

# Status quo of the Renewable Energy Sector in Montenegro

Final Report

8th July 2016

OESTERREICHISCHE  
ENTWICKLUNGS-  
BANK AG

[WWW.OE-EB.AT](http://WWW.OE-EB.AT)



Oesterreichische Entwicklungsbank AG

Prepared for OeEB by Posch & Partners Consulting  
Engineers in cooperation with Energiewerkstatt  
Consulting and ASiC - Austria Solar Innovation Center.



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**Last edited:** 02 August 2016

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## ABBREVIATIONS

AMM	Advanced Meter Management
AD	Joint Stock Company
CCEE	Montenegrin Centre for Energy Efficiency
CDM	Clean Development Mechanism
CGES	Crnogorski elektroprenosni sistem AD - Transmission System Operator
CHP	Combined heat and power
COTTEE	Crnogorski operator tržišta električne energije - Electricity Market Operator
DC	Direct current
DS	Distribution System
DSO	Distribution System Operator
DSP	Detailed Spatial Plan
d.o.o.	DRUŠTVO SA OGRANIČENOM ODGOVORNOŠĆU Limited Liability Company (LLC)
EE	Energy Efficiency
EEX	European Energy Exchange
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EPCG	Elektroprivreda Crne Gore - Montenegrin Power Company JS Niksic
ERA	Regulatorna agencija za energetiku – Energy Regulatory Agency
EU	European Union
FIT	Feed-in tariff
FU	Functional Unit
GDC	Grid Connection Agreement
GDP	Gross Domestic Product
GIS	Geographical Information System
GWh	Gigawatthour
HMZ	Hidrometeorološki zavod Crne Gore - Hydrometeorology and Seismology Institute of Montenegro
HPP	Hydropower Plant (installed capacity above 10MW)
IMB	Institute for Marine Biology
IPA	Instrument for the Pre-Accession Assistance
JEP	Jafni Elektroprivreda Public Electric Utility
KAP	Kombinat Aluminijskog Podgorica – Aluminium Plant Podgorica
kV	Kilovolt
LoE	Law on Energy
MD	JP Morsko Dobro (Public Enterprise for Coastal Zone Management)
MoE	Ministry of Economy
MONSTAT	Statistical Office of Montenegro
MSDT	Ministry of Sustainable Development and Tourism of Montenegro
MW	Megawatt
MWe	Megawatt electric
MWh	Megawatthour

NASA	National Aeronautics and Space Administration
NDC	National Dispatching Centre
NGO	Non-Governmental Organization
NGSDH	Next Generation Synchronous Digital Hierarchy
No	Number
NREAP	National Renewable Energy Action Plan
NSDI	National Spatial Data Infrastructure
NSSD	National Strategy for Sustainable Development
OeEB	Österreichische Entwicklungsbank AG (Development Bank of Austria)
OHL	Overhead line
OPGW	Optical Fibre in Ground Wire
P&P	Posch and Partners Consulting Engineers
PIB	Montenegrin abbreviation for Tax Identification Number
PPA	Power Purchase Agreement
$P_{pe}$	Net (on the threshold) Power
PSO	(Producer) with public service obligation
PV	Photovoltaic
RE	Renewable Energy
RES	Renewable Energy Sources
SCADA	Supervision Control and Data Acquisition
SEERECT	South East Europe Regional Energy Community Treaty
SHPP	Small Hydro Power Plant (installed capacity below 10MW)
TS	Transmission System
TSO	Transmission System Operator
TWh	Terawatthour
WPP	Wind Power Plant
WWF	World Wildlife Fund

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## EXECUTIVE SUMMARY

The Development Bank of Austria (OeEB-Österreichische Entwicklungsbank AG) has set itself the objective to support projects in the field of renewable energy sources (RES) in selected countries.

This study has been prepared for that purpose with the aim to provide principal information about the Montenegrin energy and electricity sector and to analyse the current status regarding renewable energy sources (RES) in Montenegro.

Furthermore, this study shall provide accurate information on the RES market in Montenegro and support project developers, investors and banks in the assessment of RES projects in Montenegro.

### Electricity Sector overview

The main structure of the electricity market of Montenegro is built around the following companies and institutions, with the Ministry of Economy in charge of the overall energy sector: Elektroprivreda Crne Gore - Montenegrin Power Company (EPCG) which performs generation, distribution and supply, the Montenegrin transmission system operator - Crnogorski elektroprenosni sistem (CGES), the electricity market operator - Crnogorski operator tržišta električne energije (COTEE) and the Energy Regulatory Agency of Montenegro - Regulatorna agencija za energetiku (ERA).

Montenegro's energy production is mainly based on two large hydro power plants, namely "Perućica" and "Piva", and one thermal power plant, with the name Pljevlja. With a production share of two thirds, hydropower is the predominant source, of which the contribution of small hydropower is less than 1%. The country's total annual electricity production amounts to 3,071 GWh.

Based on the historical supply and demand pattern it is evident that Montenegro has not been able to cover its electricity demand and has always been strongly dependant on energy imports. This is mainly attributable to the KAP Aluminium Plant, which, together with the steel work plant in Niksic, accounted for up to 32% of the country's total electricity demand during the last decades. In addition to the KAP Aluminium Plant and the steel work plant, the country's other largest electricity consumers are the Montenegrin railway and the thermal power plant (TPP) Pljevlja.

Between 2011 and 2014 the average annual electricity demand of all direct connected industrial consumers amounted to 1,052 GWh. This annual demand decreased significantly following privatisation of the KAP Aluminium Plant in 2013 and in 2014 only 715 GWh were consumed by directly connected industrial users.

For comparison, the average annual domestic electricity consumption in the same period amounted to 2,527 GWh. According to Eurostat, Montenegro's energy intensity by gross inland consumption of energy is 3.3 times higher than that of the EU-28 average, which is mainly due to the widespread use of electricity for heating.

Considering the last four years, the domestic electricity demand was more or less stable, whereas the industrial electricity demand has declined. This results in Montenegro's energy production and consumption becoming steadily more equal and, if this trend continues, Montenegro will in future be able to export more electricity than it imports.

Each future new implemented RES, or related infrastructure project, such as the undersea cable between Montenegro and Italy, further supports this export potential, which would also be a benefit for Montenegro's economy.

Transmission and distribution is still one of the most concerning problems in the country. Although steps have been made towards unbundling of systems, and the transmission system operation is legally unbundled from other activities, distribution and generation is still bundled within EPCG. However, further unbundling of EPCG is planned for 2016, when the

Functional Unit (FU) Distribution shall be detached from EPCG and will start operation as an independent institution.

Due to the lack of transmission and distribution capacities, applications for connections to the grid are currently on hold. Moreover, the system operators have still not come up with plans to develop their network to integrate more renewable energy into the grids. Transmission and distribution losses are relatively high and government or third party investments would be required to reduce them significantly.

### **Potential of RES**

As in other countries of the Western Balkans region, in Montenegro it is also the case that traditionally renewable energy resources have had no significant history, except for utilization of hydropower.

However, Montenegro has a high RES potential and although hydropower already provides two thirds of the country's total energy production, only 17% of the theoretical hydropower potential has actually been exploited so far. Up to now, hydropower is the only renewable energy source that contributes significant to the energy production of Montenegro. Other renewable energy sources, such as wind potential, have not yet been utilized. However, recent developments such as the wind farm Krnovo (72 MW), currently under construction, or Mozura (46 MW), already in advanced stage, indicate the direction of future development. Furthermore, the construction of a new undersea electricity cable between Montenegro and Italy, which shall become operational in 2018, supports this development and creates new opportunities for the implementation of RES projects.

Currently there is no complete data available on how much solar energy (photovoltaic PV) is used on the territory of Montenegro. However, it is clear that it plays only a very minor role in the Montenegrin electricity production sector, and this will most likely continue to be the case also in the future, as the strategic objective and future strategy of Montenegro is more supportive to the development of solar thermal heating and cooling than utilization of solar energy for electricity production. Other reasons that PV is practically not exploited in Montenegro are because of high investment costs (4,000 - 6,000 EUR/kW) and also because in general photovoltaic is foreseen only in a relatively small range and in special conditions (structures and applications for which the construction of a distribution network is not economic).

#### Hydropower:

According to the Energy Development Strategy of Montenegro by 2030 the theoretical potential of large scale hydropower on Montenegro's main rivers amounts to 9,846 GWh, plus 800- 1,000 GWh/year on smaller rivers. The technically and economically reasonable usable potential on Montenegro's main rivers is between 3.7 and 4.6 TWh/year which can be increased to 5.3 TWh/year, if water from the River Tara is diverted to River Moraca. In comparison, the realistic usable potential for small hydropower is estimated to be 400 GWh/year. Altogether, the theoretical potential for hydropower in Montenegro amounts to a little bit less than 11 TWh/year, of which 5.7 TWh/year can be economically reasonably used.

In recent years several concessions were awarded by the Montenegrin Government. Based on currently awarded concessions, the realisation of around 30 Small Hydropower Plants (SHPPs) with a total installed power of 75 MW and planned annual production of 236 GWh can be expected within the next two to three years.

#### Wind:

Montenegro has a wind potential of 100 MW for high wind speed areas with wind speeds above 7 m/s. The potential rises to 400 MW if medium potential zones are taken into account. The power produced from wind could reach up to 25% (925 GWh) of the country's yearly power consumption.

### Solar:

The average annual number of sunshine hours in Montenegro is more than 2,000 hours, whereas coastal regions enjoy more than 2,500 hours of sunshine a year. The potential for solar energy in Podgorica, capital of Montenegro, is approximately 1,600 kWh/m<sup>2</sup>. Based on this potential, and also from a technical point of view, the use of solar thermal energy in Montenegro is recommended.

### **Strategic Objectives and Future Scenarios**

Montenegro has defined its strategic Objectives and Future Scenarios mainly in two documents, namely: The *National Renewable Energy Action plan for use of RES by 2020* (NREAP) and the *Energy Policy Strategy of Montenegro until 2030*.

In line with the EU directive 2009/28/EC, the Energy Policy Strategy covers the promotion of the use of energy from renewable sources. The Action Plan defines explicit targets for renewable energies in Montenegro for every year till 2020. In 2020 in the production of electricity from renewable energy sources should raise to 33% (from 26.3% in 2009), with shares of 81.5% hydro, 13.8% wind, 4% biomass and 0.7% solar power plants.

In the Energy Policy Strategy of Montenegro until 2030, Montenegro identified goals regarding the energy development as well as measures for their achievement. The main statements, in particular for RES, are a continued active monitoring and compliance with changes of the European Union (EU) and Energy Community energy policies, the development of a competitive energy market, providing a favourable environment for the participation of new players in the energy market, a sustainable energy development that pushes renewable energy sources, and planning and construction of new electric power interconnecting lines with neighbouring countries, allowing a better implementation of a high proportion of e.g. wind and hydropower into the energy grid.

### **Support mechanisms for RES projects**

In order to support electricity producers using renewable energy sources for energy generation, Montenegro has chosen a system of guaranteed purchase of electricity at defined "feed-in-tariffs". These incentive feed-in tariffs are given to so called "privileged users" and are guaranteed for a period of 12 years. The status of a privileged user is acquired per plant and can be acquired for SHPPs with an installed capacity below 10 MW, not older than 3 years or which have been refurbished and produce additional electricity compared to the average annual electricity production over the last five years prior to the plant refurbishment. The status of a privileged user can also be acquired for windfarms and for plants for high efficiency cogeneration with an installed capacity from 1 MWe to 10 MWe. Photovoltaic plants can become privileged electricity producers only if the panels are installed on roofs of existing (or planned) buildings and if the installed capacity is less than 1 MW.

### **Regulatory Framework**

Due to economic, legal and other social reforms the Montenegrin legal environment is very dynamic and subject to frequent changes. For example, it is particularly noteworthy that between 2009 and 2013, 586 laws have been issued by the legislative activity of the Parliament of Montenegro, which is even more impressive when it is considered that a part of it is fully new legislation. During the last decade, two versions of the Energy Policy were brought out, as well as two Energy Development Strategies, and two Energy Laws (with two amendments of the first law) and an innovative set of by-laws, etc.

In all strategic documents, especially in the *Energy Policy of Montenegro until 2030* (adopted in 2011) and *Energy Development Strategy by 2030* (adopted in 2014), the Government of Montenegro recognizes that renewable energy is an essential pillar in the sustainable and long-term development of Montenegro.

Montenegro aspires to be integrated and to accede to the European Union (EU). Thus, the strategic and recent regulatory framework in the energy sector is closely aligned to EU policy.

Since July 2006, Montenegro is also a signatory of the South East Europe Regional Energy Community Treaty (SEERECT), which is the first legally binding document of Montenegro towards the EU. Among other things this treaty includes an emphasis on the need to improve the exploitation of renewable energy sources.

The entire authorization procedure for RES projects consists of several individual procedures based on different legislation (water law, environmental law, electricity law, construction law, etc.). RES projects such as small hydropower plants or wind power plants are approved in two steps: a) approval of concessions and b) approval of construction.

a) Concessions:

Concessions for RES projects are signed by the Montenegrin Government, whereas procedures for awarding of the projects are implemented by the Ministry of Economy.

Concessions are usually granted for a period "considering" the time required for return on investment and to make a profit on the basis of concession activities. The maximum concession period is limited to 30 years, with the possibility of extension for another 15 years.

For small hydropower plants with an installed capacity below 1 MW a simplified authorization in form of an energy permit exists. This simplified procedure also applies on watercourses with a gross energy potential of less than 15 GWh.

Any domestic or foreign company or other legal entity, entrepreneurs or other individuals, a consortium or any other form of business association that meets the requirements related to eligibility in the public bidding procedure in accordance with the Law on Concessions, are eligible to participate in the public bidding procedure.

b) Construction Permit Procedure:

The procedures for obtaining necessary approvals for construction of RES facilities are under the competence of the Ministry of Sustainable Development and Tourism (MSDT). Whereas in the past, more than 30 procedures were needed for obtaining a construction permit, since 2011, only two permits, namely the issuance of a) urban-technical conditions and b) the construction permit itself are required. All other necessary documents are obtained by the competent authority ex officio.

- i) As for the urban-technical conditions several agencies and bodies, i.e. water management, forestry, tourism, nature protection, etc. are obliged to submit available data, their own proposals and opinions to the MSDT, which then have to be considered in the main design. Thus, the main design has to be prepared according to these provisions.
- ii) As for the construction permit the investor is obligated to submit the main design and a proof of liability insurance of the investor and legal entity that drafted and reviewed the main design. The need for an Environmental Impact Assessment is determined by the Agency for Environmental Protection (EPA). Usually, the general time horizon for obtaining all required permits is 6-12 months.

The last step, before start of operation, is the issue of a use permit, which will be granted after trial operation and a positive technical inspection (commissioning).

### **Grid connection**

Pursuant to the *Energy Law*, the electricity transmission and distribution system gives preference to privileged producers, in accordance with the technical capabilities of the system and in the context of the activities of transmission and distribution systems and dispatching. Furthermore, priority is given to the connection of plants using RES.

Due to the lack of transmission and distribution capacities, applications for connections to the grid are currently on hold. Up to now, the system operators have not yet come up with plans to develop their network to integrate more renewable energy into the grid.

### **Electricity trading and exchange with neighbouring countries**

Currently 54 market participants are registered, among which 36 are traders, 7 producers, 2 suppliers of end-customers and CGES, and 9 balancing responsible entities. As an exception in the region, Montenegro does not require domestic licenses for trade.

The electricity market established in Montenegro comprises both a wholesale and a retail sale market. The wholesale electricity market comprises a long-term market (based upon bilateral contracts), a medium-term market (the day-ahead market), a short-term market (balancing market) and activities following real time (clearing and settlement of deviations).

According to the energy balance of Montenegro the plan for 2016 includes: 3,128 GWh of electricity produced from own resources, 818 GWh of import and 507 GWh of export. Therefore, the total needs are 3,440 GWh, of which the direct connected customers with linked long-term power purchase agreements (PPAs) contracts are: Aluminium Plant (746 GWh), Steel Plant (48 GWh) and Railway Infrastructure (23 GWh).

### **Institutional Framework**

The institutional framework regarding RES is a part of wider institutional framework within the energy sector of Montenegro. Public authorities responsible for RES projects in Montenegro are:

The Ministry of Economy (MoE) is the key authority in charge of the overall energy sector. Also involved are the Energy Regulatory Agency (ERA), the Montenegrin Electricity Market Operator (COTEE), the Ministry for Tourism and Sustainable Development (MSDT), the Environmental Protection Agency (EPA), the Ministry for Agriculture and Rural Development, the Ministry of Transport and Maritime Affairs, the Ministry of Culture, the Ministry of the Interior, Local Municipalities, the Institute of Hydrometeorology and Seismology of Montenegro, etc.

The key market participants in the area of electricity generation, transmission and distribution are the Montenegrin Transmission System Operator (CGES), Montenegro Bonus (as former supplier of the KAP Aluminium Plant), Zeta Energy Danilovgrad, currently 5 privileged producers using RES for energy production, 36 electricity traders and the Montenegrin Power Company (EPCG). The Montenegrin Power Company is subdivided into three functional units (FU): FU Electricity Generation (production), FU Electricity Supply and FU Electricity Distribution (Distribution System Operator). Further to this, the unbundling of EPCG is planned for 2016, when the FU Distribution will be detached from EPCG and will start to operate as an independent institution.

Austrian companies which are operating in the field of RES in Montenegro are: Geppert Hydropower Austria, Andritz Hydro Austria and Kössler Austria.

# 1 THE ENERGY SECTOR OF MONTENEGRO

## 1.1 HISTORIC DEVELOPMENT

Electrification of Montenegro started in the first decade of the 20<sup>th</sup> century. The first thermal power plant was built in Cetinje with a capacity of 2 x 110 kW and started operation on 19<sup>th</sup> August 1910. This day is still celebrated as the birthday of Elektroprivreda Crne Gore (EPCG) Niksic (electric power utility of Montenegro).

Soon after Cetinje HPP became operational, other power plants were constructed to provide electricity also to other cities: Bar in 1913, Kotor in 1916, Herceg Novi in 1925, Podgorica and Nikšić in 1927, Risan in 1928, Kolašin in 1929, Ulcinj in 1930, Zelenika in 1935, Perast in 1936, Pljevlja in 1937, Tivat in 1939 and so on. The first phase of development of the energy system of Montenegro was completed by construction of mini hydropower plants in isolated operation.

The second phase of development started with the construction of small hydropower plants. In 1937, the „Podgor“ HPP, with a capacity of 250 kW, was constructed near Cetinje and this still generates electricity today. The "Rijeka Musovica" followed in 1950 with a capacity of 1.36 MW, "Slap Zete" was constructed in 1952 with a capacity of 1.2 MW and annual generation of 6000 GWh, "Rijeka Crnojevica", also constructed in 1952, with a capacity of 754 kW (only 160 kW during commissioning) and "Glava Zete" [1] constructed in 1955, with a capacity of 4.5 MW and which is the only underground HPP. The following two small hydro power plants are also currently in operation: "Lijeva Rijeka" and "Savnik"; the total capacity of small hydro power plants amounts to 8.5 MW.

