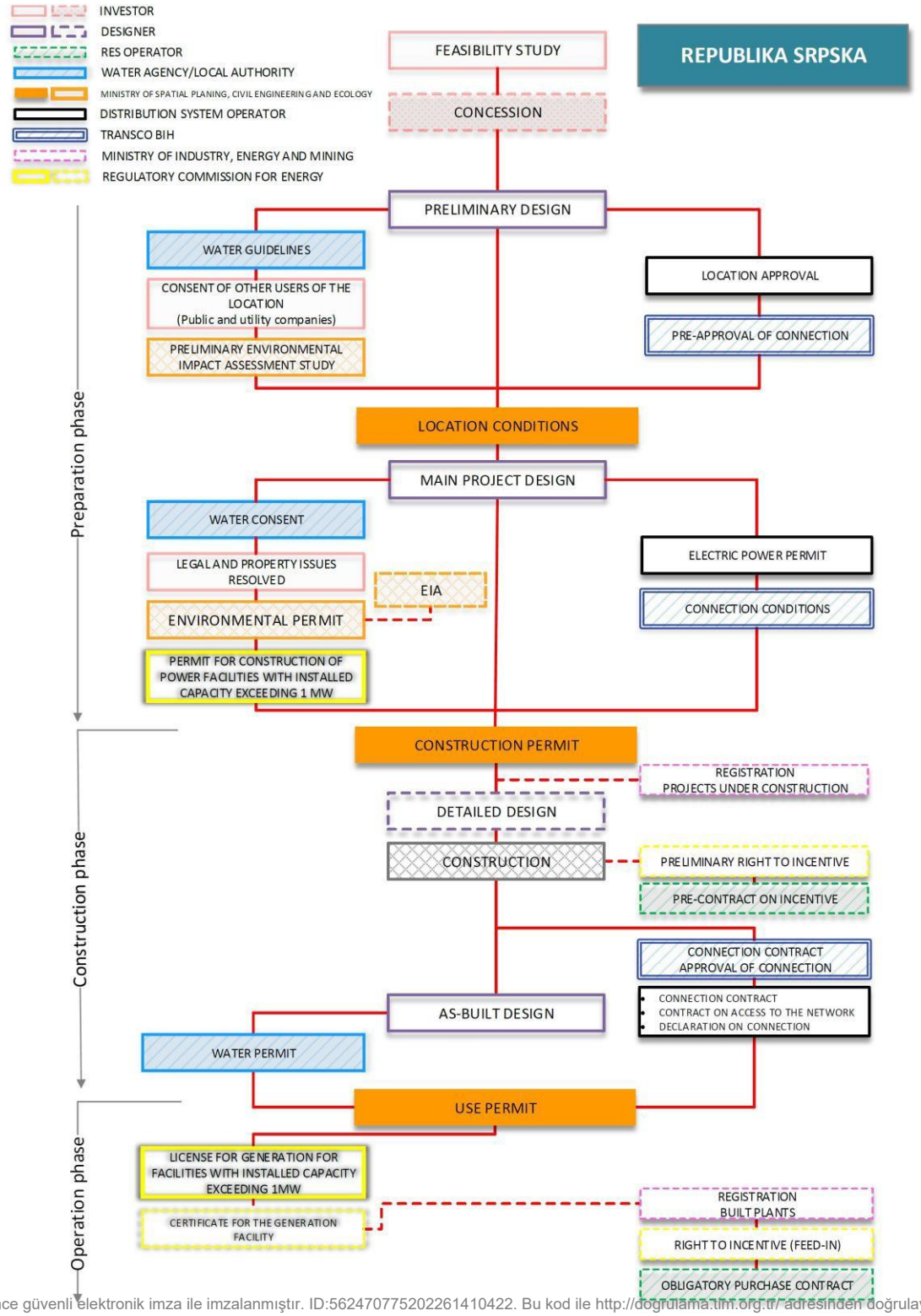
Finally, the procedure for acquiring incentives for RES generation is slightly different.
The scheme (mapping) of the RS permitting procedure and individual permits is illustrated by Figure 9 and explained in the text below, including steps for acquiring incentives for RES. The two most important permits in RS are: 1) the Location Conditions, and 2) the Construction Permit.

The issuance of some permits consists of multiple steps and/or the issuance of progressive administrative decisions/acts as the permitting procedure progresses, which lead to the issuance of a final permit from that category. Hence, in the case of a Water Permit, two administrative decisions/acts – the Water Guidelines and the Water Consent – are required before the Water Permit is issued at the end of the process (before the issuance of the Use Permit). All those water acts are issued by the same authority – the RS Water Management Agency/local authority – in the same permitting procedure after the collection of required information. The Water Guidelines contain the conditions and methods of use of water, and the documentation requirements; the Water Consent confirms the submission of the required documentation; and the Water Permit defines the operational conditions and disposal of waste.

In order to illustrate this process clearly, the respective permits are grouped and presented on the basis of category and/or the institution competent for their issuance (e.g., water, connection to distribution network, RES production), rather than in the exact order of their collection as illustrated by Figure 9. Each category of permit is identified by the same pattern and color in the diagram; for example, all water acts are colored in blue and illustrated by a diagonal pattern. Where a category of permits is described, for context and clarity at the beginning of that section, a process diagram containing the permitting process in such category in relation to the two main permits – the Location Conditions and Construction Permit – has been extracted from the overall diagram in Figure 9.

Some procedural steps in the RS permitting procedure are optional and depend on the legal requirements for the type and size of generation facility and/or whether the competent authority deems the procedure necessary (e.g., concession, EIA). This type of procedure is presented in Figure 9 by dotted lines. A solid line is used to identify the required procedural steps that an investor must take.

Figure 9: RS Permits and Competent Institutions



Concessions: The area of concessions in the RS is governed by the RS Law on Concessions (the RS Law). This RS Law was adopted in 2013, and replaced the previous 2002 RS Law on Concessions. Adoption of new regulations followed the adoption of the RS Law, such as the Regulation on the Procedure for Transfer of Concession Contract and Change of Ownership Structure of the Concessionaires (the Regulation on Transfer of Concession Contract), and the Regulation on Content and Maintenance of the Registry of Concession Contracts (the Concession Registry), both adopted in 2014. However, to date the Policy Document on Concessions, which was adopted in 2005, has not been updated.

The term "concession" is defined by the RS Law as "the right to perform economic activities through the use of public goods, natural resources and other goods of general interest, as well as the right to perform activities of general interest." The RS or a local community or, more specifically, the RS Government on behalf of the RS and the Municipal Assembly on behalf of the local community, perform the role of Conceding Party. In fact, the RS Government is authorized to grant concessions for all subjects prescribed by Article 6 of the RS Law other than for communal activities, which is the only exclusive competence of a local community.

A Concessionaire can be a legal entity, which needs to be registered in accordance with the RS laws and regulations. Article 6, paragraph (1), item v) of the RS Law on Concessions defines the energy facilities that are "subject to concessions" as follows: "The construction and use of energy facilities of over 250 kW of installed capacity, apart from energy facilities using biomass, biogas and solar facilities with photo-voltaic panels on facilities, irrespective of the facility's installed capacity." However, whether a concession is required for generation using biomass, biogas or solar facilities with photo-voltaic panels up to 250 kW of installed capacities (smaller generation), is not defined by the RS Law.

The RS Law differs from the previous RS Law on Concessions and the current laws on concessions on the state and FBiH level in terms of the prescribed methods for granting concessions. As explained earlier in this report, the BiH Law on Concessions and the FBiH Law on Concessions envision two methods for granting concessions: a) public tender, and b) unsolicited proposal. The RS Law, however, prescribes three separate procedures for granting concessions, each of them comprising elements of both methods - public tender and unsolicited proposal. The three different procedures are entitled as the procedure initiated by "i) a competent body/institution, ii) an interested party, or a procedure conducted through iii) a direct agreement."

Under the first type of procedure involving the initiative of a competent RS body/institution for granting a Concession, the envisioned method is a public tender. Prior to the tendering procedure, a competent body must develop a Feasibility Study or request the development of a Feasibility Study from the potential bidders through a public tender.

The second type of procedure refers to a situation when an interested party has initiated a procedure for granting a concession. An interested party cannot initiate a procedure for a concession for which a procedure has already been initiated by a competent RS body/institution. Under this second procedure, the public interest for the proposed concession must be evaluated first; and, if the public interest is determined, then the competent body is obliged to launch a public tender and invite the party that initiated the procedure to apply along with other bidders. When the bids are evaluated, the offer of the party that initiated the procedure gets a bonus of up to 10% points maximum. This second procedure has departed from the exclusivity given to the proposal of the interested party prescribed under the previous RS Law on Concessions, when the tendering procedure was not obligatory.

Finally, Article 26 of the RS Law prescribes the third type of procedure for granting concession through direct agreement in the following cases:

"a) Bids of the public companies which perform activities of public interest, when such an activity is subject to concession;
b) Implementation of the existing agreements, signed by the Government or public companies, pertaining to the implementation of concessions;
c) Extension of the concession period for granted concessions."

An important role in the concession process in the RS has been given to the RS Commission for Concessions, which is a permanent and regulatory body, tasked to perform various activities pertaining to concessions under the RS Law. The RS Commission maintains a Concession Registry, which is available on its web site.

The Concession Registry contains data of a total of concessions granted in the different sectors in the RS thus far, including generation facilities. The RS Commission for Concessions reports annually to the RS National Assembly, and its annual reports are public and include a list of all concessions granted for the reporting year.

Article 40 of the RS Law on Concessions prescribes a new security instrument for creditors, which is the possibility of transferring a concession to a third party or a financial institution (e.g., a bank), which provided financing for the Concessionaire. This mechanism can be used if the Concessionaire has not been able to meet its obligation contained in the Contact with the financial institution. The possibility for transferring a concession to a financial institution is something new prescribed by the RS Law.

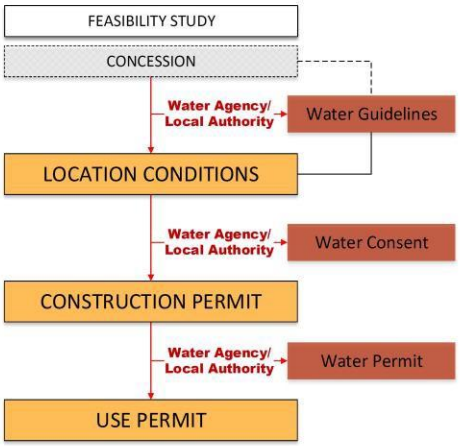
The procedure for the transfer of the concession to a third party or a creditor is prescribed by the Regulation on Transfer of Concession Contract, which was passed by the RS Commission on Concessions. A Concession Contract can be concluded for a maximum of 50 years.

Concession fees are determined separately for each concession by the Concession Contract, taking into account the following parameters, among others: the type, category, quantity, and purpose of a concession, the market price of the natural resource, length of the concession contract, and risk and

anticipated profit. The RS Law prescribes that concession fees comprise two types of payments: i) a lump sum paid after the Concession Contact is concluded, and ii) fees for the use of public goods expressed in a percentage (%) of the generated annual revenue.