The third phase of development began with construction of the large hydro power plant, HPP "Perucica", which was commissioned in 1960 in the first stage of its construction. After finalisation of the second and third stage of construction of this hydro power plant, Montenegro had significant electricity surplus. In 1976 another large hydro power plant was constructed - "Piva", with the highest dam in the Balkans, i.e. one of highest in Europe at the time (220 m).

To cover increasing energy demands, in particular the Aluminium Plant Podgorica (KAP) and the steel work plant in Niksic, the existing energy production infrastructure was expanded by the thermal power plant (TPP) Pljevlja in 1982. This was the last generating unit of Elektroprivreda Crne Gore to be constructed.

In addition to generating units, Elektroprivreda Crne Gore constructed a considerable electricity network of different voltage levels with overhead lines, substations and other facilities, as well as distribution networks reaching all inhabited areas of Montenegro.

Currently ongoing development projects are the construction of a submarine power cable from Montenegro to Italy, which is planned to become operational in 2018, and construction of two wind farms in Krnovo and Mozura.

Over the past few years Montenegro was highly dependent on electricity imports, but this dependency has reduced recently due to decreasing industrial energy consumption which is primarily caused by decreasing consumption of the KAP Aluminium factory in Podgorica.

Montenegro has a huge potential of renewable energy sources (RES), in particular hydropower, which has not been utilized so far. The Government of Montenegro is aware of this situation and is consequently continuously developing and establishing a legislative framework to enable and favor the utilization of RES. Therefore, the RE sector of Montenegro is characterized by a fast development and implementation of laws and regulations.

Montenegro's strategy to favour RES started in 2003 with the introduction of the Law on Energy. At that time, Montenegro had begun to adjust the legal framework to European Union (EU) energy policy. A major milestone was in 2006, when Montenegro became a signatory country of the Energy Community Treaty, which commits Montenegro to application of the EU Directives in the field of energy, environment and competitiveness. This resulted in an adoption of the Law on Energy in 2010, introducing new reforms and amendments in the



energy sector, but also providing direct support to renewable energy source projects in accordance with EU Directive 2009/28/EC. In the course of this, Montenegro also defined a National Renewable Energy Action Plan for the use of RES by 2020 (NREAP) containing Montenegro's strategy on RES and goals to be reached.

Until 1998, the key player in the electricity market of Montenegro was JEP (Jafni Elektroprivreda – Public Electric Utility) Elektroprivreda Crne Gore Nikšić. On 16<sup>th</sup> October 1998, JEP Elektroprivreda Crne was transformed by state decision into Gore Elektroprivreda Crne Gore AD Nikšić (EPCG) with the mandate for performing energy activities in the country, i.e. electricity generation, distribution and supply.

## 1.2 CURRENT SITUATION

### 1.2.1 Key Players

The key players in the electricity market of Montenegro are as follows:

1. The **Ministry of Economy** is in charge of the overall energy sector:
2. **Elektroprivreda Crne Gore Nikšić** (EPCG)

EPCG is the Montenegrin national power company [2] established by the decision on 16<sup>th</sup> October 1998 for the purpose of carrying out the energy activities of electricity generation, distribution and supply. The company is controlled by the State (57.02 % of the shares) and the Italian A2A (41.75 % of the shares). EPCG operates on the market with the following 3 functions:

- Generation (operates 7 hydro power plants plus one thermal power plant)
- Distribution (operates distribution system)
- Supplier (selling power to end consumers).

EPCG operates 3 large power plants (HPP Perucica, HPP Piva and TPP Pljevlja) and 4 small hydro power plants (Rijeka Crnojevica, Podgor, Rijeka Musovica). Furthermore, EPCG owns 51% of the shares of the company Zeta Energy Danilovgrad, which operates HPP Glava Zete and HPP Slap Zetre (see below).

3. **Montenegro Bonus** [3]

Montenegro Bonus is a limited liability company, established by the Government of Montenegro. The primary activity of Montenegro Bonus is storage and trading of oil derivatives.

By decision of the Montenegrin Government, majority share of the company is owned by the state, Montenegro Bonus extended his activity by supplying electricity to KAP, Kombinat Aluminijuma Podgorica - Montenegrin Aluminium Smelter Company, the largest consumer in the country. Therefore, Montenegro Bonus traded with electricity on the electricity market. Montenegro Bonus never operated a power plant by itself. Until 1<sup>st</sup> March 2016, Montenegro Bonus supplied electricity to KAP. Since that Montenegro Bonus is focused back on his primary activity, and is no more active in the electricity sector.

4. **Crnogorski Elektroprenosni Sistem** - Montenegrin Transmission System Operator (CGES) [4]

CGES is the Montenegrin transmission system operator. 55% of the shares are owned by the Montenegrin State, 22% of the shares are owned by the Italian electricity supplying company TERNA [5], which is currently implementing a submarine power cable from Italy to Montenegro which shall be operational in 2018. The remaining shares are owned by several investment funds.

5. **Crnogorski Operator Tržišta Električne Energije** – Montenegrin Electricity Market Operator (COTEE) [6]

COTEE is in full state ownership and was established in 2011.

6. **Regulatorna Agencija za Energetiku** – Montenegrin Energy Regulatory Agency (ERA) [7].

The Energy Regulatory Agency of Montenegro (ERA) performs regulatory tasks and duties.

7. **Zeta Energy Danilovgrad**

Zeta Energy Ltd Danilovgrad started operation as power producer in October 2010. The ownership structure of Zeta Energy Ltd is as follows: EPCG - 51% and Nord-Trøndelag Elektrisitetsverk (NTE - Norway) - 49%. As a share capital EPCG offered two small hydroelectric power plants ("Glava Zete" and "Slap Zete") of total capacity of 4.5 MW and 1.2 MW.

8. **Privileged Electricity Producers** using renewable energy sources (RES)

For the time being, five privileged electricity producers are active in the Montenegrin electricity market. In this regard, it should be mentioned that all of them have obtained their status as privileged producer after 2013:

- Hidroenergija d.o.o. Berane - operates 5 small hydro power plants with total capacity of about 5 MW
- Kronor d.o.o. Danilovgrad - will operate 2 small hydro power plants with total capacity of about 7 MW, which are in the final phase of construction
- Synergy d.o.o. Podgorica - operates a single small hydro power plant with total capacity of 0.65 MW
- Iigma energy Andrijevica - operates a single small hydro power plant with total capacity of 0.95 MW
- Hidro Bistrica Berane - operates a single small hydro power plant with total capacity of 5.2 MW.

9. **Electricity traders** - 36 traders are currently active in Montenegro.

e.g. LE Trading a.s. from Slovakia, supplying electricity to the KAP Aluminium Plant since 1<sup>st</sup> March 2016.

## 1.2.2 Power Generation

Montenegro's energy production is mainly based on two large hydro power plants, namely HPP Perućica and HPP Piva, and one thermal power plant, TPP Pljevlja. With a share of approximately 61% hydropower is the predominant source, of which the contribution by small hydropower is less than 1%. The following table shows an overview of currently installed main energy production facilities with their corresponding production shares:

**Table 1-1: Power generation plants in Montenegro**

Description	Installed Capacity		Annual Average Energy Production 2014 -2015 [8]	Approximate Production Shares
	[MW]	[%]	[GWh]	[%]
Large Hydro: Perucica	307 (5x38 + 2x58.5)	74	~ 895	~30
Piva			~ 655	~30
Small Hydro	21.5	2	~ 37.8	Less than 1
TPP Pljevlja*)	210	24	~ 1,367	~40
<b>Total</b>	<b>881</b>		<b>2955</b>	

\*) Coal fired thermal power plant: Not a renewable energy source power plant

The total energy production of all energy generation facilities is as follows:

**Table 1-2: Energy production from power plants 2013 – 2015 [8]**

Source	2013 [GWh]	2014 [GWh]	2015 [GWh]
Hydro (HPP)	2,498	1,745 HPP Perućica: 995 HPP Piva: 725 Small HPPs: 25	1,460 HPP Perućica: 783 HPP Piva: 631 Small HPPs: 45,5
Thermal (TPP)	1,311	1,360	1,411
Total	3,809	3,105	2,871

### 1.2.2.1 Hydropower

Since the electrification of Montenegro, hydropower played a major role in the Montenegrin energy production and it is more than likely that hydropower will continue to have this role also in the future, as Montenegro is a water rich country and the full hydropower potential has not been utilized by far. According to the World Small Hydropower Development Report, published in 2013, [9] and Energy Development Strategy of Montenegro by 2025 [10], only 17% of Montenegro's total hydropower potential has been exploited so far.

The Government of Montenegro is well aware of this situation, and hence is active in promoting the utilization of hydropower, in particular through issuing of concession tenders. In the period from 2007 to 2015, 33 projects have been approved. For 26 of them concession agreements were signed by the Montenegrin Government. Among these 26 projects, awarded with concessions, 21 concessions are still active, 5 concession agreements have expired. Based on 14 active contracts, it can be expected that 30 SHPPs with a total installed power of 75 MW and planned annual production of 236 GWh will be implement during the next two to three years. The average installed capacity of each SHPP is 2.5 MW, with only 8 plants having an installed capacity of less than 1 MW.

In accordance with the awarded concessions, the largest number of SHPPs is planned in the northern municipalities: Kolasin, Berane, Andrijevica, and Plav. Further SHPPs are planned in Bijelo Polje, Plužine, Mojkovac, Gusinje and Budva. However, if the planned installed capacity is taken into account, Andrijevica is leading with 22.3 MW (mainly due to SHPP Trepacka rijeka with a planned capacity of 9.6 MW). After Andrijevica, there are Berane with 19.9 MW, then Plav with 17.2 MW, Kolasin with 10.1 MW, Plužine with 5.4 MW and Bijelo Polje with 4.1 MW.

### 1.2.2.2 Wind

Up to now wind energy has not yet played a role in Montenegro's energy production and no wind park projects have been realised. According to the Montenegrin Ministry of Economy [11], two wind farm projects have reached an advanced status of project development: The Krnovo Wind Power plant, which is located in the area of Niksic, has a planned capacity of 72 MW. At this site, construction of roads and foundations started recently. At the Mozura site in the region of Ulcinj, a wind farm with an installed capacity of 46 MW shall be erected. The start of construction works is slightly delayed due to a contractor change. [11]

Project development of both wind farms started already in 2006 [12], concessions were granted by the Montenegrin government in 2010 [13] and both wind farm projects have in the meantime obtained all relevant permits. [11]

Due to limitations from the grid, all other wind energy projects are delayed until the grid is expanded and strengthened. [11]

### 1.2.2.3 Solar

The Government of Montenegro is more supportive to the development of solar thermal heating and cooling than utilization of electricity from photovoltaic systems. The main reason for this is because Montenegrin households primarily use electricity (more than 90%) for water heating (electric boilers). The remaining share of households uses wood fuel. In the commercial sector, electricity and residual fuel oil dominate for water heating, and to a much lesser amount wood fuel, pellets and coal lignite are also used. In summary this means a high proportion of combustion energy is used for heating and cooling of water.

A large obstacle to more significant use of photovoltaic (PV) systems is the high installation cost ranging from 4,000 to 6,000 EUR/kW, while their conversion efficiency is relatively small.

Overall, the use of solar radiation for electricity generation (PV) is practically not exploited in Montenegro. Currently there is no global data on how much PV energy is used on the territory of Montenegro, but in any case it is expected to be negligible and only sporadic. [14]

In the period until 2025, there are no plans to use solar energy for generation of electricity (photovoltaic) that could be transmitted into the distribution network, only foreseen is the direct use of solar energy for heating, hot water, and other low temperature processes, mostly in the service sector, including tourism and households. Photovoltaic is foreseen only in a relatively small range and in special conditions (structures and applications for which construction of distribution network is not economic). [10]

A successful project that implemented solar heating was SOL THERM. The project was performed by the Montenegrin centre for energy efficiency (CCEE). The aim of the project was to replace existing water heating systems in selected hotels with solar collectors.

Another project that aims to establish an attractive and sustainable financial mechanism for obtaining a retail loan to install solar collectors started in July 2011, with the implementation of the project MONTESOL, performed by the MoE of Montenegro. This project supported smaller projects, such as SOIARNI KUTANI, which contributed to 135 household installed solar systems. From the beginning, interest in the project itself was big, but only a small percentage of interested parties decided to install the system. There are several reasons for this, in particular a low public awareness of energy efficiency and renewable energy sources, also the fairly low purchasing power of citizens, as well as credit indebtedness. Another important reason is the lack of awareness of citizens about important facts related to the project, regardless of the comprehensive and continuous promotional campaign. [15]

From this point of view, smaller off-grid projects, such as the "Luxor PV system in Petrovac" (2,24 kWp), might be easier to implement.

The use of solar thermal in the heating and cooling sector has not been foreseen in the NREAP by 2020. Only a few mechanisms at a national level for the promotion of RES for heating and cooling are in place. These include an obligation for new buildings in certain climate zones, coastal part of the country and Podgorica, to cover a quota of their energy needs for domestic hot water with renewable sources (solar thermal systems), and a number of energy efficiency credits schemes, applicable to technologies such as solar thermal systems and biomass boilers.

PV - In Montenegro the support for solar plants is restricted to a maximum capacity of 1 MW limited only to roof tops or building structure. [16] Simplified procedures are in place for solar plants with an installed capacity up to 20 kW, i.e. except approval for the connection to the electricity distribution grid no authorization is required. Based on the energy permits register only 4 PV power plant permits have been issued by end of 2015.

- Semir d.o.o, PV "Semir", 8.97 kW
- Monte solar d.o.o, PV "Brod", 2.2 kW
- Solpan d.o.o., "Klenak 80 kW", 83 kW
- Solarna elektrana Kijanović Milisav, 9. 70 kW
- And one permit application: "Invicta" doo, Podgorica, 416kW

### 1.2.3 Supply and Demand

The main characteristic of energy imports is that Montenegro imports 100 % of the needed amount of oil derivatives. As for import of electricity, the situation significantly changed with decreasing of the KAP and other industry production.

#### 1.2.3.1 Import & Export

From 2011 to 2014, Montenegro's total average annual electricity production amounted to 3,071 GWh. As shown in the below table, total electricity supply and imports both decreased significantly in 2013, due to the privatisation and corresponding production decrease of the KAP Aluminium Plant in the same year. However, independently thereof, an increase of the electricity exports can be observed in recent years, from 431 GWh in 2011 to 634 GWh in 2014.

**Table 1-3: Electricity production, imports & exports [17]**

Description	2011	2012	2013	2014
Electricity production [GWh]	2,656	2,715	3,809	3,105
Net imports [GWh]	1,993	1,569	195	886
Net exports [GWh]	431	353	681	634
Total electricity supplied [GWh]	4,218	3,932	3,323	3,357

Based on the historical supply and demand pattern it is evident that Montenegro was not able to cover its electricity demand and always was strongly dependant on electricity imports. This was mainly attributable to the KAP Aluminium Plant, which accounted together with the steel work plant in Niksic for up to 32% of the country's electricity demand.

The current situation is that Montenegro is almost able to cover its electricity needs from its own production. However, in case that KAP increases the production (it is announced by the Government in several occasions), the increase of imported electricity share is inevitable without new power plants (announced by the Government).

#### 1.2.3.2 Consumption

Montenegro's largest industrial electricity consumers are the KAP Aluminium Plant, with an average consumption of 977 GWh/year (2011-2014), followed by the steel work plant in Niksic with an average annual consumption of 49 GWh. Other major consumers are the railway with an average annual consumption of 17 GWh/year and TPP Pljevlja with an average annual consumption of 9 GWh. All in all, the average annual electricity demand of all direct connected industrial consumers amounts to 1,052 GWh. In comparison, the average annual domestic electricity consumption in the same period amounts to 2,527 GWh.

**Table 1-4: Electricity consumption [8]**

Description	2011	2012	2013	2014
Aluminium Plant - KAP (GWh)	1,397.8	1,110.0	737.0	665.0
Steel work plant in Niksic, (GWh)	91.0	53.0	29.0	21.0
Railway (GWh)	15.4	15.0	19.0	19.5
TPP Pljevlja (GWh)	6.4	9.2	9.0	9.5
<b>Total Direct Consumers (GWh)</b>	<b>1,510.6</b>	<b>1,187.2</b>	<b>794.0</b>	<b>715.0</b>
Total Domestic Consumers (GWh)	2,558.9	2,602.1	2,522.0	2,426.0
<b>Total (GWh)</b>	<b>4,069.5</b>	<b>3,789.3</b>	<b>3,316.0</b>	<b>3,141.0</b>

The electricity consumption of private households is more or less stable. As for industrial use, except for the railway, a decrease of the electricity consumption can be observed, in particular at the KAP Aluminium Plant, due to already above explained reasons. In the period between 2011 and 2014 the total electricity consumption, industrial and domestic, decreased from approximately 4.1 TWh/year to 3.1 TWh/year, with a very sharp decrease in 2013 (due to KAP Aluminium Plant) and further decrease in 2014.

This means that Montenegro's electricity consumption and own production are becoming more and more equal. If this trend continues, Montenegro will in future be able to export more electricity than it imports for the first time (with the exception of 2013). This trend is further

supported by every new implemented RES or infrastructure project, such as the submarine power cable between Montenegro and Italy, and greater electricity exports will lead to economic benefits for Montenegro.

## 1.2.4 Transmission & Distribution

### 1.2.4.1 Network

The transmission grid (110 kV and above) is operated by CGES (TSO), whereas the distribution grid (up to 35 kV) is operated by EPCG (FU Distribution – DSO). The transmission grid consists of over 1,300 km of overhead lines, 24 substations and switchgears on voltage levels of 400 kV, 220 kV and 110 kV. [4] The distribution grid (up to 35 kV) consists of 19,110 km power lines and 4,887 substations. Thereof, 981 km are 35 kV power lines, 4,911 km are 10 kV power lines and 13,216 km are 0.4 kV power lines. [2]

### 1.2.4.2 Current Status

Transmission and distribution is still one of the most concerning problems in the country’s power supply system. Although steps have been made towards unbundling of systems, with the transmission system operation now legally unbundled from other activities, distribution and generation are still bundled within EPCG. Terms, conditions and fees for third party access and use of transmission and distribution networks are defined in the respective rules approved by ERA. The network operators are still to adopt programmes and measures for ensuring non-discriminatory access to the transmission and/or distribution networks, as required by the law.

Due to the lack of transmission and distribution capacities, applications for connections to the grids are on hold. Up to now, the system operators have not yet come up with plans to develop their network to integrate more renewable energy into the grid. More specific information on grid access and distribution network is presented in chapter 3.5.



Figure 1-1: Transmission grid (110kV and above) of Montenegro

### 1.2.4.3 Transmission and Distribution Losses

Transmission and distribution losses are relatively high and Government or third party investments would be required to reduce them significantly.

**Table 1-5: Transmission and distribution losses [17]**

Description	2011	2012	2013	2014
Transmission losses [GWh]	159	154	142	125
Transmission losses [%]	3.70%	3.90%	4.28%	3.90%
Losses in Distribution [GWh]	492	541	480	433
Losses in Distribution [%]	19.20%	20.84%	18.96%	17.60%

Distribution losses include both technical and non-technical (dominantly non registered electricity due to illegal connections and tampering with metering devices). The total electricity losses are calculated as the difference between the amount of electricity received from the transmission network and the amount of electricity billed for consumers. The percentage share is calculated with respect to the amount of electricity received from the transmission network.