Water Acts: The RS Law on Water120 defines Water acts as acts that determine the right, obligation, or legal interest for a third party (i.e., a natural person or legal entity, the state/RS body, or a local community). Water acts are issued in accordance with a separate procedure prescribed by the RS Law on Water and the general provisions of the RS Law on Administrative Procedure. There are three types of Water acts that must be obtained by an energy facility for any use of water exceeding the ordinary use of water or disposal of waste water, regardless of the facility's impact on the water regime. Specifically, in the permitting procedure for the construction of an energy facility, the investor needs to acquire the following Water acts: i) Water Guidelines; ii) Water Consent; and iii) Water Permit. The stages at which these Water acts are issued in relation to the Location Conditions and the Construction Permit in the RS permitting procedures are illustrated by Figure 10.

Figure 10: RS - Issuance of Water Acts



According to Article 127 (1) of the RS Law on Water, the RS Water Agency has the authority to issue Water acts, among others, for the construction of the following facilities/activities: "hydro power plants (HPPs); all accumulations on the RS territory; disposal of technological waste water; and facilities that use five (5) liters of water or more in one second." The authorized body of a local community is competent for the issuance of Water acts that are not defined by Article 127 (1) of the RS Law on Water.

Water Guidelines: Water Guidelines determine mandatory terms and conditions to be included in the Project Documentation for the construction of new or reconstruction of an existing generation facility and for other non-construction activities, which can have an impact on the water regime on a permanent or temporary basis. Issued Water Guidelines are valid for the period of one year.
The RS administrative bodies/institutions that are authorized to grant concessions are required to obtain Water Guidelines before a Concession procedure is initiated.

Water Consent: According to Article 139 of the RS Law on Water, a Water Consent is required for the construction, reconstruction or removal of an existing energy facility, if such facility can have an impact on the quality and quantity of water, or more specifically, if water regimes can be impacted on a permanent or temporary basis.

A Water Consent determines that the Project Documentation attached to the request for Water Consent is in line with the Water Guidelines, water regulation and planning documents. The issued Water Consent is a precondition for the issuance of the Construction Permit. A Water Consent is issued in the form of a document and is valid for the period of one year, unless the works on construction have commenced within this period.

For objects and facilities that dispose of waste water or other dangerous materials, a Water Consent and Construction Permit cannot be issued unless the Project Documentation has planned the simultaneous construction of the facilities for the treatment of water waste and/or a reduction of the concentration of dangerous substances.

Water Permit: A Water Permit must be obtained for all facilities for which a Water Consent is required, including generation facilities. It verifies that all terms and conditions specified under the Water Consent are met. Further, a Water Permit determines the purpose, ways and terms for the use of water, the water regime for the disposal of waste water, and other conditions. A Water Permit is the final Water act and is a precondition for the issuance of the Use Permit for any generation facility. A Water Permit is issued for a limited period of time, a maximum of fifteen years.

Water acts are issued upon written request of investors or a competent authority, or upon the request of the administrative body competent for the issuance of the Urban Permit.

Consent of the Other Users of the Location (Public and Utility Companies): In order to apply for Location Conditions in the RS, an investor must obtain written approvals (consents) from all users operating at the specific location. According to the RS Law on Spatial Planning and Construction, with an application for Location Conditions, the investor must submit approvals of the location for the future facility from the public utility companies, and the public companies for managing public infrastructure. However, if the area of construction is already included in the existing spatial planning documentation (such as zoning

plan or a regulation plan), these approvals on location are not needed, since all aspects of the construction on the specific location are already evaluated and included in the spatial planning documents.

If required, consents and approvals need to be obtained from telecom/phone companies, gas companies, road management companies, water, sewage and other RS utility companies.

Location Conditions: The Location Conditions have the same meaning and purpose as the Urban Permit in FBiH; but since RS has developed spatial planning documents, then Location Conditions, which encompass comprehensive and detailed information on the terms and conditions for the construction at the specific location, are issued instead of Urban Permit. In essence, the Location Conditions is a technical document, which defines the terms and conditions for the planning and construction of a generation facility (or reconstruction), and is issued on the basis of the RS Law on Spatial Planning and Construction, other pertinent RS laws and regulations, and detailed spatial planning documents. The detailed (implementing) spatial planning documents, which are the basis for the issuance of the Location Conditions are as follows: zoning plan, zoning plan for the areas designated for special purpose, regulation plan, urban plan, and plan for parcelization.

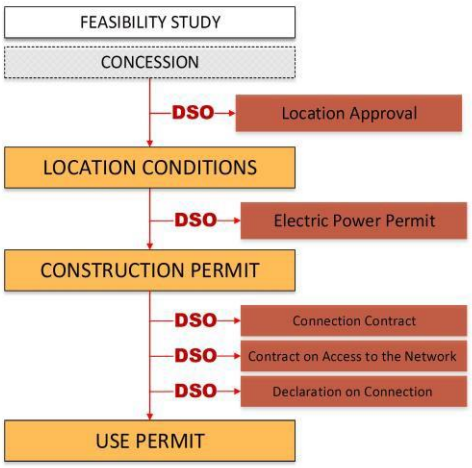
If detailed spatial planning documents are not adopted for the specific area where the project is to be located, then the Location Conditions are issued on the basis of the spatial planning documents available for that location. Additionally, an expert opinion must be sought from a legal entity that is licensed for the development of spatial planning documents. Regardless of the status of the development of spatial planning documents, the Location Conditions include two compulsory documents: i) a verified excerpt from the spatial planning documents; and ii) a document specifying urban-technical conditions.
The document defining urban-technical conditions for the construction of a generation facility and the use of land includes the following information: a) the purpose of the facility; b) the size, shape and photographs of the land parcel; c) the terms for constructing the facility; d) the need for the development of a Preliminary Design; e) the terms and conditions related to the construction vis-àvis neighboring objects; f) the terms for the protection of the environment in accordance with the regulations governing the area of environment (i.e., whether the EIA is mandatory for the project and the scope of the EIA); g) the need and methods for the geo-mechanical examination of the soil; and h) other terms and conditions relevant for the facility.

The municipal administrative body competent for spatial planning is defined as the authorized body for the issuance of Location Conditions by Article 60(1) of the RS Law on Spatial Planning and Construction. Article 60(2) of the RS Law on Spatial Planning and Construction defines the exceptions to this rule. Thus, according to Article 60(2), the RS Ministry for Spatial Planning is competent for the issuance of Location Conditions for the construction of the facilities located on the territory of two or more municipalities. Furthermore, Article 60(2), items d) and e) prescribe additional competences for the RS Ministry for Spatial Planning for the issuance of Location Conditions for the following energy infrastructure facilities: “d) energy and other objects and facilities for generation, apart from solar photovoltaic generation and

facilities that use all other types of RES up to 250 kW of installed capacity; and e) power lines of 110 kV of installed capacity and over, and power stations of 110 kV of installed capacity and over."

The competent body is required to issue Location Conditions within 15 days from the date of the submission of the completed request. It should be noted that the Location Conditions for the projects that can have significant impact on the environment can be issued by the competent authorities, provided the final document (certificate) on the EIA implementation and its scope is previously obtained.
Connection to the Distribution Grid (Network): In order to connect a generation facility to the distribution grid at low and medium voltage level in the RS, the investor must obtain a number of permits and contracts from Distribution System Operator (DSO), each at a specific stage of the construction process. In accordance to the RS Electricity Law, the DSO is in charge of the operation, control, maintenance and development of the distribution system. Currently, there are five companies licensed for the distribution of electricity in the RS, each operating in its distribution area:
1) MH ''ERS'' ZP ''Elektro Doboj'' a.d. Doboj;
2) MH ERS ZEDP ''Elektro-Bijeljina'' a.d. Bijeljina;
3) MH ERS ZP ''Elektrokrajina'' a.d. Banjaluka;
4) MH ERS ZP ''Elektrodistribucija'' a.d. Pale;
5) MH ERS Trebinje ZP ''Elektro-Hercegovina'' a.d. Trebinje.
The role and stages in connection of a generation facility to the distribution grid in relation to the Location Conditions and the Construction Permit are illustrated by the Figure 11.

Figure 11: RS - Steps for Connection and DSO documents



Location Approval: The Location Approval is an initial confirmation that the generation facility can be connected to the distribution grid at the planned location. According to the General Conditions for Delivery and Supply of Electricity (General Conditions), on the basis of the request of the authority

competent for the issuance of Location Conditions for spatial planning, the DSO is required to approve the location for the future construction of the energy facility.

Although this approval is acquired ex-officio at the request of the competent authority in charge for spatial planning and doesn't require any action by the investor, it should be noted that this is an important step, given that the Location Conditions cannot be issued without it.

Electric Power Permit: The Electric Power Permit is issued at the request of the investor, for each individual connection of the generation facility to the distribution network, prior to the issuance of the Construction Permit. The Electric Power Permit is a mandatory attachment to the request for the issuance of Construction Permit, if the energy facility is to be connected to the distribution network.
Along with the request, the investor must provide data on the owner of the facility, the type of primary source of energy, voltage levels, nominal capacity and number of generators, annual generation per month, estimated time of connection and other technical data. The DSO will make a decision on the issuance of the permit within 30 days from the date of submission of the application.

The Electric Power Permit contains the following data: details on the applicant, general data about the constructed facility, electric power and technical requirements (such as the voltage levels, installed capacity, consumption and generation data, peak capacity), conditions of facility usage, information on the obligation of contract conclusion, validity period and other conditions as defined by the DSO.
The conditions set in the Electric Power Permit are binding on the network user (investor) and cannot be modified during construction without approval of the DSO. In general, the validity of the Electric Power Permit is not limited, but the investor has the obligation to conclude a Connection Contract with the DSO within two (2) years from the date of the issuance of this permit.

Connection Contract: Based on the Electric Power Permit and at the request of the investor, the DSO prepares a Connection Contract. This contract must be concluded before construction of a connection point to the distribution grid; it regulates the procedures and terms of connection, method of payment and other necessary aspects of a specific connection point. Also, it includes data on the following: contracting parties, power facility, and technical elements of the connection, payment of fee for the connection, maintenance and ownership of the connection point, and deadline for the construction.
The construction of a connection point starts after the conditions specified by the Connection Contract have been fulfilled.

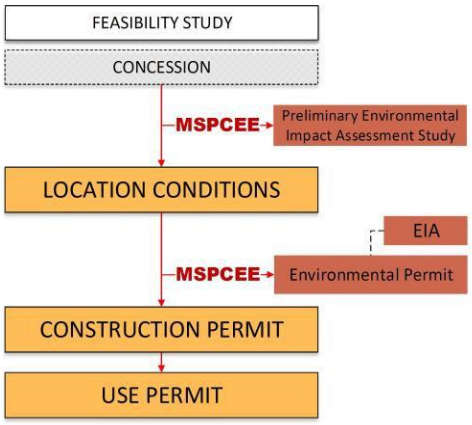
Contract on Access to the Network: In order to use the distribution network, after the construction of the connection point has been completed, an investor must submit a request for connection to the distribution network. Based on this request, the DSO prepares a Contract on Access to the Network, to define and regulate network usage conditions. The contract is signed between the investor and DSO, and it includes basic data on the contracting parties, the capacity approved by the Electric Power Permit, data on the measuring point, quantity and quality of electricity, and liability for the damages.

The validity of the Contract on Access to the Network is not limited.

Declaration on Connection: Having connected a power facility to the distribution network, the DSO prepares a Declaration on Connection for each metering point, which contains the final data on connection capacity, type of the connection, connection point, supply point, ID of metering point, main fuses, category of consumption, modifications made during construction and other important data. The Declaration on Connection contains "as-built" data on the connection.

Environmental Permit: An Environmental Permit defines the measures and activities for preventing or reducing emissions in the air, area, water and land, as well as prevents the accumulation of waste materials in order to protect the environment to the highest extent possible. The issuance of the environmental permit in the RS encompasses a few steps that are illustrated in Figure 12.

Figure 12: RS – Environmental Permit – Steps



For any project that can have a significant impact on the environment because of its nature, size, or location, an Environmental Impact Assessment (EIA) must be developed. Energy infrastructure projects for which an EIA is mandatory are as follows: "energy industry: . . . i) thermal power plants and other combustion facilities of 50 MW and over; ii) hydro power facilities with the output of 5 MW and over for each individual facility; iv) construction of power lines of 220 kV and over, and a length of 15 km and more." As to RES generation facilities, it is within the authority of the RS Ministry for Spatial Planning, Civil Engineering, and Environment (MSPCEE) to decide whether a specific RES project needs an EIA.

The core steps for an EIA include identification, determination, analysis, and an assessment of a direct or indirect impact of the project on the environment. Pursuant to Article 61(2) of the RS Law on Protection

of Environment, the EIA is implemented through two phases: “a) the preliminary EIA procedure, and b) the EIA procedure.”

A decision on whether an EIA is mandatory for the project and what the scope of the EIA should be, is determined during the preliminary EIA phase. The final decision on the preliminary EIA phase is published on the web site of the competent ministry. The investor is then obliged to submit a request for the development of the EIA Study to a licensed legal entity that is authorized for the development of EIA Study by MSPCEE within six months from the final preliminary EIA decision.

Following the development of the EIA Study, the investor is required to inform the general public and interested parties on the developed EIA Study through an announcement in one daily newspaper that is available in the local community where the construction is planned. Additionally, the investor is obliged to allow access to the EIA Study by all interested parties free of charge, and to arrange one public consultation on the EIA Study to get feedback. The next step encompasses a Review of the EIA Study by the licensed legal entity authorized by MSPCEE for conducting review of EIA Studies. The objective of this Review by the licensed legal entity is to assess the quality of the EIA from an expert point of view. The investor is required to update the EIA Study in accordance with the comments made under the Review procedure and then re-submit the updated version to the competent authority. If approved, the EIA Study is valid for two years. Within a two-year period from the date of the EIA approval, the project promoter must obtain the Construction and Environmental Permits.

According to the RS Regulation on Facilities That Can Be Constructed and Become Operational Only if an Environmental Permit Is Issued (the RS Regulation on Environmental Permit), the MSPCEE is authorized for the issuance of the Environmental Permits for all projects for which the EIA is mandatory. In addition, the RS Regulation on Environmental Permit prescribes discretionary authority to the MSPCEE to evaluate whether a certain project requires an EIA or not. Thus, in accordance with the RS Regulation on Environmental Permit, the MSPCEE is authorized to decide whether the EIA is required on a case-by-case basis as well as in cases of smaller projects, which are beyond the legally prescribed thresholds.

Furthermore, the RS Regulation on Environmental Permit specifically prescribes the authority for MSPCEE to issue the Environmental Permit for energy infrastructure projects, among others, falling under the category of the “energy industry,” such as: thermal energy facilities of 10 MW of installed capacities and over; facilities for energy transmission via power lines of 220 kV and 110 kV and less than 15 meters length.134 For t energy infrastructure projects beyond the above-prescribed thresholds (smaller facilities), the environmental permit is issued by the local administrative body competent for the environment protection.

Permit for Construction of Power Facilities with Installed Capacity Exceeding 1MW
(**Energy Permit):** According to the RS Law on Electricity, one of the permits required in the RS electric energy sector is the Permit for Construction of Power Facilities with Installed Capacity Exceeding 1MW,

issued by RSERC. The criteria, contents and proceedings for the issuance of this permit are given in the RS Rulebook on Licenses.

Before the construction or major reconstruction of an existing facility begins, the investor must obtain a Permit for Construction of Power Facilities with Installed Capacity Exceeding 1MW from RSERC. This permit is issued prior to the Construction Permit, although this order is not explicitly defined by the RS Law on Electricity. However, the RS Rulebook on Licenses clearly states that neither construction nor reconstruction of a generation facility can begin before a Permit for Construction of Power Facilities with Installed Capacity Exceeding 1MW is issued.136 Thus, to get a Construction Permit from the competent authority, the investor first must obtain a Permit for Construction of Power Facilities with Installed Capacity Exceeding 1MW.

With the request for the issuance of a Permit for Construction of Power Facilities with Installed Capacity Exceeding 1MW, the investor must enclose a significant number of other documents and major permits, including a: Feasibility Study, Environmental Impact Assessment Study, Environmental Permit, Water Permit, Electric Power Permit (Transco BiH) and/or Connection Conditions (DSO), Location Conditions and Concession Contract (if required).

After a detailed review by RSERC of the documents,138 the Permit for Construction of Power Facilities with Installed Capacity Exceeding 1MW is issued as a Decision, which confirms that the facility was planned and designed adequately regarding its impact on the power system, design of the installations, energy efficiency and the environment. The Decision is issued within 60 days following the date of submission of the completed application to RSERC, and the Permit for Construction of Power Facilities with Installed Capacity Exceeding 1MW is valid to a maximum of six years.

According to the Law on Electricity, RSERC is authorized to issue a Permit for Construction of Power Facilities with Installed Capacity Exceeding 1MW only for the generation facilities that exceed the installed capacity of 1MW. The issue of competence for the issuance of a permit for construction of power facilities with installed capacity of less than 1MW in the RS is not legally defined.

Construction Permit: The Construction Permit allows the construction of generation facilities at a planned location. The investor is required to develop a Main Project Design before the submission of its request for the Construction Permit. The Main Project Design needs to ensure harmonization of the construction with all spatial planning documents through meeting required terms and conditions defined by previously issued Location Conditions.

Along with the request for the issuance of the Construction Permit, the documents that the investor must enclose include: the Location Conditions; proof that property issues have been resolved; the Concession Contract (if required); three copies of the Main Project Design; the Report on the Review of the Technical Documentation (Project Documentation); and the Environmental Permit (if required).

A Construction Permit is issued by MSPCEE in accordance with Article 60(2) of the RS Law on Spatial Planning and Construction or a municipal authority competent for spatial planning, on whose territory the construction is planned.

The Construction Permit may be issued for the entire facility or a part of a facility which comprises a technical, technological, and/or a functional unit. The construction must begin within a period of three years following the final date of the issuance of a Construction Permit.

Use Permit: A newly constructed energy facility cannot become operational before a Use Permit is acquired from the competent authority. Prior to the issuance of a Use Permit, a Technical Inspection of a generation facility must be performed. The Technical Inspection encompasses inspection of the completed works and their compliance with the Construction Permit and technical documentation that were the basis for the construction. The Technical Inspection ensures compliance of the works with the technical regulations and standards pertaining to the specific types of works, including materials, installations and equipment. A Technical Inspection must be performed within 15 days following the date of the submission of the request.

Based on the opinion of the Committee that performs the Technical Review, the competent authority can issue a permit for a testing period, allowing the temporary use of the facility during the testing period for the energy facilities. The permit for a testing period can be issued only if the Technical Review has confirmed that the facility has been constructed in accordance with the Construction Permit, and that the operation of the facility will not endanger the life, health, environment and the neighboring buildings. The testing phase can last up to a maximum of one year; and in the case of particularly complex technological process, the testing phase can be extended for one additional year.
The investor must submit its request for an Use Permit to the competent authority that has issued the Construction Permit, once the works on the facility have been completed.

License for Generation for Facilities with Installed Capacity Exceeding 1MW: After construction is completed and the Use Permit for the facility is issued, the investor must obtain a License from RSERC in order to perform activities on electricity market. The procedure for the issuance of a License and its conditions and content are defined by the RS Rulebook on Licenses.

The investor that plans to perform an activity in electricity market has the obligation to submit an application for a License for that specific activity (generation, distribution, supply or trade). Accordingly, RSERC is authorized for the issuance of the following licenses in the electricity sector:

a) License for Generation of Electricity for Hydro Power Plants, Thermal Power Plants, Thermal Power Plants with Integrated Mines and Other Power Plants with Capacity Exceeding 1MW (License for Generation)

b) License for Distribution of Electricity, for the Purposes of Delivery of Electricity at MiddleVoltage and Low-Voltage Network to the Customers
c) License for Supply of the Tariff Customers d) License for Electricity Trade and Supply on the Territory of BiH

In order to produce electricity in the power plant, the investor must obtain a License for Generation. With the application, the investor must enclose the following: information on the power facility and technical parameters, proof of meeting the requirements regarding the establishment of the system of quality control and the system of environmental protection control in the power facility, proof of the nature of the primary source of energy, Water Permit, Environmental Permit, Concession Contract, Connection Contract (DSO or Transco BiH) and Use Permit.

The decision on the issuance of the License is made within 60 days following the date of the submission of the completed application to RSERC. The License is valid for a period of 30 years maximum.

System of Incentives for Production and Purchase of Electricity from RES and Efficient Cogeneration: The system of incentives for the production of electricity from RES and efficient cogeneration in the RS was established by the RS Law on Renewable Energy Sources and Efficient Co-generation (RS Law on RES).

According to the RS Law on RES, in addition to the price of electricity, all end users are obliged to pay a surcharge for electricity production from RES and efficient cogeneration.141 The terms, conditions, and procedure for exercising the right to incentives are defined by the Rulebook on Incentives for Generation of Electricity from Renewable Sources and in Efficient Co-Generation (Rulebook on Incentives).

In the RS, eligible RES producers are entitled to different benefits. For example, the DSO is required to inform the RES producer of whether it is feasible to connect to the system and the possibilities of connection, and the precise timeframe for the connection at the DSO's expense. The RES producer is also entitled to priority dispatching of electricity according to the daily schedule. Finally, the RES producer is entitled to obligatory purchase of electricity at currently valid Feed-in tariffs, and the Right to a Premium143 in the case of self-consumption or the sale of electricity in the RS market.

The RS Action Plan for Renewable Energy Sources (the RS Action Plan) defines the total quotas for incentives as well as the quantities of incentives for each specific technology. The amounts of the Feed-in tariff and the Premium Price that is paid to the producers are determined by an RSERC decision, which must be approved by the RS Government. The prices are evaluated at least once a year.