### 1.2.5 Pricing Mechanism

The Energy Law of 2010 was implemented in line with the EU Directive 2009/28/EC. Based on this Energy Law of 2010 the Ministry of Economy is responsible for setting the methodology of feed-in-tariffs. Since 2011, *Governmental Decrees for feed-in tariffs for small hydropower plants, wind and biomass as well as for cogeneration and power plants that use solid waste, biogas and waste gases* are in place for so-called privileged producers.

The status of a privileged producer may be obtained only after the renewable energy plant has been constructed and is connected to the transmission or distribution system. Therefore, the Market Operator COTEE has adopted a pre-power purchase agreement committing the feed-in tariffs at the moment of signature of the power purchase agreement (PPA). A detailed overview of the procedure on how the status of a privileged user can be obtained, which requirements are necessary and who can obtain this status is given in chapter 3.5.

Feed-in tariffs are revised annually based on the national inflation index. Subsidised feed-in tariffs are guaranteed for a period of 12 years. Support to small hydropower plants, plants using biomass, biogas, solid waste or landfill gas and cogeneration plants are limited to a maximum capacity of 10 MW. A detailed description and overview of the current feed-in tariffs is presented in chapter 3.5.

## 1.3 GOVERNMENT STRATEGY

Montenegro has defined strategic objectives and future scenarios mainly in two documents, namely: The *National Renewable Energy Action plan for use of RES by 2020 (NREAP)* and the *Energy Policy Strategy of Montenegro until 2030*. Both are briefly summarised below and are described in more detail in chapter 3.2.

### 1.3.1 National Renewable Energy Action Plan for use of RES by 2020

The *National Renewable Energy Action Plan by 2020 (NREAP)* is the most important strategic document regarding the development and implementation of RES projects.

Based on the energy policy strategy, in May 2011 the Government of Montenegro implemented the EU directive 2009/28/EC, which covers the promotion of the use of energy from renewable sources in the field of electricity and energy for heating and / or cooling. In the course of this process, the Government of Montenegro defined a National Action Plan for Renewable Energy Sources by 2020 (NREAP) [18]. In 2014, this document was updated and this was published on the 11<sup>th</sup> December 2014.

The Action Plan defines explicit targets for renewable energies in Montenegro for every year till 2020. By 2020 the production of electricity from renewable energy sources should rise to 33% (from 26.3% in 2009), with shares of 81.5% hydro, 13.8% wind, 4% biomass and 0.7% solar power.

**Table 1-6: Estimation of total contribution expected from each renewable energy technology in Montenegro to meet the 2020 indicative objectives [18]**

	2015		2016		2017		2018		2019		2020	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
Hydro:	660.5	1781	744	1789	752.8	1813	821.3	1999	826	2012	826	2050
<1MW	4.5	14	4.5	14	6.8	20.3	11.2	35.1	11.2	35.1	11.2	35.1
1MW-10 MW	29	88	32	96	38.5	113.7	81.6	238.9	86.3	251.9	86.3	251.9
>10MW	627	1679	707.5	1679	707.5	1679	728.5	1725	728.5	1725	728.5	1763
Of which pumping	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0	0
Solar:	3.2	5.3	6	9.9	7	11.6	8	13.2	9	14.9	10	16.5
Photovoltaic	3.2	5.3	6	9.9	7	11.6	8	13.2	9	14.9	10	16.5
Concentrated solar power	0	0	0	0	0	0	0	0	0	0	0	0
Tide, wave, ocean	0	0	0	0	0	0	0	0	0	0	0	0
Wind:	0	0	0	0	118	271.4	125.5	288.6	125.5	288.6	151.2	347.8
Onshore	0	0	0	0	118	271.4	125.5	288.6	125.5	288.6	151.2	347.8
Offshore	0	0	0	0	0	0	0	0	0	0	0	0
Biomass	7	22.5	9.4	31.3	14.1	46.6	17.7	58.5	19.1	63.5	29.3	101
solid	4.8	15.5	7.2	23.7	10.2	33.8	12.6	42.2	12.8	43.7	22.4	81.2
biogas	2.2	7	2.2	7.6	3.9	12.8	5.1	16.3	6.3	19.8	6.9	19.8
bioliquids <sup>57</sup>	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>670.7</b>	<b>1808.8</b>	<b>759.4</b>	<b>1830.2</b>	<b>891.9</b>	<b>2142.6</b>	<b>972.5</b>	<b>2359.3</b>	<b>979.6</b>	<b>2379</b>	<b>1016.5</b>	<b>2515.3</b>
of which in CHP	0.1	0.6	0.2	0.84	0.2	1.08	0.3	1.32	0.4	1.68	10.5	40.2

The following table shows estimations on incentives to be paid to already contracted and future projects up to 2020 according to the Action Plan. These estimations were updated in 2014, considering a consumer price index of 2% per year and with very high incentive prices (from 104.40 EUR/MWh in 2014 to 114.97 EUR/MWh in 2020; with 108.91 €/MWh in 2016).

**Table 1-7: Estimated incentives to be paid till 2020 [EUR] [18]**

Technology	2014	2015	2016	2017	2018	2019	2020
Wind farms	0	0	0	29,341,486	31,825,026	32,461,526	39,902,707
Biomass plants	0	2,300,222	3,587,457	5,218,614	6,645,859	7,019,728	13,304,392
Biogas plants	0	1,136,554	1,258,652	2,162,232	2,808,536	3,479,828	3,549,425
Solar PP	0	860,534	1,639,560	1,959,523	2,274,398	2,618,659	2,957,854
Hydro PP	208,800	7,229,236	8,059,764	11,913,222	24,626,213	26,251,966	26,777,005
<b>TOTAL</b>	<b>208,800</b>	<b>11,526,545</b>	<b>14,545,433</b>	<b>50,595,076</b>	<b>68,180,031</b>	<b>71,831,707</b>	<b>86,491,383</b>

Local authorities are required to submit an annual report on the implementation of energy plans to the Ministry of Economy, in order to ensure their compliance with the national objectives listed and published in the National Action Plan.

A new Report is to be prepared and submitted to the Government and Secretariat of Energy Community till end of 2016. This Report will evaluate and modify the current National Action Plan.



### 1.3.2 Energy Policy Strategy of Montenegro until 2030

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Pursuant to the Energy Law ("Official Gazette of MN", no 28/10), in 2011 the Government of Montenegro identified goals regarding the energy development as well as measures for their achievement.

From the perspective of RES, the following points are particularly noteworthy [19]:

- Continue harmonization of legislative-regulatory framework of Montenegro with the energy policy of the Energy Community and therefore with EU.
- Active monitoring and compliance with the changes of the EU and Energy Community energy policies.
- Development of a competitive energy market, providing a favourable environment for participation of new players in the energy market of Montenegro: independent producers, traders and suppliers, aimed at de-monopolization and de-concentration of the market and the increase of competition.
- Sustainable energy development. RES will be pushed in future.
- Planning and construction of new electric power interconnecting lines and connection to neighbouring countries, allowing a better absorption of a high proportion of wind power into the energy grid.

## 2 RENEWABLE ENERGY POTENTIAL

### 2.1 HYDROPOWER

#### 2.1.1 Theoretical Potential

Montenegro has a diverse landscape and one of the most rugged terrains in Europe. The country is famous for its gorges (e.g. Tara River Canyon), fast-flowing rivers, karst scenery, and numerous lakes. The main part of Montenegro is mountainous, with high mountains particularly in the northern part. 70% of the land is located between 500 m and 1,500 m a.s.l., with a mean elevation of 1050 m. [20]

In addition, Montenegro experiences high river discharges, with an average total of 40 l/s/km<sup>2</sup> [21] and, as such, is in the top 4% of the world's territory in terms of average outflow. [36] Given the fact that 95% of Montenegrin watercourses are formed within the country, water is one of Montenegro's biggest natural resources. Approximately 52% of the country's surface contains rivers, [21] so Montenegro is extremely rich in water resources in comparison to its relatively small territory. This, in combination with the mountainous environment, means that in Montenegro there is generally a high availability of significant hydropower potential for energy utilization.

According to the Energy Development Strategy of the Republic of Montenegro by 2030 [14] as well as the Energy Development Strategy of the Republic of Montenegro by 2025 [10], both published by the Chamber of Economy of Montenegro, and both based on a study by the Institute for Research in Energy, Ecology and Technology (IREET Institute, Ljubljana 2007) [22] the theoretical total potential for hydropower amounts to **9,846 GWh/year** or 9.85 TWh/year. A detailed overview of the theoretical hydropower potential on Montenegro's main rivers is shown in below table.

**Table 2-1: Theoretical total hydropower potential on main rivers [22]**

River	Theoretical Hydropower Potential [GWh/year]
Piva	1,361
Tara	2,225
Čehotina	463
Lim	1,438
Ibar	118
Morača (up to Zeta)	1,469
Zeta	2,007
Mala rijeka	452
Cijevna	283
<b>Total</b>	<b>9,846</b>

Besides the hydropower potential of main rivers, which can be used for construction of hydropower plants with a higher capacity, there is also a potential on smaller rivers, which can provide excellent opportunities for energy exploitation through SHPPs (up to 10 MW).

Based on the Energy Development Strategy of the Republic of Montenegro by 2025, the theoretical potential for small hydropower is between 800-1,000 GWh/year. [10] [14] In this regard it should be mentioned that also on small rivers hydropower plants with a capacity of more than 10MW are realistic. Thus the theoretical hydropower potential on small rivers can be seen only as an indicative figure and a detailed assessment as well as a more detailed research will be necessary to determine the theoretical potential of smaller rivers more accurately. [14]

All in all, the total theoretical potential for hydropower in Montenegro amounts to slightly less than **11 TWh/year, of which only 17% have been exploited so far.** [9] [10]

## 2.1.2 Technical and Economic Potential

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Montenegro has a high unused theoretical potential for hydropower projects, but not the whole theoretical hydropower potential can be used for energy production due to following reasons:

- A part of Tara river is located in the national park Durmitor, which is on the list of the UNESCO World natural heritage and the basin of the Tara river is included in biosphere reserves of UNESCO programs.
- Water resources needed for human needs and agriculture will always be given priority
- Potential sites for hydropower plants are characterized by relatively small flows and high head, or high flows in combination with a smaller head. Consequently, not every location is suitable for the construction of a hydropower plant.
- Potential locations may not be accessible due to rugged terrain
- Not every technically realisable project is economic feasible
- Specific values such as head losses are not considered in the calculation of the theoretical (gross) hydropower potential

The Energy Development Strategy of Montenegro by 2030 does not clearly define if the stated technically and economically usable potential is still exploitable or if it is the total technically and economically usable potential. However, since the theoretical hydropower potential is given as the total hydropower potential, the same approach can be assumed for the technically and economically potential.

Furthermore, it is unclear if social and environmental aspects have been considered. However, since the data regarding the potential is taken from a study prepared in 2007, and taking into account that environmental regulative has changed significantly since then, the need for an update of the study results is evident.

According to the Energy Development Strategy of Montenegro by 2030, the "total" technically and economic usable potential of large scale hydropower is between 3.7 and 4.6 TWh/year. This can be increased to 5.3 TWh/year if water is partially diverted from River Tara to River Moraca. [10] [14] The realistically usable small hydropower potential is approximately 400 GWh. [10] [14]

In total this means a **technically and economic usable potential between, 4.1 TWh/year and 5 TWh/year**. This can be increase to 5.8 TWh/year if water is partially diverted from the River Tara to River Moraca.

## 2.1.3 Availability of Data

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### 2.1.3.1 Institute of Hydrometeorology and Seismology of Montenegro

The Institute of Hydrometeorology and Seismology of Montenegro (HMZ) operates 32 hydrological stations. In addition, HMZ operates 120 meteorological stations. The data obtained from HMZ is the basic input for investors. This input is prepared in a form of a concise elaborate (10 pages), has to be paid for, and is titled a "rough estimation of hydro power potential". However, investors often perform additional measurements in order to increase the reliability of the input data.



**Figure 2-1: Hydrological stations operated by HMZ [23]**

Since 2005, HMZ has implemented several projects and corresponding studies (e.g. UNDP), to prepare a hydrological basis (master plan) for the development of hydropower plants. Recently issued concession tenders have been based on the results of these studies.

**2.1.3.2 Private Measurements**

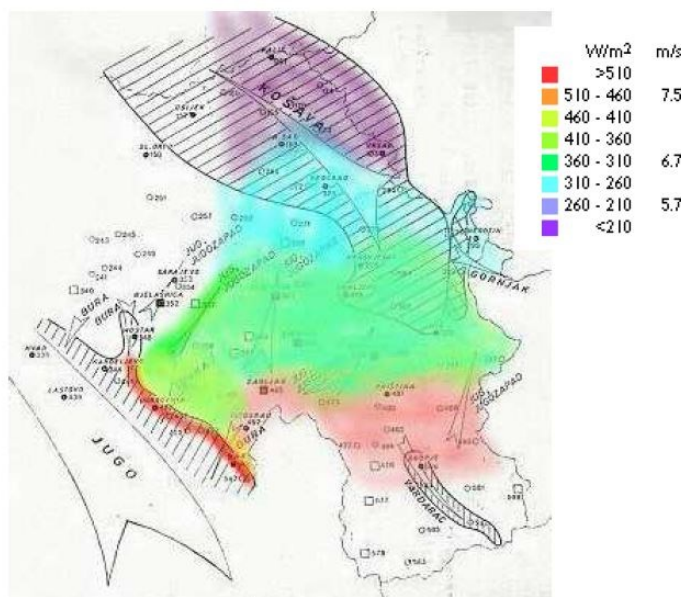
Besides HMZ, there are also privately operated gauging stations, most of them are operated by project developers or investors, and it can be assumed that the measurements are mainly performed for their own purpose.

## 2.2 WIND

### 2.2.1 Theoretical Potential

#### 2.2.1.1 Study of the University Niš

A first study was carried out in 2006 by the Facta Universitatis Niš for the regions of "Serbia and Montenegro". The following wind map has been established using measurement data from the Hydro-Meteorological Institute (HMZ). In order to improve the accuracy of the assessment, only data from measurement stations exceeding an average value of 5.1 m/s has been considered.



**Figure 2-2: First Montenegrin wind map, published by the Facta Universitatis Niš [13]**

In this study the following figures regarding the theoretical wind potential have been published for the region along the Montenegrin seaside. This region is a belt along the coast from Ulcinj to Herceg Novi, which is 20 km wide and spans over an area of about 1000 km<sup>2</sup>: The average wind velocity in this area is > 7 m/s and the average wind power is 400 - 600 W/m<sup>2</sup>. On the mountain ridges and hills along the Montenegrin seaside (sites above Budva, Tivat, Kotor, etc.) the average wind power at altitudes of 50 m may be over 1,000 W/m<sup>2</sup>. [13]

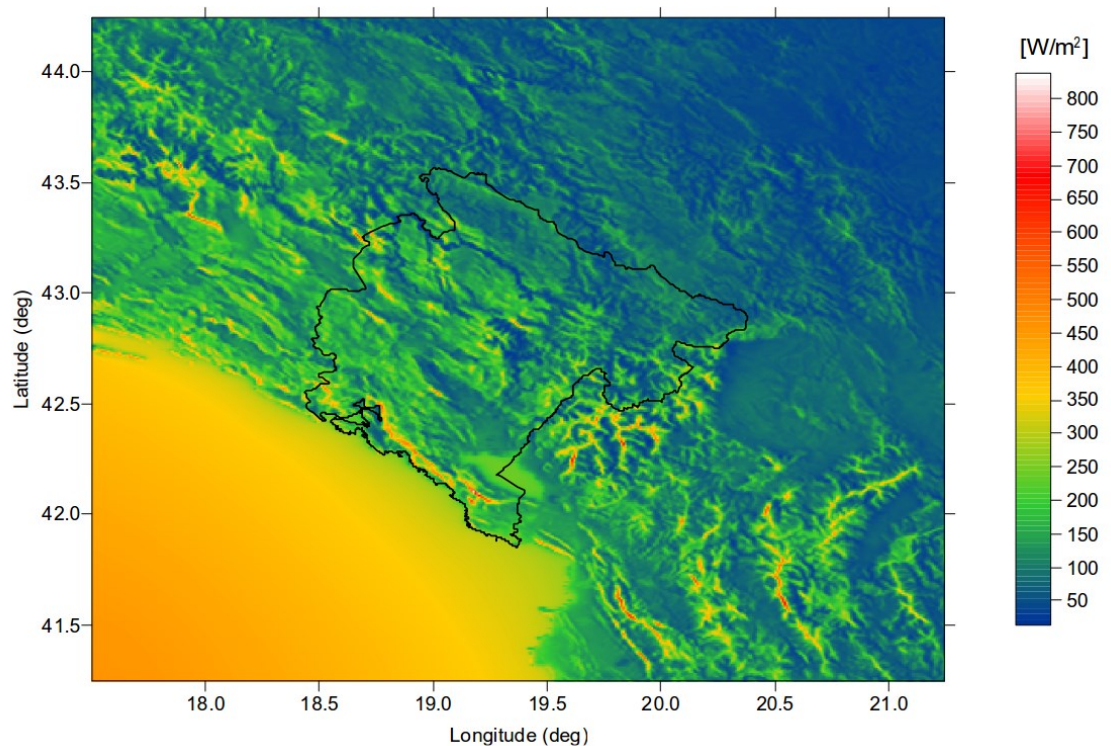
#### 2.2.1.2 CETMA-Study

A rather comprehensive assessment of the countrywide wind energy potential was published by CETMA, an Italian Consortium of public and private research organisations and small-medium enterprises in 2007. The study was funded by the Italian Ministry for Environment, Land and Sea and undertaken in close cooperation with the responsible Montenegrin Ministries. [24]

In the course of this study, the countrywide theoretical wind potential based on a model combining statistical analyses of data relative to the wind speed aloft with numerical modelling of wind flows over complex terrain was assessed. The mean wind field and wind potential maps provided by the simulations were subsequently corrected based on the average wind speeds measured at 10 m above ground level at the existing measuring stations located within the target area. Measurement data from the inland were provided by the Hydro-Meteorological Institute Montenegro (HMZ) (see chapter 2.2.3.1), while offshore satellite data were provided by the National Aeronautics and Space Administration (NASA). [24]

As a final result, a set of maps of the Montenegrin territory was published indicating the average wind speed [m/s] and the average power density [W/m<sup>2</sup>] at a height of 50m above

ground level. The following figure illustrates the average wind power at 50m above ground level. [24]