Incentives are given to the producers for the following types of facilities, provided that they do not exceed the total quantities of incentives determined by the RS Action Plan:

a) Hydro power plants with installed capacity up to 10MW

b) Wind power plants with installed capacity up to 10MW
c) Solar photovoltaic power plant with installed capacity up to 1MW
d) Geothermal power plants with installed capacity up to 10MW
e) Biomass power plant with installed capacity up to 10MW f) Biogas power plant with installed capacity up to 1MW g) Cogeneration power plants with installed capacity up to 30MWe.

The incentives are allocated following the order of submission of the applications to RSERC, until the total quotas set by the Action Plan are filled.

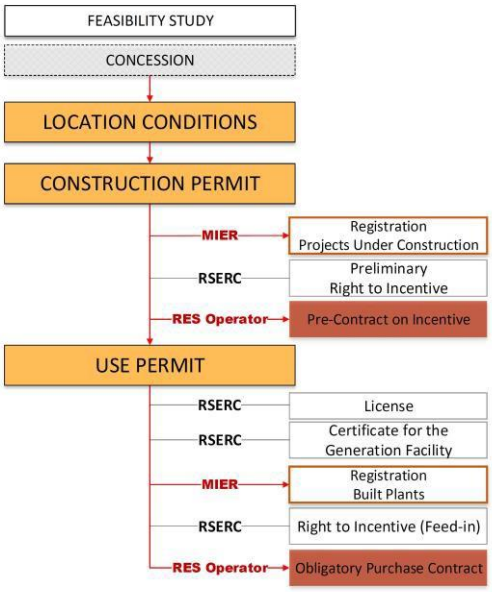
It should be noted that the incentives cannot be given to the producers that installed used equipment during the construction of the facility. Basic components for the production of electricity, such as generators, photovoltaic panels, boilers, or turbines have to be new for the producer to be eligible for incentives.

The Operator: The RS Law on RES prescribes the role of the Operator of the Incentive System (Operator) as a non-profit organization (legal person) with public authorities. However, the Operator has never been established, and the activities of the Operator are currently performed by the RS power utility company (EPRS). The tasks of the Operator under the RS Law on RES include the administrative, financial and other operational activities for the system of incentives for the production from RES and efficient cogeneration. The work of the Operator is supervised by the RS Ministry of Industry, Energy and Mining (MIER) and RSERC.

The competences of the Operator146 include keeping records of the total amount of electricity produced from RES and efficient cogeneration, signing Contracts on the RES Incentives, and balancing responsibility.

Exercising the Right to Incentive: The Steps for acquiring incentives for renewable generation and efficient cogeneration as well as the sequences (stages) of the project registration in relation to the issuance of the key permits in the permitting procedure in the RS are illustrated by Figure 11. Each process step is further explained in the text below.

Figure 11: The RS - Steps for Acquiring Incentives and Registration Stages for RES



Steps for Acquiring Incentives:

The investor that plans construction of an RES and/or efficient cogeneration facility, needs to take the following steps in order to become eligible to the incentivized electricity production:

- Preliminary Right to Incentive

The Preliminary Right to Incentive enables the investor to sign a Pre-contract on Obligatory Purchase of Electricity with the Operator. It is acquired through an RSERC Decision for the following types of the incentives:

a) right to obligatory purchase of electricity at currently valid feed-in tariffs (guaranteed price), or
b) right to premium (for self-consumption or sale in the electricity market).

The following documents need to be enclosed with the request: a Feasibility Study, document certifying entry into the Register of Projects, Construction Permit and evidence that the construction of the facility has begun.

The Decision on the Preliminary Right to Incentive includes data on the generation facility, the type of incentive, planned production of electricity and amount of incentives, and the validity period. The Decision, however, does not contain the price at which the electricity will be purchased (feed-in tariff or premium), since the price is determined by the Contract on Obligatory Purchase of Electricity at a later stage, and after the construction has been completed.

- **Pre-Contract on Incentive**

The Pre-Contract is signed between the investor and the Operator, based on a Decision on Preliminary Right to Incentive in order for the investor to reserve the available amounts of incentives in the system.The investor has the obligation to submit a request for signing the Pre-Contract within 15 days, following the date of issuance of the Decision on Preliminary Right to Incentive.

- **Certificate for the Generation Facility**

To acquire the Right to Mandatory Purchase of Electricity at currently valid feed-in tariffs (the guaranteed prices) or the Right to Premium, the investor must first acquire a Certificate for the Generation Facility (the Certificate). The Certificate is a document issued by RSERC that proves that the generation facility produces electricity using waste material or RES, economically and in an environmentally friendly manner. The criteria and the procedure for the issuance of the Certificate are defined by the RS Regulation on the Issuance of Certificates for the Generation Facility which Generates Electricity Using RES or in Efficient Cogeneration.

- **The Right to Incentive**

After the issuance of the Certificate, the investor can apply for the following incentives: the Obligatory Purchase of Electricity at currently valid Feed-in tariffs or Premium, and Obligatory Purchase of Electricity based on the Net-metering Principle. The application is submitted to RSERC together with the Document on Entry into the Register of Projects, Certificate, Use Permit, Connection Contract (DSO) or Approval of Connection (Transco BiH), and other evidence as prescribed by Article 21 of the Regulation on Incentives. RSERC decides on the application within 30 days, following the date of submission of the completed application. The Decision contains data on the producer, the approved type of incentives, the planned production of electricity, the incentivized amounts, and the validity period.
The Right to Obligatory Purchase of Electricity at currently valid Feed-in Tariffs and the Right to a Premium are granted for a period of 15 years.

- **Obligatory Purchase Contract**

Finally, a Contract on Obligatory Purchase of Electricity is entered into by the investor and Operator. The type of the Contract depends on the approved type of the incentive:

a) Contract on Obligatory Purchase of Electricity at currently valid Feed-in Tariffs for RES facilities;
b) Contract on Obligatory Purchase of Electricity at currently valid Feed-in Tariff for the Efficient Cogeneration Facilities; or
c) Premium Contract.

The Contract includes data on the contracting parties, the planned electricity generation and possible deviations, the Feed-in Tariff or Premium Amount, data on metering point, and balancing responsibility like.

The Register of Projects: According to Article 39 of the RS Law on RES, a natural or legal person (investor) that constructs a generation plant has the obligation to register the project in the Register of Projects, maintained by MIER, within 30 days from the issuance of Construction Permit or conclusion of the Contract on Concession. The Register of Projects contains all RES and efficient cogeneration projects in the RS, which is used to monitor the goals set by the RS Action Plan regarding the participation of RES in the final (gross) consumption of electricity.

The form, contents and procedure of keeping the Register of Projects are defined by the RS Instructions on Managing and Updating the Register of RES and Efficient Cogeneration Projects (Instructions). The Register of Projects is divided into the following sections: 1. Projects under construction; 2. Built projects; and 3. Abandoned projects.

The project can only be registered in one section of the Registry of Projects at a time; and for each registration, MIEM issues a written confirmation. Although the registration is mandatory for all RES projects, it does not provide the priority in allocation of incentives, since incentives are granted on the basis of submission of the completed application to RSERC.

Step 4 - Securing Land, or the Right to Use Land: If the investor cannot obtain the ownership of the land through negotiation with owners or acquire the right to use the land or construct on it, then the property can be expropriated for the purpose of the construction of the facilities that are of a “general interest,” including energy facilities.

According to the RS Law on Expropriation, the expropriation beneficiaries are the RS and local selfgovernance units (municipalities), “if not otherwise prescribed by the Law.”151 The expropriated property is transferred to the investor for the purpose of construction of the facility in accordance with the terms and conditions defined by the Contract.

In order for the expropriation to begin, the public interest for the construction has to be declared by the RS Government. A proposal for the declaration of the public interest is submitted by the expropriation beneficiaries to the RS Government, together with an Elaboration on Expropriation, which contains data on the area of expropriation (geodetic and cadastral plan), data on the property and its owners, purpose of the expropriation and the estimated value of the property. After obtaining an opinion on expropriation from the municipality, the RS Government adopts a decision on expropriation.
Articles 18(5), 33(1) and 48 of the RS Law on Expropriation were rendered unconstitutional by the Decisions of the RS Constitutional Court.

They contained the following provisions: (i) Article 18(5) prevented the owners to appeal the Decision on Expropriation in an administrative dispute; (ii) Article 33(1) enabled the entry into the possession of the expropriated property before the payment of the expropriation fees; and (iii) Article 48 prescribed that the public interest was already established in the case the expropriation property was included in the existing regulation plans. The RS Constitutional Court found that these provisions violated property rights and were contrary to the RS Constitution and the European Convention for Human Rights (ECHR). Consequently, the RS Law on Expropriation was amended to repeal those Articles in 2015.

A MAP OF SOLAR POWER PLANTS IN BIH

CONSTRUCTED POWER PLANTS WHICH ELECTRIC ENERGY PRODUCE FROM RENEWABLE ENERGY SOURCES - Electric Power System EP HZHB, November 2017

PRIVILEGED PRODUCERS

NO.	NAME OF THE LICENSEER	NAME OF THE SOLAR POWER PLANTS	INSTALLED POWER (kW)
1.	NSSN LTD MOSTAR	SP VRELO Radobolje	**8**
2.	IN SOLAR LTD ČAPLJINA	SP In Solar Trebižat	10
3.	G.M.C. BIH LTD ORAŠJE	SP G.M.C. BIH	36
4.	ESCO ECO ENERGIJA LTD LIVNO	SP Gradska toplana Livno	78
5.	SOLIK LTD PROZOR	SP Prozor	135
6.	SOLARMAX LTD MOSTAR	SP Stolac 1	150
7.	MK GROUP LTD	SP MK Hodovo 1	150
8.	GP TOMING LTD GRUDE	SP Krenica 1	150
9.	GP TOMING LTD GRUDE	SP Hodovo 1	150
10.	HE ENERGY LTD STOLAC	SP HE Energy 1	149
11.	VELIKO SUNCE LTD STOLAC	SP Veliko sunce	150
12.	ENERGOSOL LTD STOLAC	SP Pješavac 1	150
13.	SOR SOL-VES POSUŠJE	SP Batin	23
14.	ANNY-COMERCE LTD PROZOR – RAMA	SP Sunčani Lug	20
15.	GP TOMING LTD GRUDE	SP Krenica 2	150
16.	GP TOMING LTD GRUDE	SP Krenica 3	150
17.	GP TOMING LTD GRUDE	SP Hodovo 2	150
18.	GP TOMING LTD GRUDE	SP Hodovo 3	150
19.	GP TOMING LTD GRUDE	SP Hodovo 4	150
20.	GP TOMING LTD GRUDE	SP Hodovo 5	150
21.	GP TOMING LTD GRUDE	SP Hodovo 6	150
22.	GP TOMING LTD GRUDE	SP Hodovo 7	150
23.	GP TOMING LTD GRUDE	SP Hodovo 8	150
24.	GP TOMING LTD GRUDE	SP Hodovo 9	150
25.	GP TOMING LTD GRUDE	SP Hodovo 10	150
26.	GP TOMING LTD GRUDE	SP Hodovo 11	150
27.	GP TOMING LTD GRUDE	SP Hodovo 12	150
28.	GP TOMING LTD GRUDE	SP Hodovo 13	150
29.	GP TOMING LTD GRUDE	SP Hodovo 14	150
30.	ENERGETIC ELEKTRONIC LTD ČITLUK	SP Energetic electronic	150
31.	IGI SOLAR LTD ČITLUK	SP Blizanci 1	150
32.	ELPRO LIVNO	SP Suhača	22

33.	PRAHA LTD ŽEPČE	SP Praha 1-150	150
34.	ECO – KW KISELJAK	SP Elur 1	150
35.	OBRT SE PROSLAP PROZOR –RAMA	SP Proslapsko sunce	22
36.	FNE PAŽIN LTD STOLAC	SP Pažin	133
37.	SOLAR ENERGY LTD ČAPLJINA	SP Čapljina	918
38.	MAC ECO OIL LTD SARAJEVO	SP Mac Eco Oil	149
39.	BINGO LTD EXPORT – IMPORT TUZLA	SP Bingo Solar 05	998
40.	OBRT SE PROSOLAR PROZOR – RAMA	SP Prosolar	135
41.	FNE TG-GRANIT LTD PROZOR – RAMA	SP Poljana	135
42.	FNE JAKLIĆI B&B LTD PROZOR – RAMA	SP Rama	22
	TOTAL		**6742**

QUALIFIED PRODUCERS

No.	NAME OF THE LICENSEER	NAME OF THE SP	INSTALLED POWER (kW)
1	"ŠOKČEVIĆ" doo Orašje	SE "Bazeni"	72
2	"SP ĆOŠKOVIĆ"doo Domaljevac	SE "Domaljevac"	30
3	"VELOVO KUĆIŠTE	SE "Vila Anit"	10
4	"LADANUŠIĆ Rakitno-Posušje	SE "Ladanušić"	10
5	SE "Bičakčić 3 ELDIN"	SE "Bičakčić 3 ELDIN"	10
6	"MAXIMA IST" doo Mostar	SE "STOLAC-A"	150
7	Pliva d.o.o. Jajce	SE PLIVA	150
8	"SUNCE" Raštani	SE Raštani	10
9	"ŠAKOTA" doo Čitluk	SE Šakota	23
10	FNE "ŠOLA" doo Tomislavgrad	SE Šola 1	22
11	FNE "GRANITEX" doo Čapljina	SE Graniteks	22
		UKUPNO	508

SOLAR POWER PLANTS – TEST MODE

NO.	NAME OF THE LICENSEER	NAME OF THE SOLAR POWER PLANTS	INSTALLED POWER
1	"ĆANDRO" Prozor-Rama	SE Zelenika 1	22
2	FSE " BLJESAK" Čitluk	FNE Bljesak	22
3	"ČULE PROMET"doo Mostar	SE Čule promet	150
4	SE "BARE" Prozor-Rama	SE Bare	23
5	SE "SOLAR-RAMA"	SE Solar-Rama	135
6	SFE "INTERQUALITY" Prozor - Rama	SE Interquality	22
7	FSE " MIRNA - LUKA" Dretelj Čapljina	SE Mirna - Luka	22
8	FSE "BROTIS" Čitluk	SE "BROTIS"	22
		UKUPNO	418

CONSTRUCTED POWER PLANTS WHICH ELECTRIC ENERGY PRODUCE FROM RENEWABLE ENERGY SOURCES - Electric Power System BIH, November 2017

PRIVILEGED PRODUCERS

1	"BIOTECH" d.o.o. Busovača	SE Biotech	10
2	"Elektro test" d.o.o. Sarajevo	SE Gornja Jošanica	10
3	"SICON SAS" d.o.o. Tuzla	SE Sicon 1	10
4	"SV Energija" d.o.o. Tešanj	SE Lepenica	10
5	"BIČAKČIĆ" d.o.o. Sarajevo	SE Bičakčić 1	10
6	"SUBAŠIĆ d.o.o. Tešanj	SE Subašić	10
7	"IVEX" d.o.o. Usora	SE Ivex	25
8	"EKO ENERGIJA" d.o.o. Kalesija	SE Sportska hala Kalesija	120
9	"Energy trade" d.o.o. Usora	SE Energy 1	150
10	"Remedia" d.o.o. Tuzla	SE Ahimbašići 1	22
11	„SOLIS" d.o.o. Lukavac	SE Solis 01	136
12	"Bratstvo" d.d. Gornji Vakuf-	SE Tele-com 1	138
13	"GROHS H&G" d.o.o.Sarajevo	SE Pretis 1	150
14	„ESPRO" d.o.o. Donji Vakuf	SE Espro 1	60
15	„EMY" d.o.o. Zenica	SE Emy 30 Kw Žepče	30
16	„EMY" d.o.o. Zenica	SE Emy-2 -Doboj Jug	30
17	"Eko-San" d.o.o. Sarajevo	SE O.Š. Meša Selimović	23
18	"BINGO" d.o.o. Tuzla	SE Bingo Solar 2	144
19	"BAHEN GRADNJA"d.o.o. Sarajevo	SE Bujaci	150
20	"EKO-SAN" d.o.o. Sarajevo	SE Bijela Ploča	8
21	"NINO-HA" d.o.o. Doboj Jug	SE Konak	30
22	"mSE Vedo 1" vl. Kantardžić Elvedin	SE Vedo 1	11
23	"POLJOTRG" PP Visoko	SE Poljotrg	23
24	"MAHIR" doo Visoko	SE Mahir	23
25	"GOLD ENERGY" doo Gradačac	SE Gold energy-150	150
26	"VRTOVI HEĆO" vl.Zaim Hećo	SE Košćan 1	10
27	"ENERGONOVA" d.o.o. Sarajevo	SE "Merkur"	115
28	"ENERGONOVA" doo Sarajevo	SE "Klas centar Mostar"	102
29	"ENERGONOVA" doo Sarajevo	SE "Zlatka Vuković"	105
30	"ENERGY" doo Kakanj	SE "ENERGY"	150
31	"GSL AUTOCENTAR"Gornji Vahuf	SE GSL	23
32	"SE BAZA" doo Tuzla	SE Baza	17
33	"ENERXIA" doo Bugojno	SE Enerxia	135
34	"COMEX" d.o.o.Tešanj	SE RADUŠA "	23
		UKUPNO	2.161

QUALIFIED PRODUCERS

Red broj	Naziv nosioca Licence	Naziv postrojenja - Solarne elektrane	Instalisana snaga
1	"BEA " d.o.o. Tešanj	SE BE.23-1	23
2	"GRAND 99" d.o.o Travnik	SE Grand 99	30
3	"OPES" d.o.o. Sarajevo	SE Dragovići 1	30
4	"ELCOM" Đurđevik, Živinice	SE Đurđevik	20
5	"FNE SM BRKA" Tešanj	FNE SM Brka	10
6	"ORKAN 1" Živinice	SE Orkan 1	15
7	"ŠNELKOM" doo Ilidža	SE Šnelkom	10
8	"MAZOLJICE" Mostar	SE Mazoljice	10
9	"SE ELEKTRONIK" Tešanj	SE Dolina	13
10	"SE UMEL-DALEKOVODMONTAŽA" doo Tuzla	SE Umel-dalekovod	23
11	"SE BINGO " doo Tuzla	SE Bingo solar 01	144
12	"SE SARKOP" doo Srebrenik	SE Sarkop	150
13	"SE HERCEG" doo Srebrenik	SE HERCEG	150
14	"SAMI PROMET" doo Visoko	SE Sami promet 1	30
15	"SJAJ" d.o.o. Maglaj	SE Sjaj Maglaj	23
16	"ALIM" doo Visoko	SE Alim	30
17	"HENKOPROM" doo Žepče	SE Henko HE. 1-150	122
18	"GNJEČE 1" Klokotnica	SE Gnječe 1	23
19	"ELWORK" doo Tuzla	SE Elwork 1	30
20	"ASCOM"doo Tešanj	SE Askom 1	10
21	"PETROL - P" doo Bihać	SE Petrol - P1	15
22	"PETROL - P" doo Bihać	SE Petrol - P 2	10
23	"SAMELAY" doo Tešanj	SE Samelaj 1	23
24	HO SVJETLOST Doboj Istok	SE Gaj 1	20
25	"FAVORIT BH" doo Bihać	SE Favorit BH	20
26	" SLAVINOVIĆI I" Tuzla	SE Slavinovići 1	6
27	"SE SOLAR 1-2" Hadžići	SE Solar 1	133
28	"PERO" doo zenica	SE Pero 1	119
29	"IVEX" doo Usora	SE Ivex 2	127
		UKUPNO	1.369

SOLAR POWER PLANTS – TEST MODE

Red broj	Naziv nosioca Licence	Naziv postrojenja - Solarne elektrane	Instalisana snaga
1	"CONRA" doo Tešanj	SE FNE CO-23	22
2	MSF-TRADE doo Doboj Istok	SE Duje	23
3	"INTER" doo Tešanj	SE Inter IN 23-1	20
4	"KALIM-PROFIL" doo Tešanj	SE Kalim K23-1	22
5	"PAPE" vl. Mirsad Bašić	SE Pape	22
		UKUPNO	109

Constructed power plants generating electricity from renewable sources
List by the status of producers

	PRIVILEGED PRODUCERS		QUALIFIED PRODUCERS		PRODUCERS IN TEST MODE		TOTAL	
	No of plants	TOTAL (kW)	No of plants	TOTAL (kW)	No of plants	TOTAL (kW)	No of plants	TOTAL (kW)
HIDRO ENERGY	**43**	**35.694**	**7**	**12.485**	**1**	**500**	**51**	**48.679**
JP EP BiH	38	31.769	7	12.485	1	500	46	44.754
JP EP HZHB	5	3.925	0	0	0	0	5	3.925
SOLAR ENERGY	**76**	**8.903**	**40**	**1.877**	**13**	**527**	**129**	**11.307**
JP EP BiH	34	2.161	29	1.369	5	109	68	3.639
JP EP HZHB	42	6.742	11	508	8	418	61	7.668
BIOMASS	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
JP EP BiH	0	0	0	0	0	0	0	0
JP EP HZHB	0	0	0	0	0	0	0	0
WIND ENERGY	**0**	**0**	**1**	**300**	**0**	**0**	**1**	**300**
JP EP BiH	0	0	1	300	0	0	1	300
JP EP HZHB	0	0	0	0	0	0	0	0
TOTAL	**119**	**44.597**	**48**	**14.662**	**14**	**1.027**	**181**	**60.286**

PROJECTS SUMMARY BY CANTONS

A/ PROJECTS IN THE TEST MODE

PLANTS	UN-SAN	POSAV.	TUZLAN.	ZE-DO	BO-POD.	SR-BOS.	HNK	ZAP-HER.	SARAJEV.	KAN. 10	TOTAL
HIDRO	0	0	2	4	0	5	0	0	1	0	12
WIND	1	0	0	0	0	3	5	2	0	10	21
BIOMASS	0	0	0	0	0	0	0	0	0	0	0
SOLAR	2	0	2	8	1	7	5	0	1	1	27
OTHER	0	0	0	0	0	0	0	0	0	0	0
KOGEN.	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	0	4	12	1	15	10	2	2	11	61