**Figure 2-3: Actual wind potential [W/m<sup>2</sup>] at 50 m a.g.l.**

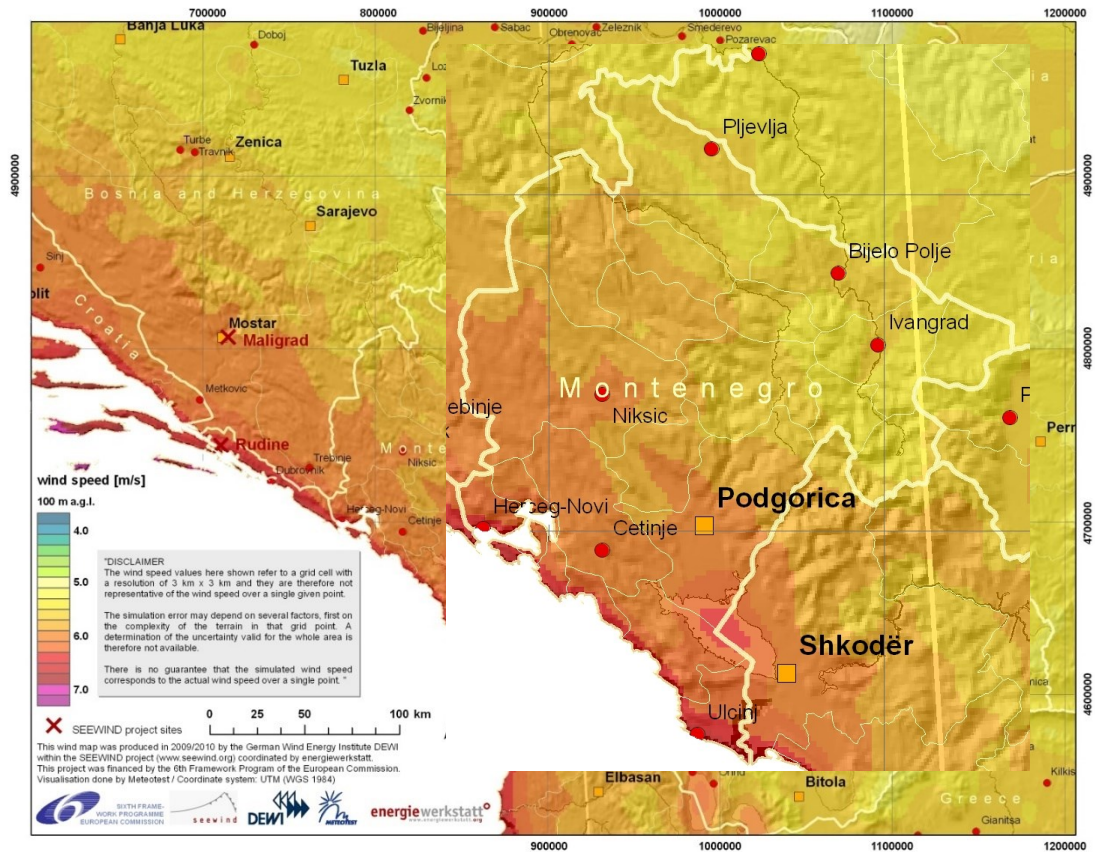
The theoretical wind potential is presented for horizontal grid spacing of around 1 km and in different layers on the vertical axis. Besides general remarks on the limitations and uncertainties of the assessment, a concrete indication on the accuracy of the results is not given in the study.

According to this study, Montenegro shows a good potential for wind energy systems in specific regions. The calculated values are in the range of 5-7 m/s when moving towards the sea, reaching 7-8 m/s in promising areas along the coast. In terms of power density, typical values are in the range of 100÷300 W/m<sup>2</sup> and for the windiest areas, located on the ridges and tops of mountain ranges, to more than 400 W/m<sup>2</sup> (Compare [24] on page 143).

### 2.2.1.3 Vestas Wind map

In 2010 another wind atlas for Montenegro was published by the turbine manufacturer Vestas with a resolution of 1x1 km for a height of 80 m above ground level. The calculation was performed by numerical simulations, and no wind measurements have been taken into account [13]. Unfortunately, a better resolution than shown in the figure below is not available.





**Figure 2-5: Wind map in 100m height calculated in the course of the SEEWIND Project**

The resolution (3x3km) of the SEEWIND wind map is coarser compared to the CETMA study. This might lead to higher uncertainties especially in complex terrain. The same as with the Vestas wind map, no data from ground-based wind measurements was taken into account.

**2.2.1.5 POWERED – Offshore Wind Project**

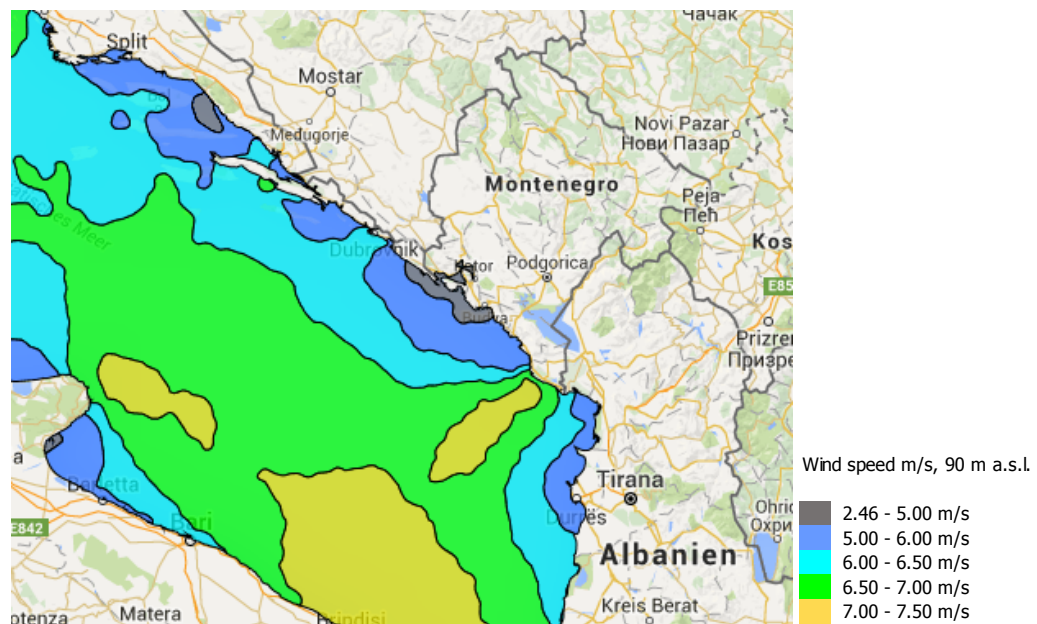
The "Project of Offshore Wind Energy: Research, Experimentation, Development" - POWERED is an international project funded by the IPA Adriatic. The project was initiated by the Region Directorate of Abruzzo, Italy, which is the creator and leading partner in this project, together with 12 partners from Montenegro, Italy, Croatia and Albania.

The project POWERED has set itself the task of defining a set of strategies and shared methods for the development of the off-shore wind energy in all Countries overlooking the Adriatic Sea. In the course of this work, wind maps of the Adriatic Sea have been created. [26]

The project explored the wind potential with a network of anemometers along the Adriatic coast. These anemometers were placed on the open sea, on pillars with heights between 40 and 60 meters. The collected data was processed in the Italian Aeronautical Meteorological Centre. As a result, a detailed potential study has been published on the website <http://www.powered-ipa.it>. [26]

Figure 2-6 shows a wind map from an earlier stage of the project. The final wind map with a planned resolution from 1x1km to 200mx200m has not yet been published. [27]





**Figure 2-6: A Wind map in 90m height above sea level published in the course of the project "POWERED"**

## 2.2.2 Technical and Economic Potential

In general, various impacts limit the possibility of utilizing wind power at certain geographic locations: Besides the information about the wind speed (see chapter 2.2.1), minimum distances to settlement structures, the terrain slope as well as protected areas and economic parameters need to be considered. In most cases assessments as to the realisable wind potential are carried out on the basis of a GIS analysis.

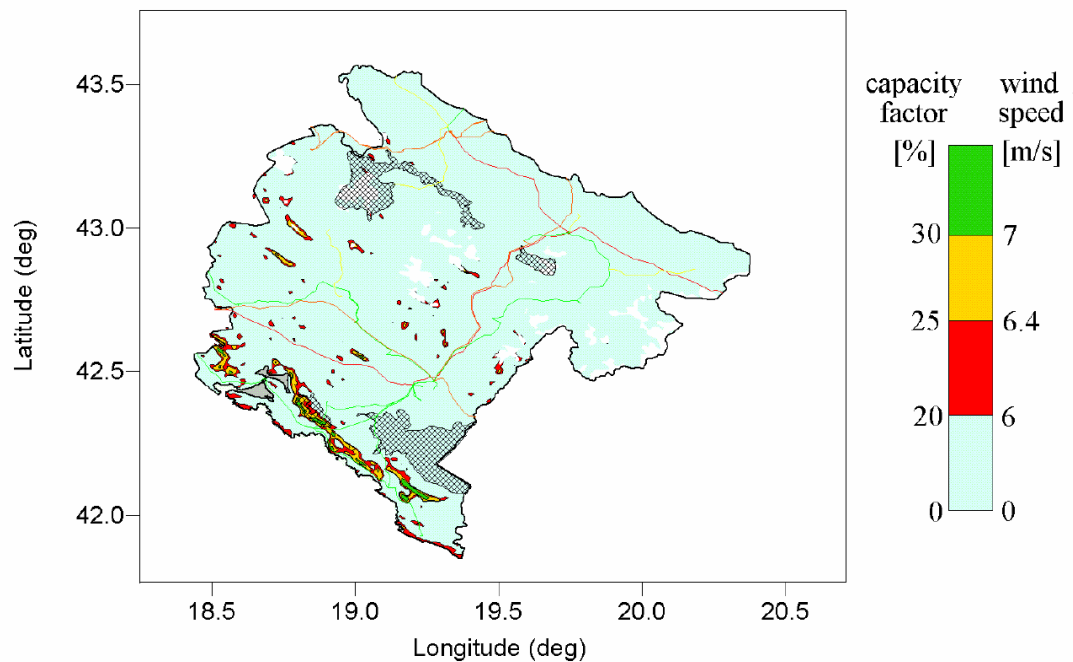
### 2.2.2.1 Study of the University Niš

This project was performed in 2006 (see also chapter 2.2.1.1) and followed a rather fundamental comparative analysis. Instead of a GIS analysis, wind measurement data from hydro-meteorological stations was used to estimate the degree of similarity of the local wind data with wind measurement data in Denmark and Germany. Besides the average wind velocity, parameters like population density, total installed electric power, total production of electric energy, total consumption of electric energy, total installed wind power as well as the share of wind energy in total produced electric energy were taken into account. In this way, different similarity parameters between Denmark and Germany were calculated and have been transferred and adjusted to the situation in Serbia and Montenegro. [28]

According to this study the belt along the coast from Ulcinj to Herceg Novi is not only suitable in terms of the theoretical wind potential, but also from other aspects for the construction of wind generators (it is not wooded, proximity of the grid, absence of problems concerning visual influence on the environment). According to this study, about 1,000-1,500 MW of wind power capacity could be built here. [28]

### 2.2.2.2 CETMA-Study

Following the mapping of the wind energy potential (see chapter 2.2.1.2), the CETMA consortium performed a GIS-based evaluation taking into account the height above sea level, the road and railway net-work, the electrical power supply system as well as natural / protected areas [24]. The result is presented in the following figure, whereupon the thin-coloured lines represent the power grid, the hachure marks protected areas and the white spots are areas above 1,800 m.



**Figure 2-7: Capacity factor and wind speed for different regions in Montenegro, implied for a Vestas V-52 wind turbine**

The analysis showed that, beside some coastal areas, highest speed wind locations in Montenegro are located in mountainous areas. According to [24], these areas represent the high productivity potential areas with a capacity factor above 30% and a wind speed over 7 m/s. However, these locations lose their potential due to bad accessibility (no road or grid network available). The study suggests that rather than a few big turbines, instead many small turbines (up to 1 MW) would be more suitable for mountain locations, since these are easier to transport.

Medium productivity potential areas are areas with a capacity factor above 25% and a wind speed over 6.4 m/s, representing most of the coastal areas of Montenegro. (Compare [24])

According to the CETMA study, Montenegro provides a wind potential of 100 MW for high wind speed areas with wind speeds above 7 m/s. The potential rises to 400 MW if medium potential zones are taken into account. The power produced from wind could reach up to 25% (925 GWh) of the countries yearly power consumption. [24] In terms of the economic potential the CETMA study concludes, that even at the best locations it's not possible to operate wind parks without incentives from the government (e.g. feed in tariffs). [24]

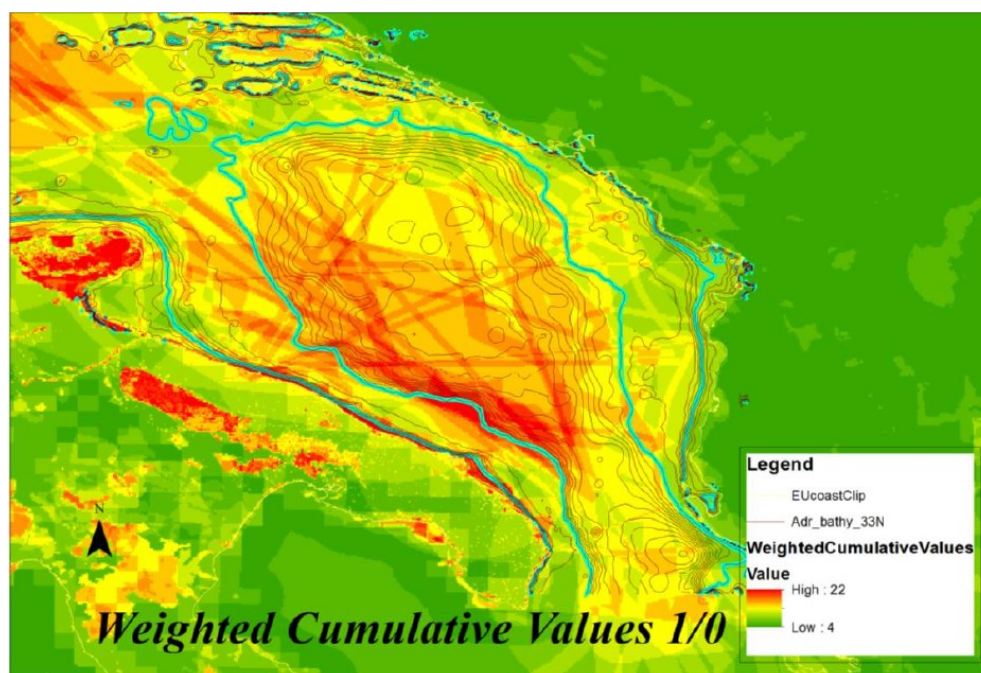
When assessing the quality of the results published in the CETMA-Study, the following aspects have to be borne in mind:

- The accuracy of the used wind resource map and other relevant GIS data is difficult to assess (especially for complex terrain).
- The results were calculated for Vestas V52 Wind Turbines with a hub height of 50m. In the mean-time turbines with 140m diameter and a hub height of 150m are available on the market.
- The resolution of the wind map and the GIS analysis was 1x1 km and therefore rather coarse. Comparable studies nowadays have a resolution of 100x100 meter.
- The capacity of the grid is neglected. Nevertheless, the current main constraint for the wind energy potential is the weak power grid. According to [11], the current power grid can't hold more than the 120 MW that are now under construction. All other wind energy projects have to wait till the existing grid is expanded and strengthened.

### 2.2.2.3 POWERED – Offshore Wind Project

A detailed, GIS-based evaluation of the technical offshore wind energy potential of the Adriatic region was carried out within Project POWERED. This study made no statements about the actual potential in MW but created a map as a preliminary tool to identify possible locations for future offshore wind farms. [29]

Figure 2-8 shows the map for the southern Adriatic region. A high weighted cumulative value represents a problematic area for offshore wind installation, whereas areas with a low number of concurrent critical issues (means a low cumulative value) represent those more suitable / less problematic for offshore wind energy utilisation. The map takes into account aquaculture, natural banks of edible molluscs, critical benthic habitats, birds, protected areas (at any level), elasmobranchs (sharks and rays), emerald sites, oil exploration areas, fishing intensity, spawning fish, fish nurseries, turtles, mammals, existing platforms, ports plus a number of per se critical areas. [29]



**Figure 2-8: Southern Adriatic in the weighed cumulative value analysis and with the critical bathymetry highlighted in blue [29]**

According to the final report of Project POWERED [29], the coastline in southern Montenegro could be suitable for Off Shore Wind Power, as the marine bottom conditions could allow the installation of wind turbines as well as because of the relative vicinity of ports and infrastructures. Based on the available information, some restrictions could pop up related to the protection of the marine environment. It is worth noting that because of the scant quantitative information about some environmental characteristics of the area, the estimated low number of constrains here reported for this area could be simply an underestimation of the actual environmental criticalities. [29]

## 2.2.3 Availability of Data

### 2.2.3.1 Wind Measurement Stations from the Institute of Hydrometeorology and Seismology of Montenegro

The Hydro-Meteorological Institute of Montenegro (HMZ) operates a dense network of metrological measurement stations on the Montenegrin territory. Systematic meteorological measurements and observations in Montenegro started in 1949. Today, a lot of meteorological stations are scattered across Montenegro, which are equipped according to the standards of the World Meteorological Organization. [21]

Meteorological stations are classified in three groups by their purpose and working programme: main or synoptic stations, climatological and precipitation stations. All together these represent the basic network of meteorological stations, which is shown in Figure 2-9. Automatic logging of wind speed is performed at a height of 10 m at only four locations (Podgorica, Bar, Herceg Novi and Ulcinj). [21]



**Figure 2-9: Overview of metrological stations operated by HMZ [21]**

The wind data from the Hydro-Meteorological Institute of Montenegro is not available online, but can be obtained. In this context it has to be borne in mind, that due to the low elevation of those measurements, nearby obstacles like houses or trees might significantly influence the accuracy of the readings. For wind energy projects it is necessary to perform high quality measurements at least at 2/3 of planned hub height.

Not all of Montenegro`s meteorological stations are in HMZ competence. Some stations are placed and maintained by other institutions and companies or by HMZ on the request of different users. Such are, for example, aviation meteorological stations at Golubovci and Tivat airports, as well as climatological stations in national parks. [21]

**2.2.3.2 Private Wind Measurements**

According to the Energy law (article 110), the ministry of economy needs to issue a permit for private wind measurements, which is valid for two years. Up to now four companies have applied, but for two companies the permit has already expired [11]. The remaining two wind measurements are located at the planned wind farms sites Krnovo and Mozura.

**Table 2-2: List of all permitted private wind measurements in Montenegro [24]**

Company	Location	Status
Fersa Energias Renovables (SPAIN) [30]	1x measurement in Visina Municipality of Tivat, Bar, Ulcinj, Budva and Podgorica	In operation
Ivicom wind d.o.o (CROATIA) [31]	3x measurements in Gvozd, Bukovic, Konjsko Upper and Lower Krnovo, Niksic	In operation
NTE	Rumi Bar	Permit expired
Dekar	Rumi Bar	Permit expired

As also stipulated in the Energy Law, wind measurement results need to be submitted to the Ministry of Economy. For both operational wind measurements, reports have been submitted and published online (see [31] and [30]).