B/ PROJECTS IN THE CONSTRUCTION PHASE

PLANTS	UN-SAN	POSAV.	TUZLAN.	ZE-DO	BO-POD.	SR-BOS.	HNK	ZAP-HER.	SARAJEV.	KAN. 10	TOTAL	TOTAL POWER (MW)
HIDRO	0	0	2	4	4	8	19	0	0	0	37	49.2318
WIND	0	0	0	0	0	0	8	0	0	10	18	644.723
BIOMASS	0	0	0	1	0	1	0	0	0	3	5	123.722
SOLAR	12	1	19	24	2	23	81	4	18	2	186	782.19508
OTHERS	0	0	0	0	0	0	0	0	0	0	0	0
KOGEN.	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	12	1	21	29	6	32	108	4	18	15	246	1599.87188

C/ CONSTRUCTED

PANTSS	UN-SAN	POSAV.	TUZLAN.	ZE-DO	BO-POD.	SR-BOS.	HNK	ZAP-HER.	SARAJEV.	KAN. 10	TOTAL	TOTAL POWER (MW)
HIDRO	0	0	0	7	4	30	9	2	0	0	52	49.2253
WIND	0	0	0	1	0	0	0	0	0	0	1	0.3
BIOMASS	0	0	0	0	0	0	0	0	0	0	0	0
SOLAR	4	3	19	24	2	7	51	5	8	3	126	11.20963
OTHERS	0	0	0	0	0	0	0	0	1	0	1	0,432000
KOGEN.	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4	3	19	32	6	37	60	7	9	3	180	61.16693

AVAILABLE SOLAR POWER PLANT FOR SALE IN SOLAR PARK HODOVO – STOLAC

Locations of this solar power plants are in the business-economic zone of Hodovo, which is as such determined by the Regulatory Plan of the Economic-Business Zone in Hodovo, Municipality of Stolac.

After the purchase of land in public tenders, the following are made for all the locations listed below:

- Geodetic survey performed,

- Parcelization where it was necessary,

- Payment of taxes and transfer of ownership from the Municipality to each individual,

- Scramble in the grunts and getting ZK extracts,

- Preparation of Preliminary Designs and Obtaining a Urban License,

- Main projects for construction permit developed by "ELEKTRO TEST" doo Sarajevo,

- Revision of project documentation by PROVING doo Sarajevo,

- elaborated work safety and fire protection works,

- elaborates on the protection against the reflection of solar cells of the photovoltaic power plant on adjacent surfaces,

- After submitting the complete documentation - from the Ministry of Economy of the FBIH, a Decision on compliance of project documentation with the FBiH Law on Electric Power Inspection and other regulations,

- All projects have received the PEES (Pre-Power Consent) with a connection in the Special Zone.

- We are currently awaiting the issuance of the ED (Energy Permit) by the Federal Ministry of Energy, Mining and Industry, which is the condition for the issuance of a building permit after which it can be accessed by the works, because everything is paid properly.

- Companies subject to SE are registered because it is required by law, all companies are intentionally registered with the main activity of production and distribution of electricity from renewable sources - green energy.

1. **„FIO“** LTD
   ADDRESS: Ul.Zagrebačka 53/2, Sarajevo
   k.č. 1/144 (stari broj: 991/140) K.O. Pješivac
   SE „FIO“ – Hodovo – POWER **149 kW**
   No. of urban permit : 07-02-25-274/15 od 10.04.2015

2. **„PRVI KRUG“** LTD
   ADDRESS: Ul.Milana Preloga 23
   Sarajevo
   k.č. 1/145 (stari broj: 991/141) K.O. Pješivac
   SE „ĐOZIĆ“ – Hodovo – power **149 kW**
   No. of urban permit: 07-02-25-276/15 od 10.04.2015.

3. **„VIRTUS SOLIS“** LTD
   ADDRESS : Tržni centar-pasaž-1 sprat lamela 36 A
   Tuzla
   k.č. 1/123 (stari broj: 991/119) K.O. Pješivac
   SE „Green Power 1“ – Hodovo – POWER **149 kW**
   No. of urban permit: 07-02-25-278/15 od 10.04.2015.

4. **„VIRTUS SOLIS“** LTD
   ADDRESS Tržni centar-pasaž-1 sprat lamela 36 A
   Tuzla
   k.č. 1/143 (stari broj: 991/139) K.O. Pješivac
   SE „Green Power 2“ – Hodovo – snage **149 kW**
   No. of urban permit: 07-02-25-275/15 od 10.04.2015. godine

5. **„VIRTUS SOLIS“** LTD
   ADDRESS :Tržni centar-pasaž-1 sprat lamela 36 A
   Tuzla
   k.č. 1/124 (stari broj: 991/120) K.O. Pješivac
   SE „SOLARIS“ – Hodovo – snage **149 kW**
   No. of urban permit: 07-02-25-279/15 od 10.04.2015. godine

6. **„BL-COMMERCE“** LTD
   ADDRESS: Ul.Himzije Bjelavca br.148.
   Sarajevo
   k.č. 1/122 (stari broj: 991/139) K.O. Pješivac
   SE „BREGAVA“ – Hodovo – snage **149 kW**
   No. of urban permit : 07-02-25-277/15 od 10.04.2015. godine

7. **„PRVI KRUG“** d.o.o.
   ADDRESS Ul.Milana Preloga 23
   Sarajevo
   k.č. 1/173 (stari broj: 991/170) K.O. Pješivac
   SE „PRVI KRUG 1“ – Hodovo – snage **149 kW**
   No. of urban permit: 07-02-25-261/17 od 06.04.2017. godine

8. **„PRVI KRUG“** LTD
   ADDRESS: Ul.Milana Preloga 23
   Sarajevo
   k.č. 1/174 (stari broj: 991/171) K.O. Pješivac
   SE „PRVI KRUG 2“ – Hodovo – snage **149 kW**
   No. of urban permit: 07-02-25-263/17 od 06.04.2017. godine

9. **„PRVI KRUG“** LTD
   ADDRESS: Ul.Milana Preloga 23
   Sarajevo
   k.č. 1/172 (stari broj: 991/169) K.O. Pješivac
   SE „DISCOVERY“ – Hodovo – snage **149 kW**
   No. of urban permit: 07-02-25-262/17 od 06.04.2017. godine

10. **„SOLAR CIRCLE“** LTD
    ADDRESS:Ul.Milana Preloga 23
    Sarajevo
    k.č. 1/108 (stari broj: 991/104) K.O. Pješivac
    SE „SOLAR CIRCLE 1“ – Hodovo – snage **149 kW**
    No. of urban permit: 07-02-25-257/17 od 06.04.2017. godine

11. „SOLAR CIRCLE“ LTD
ADDRESS: Ul.Milana Preloga 23
Sarajevo
k.č. 1/169 (stari broj: 991/166) K.O. Pješivac
SE „SOLAR CIRCLE 2“ – Hodovo – snage **149 kW**
No. of urban permit: 07-02-25-258/17 od 06.04.2017. godine

12. „SOLAR CIRCLE“ LTD
ADDRESS: Ul.Milana Preloga 23
Sarajevo
k.č. 1/170 (stari broj: 991/1674) K.O. Pješivac
SE „SOLAR CIRCLE 3“ – Hodovo – snage **149 kW**
No. of urban permit: 07-02-25-259/17 od 06.04.2017.

13. „SOLAR CIRCLE“ LTD
ADDRESS : Ul.Milana Preloga 23
Sarajevo
k.č. 1/171 (stari broj: 991/1684) K.O. Pješivac
SE „SOLAR CIRCLE 4“ – Hodovo – snage **76 kW**
No. of urban permit: 07-02-25-260/17 od 06.04.2017.

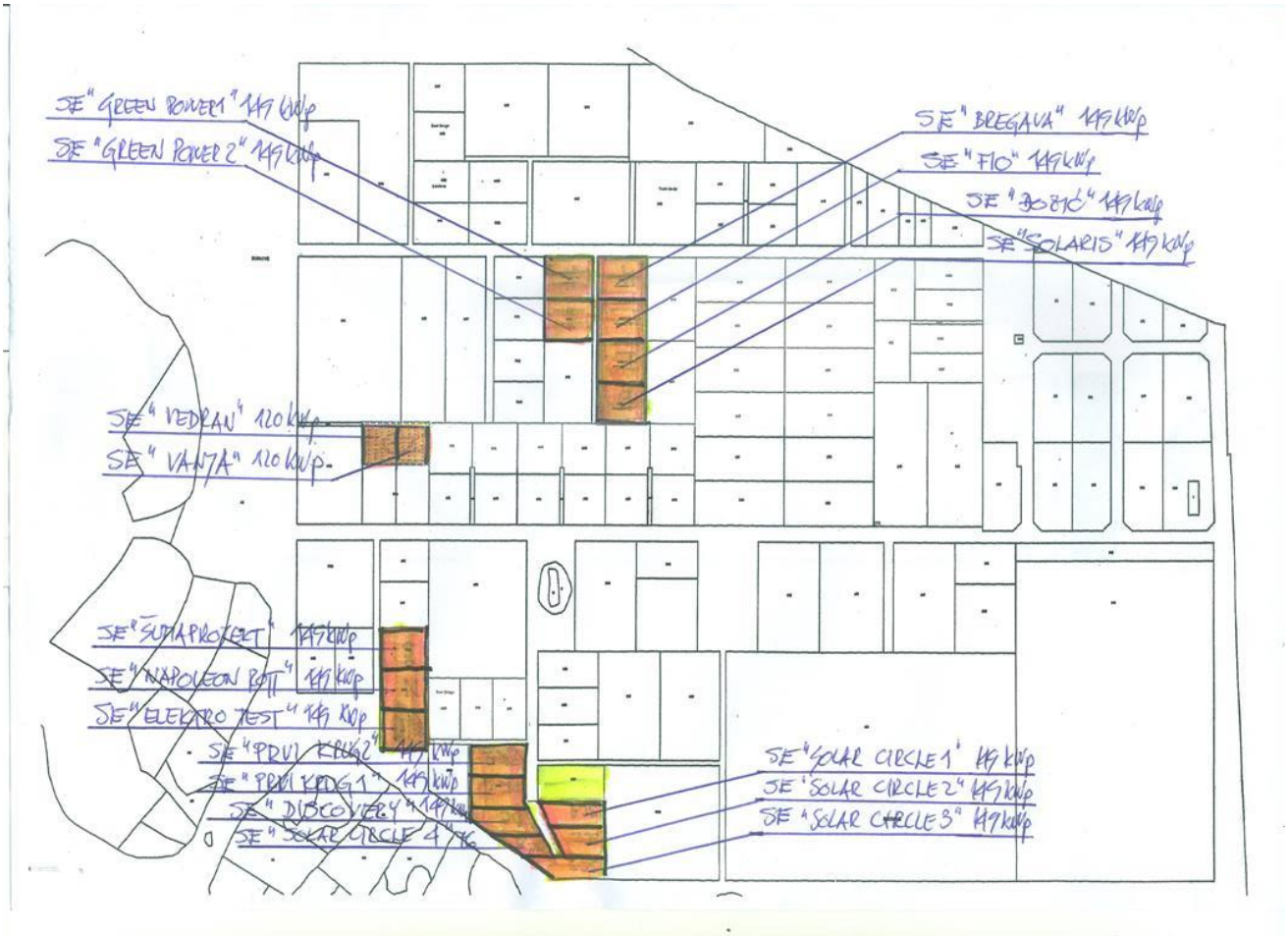
14. „SOLAR CIRCLE“ LTD
ADDRESS :Ul.Milana Preloga 23
Sarajevo
k.č. 1/103 (stari broj: 991/99) K.O. Pješivac
SE „ŠUMAPROJEKT“ – Hodovo – snage **149 kW**
No. of urban permit: 07-02-25-555/13 od 24.07.2013.
Građ.dozvola broj : 07-02-25-178/14 od 31.03.2014.