## **2.3 SOLAR ENERGY**

### **2.3.1 Theoretical Potential**

Montenegro shows a very good potential for solar energy systems, since the annual number of sunshine hours is more than 2,000 hours, almost for the whole country. The coastal regions enjoy more than 2,500 hours of sunshine a year and a very high level of solar radiation in the summer, late spring and early fall. Also, the plains exhibit a large number of hours of sunshine, although somewhat lower than on the coast. In winter, this region receives a similar amount of solar radiation to that of the coast but relatively lower in summer.

### **2.3.2 Technical and Economic Potential**

The potential for solar energy in Podgorica, capital of Montenegro, is approximately 1,600 kWh/m<sup>2</sup>. [14] Based on this potential and from a technical point of view the use of solar thermal energy in Montenegro is recommended. [24]

### **2.3.3 Availability of Data**

Solar radiation data is available as ground based data and satellite based data.

#### **2.3.3.1 Ground based data**

Reliable ground based data can be obtained from the Institute of Hydrometeorology and Seismology of Montenegro (HMZ). [21] [32] The available ground based data is from three meteorological stations located in Bar, Podgorica and Zabljak. [24] Further data is also available on PV-GIS platform, which is based on spatially continuous climatic data series, regional averages for built-up areas. Data is made with monthly averages of daily sums of global and diffuse irradiation, measured or calculated for 566 ground meteorological stations distributed over the region. The averages represent the period 1981-1990.

#### **2.3.3.2 Satellite based data**

The Helioclim-1 (HC-1) database has been developed by the Télédétection & Modélisation group. These databases are produced by the processing of satellite images, especially from the Meteosat series of satellites. The databases are called HelioClim. The current values of the HC-1 database are calculated with good accuracy. [24]

#### **2.3.3.3 Feasibility study**

A large set of information, in particular for the potential of solar water heating systems, can be found in the following two case studies. The first case study, prepared in 2007 by the Italian Ministry for the Environment, Land and Sea aimed at solar thermal energy for households. [24] The second case study, prepared in 2011 by the Montenegrin Center of energy efficiency (CCEE) aimed at solar thermal energy for the tourism sector, one of Montenegro's most important source of revenues. [32]

#### **Solar thermal energy for households**

The study is based on three locations in three different and representative geographical regions of Montenegro: coastal, central (plain) and mountainous. For the study data from close locations with similar characteristics was used, as no data for air temperature, tap water temperature, and wind speed has been available for the analysed locations. Furthermore, also the demand and production load profile of domestic hot water was assumed as also therefor no data has been available. The results of the study are estimated solar energy parameters as presented in the following table.

**Table 2-3: Estimated solar energy for the three residential case studies [24]**

Description	Coastal Region	Central Region	Mountainous Region
Specific Energy production [kWh/m <sup>2</sup> ]	703	688	688
Solar system efficiency	39%	39%	39%
Solar Fraction	58%	56%	70%
Solar Energy production [kWh/year]	1690	1650	2670

For the economic analysis, North-European types of solar thermal installations were used. The estimated prices for the three regions are presented in the following table.

**Table 2-4: Estimated price for the three residential case studies [24]**

Description	Coastal Region	Central Region	Mountainous Region
Specific Price in EUR/m <sup>2</sup>	500	500	750
Total price in EUR, installation included	1200	1200	3000
Annual Maintenance			
- in % of initial investments	3%	3%	3%
- in EUR	36	36	90
Specific Price in EUR/m <sup>2</sup>	Coastal Region	Central Region	Mountainous Region

The quintessence of the study is that solar systems would become more economic than electrical boilers if higher electricity tariffs would be available as at the time of preparation of the study. (6.76 EURcent, 2007).

### **Solar thermal energy for tourism sector**

Considering that 96% of the tourism activity in Montenegro is concentrated along the coast area, only this area has been analysed. The simulation has been carried out for the period May - October. In the following the results of the energy and the cost assessment are presented:

**Table 2-5: Estimated solar energy for the tourism sector [24]**

Description	Value
Specific Energy production [kWh/m <sup>2</sup> ]	323
Solar system efficiency	44%
Solar Fraction	62%
Solar Energy production [kWh/year]	74,350

**Table 2-6: Estimated price for the tourism sector [24]**

Description	Value
Specific Price in EUR/m <sup>2</sup>	550
Total price in EUR, installation included	126.500
Annual Maintenance	
- in % of initial investments	3%
- in EUR	3.800
Specific Price in EUR/m <sup>2</sup>	550

Based on a detailed economical calculation it has been concluded that according to the assumptions in the case studies, the solar system turns out to be more expensive even if the prices for heating fuel increase. [24]

Scientific research made by the Montenegrin center of energy efficiency (CCEE), includes surveys, on site analyses and data analyses of 28 hotels in Montenegro. The study covers information on: type of hotels, existence of solar collector systems, interest and potential of installation of a new system or extension of existing one, potential size of installation and economical benefit with analyses of existing water demand and existing energy expenses. [32]

## 3 REGULATORY FRAMEWORK

### 3.1 BACKGROUND

It is important to note that the Montenegrin legal environment is very dynamic and subject to frequent changes, due to economic, legal and other social reforms. For example, it is particularly noteworthy that between 2009 and 2013, 586 laws were issued by the Parliament of Montenegro, which corresponds to an average of 117 laws per year, which is even more impressive when it is considered that a part of it is fully new legislation.

Various legislative changes cause changes in laws in energy related areas, not only at national but also at the level of local governments, which are obligated to harmonize their regulations with changes in the law. Thus, during the last decade, two versions of the Energy Policy were brought, as well as two Energy Development Strategies, and two Energy Laws (with two amendments of the first law) and an innovative set of by-laws, etc.

In all strategic documents, especially in the *Energy Policy of Montenegro until 2030* (adopted in 2011) and *Energy Development Strategy by 2030* (adopted in 2014), the Government of Montenegro recognizes that renewable energy is an essential pillar in the sustainable and long-term development of the state of Montenegro.

Montenegro aspires to be integrated and to accede to the European Union (EU). Thus, the strategic and recent regulatory framework in the energy sector is closely aligned to EU policy. In order to honour its commitments to the EU, the objectives of Montenegro in the energy sector are to:

- Increase the security of energy supply
- Increase the use of renewable energy
- Make improvements in energy efficiency
- Attract investments and development of market competition

Since July 2006, Montenegro is a signatory to the South East Europe Regional Energy Community Treaty (SEERECT). Moreover, this treaty includes, among other things, an emphasis on the need to improve exploitation of the RES. The Energy Community Treaty implies obligations to the EU *Acquis Communautaire*, covering the six sectors of electricity, gas, environment, competition, RES and energy efficiency. The Energy Community Treaty is the first legally binding document of Montenegro towards the EU.

As it is pointed out in the *Annual Implementation Report 2013/2014* (prepared by the Energy Community Secretariat on 1<sup>st</sup> August 2014) the legislative framework in Montenegro is among the best of the Contracting Parties and the authorities are dedicated to implement it. The draft legislation for the transposition of the third EU energy legislative package is of high quality. But there are still additional obligations on improving the legislation in this area.

In the field of RES the most important is *Directive 2009/28/EC* as it promotes the use of RES. This directive defines individual national targets with the aim to reach at least 20 percent of the share of energy from renewable resources in the final energy consumption by 2020 in the EU. Decision (2012/04/MC-EnC of 18<sup>th</sup> October 2012) of the 10<sup>th</sup> Ministerial Council of the Energy Community obliges Montenegro to implement the Directive 2009/28/EC to reach the national target of 33% by 2020 for the share of energy from RES. Within some studies there are estimates that Montenegro could have a renewable energy share of about 45% in gross final energy consumption in 2020.

Governmental Decrees on feed-in tariffs (FIT) for SHPPs, wind and biomass as well as for cogeneration and power plants that use solid waste, biogas and waste gases are in place for so-called privileged producers since 2011. In January 2014, a Government Decree defining the method for allocating the cost for promoting the use of energy from RES to end-customers based on an incentive fee depending on the level of electricity consumption was adopted. The Decree further introduces the concept of a qualified buyer of electricity from renewable

sources and obliges the buyer to take the balance of responsibility on behalf of the privileged producers of renewable energy. This role is assigned to the market operator. For the purpose of providing evidence to the final customers about the share or quantity of energy from renewable, ERA was appointed to issue guarantees of origin for electricity generated from RES and to maintain a register of issued guarantees.

During the last decade Montenegro has intensified efforts to facilitate accelerated and more efficient utilization of the potential of RES (small streams, wind, solar, biomass etc.). The research and studies carried out so far have identified significant potential for utilization of capacities of RES, in particular small hydro power plants (SHPPs) up to 10 MW and wind power plants (WPPs).

The activities that are currently in progress include tenders for granting concessions for SHPP construction on ten additional small streams and construction of wind-power plants of significant capacity on the sites of Krnovo (Nikšić municipality) and Možura (Ulcinj municipality). New tenders for SHPPs are underway, and custom and test measurements of hydro and wind potential are being extended to include additional sites. Further interest is envisaged to follow in the coming period in solar power plants of smaller capacity and small biomass power plants.

Finally, the period of transition, restructuring and deregulation of the electric power industry, along with the development of new technology for the production of electricity, changes in energy prices and increasing requirements of environmental protection, will all accelerate the removal of barriers for connecting small sources to the distribution network.

## 3.2 PRELIMINARY NOTES

The regulatory framework established to facilitate the implementation of projects in the field of RES is represented by the:

- *National Strategy of Sustainable Development of Montenegro*, (adopted 2007)
- *Energy Policy of Montenegro until 2030*, (adopted in 2011)
- *Concession Act for Awarding Concessions for Exploitation of Water Courses for Construction of Small Hydro Power Plants in Montenegro*, (adopted in 2013)
- *Energy Development Strategy of Montenegro by 2030* (adopted in 2014)
- *National Renewable Energy Action Plan to 2020* (adopted in 2015)
- *The Law on Energy Efficiency* (adopted in 2014)
- *Energy Law* (adopted in 2016)
- set of by-laws.

Hereinafter follows a brief review of the above regulatory documents with emphasis on RES.

The ***National Strategy for Sustainable Development of Montenegro*** was based on the globally accepted principles, which include, among others, careful management and preservation (to the greatest possible extent) of non-renewable resources and rational/sustainable use of energy and natural resources (water, land, forests, etc.)

The ***Energy Policy of Montenegro until 2030*** is an innovative document and should enable the energy sector of Montenegro to develop as a system that is open to investments, in compliance with the complete energy system of the EU at large and the Energy Community in particular. *The Energy Policy* recognizes three main priorities and 20 key strategic objectives that need to be addressed by 2030.

One of the key strategic commitments of Montenegrin *Energy Policy by 2030* with high priority is the utilization of RES. The commitment implies the following activities:

- Creating a favourable environment for development and utilization of RES and reaching the national target regarding the RES share in the gross final consumption of energy;



- Continued research on RES potentials and study work on the possibilities to use remaining available RES potentials;
- Increased share of RES utilization in transport aimed at securing the achievement of RES share in overall consumption of energy in transport, in accordance with the obligations of the state.

*The Energy Policy* also emphasizes the need for improving the system of financing, planning, monitoring and control of the implementation of energy policy and strategy, which are prerequisites for sustainable development of the energy sector.

Consequently, strategic directions and development paths of the energy sector, including development and utilization of RES, were defined afterwards in the *Energy Development Strategy of Montenegro by 2030*.

The ***Concession Act for Awarding Concessions for Exploitation of Water Courses for Construction of Small Hydro Power Plants in Montenegro*** was prepared in accordance with the *Law on Concessions* (Official Gazette of Montenegro, no. 08/09) and contains data, information and analysis related to the concession for the use of watercourses for construction of SHPPs in Montenegro. This document explains activities and commitments of the bidder during the bidding process, and the conditions and obligations to be fulfilled by the concessionaire during the concession.

The objective of the public competition is the selection of the most advantageous tenders for the construction of SHPPs in Montenegro for the purpose of exploitation of energy potential of water courses. Concessions are awarded through public competition under an open procedure of the public competition, as prescribed by the *Law on Concessions*.

The ***Energy Development Strategy of Montenegro by 2030*** focuses on energy supply security with a drive toward sustainable energy supply development, as well as development of a competitive market. Inter alia, it accelerates activities and plans for construction of SHPPs and wind farms. Generally speaking, the earlier *Energy Strategy up to 2025* included a move toward reducing dependence on energy imports, primarily through the creation of stable conditions for investments in research /exploration and construction of new energy facilities (especially on the basis of already explored sites with unused hydropower potentials), as well as investments in other energy infrastructure. The recent Strategy envisages construction of SHPPs with a total capacity of approximately 130 MW. As for wind energy, the *Energy Development Strategy of Montenegro by 2030* envisages the construction of wind turbines with total capacity of 96 MW, or even 118 MW in the same period. Moreover, the need for new and detailed assessments of potentials and possibilities for extended use of remaining RES (solar energy, biomass, municipal waste, etc.) is envisaged.

The upper limit of acceptable wind power generation is defined by the ability of the power system operator (in this case Transmission System Operator - TSO, i.e. CGES in Montenegro) to balance the system. Wind power plants have extremely negative impact on the system balancing due to the fast and large changes in the production power. Therefore, the TSO defines the upper limit of the installed power of the wind power plants. In Montenegrin case, the mentioned installed power is derived from National Energy Strategy and refers to two wind power plants: Mozura (46 MW) and Krnovo (50 + 22 MW, construction phase I and II). Therefore, after the phase I of the construction of Krnovo, including Mozura, the total installed wind power will amount to 96 MW, and after the phase II, it will be 118 MW. Also, National Energy Strategy includes plans for other wind power plants until 2030, when the total installed wind power in Montenegro is planned to be 190 MW. The specific locations for these plants are not given as precisely as for Krnovo and Mozura.

The ***National Renewable Energy Action Plan to 2020*** (NREAP), pursuant to the template envisaged by the *Renewable Energy Directive 2009/28/EC - Decision 2009/548/EC*, December 2015, defines dynamic of utilization of natural resources, as well as the planned use of technologies required to reach the national target of 33% by 2020 for the share of energy produced from RES in the gross final energy consumption. Specific legislative measures to fulfil the requirements of *Directive 2009/28/EC* will be specified hereinafter under list of by-

laws, as in the necessary procedures for building, authorizing, certifying and licensing RES installations. This *Action Plan* is considered as driver for development in the eyes of the investors and international financial institutions if the specific projects have their confirmation, justification and place in those documents. This increases their willingness to support and reduces the time for decision making.

The **Law on Energy Efficiency** is to a great extent compliant with the EU acquis on Energy Efficiency (EE), and 2009/28/EC 2009 and, inter alia, on the promotion of the use of energy from RES.

The **Energy Law** was adopted at the end of 2015, and its purpose is to harmonize legislative framework in compliance with the EU *Third Energy package*.

As reported by the Energy Community Secretariat, Montenegro has not fully complied with the *Third Energy Package*. In particular, the EU requirements pertinent to security of supply, unbundling in the electricity sector, and development of the gas market as well as related to mandatory oil stocks were not implemented.

Among other issues, it specifies energy activities, regulates terms and conditions for carrying out of those activities in order to ensure quality and a safe energy supply to final customers as well as to incentive electricity generation from RES and high-efficiency cogeneration, procedure for organization and management of the electricity and gas market as well as other matters of relevance for the energy sector. Achievement of the mandatory share of energy from RES in the final gross consumption of energy, in line with obligations assumed by ratified international contracts in Law, is declared of the public interest.

After adoption of an appropriate *Action plan* on use of energy from RES by the Government, the Ministry will monitor implementation of that plan and submit a report on its implementation to the Government every second year. Also, the Ministry shall inform the competent Community's body on adoption of the *Renewable Energy Action Plan*.

Besides the *Energy Law* there are a number of other legislative acts (laws and by-laws) affecting the development of RES use, including those related to concessions, water management, forestry, agriculture, environmental protection, construction of facilities, state property, expropriations etc.:

- *Law on Concessions*  
(Official Gazette of Montenegro, 08/09),
- *Law on Waters*  
(Official Gazette of Montenegro 27/07, 32/11, 47/11);
- *Law on Spatial Development and Construction of Structures*  
(Official Gazette of Montenegro 51/08, 40/10, 34/11, 40/11, 47/11);
- *Law on Environment*  
(Official Gazette of Montenegro 48/08, 40/10, 40/11);
- *Law on Strategic Environmental Impact Assessment*  
(Official Gazette of Republic of Montenegro 80/05, and Official Gazette of Montenegro 73/10, 40/11, 59/11)
- *Law on Environmental Impact Assessment*  
(Official Gazette of Republic of Montenegro 80/05, and Official Gazette of Montenegro 40/10, 73/10, 40/11)
- *Law on Financing Water Management*  
(Official Gazette of Montenegro 40/11)
- *Law on Integrated Environmental Prevention and Control of environmental pollution* (Official Gazette of Republic of Montenegro 80/05, and Official Gazette of Montenegro 54/09, 40/11)
- *Law on State Survey and Real Estate Cadaster*  
(Official Gazette of Republic of Montenegro 29/07, Official Gazette of Montenegro no 73/10, 32/11, 40/11)
- *Law on Waste Management*  
(Official Gazette of Montenegro 64/11)
- *Law on National Parks*  
(Official Gazette of Montenegro 56/09)
- *Law on Property and Legal Relations*  
(Official Gazette of Montenegro 19/09)
- *Law on Nature Protection*  
(Official Gazette of Montenegro 51/08, 21/09, 40/11)
- *Law on Protection of Cultural Heritage*  
(Official Gazette of Montenegro 49/10)

- *Law on Safety at Work*  
(Official Gazette of Montenegro 79/04)
- *Law on Ratification of Kyoto Protocol with the UN Framework Convention on Climate Change*  
(Official Gazette of Montenegro 17/07)
- *Law on Protection from Noise in Environment*  
(Official Gazette of Montenegro 28/11, 28/12)
- *Law on State Property*  
(Official Gazette of Montenegro 21/09)
- *Law on Fresh Water Fishery*  
(Official Gazette of Montenegro 11/07, 40/11)
- *Law on Expropriation*  
(Official Gazette of Republic of Montenegro 55/00, 12/02, 28/06, and Official Gazette of Montenegro 21/08)
- *Law on Business Organizations*  
(Official Gazette of Republic of Montenegro 06/02 and Official Gazette of Montenegro 17/07, 80/08, 40/10, 73/10, 36/11, 40/11)
- *Law on Foreign Investments*  
(Official Gazette of Montenegro 18/11)
- *Law on Agricultural Land*  
(Official Gazette of Republic of Montenegro 15/92, 59/92, and Official Gazette of Montenegro no 32/11)
- *Law on General Administrative Procedures*  
(Official Gazette of Republic of Montenegro 60/03, and Official Gazette of Montenegro no 32/11)

The following lists existing national by-laws concerning authorization, certification, licensing procedures and spatial planning applied to plants and associated transmission and distribution network infrastructure:

- *Decree on projects requiring environmental impact assessment*  
(Official Gazette of Montenegro 20/07);
- *Regulation on the contents of documents to be submitted along with the application for deciding on the need for environmental impact assessment*  
(Official Gazette of Montenegro 14/07)
- *Rulebook on the contents of the environmental impact assessment study*  
(Official Gazette of Montenegro 14/07)
- *Regulation on the method of setting the guaranteed minimum flow downstream from the water intake structure*  
(Official Gazette of Montenegro 22/08)
- *Decree on the method of categorization and categories of water structures and their transfer for management and maintenance*  
(Official Gazette of Montenegro 15/08)
- *Rulebook on the method of conducting audit of preliminary and main designs*  
(Official Gazette of Montenegro 81/08)
- *Rulebook on the contents of the study on preparatory works*  
(Official Gazette of Montenegro 80/08)
- *Rulebook on the contents of the application and documents for issuance of water-related documents, the method and conditions for obligatory notice under the procedure of establishing water-related conditions and the contents of water-related documents*  
(Official Gazette of Montenegro 07/08)
- *Rulebook on identifying and maintenance of zones and belts of sanitary protection of fountains and limitations in such zones*  
(Official Gazette of Montenegro 66/09)
- *Procedure for issuing documents for connection small power plants to the distribution network*  
(EPCG AD Niksic – FC Distribucija, 2009)
- *Rules on the manner and conditions for the issuance, modification or revocation of licenses for performing energy activities*  
(Official Gazette of Montenegro 66/10)
- *Rulebook on more detailed requirements to be met by a legal entity for measurement and exploring the potential of renewable energy sources*  
(Official Gazette of Montenegro 28/11)
- *Rulebook on types and classification of power plants for electricity generation from renewable energy sources and high efficiency cogeneration plants*  
(Official Gazette of Montenegro, no 28/11)
- *Decree on manner of issuance, transfer and cancellation of guarantees of origin for energy produced from renewable energy sources and high efficiency cogeneration* (Official Gazette of Montenegro 37/11)
- *Market Rules*  
(Official Gazette of Montenegro 44/12)

- *Transmission Grid Code*  
(Official Gazette of Montenegro 05/12)
- *Distribution Grid Code*  
(Official Gazette of Montenegro 50/12)
- *General terms and conditions for electricity supply*  
(Official Gazette of Montenegro 20/12)
- *Rulebook on criteria for issuance of energy permit, content of a request and registry of energy permits*  
(Official Gazette of Montenegro 49/10, 38/13)
- *Decree on the organization and functioning of public administration*  
(Official Gazette of Montenegro 05/12, 25/12, 61/12, 20/13)
- *Decree on incentive fees for promoting electricity production from renewable energy sources and cogeneration*  
(Official Gazette of Montenegro 08/14)
- *Decree on acquiring the status and accomplishing entitlements of the privileged producer of electricity*  
(Official Gazette of Montenegro 37/11 and 28/14)
- *Decree on tariff system for determining incentive prices for electricity produced from renewable energy sources and high efficient cogeneration*  
(Official Gazette of Montenegro 52/11 and 28/14)
- *Decree about amendments to the Decree on tariff system for determining incentive prices for electricity produced from renewable energy sources and high efficient cogeneration*  
(Official Gazette of Montenegro 79/15)
- *Rulebook on the amount of incentive fees to encourage production of electricity from renewable energy sources and cogeneration in 2015*  
(“Official Gazette of Montenegro” 4/15)
- Other laws, regulations and technical regulations in this field, related to concession activity.

### 3.3 LOCAL CONDITIONS

Montenegro is recognized as a country that is rich in hydro potential. Through the fact that the majority of watercourses suitable for construction of SHPPs are located in the northern part of Montenegro, it can be expected that their construction will substantially contribute to the improvement of local socio-economic conditions, which is particularly an important aspect in respect to the development of economy.

In addition, a significant wind energy potential throughout the territory of Montenegro as well as a great potential of solar energy, especially in the southern and central region, has been recognized in a series of studies.

Geographically, RES projects, including SHPPs by their nature, are implemented at smaller locations in areas that are used for various other different purposes. These power plants have to fit in with the rest of the environment and space and therefore they are included in different areas of planning. This principle of integration into the surrounding area is what makes distributed sources, especially RES, attractive.

However, in order to obtain the approval for RES project realization at a particular location, it is necessary to obtain the consent of the space planning sector, local electricity infrastructure, the environment, the impact on the cultural monuments, traffic, etc. In order to enable an effective procedure for development and approval of a SHPP or wind farm and to allow the approval of only those projects that contribute to sustainable development and represent economic progress, the energy strategy and other documents should be harmonized.

If they are not harmonized, approvals may be granted to projects, which in terms of the efficiency of energy resources exploitation and technology used, represent the optimal projects, but which can, on the other hand, create significant adverse impacts on other sectors. This leads to a dilemma over priorities of one sector over another. However, most often a viable solution represents a compromise solution. Solving of the mentioned problems during the realization of the project leads to delays and can be a financially demanding procedure.

As in many other countries, the administrative procedures in Montenegro for permitting, construction and licensing remain lengthy and burdensome despite several tendering rounds for concession of water streams for SHPPs in the last years. Currently, Montenegro fails to comply with the requirements of Article 13 of *Directive 2009/28/EC*. This means, for the time being, simplified and coordinated administrative procedures for obtaining concessions and

usage of renewable energy sources are not in place as it is foreseen in Article 13 of *Directive 2009/28/EC*, i.e. Paragraph 1, Section a) and c) of Article 13 of *Directive 2009/28/EC states*, that "Member States shall, in particular, take the appropriate steps to ensure that:"

- a) subject to differences between Member States in their administrative structures and organisation, the respective responsibilities of national, regional and local administrative bodies for authorisation, certification and licensing procedures including spatial planning are clearly coordinated and defined, with transparent timetables for determining planning and building applications
- c) administrative procedures are streamlined and expedited at the appropriate administrative level

The procedure for construction of a facility does not specifically define the relationship and coordination between the electricity system operators and other institutions in charge of issuing permits and approval. The coordination between different levels of administration requires improvement and advancement. For the time being, there is no institution with the formal authority to coordinate between the different levels, although the Ministry of Economy plays the role of the central body for the implementation of RES projects.

However, the absence of adequate planning documents and therefore the impossibility of obtaining urban-technical conditions for the development of technical documentation of planned SHPPs, was overcome by relaxing of a Governmental decision. Pursuant to this decision the Ministry responsible for regional planning was obligated to issue urban-technical conditions for the construction of SHPPs on the basis of the *Spatial plan of Montenegro by 2020*, with the approval of the Ministry of Economy and the relevant local authorities.

Also, if in the course of granting concessions there is no proper planning document, the Ministry responsible for spatial planning and construction of buildings or units of local government (where the water stream is located) can develop national or local spatial planning document in accordance with the accepted conceptual design of the first-ranked bidders.

The granting of concessions for exploitation of water flows is carried out in accordance with the *Law on Concessions*, and consequently the concessionaire obtains a right to use land owned by the state during the concession. This provision is an additional security for the upcoming projects.

On the other hand, according to the *Law on Spatial Development and Construction of Structures*, the local self-government authorities have their own *Spatial Plans* where, among other things, the allocation of land for RES development and construction is defined.

Local governments are responsible for issuing energy permits for facilities that use RES for heat generation and / or distribution of heat.

Pursuant to the *Energy Law*, the local self-government authorities shall plan energy demand and energy supply modes, measures for energy efficiency as well as use of RES and cogeneration in a Local Energy Plan in accordance with the Energy Development Strategy, Action Plan for use of renewable energy and Action Plan for energy efficiency. It is inter alia necessary that the local energy plan must contain a particular estimation of potentials and possibilities of increased use of RES during next 10 years. According to available information, the Local Energy Plans are prepared for 6 local self-governments: Podgorica, Nikšić, Bijelo Polje, Andrijevica, Cetinje and Kotor.

Finally, a significant contribution from RES projects to the municipality development is realized through the construction of road and electricity infrastructure, the implementation of multi-purpose solutions (construction of tourist objects, electrification facilities to summer pastures, the reconstruction of public lighting, local jobs, etc.).

Positive effects of these projects are also: increase of security of energy supply; reduction of import dependence; contribution to the achievement of a binding target for energy from renewable sources; increasing the revenues of the state and municipal budget for payment of

concession fee; and RES facilities transition to state ownership after the expiration of the concession period.

The average time for obtaining all required permissions is usually between 6 and 12 months, but depends on the individual project and seriousness of each investor. Larger projects must often undergo a spatial planning process which is time consuming, partly due to the involvement of the local population and other authorities.

The Law does not take into account the particulars of different technologies for producing energy from renewable sources in the approval procedures of RES projects. The difference exists in terms of the implementation of tendering procedures depending on renewable energy (resources) used.

If the RES is defined as state / local (all streams, certain forests), it can be used over a period of time through the concession in accordance with the *Law on Concessions*. If the resource is not defined as state / local (solar potential, wind, biomass privately owned), and plans to use state land, land is leased through public bidding in accordance with the *Law on State Property*.

### 3.4 PERMITS AND APPROVALS REQUIRED FOR RES PROJECTS AND TIMEFRAME

Most of the procedures for authorization, certification and licensing for power plants using RES are under the jurisdiction of the state administration, i.e. Ministry of Economy (MoE), Ministry of Sustainable Development and Tourism (MSDT), Environmental Protection Agency (EPA), Energy Regulatory Agency (ERA), Market Operator (COTEE) and power system operators (TSO / DSO). All in all, 6 - 12 months are required for obtaining all necessary permits.

As a general guidance for investors, in the following, all necessary permits together with the responsible authorities are stated in a chronological and concise manner. Information is given also on other necessary steps that are required for the implementation of a RES project such as grid connection and land ownership. More detailed information on each item can be found in the chapters referenced to.

Necessary permits and relevant authorities for the implementation of RES facilities:

- **Concession Agreement or Energy Permit**  
Ministry of Economy (MoE)
  - above 1 MW: Concession Agreement with prior public tender, see 3.4.1
  - below 1 MW: Simplified procedure in form of energy permit without public tender, except if 2 developers show interest at the same river, see 3.4.2
- **Obtaining of Urban-Technical Conditions**, see 3.4.3  
Ministry of Sustainable Development and Tourism (MSDT)
  - Obtaining of official provisions and specifications of relevant authorities through the MSDT, e.g. water management, nature protection, etc.
- **Construction Permit**, see 3.4.4  
Ministry of Sustainable Development and Tourism (MSDT)
  - Based on main design, (urban-technical conditions incorporated)
- **Environmental Impact Assessment (EIA)**, see 3.4.5.  
Energy Protection Agency (EPA)
  - Project screening by EPA and decision if a EIA is required or not
- **Use Permit**, see 3.4.6  
Ministry of Sustainable Development and Tourism (MSDT)
  - After technical inspection and trial operation

Grid connection:

- **Grid Connection Agreement (GDC)**, see 3.5  
Case by case specific, depending on available grid capacity, as general orientation:  
EPCG, FU Distribution (DSO), if the installed capacity is less than 20 MW  
CGES (TSO) if the installed capacity is more than 20 MW
- **Power Purchase Agreement (PPA)**, see 4.4.3  
Electricity Market Operator (COTEE)

Land ownership:

- **Land ownership**, see 3.9  
Real Estate Directorate of Montenegro, prior to start of construction works

Although the procedure for the use of wind power is similar to the procedure for the construction of a SHPP, taking into account greater interest of investors, the attention here will be predominantly focused on the development of SHPPs.

### 3.4.1 Concession Agreement – MoE (>1 MW)

A concession agreement is required for RES power plants with an installed capacity of more than 1 MW. The steps for obtaining a concession are as follows:

#### **Initiation of Concession Act:**

Pursuant to Article 17 of the *Law on Concessions*, the procedure for granting concessions is initiated by the competent authority making a *Concession Act*, in accordance with the *Action Plan*.

The procedure referred to in paragraph 1 of Article 17 may be initiated also on the initiative of the interested party. In accordance with Article 41 of the same Act interested persons may submit to the competent authority on their own initiative suitable RES projects which are not contained in the *Action Plan* referred to in Article 7 paragraph 1 of the *Law on Concessions*. Along with the application, pursuant to paragraph 2 of the said Article, the interested persons submit to the Ministry data and information necessary for the preparation of the *Concession Act*.

#### **Concession Act (Public Hearing & Debate):**

Concession Acts are adopted by the Government of Montenegro. Prior to submission for approval, the Ministry organizes and conducts a public hearing within 15 to 30 days after a public call for a public debate. Accordingly, the aim of public hearings is to inform the competent institutions on the subject of giving concessions, as well as to enable them to give their suggestions and comments. After adoption of the *Concession Act*, in accordance with the law, the Ministry is obligated to launch a public tender for granting concessions.

Concession periods granted are determined on basis of the object of the concession, the time required for return on investment and to make profit on the basis of concession activities, whereas the maximum concession period is limited to 30 years.

#### **Eligible Bidders:**

Any domestic or foreign company or other legal entity, entrepreneurs or other individuals, a consortium or any other form of business association that meets the requirements related to eligibility in the public bidding procedure in accordance with the *Law on Concessions*, are eligible to participate in the public bidding procedure.

For application, each Bidder has to submit a bank guarantee, in an amount as specified in the public announcement, payable on first demand without the right of objection, in the form as set out in the instruction, or evidence of a cash deposit payment in the same amount. The

validity of the bank guarantee or cash deposit must be 180 days counted from the deadline for submission of applications.

Bidders have the right, based on a written request, to withdraw the application latest by the expiry date of the deadline for submission of the application. Applications are considered as withdrawn once the written request for withdrawal of the application has been received.

#### Evaluation Criteria:

Table 3-1 shows the criteria used for evaluation and selection of the most favourable application for the construction of a SHPP:

**Table 3-1: Criteria for selection of the best tender (awarding of concession)**

Number	Criterion/Sub-Criterion	Points
1.	Experience in managing hydro energy facilities	30
2.	Financial capacity	30
3.	Technical solution	20
3.1	Installed capacity	8
3.2	Annual energy generation	12
4.	Experience in the local market	12
5.	Multipurpose solutions	8

**Note:** Number of points under every criterion or sub-criterion are rounded off to the first decimal.

### 3.4.2 Energy Permit - MoE (<1 MW)

Apart from the concession procedures which are significantly more demanding for facilities with greater installed power, a simplified procedure exists for the authorization of energy facilities with an installed capacity up to 1 MW, or watercourses that are of local significance and for which the gross energy potential is less than 15 GWh. The procedural steps are clearly defined in the *Rulebook on criteria for issuance of energy permits, content of a request and registry of energy permit*. In case that only an energy permit is required no public tender will be performed, except for if two investors are interested to construct a power plant on the same river.

The procedure to obtain an energy permit is rather efficient in case of a single investor and if the project documentation is well prepared (all necessary approvals and permits are collected).

Up to the middle of 2015 there were 13 energy permits issued for construction of SHPPs on 11 streams with a total installed capacity of 8.7 MW and annual production of 33 GWh. During the mentioned period 7 concession contracts were awarded for 6 streams. The longest period for concession contract awarding lasted 5 months, but this procedure should be relatively short and efficient taking into the account that only simple administrative procedures are needed for its fulfilment. Also, it should be taken into account that prior to sending a concession act to be adopted, the MoE has to organize and carry out a public debate, within 15 to 30 days as of the day of submission of the public notice to such public debate.

### 3.4.3 Urban-Technical Conditions - MSDT

The procedures for obtaining necessary approvals for the construction of RES facilities are under the competence of the Ministry of Sustainable Development and Tourism (MSDT) and are governed by the provisions of the *Law on Spatial Development and Construction of Structures*. In the past, more than 30 procedures were needed for obtaining a construction permit, but since 2011, only two procedures, namely the issuance of urban-technical conditions and the construction permit are required. All other necessary documents are obtained by the competent authority ex officio.



For issuance of urban-technical conditions in development of a planning document all bodies, business organizations, institutions and other legal entities responsible for affairs of: forecasts of development, water management, electric power industry, transport, telecommunications, radio broadcasting, culture healthcare, defence of country, residential and public utility, geodetic, geologic, geophysics, seismic and hydro-meteorological affairs, statistics affairs, agriculture, forestry, tourism, nature protection, protection of cultural and natural heritage, environmental protection, sports, education, finance, real estate register etc., are obliged to submit available data, their own proposals and opinions which are necessary for the development of the planning document. The main design then has to be prepared according to these studies and approvals.

According to the *Law on Spatial Development and Construction of Structures*, urban-technical conditions have to be issued within 30 days after submission of the application.

#### **3.4.4 Construction Permit - MSDT**

In order to obtain a construction permit the investor is obligated to submit two items of evidence:

- ➔ Revised preliminary or main design (based on provisions of urban-technical conditions)
- ➔ Proof of liability insurance of the investor and legal entity that drafted and reviewed the preliminary or main design.

According to the law the construction permit has to be issued within 30 days, except structures that require an environmental impact assessment (EIA) study. In this case the permit has to be issued within 60 days after submission of the application.

All participants in the project realization (investor, designers, reviewers, constructors ...) have to provide a standard insurance policy in case of damages inflicted to third persons (their property) during the project construction. This obligation is defined by the Law on Spatial Development and Construction of Structures (Article 71, Article 93) as a necessary requirement for issuance of the construction permit.

#### **3.4.5 Environmental Impact Assessment - EPA**

The *Law on Environment* establishes that Montenegro harmonizes its economic and social development with principles of environmental protection relating to: conservation of natural values, biological diversity, mitigation of risks, environmental impact assessment, alternative solutions, substitution of chemicals, reuse and recycling, accountability of polluters for pollution and payment for damages, fees for using natural resources, obligatory insurance for possible pollution liability, publicity of data on environmental status and timely and full information. The *Energy Development Strategy*, as well as other strategic documents have outlined a good balance between sustainable energy development of Montenegro and environmental protection.

The need for an EIA is determined by the Environmental Protection Agency (EPA). Thus, no general statement if an EIA is necessary or not can be made. The regulation recognizes two types of projects regarding the need of an environmental impact assessment study: projects subject to mandatory assessment of the environmental impact (if the reservoir volume is over 10 Mio m<sup>3</sup>), as well as projects that may require an assessment of the environmental impact in case that the competent authority (Environmental Protection Agency) decides that this is necessary. In order to determine if an EIA is necessary the concessionaire has to apply to the EPA which then performs a screening. Based on the screening the EPA decides if an EIA will be required for the specific project or not. In case that an EIA is necessary, EPA also performs the subsequent approval of the EIA.

### 3.4.6 Use Permit - MSDT

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The procedure of obtaining a use permit required to commission the plant consists of three steps:

- Submission of application
- Technical inspection
- Issuance of the use permit

After completion, prior to the technical inspection, the investor has to organize a trial operation with previously obtained approval by the competent inspection authority. The exploitation permit is issued within seven days from the day receiving the report that the structure is suitable for use.

### 3.4.7 SHPP Permitting Procedures

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In the following, the procedures for the implementation of a SHPP are described in more detail.

Principally, the approval of a SHPP project consists of two sub-phases:

- Approval of the project in terms of energy and water use, or award of the concession
- Approval of the project for the construction or award of building permits

The basis regulatory framework for the approval of a SHPP is the *Water Law* (or water cadastre), together with the *Law on Energy* and the *Law on Spatial Planning and Building facilities*. The water cadastre is an integral part of the water information system. However, the currently implemented water information system relies to a certain degree on hard copy archive material. The *Water Law* defines the possibility of adopting the water cadastre, i.e. to create an electronic information system to connect all information, e.g. water cadastre, approval permits, etc., so that this information becomes an integral part of the water information system at the national level.