15. „SOLAR CIRCLE“ LTD
ADDRESS : Ul.Milana Preloga 23
Sarajevo
k.č. 1/104 (stari broj: 991/100) K.O. Pješivac
SE „NAPOLEON ROTT“ – Hodovo – snage **149 kW**
No. of urban permit:: 07-02-25-554/13 od 24.07.2013. godine
Građ.dozvola broj : 07-02-25-177/14 od 31.03.2014.godine

16. **„SOLAR CIRCLE“** LTD
ADDRESS : Ul.Milana Preloga 23
Sarajevo
k.č. 1/107 (stari broj: 991/103) K.O. Pješivac
SE „ELEKTRO TEST“ – Hodovo – snage **149 kW**
No. of urban permit: 07-02-25-558/13 od 24.07.2013. godine
Građ.dozvola broj : 07-02-25-176/14 od 31.03.2014.godine

TOTAL POWER OF ABOVE SOLAR POWEER PLANT IS 2311 Kwp.

MAP OF THE SUN POWER PLANT HODOVO



INVESTMENT PROJECT

ROOFTOP PHOTOVOLTAIC POWER STATION „SPRECA 1“, KALESIJA

Location	Spreca Farm, Kalesija
Type	Solar energy
Installed net electric power	149,25 kWp
Electricity generation annually	174,41 MWh
Total investment cost	189 959 EUR
Civil Works	35 078 EUR
Equipment	134 913 EUR
Other costs	19 968 EUR
Approvals status	Urban approval/ location conditions - obtained Energy permit - request submitted
Investment & Technical documentation status	Feasibility study (Economic and financial analysis) – completed
Project description	The power plant, with installed power of 149.25 kWp, will be connected to the electricity grid and all produced energy will be sold at a purchase price of electricity from plants that use renewable energy sources. There is the possibility of installing larger capacity on the land around the farm.

Polimac Company d.o.o.

Sarajevo, Bosna i Hercegovina

WIND POWER PLANTS

IN THE BOSNIA AND HERZEGOVINA

Sarajevo, 2020

Polimac Company LTD

Bosna & Hercegovina

2020

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GENERAL INFORMATION

Energy has a major impact on the growth and development of the economy of each country, primarily through technological development and the increasing competitiveness of the economy. Energy is a generator of development in the technological, economic, scientific and educational terms.

The energy supply is essential for the sustainability of economic development of the countries of the Western Balkans, especially due to the fact that it is a large number of relatively small economies.

From the perspective of the European Union, SEE region has been identified as a major transit region for gas, oil and electricity. World Bank research shows that the lack of energy and energy demands throughout the region will be dramatically increased in the near future.

Energy sector is one of the most powerful in B&H, with long tradition, huge potentials and opportunities for further development and investment.

According to the latest data, B & H is at first place in the region concerning the export of electricity. The export of electricity in 2014 was 5,997 GWh.

In the last three years, BiH was ranked as 24th in the world in the export of electricity, while Germany occupied first place.

In the last few years a significant growth of foreign investment in Bosnia and Herzegovina Energy sector, has recorded. Foreign investors have recognized the potential of this sector in B&H, and also the B&H Public Companies producing electricity, invest substantial means in order to this sector enable sustainable development and growth.

WHY INVEST IN ENERGY SECTOR OF B&H?

- Energy Community Membership
- Favorable Feed-in-tariffs for RES power plant
- Low operating costs and competitively priced & qualified human capital
- Energy Reserves and Potentials

2006 B&H ratified the Treaty Establishing the Energy Community, which provides the creation of the biggest internal market in the world for electricity and gas, signed between European Union on one side, and eight Contracting Parties: Albania, Bosnia and Herzegovina, Kosovo, Macedonia, Moldova, Montenegro, Serbia and Ukraine.

Seventeen countries have the status of Participants and directly participate in the work of the Energy Community bodies: Austria, Bulgaria, Czech Republic, Croatia, Cyprus, Finland, France, Germany, Greece, Hungary, Italy, the Netherlands, Poland, Romania, Slovakia, Slovenia and the United Kingdom.

Armenia, Georgia, Norway and Turkey have observer status in the Energy Community bodies.

The main goals of the Energy Community are:

• Creation of a stable and single regulatory framework and market space

• Providing of reliable energy supply

• Attracting investments in the electricity and gas sectors.

• Implementation of energy efficiency

• Utilization of renewable sources.

ENERGY RESERVES AND POTENTIALS

Bosnia and Herzegovina is endeavored with significant and diverse indigenous natural energy re-sources that are still untouched or only partly exploited, such as:

• The main energy resource of B&H is coal (brown coal and lignite), with estimated reserves of 6 billion tons (average annual coal consumption for electricity production is about 8 million tons)

• The hydropower potential is 6000 MW which locates B&H on the eight place in Europe and currently installed capacity of 2 054 MW represents 36% of total hydro potential ,

• According to the extensive researches, there is significant wind energy potential which is estimated at 2000 MW

• Raw material resources for the bio-mass energy are extremely favorable, including approximately 1.5 million m3 of forest / wood industry residues (all wood waste, sawdust, chips, and chipped technical wood), etc.

• Potential for exploitation of geo-thermal and solar energy are available too, but have not been sufficiently explored and exploited

• Preliminary research surveys of oil and gas, had indicated the presence of promising deposits on a number of sites in B&H (off-balance sheet reserves are estimated at about 50 million tons of oil.

B&H energy sector encompasses the following main subsectors:

• Coal

• Electric power

• Oil & Natural gas

POWER GENERATION

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

Gross electricity production in Bosnia and Herzegovina was 1328 GWh in August 2017, and it decreased by 5.4% compared to August 2016. In total gross electricity production hydro power plants participated with the share of 22.5% and thermal power plants with 77.5%

NEW POWER GENERATION PROJECTS DEVELOPMENT

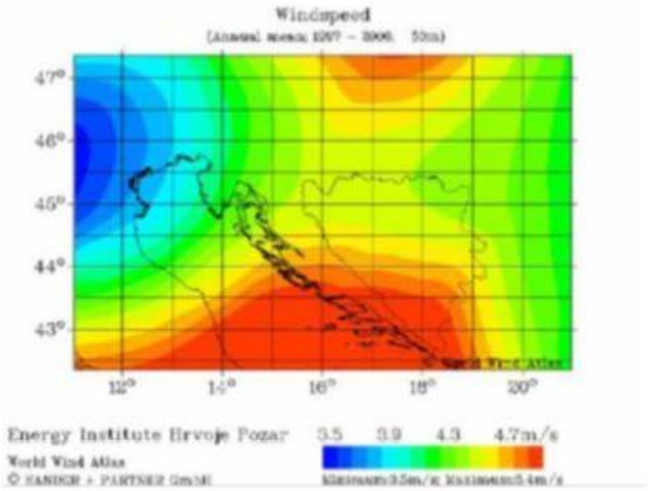
Intending to harness the substantial and diversified energy resource base in B&H, all relevant stakeholders in B&H are adopted development and investment programs for construction of new generation plants, entirely respecting recommendation from EU Directive 2003/54.

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

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

WIND POWER PLANTS IN B&H

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



Average annual wind speed 50 m a.g.l. for the period 1997-2006 as a result of global weather model

The construction of big wind parks that would give a significant contribution to the existing power resources have been the talk of the town for years.
According to CIN records, 34 wind power plants were planned to be built in B&H.

In 2013, started with work a small wind power plant - Moštre I – of the installed power of 30 kW. The construction was financed by a private company "Susa Commerce", with a power of 350 kilowatts, costing about half a million KM.

This wind farm (VE "Moštre 1") is located in the village of Zimča, in the municipality of Visoko, and the estimated annual production of electricity is approximately 1,080 GWh.

The produced electricity will be delivered to the distribution system of JP "Elektroprivreda BiH" d.d. -Sarajevo. Otherwise, wind farm (Suša Commerce) is the first wind farm in the Federation of BiH.

The Power Utility under control of Bosnian Croats EP HZHB announced the start of its 50,6 megawatt wind power plant on the Mesihovina near Tomislavgrad at the end of 2017.

The wind farm (VE) Mesihovina is located in the central part of the municipality of Tomislavgrad. It will have 22 wind turbines of the type SWT-2.3-108 of the total installed capacity of 50.6 MW and an annual production of about 165 GWh.

The funds required for this project were secured by the donation of the German Government in the amount of 1,000,000 Euros, the KfW loan in the amount of 71,000,000 Euros and the own funds of the EP EP HZHB needed for completion of the project. The total investment value of the VE Mesihovina project is around 81. Mil. Euro.

EPBiH announced that it was starting the construction of a 48 megawatt wind power plant on the Podveležje near Mostar. It secured favorable loans for these projects from the German Development Bank (KfW) with state guarantees. A 126.8 million KM loan for Podveležje at the end of 2013, but the procedure for securing a favorable loan took two years.

In recent years and especially in his year, in the media it can be find many posts about announcements about new potential wind power.

Currently there are many macro and micro locations for wind power plant construction that are evaluated as advantageous for wind power plant construction which is presented in the table from below:

No.	Location	Name	Power (MW)	Owner
1.	LIVNO	Borova Glava	52	Elektroprivreda HZHB
2.		Orlovača	42.9	HB Wind LLC, Livno
3.		Debelo Brdo	54	Koncig LLC Posušje
4.		Mučevača	63	Balkan Energy Wind LLC Livno
5.		Široka Draga	51	Imres smartgreenenergy Livno, & Enprode Istanbul
6.	TOMSLAVGRAD	Baljci	48	Tomislavgrad - Kuprec LLC Tomislavgrad
7.		Ivovik	84	Ivovik LLC Sarajevo
8.		Gradina	70	Vran-Dukić LLC Tommislavgrad
9.	GLAMOČ	Slovinj	130	EP BIH; EPHZHB; EP RS
10.		Dževa	46	EP BIH; EPHZHB; EP RS
11.		Škadimovac	110	WBL City Project Banja Luka
12.	KUPRES	Kamen-Dent	48	Kamen-Dent Mostar
13.	BOSANSKO GRAHOVO	Derala	87	G&G Energija LLC Bihać
14.	POSUŠJE	Relaks	30	Relaks LLC Vinjani Posušje
15.		Poklečani	72	EPHZHB
16.	NEVESINJE	Grebak	49.5	Grebak, Germany
17.		Trusina	51	Eol prvi LLC Nevesinje
18.	MOSTAR	Podveležje	48	EPHZHB
19.		Velika Vlajna	32	EPHZHB
20.		Pločno	34	Energy 3
21.	HADŽIĆI, SARAJEVO	Ivan Sedlo - Hadžići	25.2	Suzlon Wind Energy BiH
22.	VLAŠIĆ	Galicia	2 x 50	TLG LTD Travnik
23.		Vlašić	48	EP BiH
24.	TREBINJE	Hrgud		Elektroprivreda RS

According to NOSBiH, 10 concession contracts for wind power plants construction in the FBiH have been issued. Some firms concluded the contracts with the cantonal governments as far back as 2008, yet have not started building.

Herceg Bosna Canton granted the most concessions. In FB&iH firms must complete a complicated procedure and collect permits and approvals from at least 13 municipal, cantonal and the FBiH agencies to put up wind power stations.

The situation in the RS is somewhat different, once when is signed a concession agreement with the RS government, it was easier to collect the permits.

It is almost impossible to make projections about how much energy will come from a wind power station. That means that regulatory bodies must insure there are steady reserves of backup electricity. The number and power of wind power plants is also limited by the capacity of transmission lines in BiH.

Most of the proposed projects are located in West Herzegovina, but the transmission network is not developed enough to meet the needs of wind power plants.

For this reason, the DERK stipulated two years ago that the transmission cap for wind power plants until 2019 will be 350 megawatts. The two entities agreed that the FBiH gets 230 and the RS 120 megawatts of that. Then the entity ministries for energy, industry and mining made a list of the future wind power plants to be connected to the grid.

OVERVIEW OF THE MOST INTERESTING PLANNED WIND POWER PLANTS:

LIVNO:

WIND FARM BOROVA GLAVA, Livno

Location	Borovaglava, Livno
Type	Wind farm
Installed net electric power	26× 2 MW = 52 MW
Electricity generation	149.62 GWhannually
Total investment cost	78 million EUR
Civil Works	2.28 million EUR
Equipment	68.56 million EUR
Roads	2.25 million EUR
Other costs	4.91 million EUR
Investment & Technical documentation status	- Project Analysis & Review - Use of Wind Power for Electricity Generation in BiH completed / Feasibility Study - Geotechnical Study - Waste management plan - ESI Assessment - 110Kv Substation design completed

WIND FARM ORLOVAČA

Location	Livno, Municipality of Livno
Type	Wind farm
Installed net electric power	13 x 3.3 MW = 42.9 MW
Electricity generation	Gross production (no losses), GWh 99.06 Gross production (no losses), GWh 99.06 Net long term annual energy yield (P50), GWh 86.33
Total investment cost	65 million EUR
Civil Works	2 million EUR
Equipment	55 million EUR
Roads	5 million EUR
Other costs	3 million EUR
Investments schedule	July - December 2016 - Contracting of credit line or other forms of wind farm project financing July - December 2016 - Agreement concluding between potential partner and HB Wind April 2017 - Wind farm construction start
Approvals status	March-April - Valid registration of wind farm concession in land register March-April - Obtaining Energy approval for connection (Federal Ministry of Energy, Mining and Industry) and consent of the Government of Bosnia and Herzegovina for the wind farm May-June 2016 -Obtaining building permits

MOSTAR

WIND FARM PLOČNO, Mostar

Location	City of Mostar
Type	Wind farm
Installed net electric power	34MW
Total investment cost	Total investment in the project Pločno: 44.2 million EUR IRR = 11.1%
Investment & Technical documentation status	- Researches and analyses finished - Issuing of permissions & approvals underway - Preliminary economic analysis done - Preliminary grid connection solution done - Final design making under way - Initial contacts with turbine manufacturers made - Searching for strategic partner

WIND FARM VELIKA VLAJNA, Mostar

Location	VelikaVlajna, Mostar
Type	Wind farm
Installed net electric power	2 X 16 MW = 32 MW
Electricity generation	89.36 GWhannually
Total investment cost	52.72 million EUR
Civil Works	1.42 million EUR
Equipment	44.80 million EUR
Roads	2.00 million EUR
Other costs	4.6 million EUR
Investment & Technical documentation status	- Project Analysis & Review - Use of Wind Power for Electricity Generation in BiH completed / Feasibility Study - Geotechnical Study - Waste management plan - ESI Assessment - 110Kv Substation design completed

GLAMOČ:

WIND FARM SKADIMOVAC, GLAMOC

Location	Glamoc, the north western part of BiH, 20 km from Glamoc town
Type	Wind farm
Installed net electric power	110 MW
Electricity generation	340.000 MWh annually
Total investment cost	154 million EUR
Equipment	121.20 million EUR
Investment & Technical documentation status	The procedure of measuring the wind speed is done in the period from November 2012 to November 2014. Based on this data Naval institute in Zagreb, Croatia, has made development of the design and preliminary design wind farm Skadimovac. This projects so far has the following permits: - The concession agreement with Government of Hercegbosnian County - Permission for the environment at the Ministry of Tourism and Environment of the Federation of Bosnia and Herzegovina - Sign of the Agency for RES - Preliminary water approval by the Agency for Water Area of the Adriatic Sea - The principle approval for connection to the grid Transmission company - Urban planning permit and construction permit is in the process of obtaining

WIND PARKS SLOVINJ & DŽEVA, GLAMOČ

Location	Municipality Glamoč, Herceg Bosna Canton Bosnia and Herzegovina
Type	Wind farm
Installed net electric power	Wind park Slovinj 130 MW; Wind park Dževa 46 MW
Total investment cost	263.000.000,00 EUR
Approvals status	Location Permit Construction permit - in the issuing procedure
Investment & Technical documentation status	Cooperation with Public Companies for production and distribution of electricity: EP BiH; EP HZHB; EP RS
Project schedule	Implementation period: 10 years Project payback period: 12 years

POSUŠJE:

WIND FARM POKLEČANI, Posušje

Location	ZHT/ Posusje
Type	Wind farm
Installed net electric power	2 X 36 MW = 72 MW
Electricity generation	258,595 GWh annually
Total investment cost	108 million EUR
Civil Works	2.91 million EUR
Equipment	94.93 million EUR
Roads	3.11 million EUR
Other costs	7.05 million EUR
Investment & Technical documentation status	- Site prospection, maps - Two years measuring cycle at 10 m pole completed - Preliminary financial analysis

WIND FARMRELAKS, Posušje

Location	Oštrac, Vučipolje, Municipality of Posušje
Type	Wind farm
Installed net electric power	30 MW (10 x 3 MW)
Electricity generation	99,338 GWh annualy
Total investment cost	38,766,146.00 EUR
Civil Works	523,107.00 EUR
Equipment	29,850,000.00 EUR
Roads	251,500.00 EUR
Other costs	8,141,539.00 EUR
Approvals status	-Project is approvedin the ISO (Independent System Operator in Bosnia and Herzegovina) indicativeplan production fromrenewableenergy sources - ObtainedConcessions Contract withthe Governmentof the West-HerzegovinaCanton - Realizedall theproperty andlegal relations in the area which includeswind farm "RELAKS"
Investment & Technical documentation status	- Initiatedproceduresfor obtainingenvironmental permits - Prefeasibility study completed
Project schedule	Project developmentstarted fromearly 2009. After the decisionto buildthe projectit was necessary to obtainallapprovalsand permits and this process will probablybe extendedto theend of 2013.The plannedstart ofconstruction phaseisMarch 2014 in order that"RELAXWindfarm" could begin its operationsin early 2015.

BOSANSKO GRAHOVO:

WIND FARM "DERALA 87 MW", BOSANSKO GRAHOVO

Location	Bosansko Grahovo	
Type	Preliminary choice of turbines; Vestas V 112 - 3.0 MW, 119 m hh.	
Installed net electric power	87 MW; 29 WTG's á 3 MW (the choice of turbines is not conclusive)	
Electricity generation Ey	- 289,400 MWh Park AEP P50 including a park efficiency of 95.2 %. - 257.956 MWh AEP/ 8,895 MWh per turbine AEP Net P50 - 34 % Capacity factor Net P50. - 2,965 Full load hours Net P50.	
Total investment cost	Scenario 1: 29 Vestas turbines - Total project costs of EUR 109 million Scenario 2: 29 China turbines - Total project costs of EUR 78.9 million	
Civil Works	5 479 000 EUR	
Equipment	64 235 000 EUR	
Other costs, project rights	1 500 000 EUR	
Approvals status	- Decision on wind park development from municipality parliament - Decision on including wind park Derala in to municipality urban plan - Municipality parliament decision for wind measurement - Urban permit for wind measurement - Project registration at Renewable Energy Project Official Register at FBiH Ministry of Energy, Mining & Industry	- Contract on land rent and control - Decision to start wind park concession process by Canton. - Concession contract signed; concession rights fully obtained for period on 30+15=45 years - Decision for wind park construction from municipality parliament. - NOS Indicative plan registry
Investment & Technical documentation status	- Micrositing and wind measurement campaign, done by Garrad Hassan - Micrositing and Production Estimate, done by Global Wind Power - Wind Power Plant Assessment Report Derale done by Vestas - Wind power and production estimates done by Goldwind - Feasibility Study, different financial scenarios, done internally	
Project schedule	- Urban permit with environmental license: 3 months. - Energy licence: 5 months - Preliminary PPA: 7 months - Preliminary grid connection license: 8 months. - Final PPA, construction and grid licences: 12 months.	

VLAŠIĆ:

WIND PARK GALICA, VLAŠIĆ

Location	Central Bosnia, Mountain Vlašić, Travnik Municipality
Type	Wind Farm
Installed net electric power	2x50 MW
Electricity generation	253230
Total investment cost	156 000 000 EUR
Civil Works	4 560 000 EUR
Equipment	137 120 000 EUR
Roads	4 500 000 EUR
Other costs	9 820 000 EUR
Approvals status	In progress
Investment & Technical documentation status	- Project Analysis and Review – Use of Wind Power for Electricity generation in BiH completed Feasability study - Geotechnical study - ESI Assessement - 110 KW Substation design completed - Greed connection approval - Ecological approval
Project schedule	Final phase of documentation for construction

WIND FARM VLAŠIĆ

Location	Central Bosnia, Mountain Vlašić
Type	Wind Farm
Installed net electric power	48 MW
Electricity generation	98 GWH – annual power generation
Total investment cost	64.6 million EUR
Project schedule	2015 - 2017
Project proposed by	Public Enterprise Elektroprivreda BiH d.d. Sarajevo

Every year NOSBiH (Independent System Operator in BiH) does a 10-year projection of electricity production and publishes a list of energy projects under construction.

The latest research and analysis about the Power Network Analysis for Wind Power Integration and Market Rules Advice of Bosnia and Herzegovina, for the EBRD and ISO B&H are made in 2011.