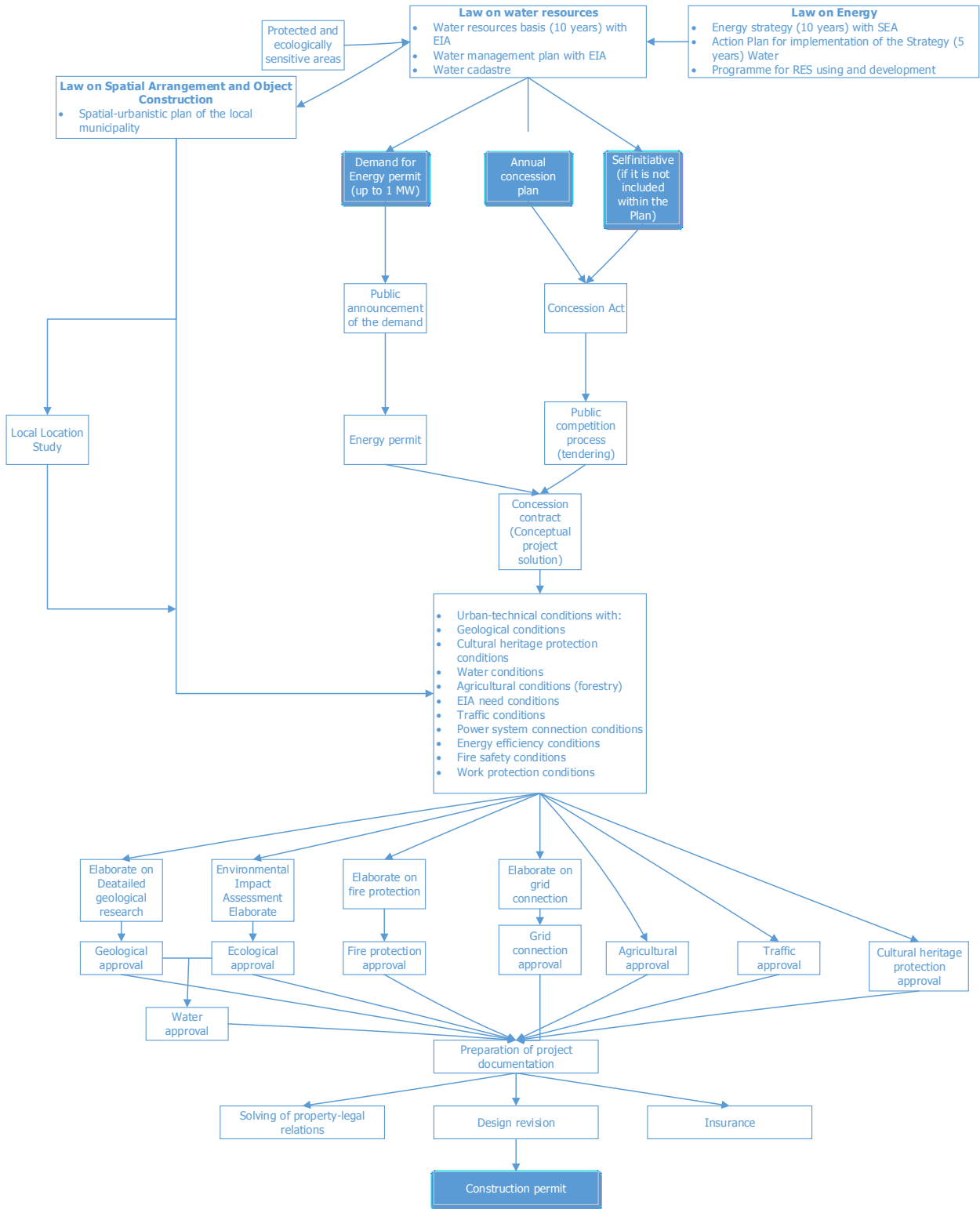
For the implementation of a SHPP, the cadastre of water facilities and systems and the cadastre of water use are most relevant. These documents define the amount and method of water use, water quality and information on the systems for water use by their purpose. Balancing the amount of water needed for the construction of a SHPP to the quantities needed for other purposes in the watercourse leads to the cadastre which is used for the planning of SHPPs.

In 2007 the *Water Law* has been adopted, but the only strategic document usable for water management planning is the *Water Resource Basis of the Republic of Montenegro* from 2001. This document, although well prepared, requires updating, and compliance with recent legislation in the areas of water management and environmental protection.

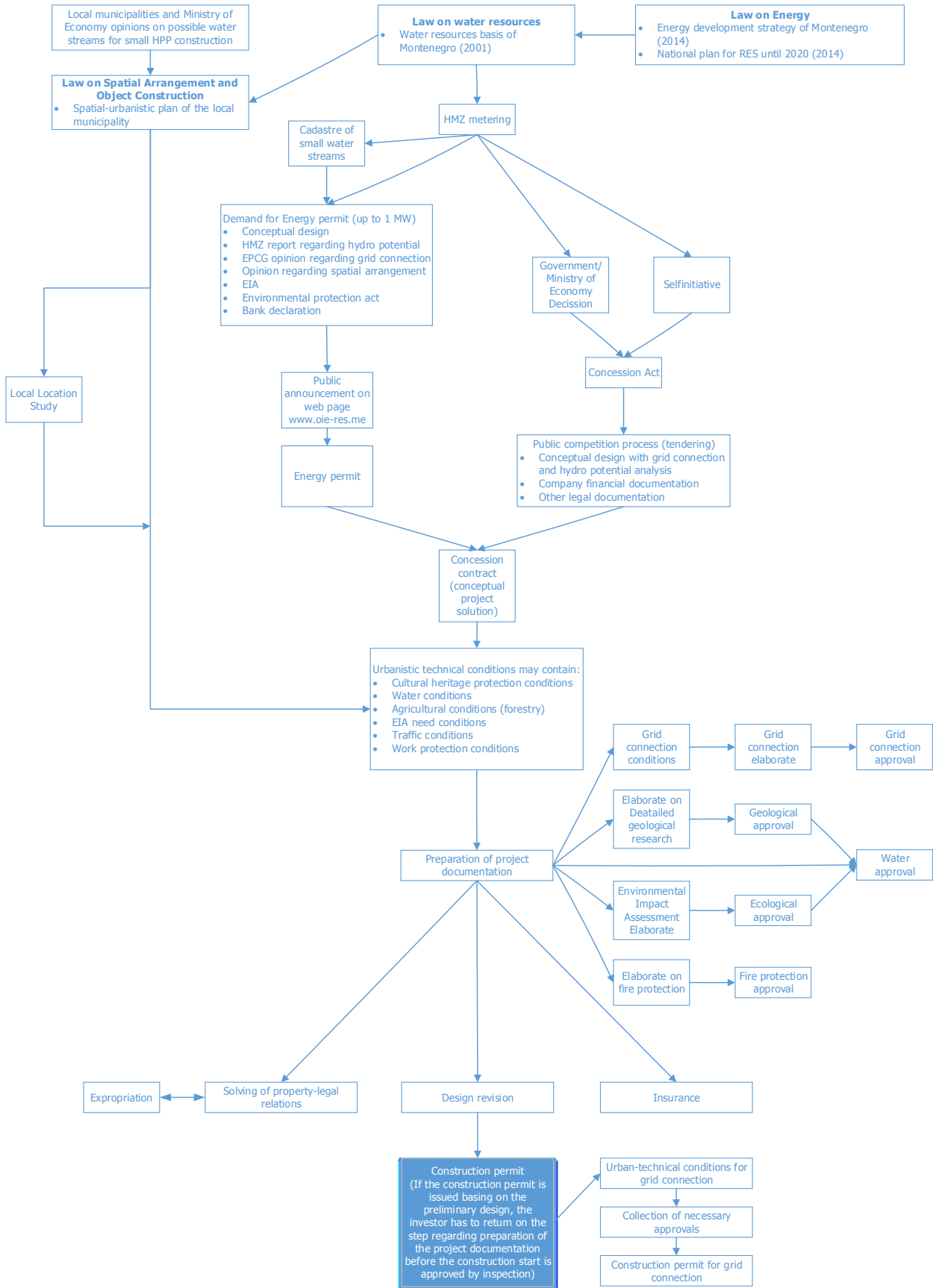
Therefore, the lack of a valid water resource basis, including water cadastre presents a serious barrier for rapid development of SHPPs. Only a cadastre of small streams for the development of SHPPs in 13 northern municipalities was made during 2011-2012.

This leads to problems, in particular for the collection and preparation of data for the environmental assessment, grid connection, as well as spatial constraints in the planning stage for particular locations, waterways, and water resources.

For this reason, deviations in the approval procedures in comparison to the current legislation are existing. Figure 3-1 shows in detail the approval phases of a SHPP project according to current regulations (i.e. Water Law 2007). In comparison, Figure 3-2 shows the same phases in a manner as they are currently implemented.



**Figure 3-1: Phases of planning and approval in accordance with the applicable legal framework in Montenegro, Water Law 2007**



**Figure 3-2: Phases of planning and approval in accordance with the procedure implemented in Montenegro, based on Water Resource Basis 2001**

## 3.5 GRID CONNECTION

The connection point of a RES power plant, as well as the necessary technical conditions that have to be met by the investor are defined by EPCG (DSO) or COTEE (TSO). Therefore, EPCG or COTEE issue an approval of the main design, technical examinations and test operation. Furthermore, they monitor and can make control demands during the operation of a RES power plant.

Based on their investment plans and documents, EPCG FU Distribution (DSO) or COTEE (TSO) assess whether the respective RES facility location may be involved in their plans and suggest potential technical solutions for their connection to the system.

Furthermore, in case that the necessary infrastructure for the connection to the transmission or distribution grid has not been foreseen in the development plans or if it is planned for another period, the user can at his own expense, after prior consent, build the necessary infrastructure. The said approval may include the manner, the terms and conditions under which the operator will take over the new infrastructure from the user.

Pursuant to the Law on Energy (LoE), the electricity transmission and distribution system gives, in accordance with the technical capabilities of the system in the context of the activities of transmission and distribution system and dispatching, preference to privileged producers. In addition, priority is given to the connection of plants using RES.

The approval may also include an agreement to transfer the management and maintenance of the new infrastructure to EPCG (DSO) or COTEE (TSO) prior to the full take over (prior to when the full compensation has been paid).

### 3.5.1 Grid Connection Point – DSO or TSO

The connection to the electricity grid is an issue that is case by case specific and depends on the installed capacity of the power plant and available grid capacity (in particular power lines and substations).

Power lines up to 35 kV are operated by the distribution system operator EPCG FU Distribution, whereas power lines with a voltage higher than 110 kV are operated by the transmission system operator COTEE.

Connections to the distribution grid are limited by the length of the available overhead line, climatic conditions and maximum voltage level of 35 kV. In general, the capacity of a 35 kV overhead line with a length of 10 km during normal operation is 24 MVA. Considering a usual power factor, the maximum power limit for a connection to the 35 kV distribution overhead line is 20 MW. In this regard, it should be noted that climatic conditions in the northern part of Montenegro are favourable with respect to the capacity.

Thus, as a general orientation it can be stated that for RES projects with an installed capacity of more than 20 MW a grid connection agreement with COTEE (TSO) has to be signed. Conversely, if the installed capacity is less than 20 MW most likely a grid connection agreement with EPCG, FU Distribution (DSO) has to be signed. In both cases, limitations due to the available electricity grid have to be analysed in detail.

In this regard it should be noted, that the capacity of the grid is not the only limiting factor, as there are other technical requirements that must be taken into account: e.g. voltage profile, voltage variations, harmonics, reactive power etc.

In summary, the connection of a power plant to the grid has to be analysed in detail on a case by case basis and no reliable general conclusions can be made due to great variations of the grid characteristics and specific location of each plant.

### 3.5.2 Connection Consent

The TSO/DSO has to issue the connection consent, if there are no technical constraints in the transmission/distribution system, and also if the equipment and installations of the facility in question meet all terms and conditions according to relevant laws, technical regulations and other provisions. The connection to the transmission/distribution system consent for a facility, among other provisions, consists of the terms and conditions for the connection including the point of connection and connection costs assessment, the method and technical conditions for connection, as well as the place and manner of metering of delivered energy.

COTEE (TSO) or EPCG FU Distribution (DSO) ensure the fulfilment of all conditions regarding the connection approval and conclude the grid connection agreement for a facility with the system user. The grid connection agreement includes:

- Technical and operational characteristics of the facility
- The methods and conditions of system operation
- Specification of negative rebound effects of the installed devices
- Rights and obligations regarding electrical power quality
- The method of electrical power measuring at the connection points

Technical requirements for connection to the transmission/distribution system are regulated by the Transmission Grid Code/Distribution Grid Code, established by the electricity TSO/DSO.

### 3.5.3 Responsibilities of EPCG FU Distribution (DSO)

During the procedure of connecting power plants to the transmission system of electricity, the DSO is responsible for:

- Giving an opinion on the possibilities of connection  
The DSO is obliged to give an opinion to the applicant on the possibility of connecting the planned facility to the distribution system, within 30 days of the receipt of a request.
- Issuing requirements for connection  
The DSO is obliged to issue to the applicant requirements for connection to the distribution system (based on preliminary solution for power plant) within 45 days of the receipt of a request.
- Issuing a decision on granting consent for the connection  
The DSO is required to resolve the request for issuance of consent for connection to the distribution system within 90 days of receipt of proper request (based on revised preliminary or main design).
- Conclusion of grid connection agreement.

Upon meeting the conditions from the decision on issuing consent for connection to and before the continuous commissioning of the power plant, the investor and DSO conclude the grid connection agreement.

If a proper request is submitted by an investor and all the conditions from the decision on issuing consent for connection, as well as from the grid connection agreement are met, the DSO is obliged to issue a permit for connection to the distribution system, and to connect the power plant to the system in the presence of the investor, within 15 days from the date of application.

Connection of facilities to the distribution network is made after conclusion of two contracts:

- A contract on electricity supply that power plants take from the distribution system and
- Power purchase agreement (PPA)

### 3.5.4 Responsibilities of COTEE (TSO)

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During the procedure of connecting power plants to the transmission system of electricity, the TSO is responsible for:

→ Giving opinion on the possibility of connecting

If there is a change in the planning documents prior to issuing consent for connection to the transmission system, the TSO reserves the right to define a new point of connection to the transmission system and amend an opinion on the adequacy of the connection and a preliminary assessment of the impact of the facility on the operation of the power system, taking into account the previously issued opinion. The final connection conditions which are binding for the TSO are defined within the issued consent for connection.

→ Issuance of consent for connection

Data and technical parameters contained in the request for issuance of consent for connection must be consistent with the revised conceptual design. In the case of requests for connection that require development of systematic analysis, the TSO in the process of issuing consent for connection prepares the detailed study on the connection whose conclusions are the basis for the issuance of consent. The TSO is obligated to perform the necessary analysis and prepare elaborate on the connection within 120 days from the receipt of request.

→ Issuance of approval for the project documentation

The TSO reviews and approves the investment, technical documentation and preliminary or main design, if developed for a construction or part of the construction that has an impact on the operation of the transmission system and is required for obtaining a construction permit, within 30 days from the date of receipt of the request.

→ Issuance of a temporary permit for the connection during probation period

Before trial operation, the TSO, upon a user's request, issues a temporary permit for the connection during the trial operation. The temporary permit is issued on the basis of a professional assessment of fulfilment of the conditions from consent for the connection.

→ Conclusion of a grid connection agreement

A grid connection agreement is concluded between the TSO and the users of the transmission system governing the technical, legal and economic conditions for connection to the transmission system, all the details of the future property relations, and future concerns in the operation and maintenance between the parties. The grid connection agreement must be signed before continuous commissioning. The TSO is obliged to submit an agreement proposal within 30 days from the date of application of request for contract conclusion.

### 3.5.5 Connection Fee

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The *Law on Energy* stipulates that costs for connection to the transmission system or distribution system have to be paid by the system user.

The investor has to bear the costs of:

- Issuing the requirements for connection,
- The decision on granting consent to the connection
- The connection costs

- The cost of construction of lines and devices to the point of connection
- The cost of necessary interventions in the distribution network necessary for reliable operation and delivery of the electricity produced in the power plants and
- The cost of resolving property and legal issues

Costs for connection are determined depending on the type and scope of work that needs to be performed in order to connect the facility to the distribution system, according to the following criteria:

- Approved installed capacity
- The voltage level of the network to which the user is connected
- The distance from the existing network
- The number of phases
- The number and types of measuring devices
- Type and line cross-section
- The type of equipment
- Type of devices and materials that are installed in accordance with the technical regulations
- The need for the provision of designs and other documents necessary for the construction of connection and related works.

Costs for connection include costs for equipment, devices and materials, building costs, machinery costs and expenses for technical documentation

In cases when the connection of generating or more complex facilities requires system development studies or preparation of connection reports, the costs of the grid development study shall be borne by COTEE (TSO) or EPCG FU Distributing (DSO), whereas costs for the preparation of connection reports must be compensated by the system user.

The existing regulation and procedures for connection to the transmission and distribution system do not provide for the attribution of costs between producers. Each power plant with related connection costs is considered individually.

### 3.5.6 Barriers

Unfortunately, the procedure for construction of a facility does not specifically define the relationship and coordination between the electricity system operators and other institutions in charge of issuing permits and approval. Therefore, the requirements related to access to and operation of the grids as well as rules for connection to the grids for renewable energy producers provided in Article 16 of *Directive 2009/28/EC* are still not entirely implemented.

Due to the **lack of transmission and distribution capacities, applications for connections to the grids are currently on hold** which is deterring investors. Moreover, the system operators still have not come up with plans to develop their network to integrate more renewable energy into the grids.

In the permitting and grid connection procedures, simplification (a one-stop-shop) and more transparency are urgently required in the context of a revised market model. The poor record of installing electricity generation capacities from RES testifies to this.

One of the barriers is the difference in views between RES energy producers and distribution companies. Producers believe that the rules of distributors are made to be unfavourable for connection of the new plants and deem that the existing rules and decisions about the grid connection favour distribution companies' interests. Distributors primarily want a safe and reliable operation of the system, which guides and monitors their decisions. Also, distributors want as little as possible outages, and in the case that they arise they should be short-lasting. However, for reasons of requisite generating reserves, distributors should have a positive look toward small sources, but of course under conditions which will not undermine the safety and reliability of the system.



Problems regarding connection to the distribution network emerged due to a lack of solutions or recommendations for connection to the grid provided by the DSO prior to the announcement of public bidding. This indicated the need for prior preparation of an official proposal for the connection of planned power plants to the grid by the DSO. This will facilitate the planning of investments by prospective bidders and create certainty that the energy produced will be taken for upcoming projects.

### 3.6 SUPPORT MECHANISMS FOR RES PROJECTS

As a support scheme for electricity produced from RES, Montenegro has chosen a system of guaranteed purchase of electricity by "feed-in-tariffs" from privileged producers, according to the *Energy Law* and adopted by-laws. Furthermore, the *Energy Law* settles the roles, relations, operations and obligations of all participants in the energy market, introduces a support scheme for RES guarantees of origin, and priority access to electricity produced from RES.

As already mentioned, *Governmental Decree on feed-in tariffs* for SHPPs, wind and biomass as well as for cogeneration and power plants that use solid waste, biogas and waste gases has been in place for so-called privileged producers since 2011.

A privileged producer who has acquired a right to the price support scheme for generation of electricity from RES or cogeneration, is provided with a guaranteed price established in the tariff system for generation of electricity from RES and cogeneration for a period of 12 years. In addition to the incentive price, priority in delivery of total generated electricity into the transmission/distribution system is ensured, as well as exemption from payment of costs for imbalances by the respective system operator.

According to Article No. 8 of above mentioned *Governmental Decree*, the mutual rights and liabilities of a producer who fulfils the conditions set for the entitlement to the incentive prices and a market operator shall be regulated by way of a contract to purchase electricity. The incentive prices for electricity produced shall be paid (Article 9 of said *Decree*) monthly by the market operator to the privileged producer on the basis of a concluded contract to purchase electricity.

The Market Operator (COTEE) enters into a contract with the privileged producer for the purchase of FIT electricity for a period of 12 years. Also, the Market Operator (COTEE) enters into contracts with electricity suppliers and qualified buyers (self-suppliers) on the take-over of a proportionate share of electricity produced in plants of privileged producers. TSO and DSO are then obliged to gather data on the delivered electricity by each privileged producer and taken-over by each electricity supplier. The Market Operator (COTEE) ensures remuneration by charging each electricity supplier for the amount of electricity accepted from privileged producers in line with the FIT levels.

According to the *Law on Energy* all end-customers shall pay a fee that will be used to encourage electricity generation from RES and cogeneration, as an addition to the basic price of electricity. The fee to be paid by the end-customer shall be clearly indicated on the electricity bill that the supplier delivers to the end-customer. The funds collected from fees by suppliers of electricity shall be transferred to the Market Operator COTEE.

Feed-in tariffs are revised annually based on the inflation index. In January 2014, a *Government Decree* was adopted defining the method for allocating the cost for promoting the use of energy from RES to end-customers based on an incentive fee depending on the level of electricity consumption. The *Decree* further introduces the concept of a qualified buyer of electricity from RES and obliges the buyer to take the balance responsibility on behalf of the privileged producers of renewable energy. This role is assigned to the Market Operator COTEE. For the purpose of providing evidence to the final customers about the share or quantity of energy from RES, ERA was appointed to issue guarantees of origin for electricity generated from RES and to maintain a register of issued guarantees.

According to Article No. 2 of the *Decree on acquiring the status and accomplishing entitlements of the privileged producers of electricity* the status of a privileged producer which is entitled to an incentive price may be acquired by a legal entity for plants that:

- are not older than 3 years or which have been refurbished and produce additional electricity compared to the average annual electricity production over the last five years prior to the plant refurbishment.
- are classified under:
  - ◆ Group O.1. (plants with installed capacity not exceeding 1 MW connected to the DS), except plants defined under subsection O.1.4.2. (solar plants as independent objects)
  - ◆ Group O.2. (plants with installed capacity from 1 MW to 10 MW connected to DS or TS), except plants defined under sub-group O.2.4. (solar plants)
  - ◆ Windfarms defined under Group O.3.
  - ◆ Group K.1. (plants for high efficiency cogeneration of installed capacity up to 1 MWe connected to DS) and
  - ◆ Group K.2. (plants for high efficiency cogeneration of installed capacity from 1 MWe to 10 MWe connected to DS or TS).

The status of a privileged electricity producer is acquired per plant.

### 3.6.1 Feed-in Tariffs

The following table shows the incentive feed-in tariffs:

**Table 3-2: Incentive prices for electricity produced in RES Plants in [€cent / kWh]**

RES power plant type	[€cent / kWh]
Wind farms	9.60
Power plants using biomass	
from forestry and agriculture	13.71
from wood-processing industry	12.31
Power plants using solar energy	
on building and engineering constructions	12.00
Power plants using solid waste	9.00
Power plants using waste gas	8.00
Power plants using biogas	15.00

The incentive prices, expressed in €cent/kWh for electricity produced in SHPPs are determined according to the net (on the threshold) power (MW), e.g. for an installed capacity of 2.5MW the calculation is as follows:  $10.44 \text{ €cent/kWh} - 0.7 \times 2.5 \text{ MW} = 8.69 \text{ €cent/kWh}$ .

**Table 3-3: Incentive prices for electricity produced in SHPPs**

$P_{pe}$ - Power on the threshold [MW]	Incentive price [€cent / kWh]
$P_{pe} < 1 \text{ MW}$	10.44
$1 \leq P_{pe} < 3 \text{ MW}$	$10.44 - 0.7 P_{pe}$
$3 \leq P_{pe} < 5 \text{ MW}$	$8.87 - 0.24 P_{pe}$
$5 \leq P_{pe} < 8 \text{ MW}$	$8.35 - 0.18 P_{pe}$
$8 \leq P_{pe} \leq 10 \text{ MW}$	6.8

### 3.7 REGULATION OF PRICES AND TERM OF FEED-IN TARIFFS

The price of domestic generation is regulated separately based on the price in the previous period and corrected by a factor reflecting the reference market price (the European Energy Exchange (EEX) Phelix baseload settlement price for the current tariff period). A plan for the phasing-out of wholesale price regulation envisages the gradual closing of the gap with the EEX price by the end of the regulatory period, *i.e.* by the end of 2015.

The last ten years have been characterized by the fact that electricity prices have grown and that the current price of 9.35 €cent represents one of the highest electricity prices for households in the region. Table 3-4 shows a comparison of electricity prices for households and industry in the EU-28, EU-18 and in Montenegro for 2012, 2013 and 2014.

Based on Table 3-4, it is evident that during the period of 2012 till 2014 electricity prices in the EU-28 have grown with an annual rate of 2.2 % for households and 1.1 % for industry. In the same period, electricity prices in Montenegro were unchanged due to the three-year period of calculation of regulatory revenue. They amounted to 48.4 % of the price in the EU-28 for households and 62.7 % for industry.

In light of the fact that prices in the EU have an upward trend, it is logical to assume that electricity prices in Montenegro will increase in future also with an annual rate of approximately 2 %. By applying past increase rates, on basis of the EU-28, for the period 2012-2014, the price of electricity in Montenegro in 2020 will be 11.3 €cent/kWh for households, and 8.0 €cent/kWh for industry.

There are no risks with respect to a retroactive amendment of the FIT. But, in accordance with article 98 of the *Energy Law*, the Government will cease to provide support schemes for construction of new capacities for generation of electricity from renewable sources in case the national objective for the share of energy from RES has been accomplished. The ERA will cease granting the status of a privileged producer, if by construction of RES facilities the share of energy from renewable sources in total gross consumption of electricity would become higher than what is compulsory, as well as to restrict support scheme prior to achievement of national objective in the event of negative impact on the economy or social status of the final customers.

**Table 3-4: Price of electricity for households and industry in the EU-28, EU-18 and in Montenegro for 2012, 2013 and 2014 (€cent/kWh) [33]**

	Households			Industry		
	2012	2013	2014	2012	2013	2014
<b>EU-28</b>	19.5	20.2	20.8	11.6	11.8	12.0
<b>EU-18</b>	20.5	21.5	22.1	12.2	12.6	12.8
<b>Montenegro</b>	9.5	9.9	9.9	7.2	7.5	7.2
<b>MN/EU-28 (%)</b>	48.7	49.0	47.6	62.1	63.5	62.5

Pursuant to the Energy Law, a privileged producer may opt, e.g. if the market price is better, to sell its energy on the power market under the same conditions and regulations as applicable to any other producer. In case of selecting this option, the producer's participation in the market cannot be shorter than 12 months. In that case the producer has to start sale on the first, and end it on the last day of a given month during which the sale of electricity is taking place. During the period of the sale of electricity on the market, the privileged producer is not entitled to receive the incentive price of electricity and is obligated to pay the system services charges to the System Operator under the conditions as prescribed for other producers. In case of an opt out the "privileged producer status" (12 years) is not prolonged for the period spent on the market.

## 3.8 ELECTRICITY TRADING AND EXCHANGE WITH NEIGHBORING COUNTRIES

### 3.8.1 Market Overview

The electricity sector in Montenegro is dominated by EPCG, which performs generation, distribution and supply activities. Since 1<sup>st</sup> January 2009, the electricity market in Montenegro has been open to all customers. Therefore, all customers except the category of households become qualified and eligible to choose their electricity supplier. Also, since 2009, the Montenegrin electricity market has been open to companies, both wholesale, and retail, but except EPCG and Montenegro Bonus (former supplier of the KAP Aluminium Plant) nobody showed an interest in the services of electricity supply.

In this regard, it should also be mentioned that for the time being EPCG is the only licensed electricity supplier that can sell electricity to all consumers. Thus, households are currently contracted to EPCG, FU Supply, which supplies them with electricity. Formally, from January 1<sup>st</sup> 2015 an open electricity market for households was declared, but due to lack of other suppliers the status of households will remain unchanged as long as no more suppliers appear on the market. However, it is assumed that after total unbundling of the FU Supply from EPCG, which shall take place already in 2016, more suppliers will appear on the market.

Nonetheless, for the time being, this means that customers connected to the distribution network are still supplied at regulated end-user prices determined by ERA. According to the *Annual Implementation Report* issued from the Energy Community Secretariat the present degree of wholesale and retail market opening in Montenegro is not satisfactory. The structure of public supply and over-regulation of prices makes supplier switching unattractive and in turn does not attract new market entrants.

In the case of distributed generation (where the generator is located on a building site and energy is sold to the building occupant), commercial PPAs have evolved as a variant that enables businesses, schools, and governments to purchase electricity directly from the generator rather than from the utility. This approach facilitates the financing of distributed generation assets such as photovoltaic, micro-turbines and fuel cells.

### 3.8.2 Electricity Trading

Generally, the *Energy Law* stipulates that purchase and sale of energy in all timeframes, including sale and purchase for a day ahead or intraday sale, shall be carried out on the electricity market, based on contracts or directly on the organized market.

The electricity market established in Montenegro comprises both a wholesale and a retail sale market. The wholesale electricity market comprises a long-term market (based upon bilateral contracts), a medium-term market (the day-ahead market), a short-term market (balancing market) and activities following post-real time (clearing and settlement of deviations).

The retail sale market is established by the Market Operator COTEE according to the following principles:

- Enabling competition in electricity supply by issuing licenses for the supply of electricity in the procedure prescribed by law
- Providing the necessary commercial arrangements for the public supplier, who will be responsible for the electricity supply of tariff customers (households and small unprotected consumers who do not want to change suppliers).

The Energy Law requires network operators to ensure non-discriminatory access to all system users, unless this endangers the provision of public services. In line with *Directive 2003/54/EC*, the affected party is entitled to complain to ERA when access is denied.

Terms, conditions and fees for access and use of transmission and distribution networks are defined in the respective rules adopted by ERA. In December 2013, the tariff methodology for

the use of the transmission network was changed to allow the introduction of a generation component in transmission charges.

CGES applies rules for allocation of interconnection capacity through annual, monthly and daily auctions of interconnection capacities to a split of 50:50 with the neighbouring systems. Congestion income is used for the reduction of tariffs.

### 3.9 LAND OWNERSHIP

Prior to the start of construction works the investor is obliged to solve the property rights for the land necessary for the construction of the SHPP, WPP or solar power plant. In order to determine the respective land owners, cadastral maps containing property parcels can be used.

#### 3.9.1 Land Use and Ownership

Montenegro’s land use structure is dominated by forests and agricultural land. Since the end of the restitution at the end of the previous century, 92% of the agricultural land is owned by private owners and only 8% is owned by the state (including local municipalities). The share of privately owned forest land is 50.4%. The remaining 49.6% of the forest land is state property. The waters, roads and other technical infrastructure are owned by the state. As for residential rural and urban land use, there is no precise official data regarding ownership, but a rough estimate of 50:50 % split between private and state land can be made without affecting the general conclusion since the residential area accounts for only up to 6 % share of the total land.

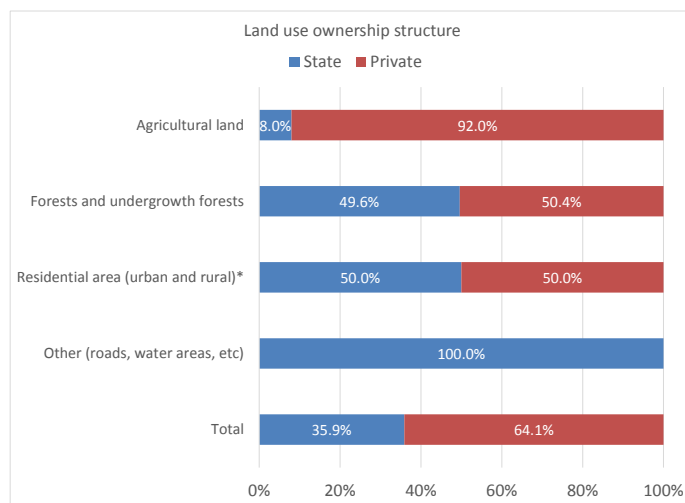


Figure 3-3: Land use ownership structure

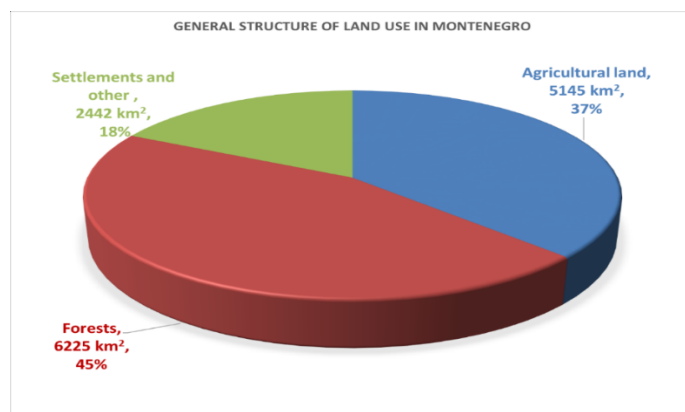


Figure 3-4: General structure of land use in Montenegro

Natural resources, stated below, belong to state property:

- Natural lakes and other water accumulations, interior sea waters and territorial sea
- Streams and underground waters significant for the state according to the Law
- State property within the protected areas - national parks
- Construction and other land and objects owned by the state in the coastal area
- Infrastructure objects important for the state
- Other areas in line with the Law on state property ("Official Gazette of Montenegro", No. 21/2009)

According to previous statements and taking into account that the share of undergrowth forest land owned by the state is 50%, it can be estimated that the total share of land owned by the state (managed by the Government) is about 30%.

According to the Law on waters, Article 10 ("Official Gazette of Montenegro" No 27/07), a land stripe of 15 m for rivers of state importance and 10 m for rivers of local importance, measured from the water-land borderline, belongs to state property.

As exception from the first paragraph of the article, the Government may define areas of other dimensions, if it is needed for:

- water and coastal ecosystem protection
- water arrangement
- protection of goods of special value and capital objects
- performing other activities of public interest according to the Law
- enabling public usage of the public goods.

According to Article 11 of the Law, borders of the water good are defined by the responsible government institution or local municipality. Markings and borders of the water good are entered in the cadaster after proposition from the responsible public authority.

### 3.9.2 Cadastral Maps

Cadastral classification and land categorization is under the responsibility of the Real Estate Directorate of Montenegro. The *Law on State Survey and Real Estate Cadaster* provides provisions on the establishment of the National Spatial Data Infrastructure (NSDI) that contains metadata, services and sets of geo-data from the geodetic-cadastral information system, as well as data on environmental protection, spatial planning documents, transportation and telecommunication networks, mineral resources and energy sources, water regimes, protected immovable cultural wealth; areas of importance for development of tourism and tourist settlements; geology, geophysics, agriculture; demography and health; and industrial and production facilities.

According to the *Law on Agricultural Land*, such land is considered to consist of fields, gardens, orchards, vineyards, meadows, pastures, swamps, ponds and marshes, as well as other land for which its natural and economic conditions can serve the public interest if used, or can be used for agricultural production. The Law stipulates that the agricultural land can be used for non-agricultural purposes, either temporarily or permanently. A permanent change in the type of use of agricultural land can only be made if the urban plan or the spatial plan with detailed elaboration, envisages such a change of use.

Pursuant to the *Law on Forests*, a change in the use of forests or forested land into land for construction or any other purpose can be done only in accordance with the spatial planning document, or forest development plan. A change in the type of use can be made for the construction of facilities for protection against natural disasters and national defence, in the

process of consolidation and regrouping of agricultural land and forests in accordance with the law, and where required by the public interest established by the law or under the law.

### **3.9.3 Expropriation**

According to the LoE, electricity generation is defined as an activity of public interest. Furthermore, the Concessions Act recognizes the possibility of expropriation of land, independent of the size of the power plant, if the same is necessary in order to make use of the concession. On this basis, if the concessionaire is unable, for reasons beyond his control, to address property rights, the Government may declare the public interest over the cadastral parcels designated for the construction of the SHPP. The manner, timing and payment of compensation for expropriation shall be defined and implemented in accordance with the *Law on Expropriation*.

On the basis of current implemented RES projects, it is very likely (up to 90%) that for parts of the infrastructure (power plant object and/or connection power line and/or access roads) dealing with private land owners is necessary.

Since 2012, 8 SHPPs are in operation in Montenegro. For the majority of them investors had to deal with expropriation issues. However, since the plants are operational (all permits were acquired), it can be assumed that expropriation issues have been successfully solved.

An expropriation is enforced by law. The investor can claim "public interest" on the land required for the SHPP construction. In addition, the investor can apply for the construction permit as soon as the request for public interest proclamation is applied to the Government. Thus, the investor does not have to wait till finalisation of the procedure when acquiring of the construction permit is in question. The compensation payment is determined by experts who are defined by the Government.

## 4 INSTITUTIONAL FRAMEWORK

The institutional framework regarding RES is a part of wider institutional framework regarding the energy sector of Montenegro, and although RES projects are mainly developed by private companies, the role of public authorities within the process is very important. Their role consists of issuing of various permits, licenses, approvals or opinions, as well as signing contracts (concessions, privileged users, grid connection etc.).

### 4.1 STRUCTURE OF THE MONTENEGRIN ELECTRICITY MARKET

The main market participants in the Montenegrin electricity market are: generation companies (producers), privileged producers, suppliers, traders and qualified buyers with balancing responsibility.

Producers may sell electricity to all electricity market participants. They may buy electricity from other producers, traders or suppliers. However, their possible transactions are limited due to their grid connection point, usually one per HPP.

Privileged producers, according to the standard contract it is guaranteed that all produced electricity of privileged producers is bought by the Montenegrin Market Operator COTEE. They are members of the EKO (eco) balancing group, a balancing group that is formed for incentivized RES producers in order to exempt them from balancing responsibility (characteristic for other non-incentivized electricity producers). The members of EKO balancing group, i.e. RES producers, do not have any costs for any deviation from the production plan they provided to the system operator.

Suppliers may buy electricity from other suppliers, producers and traders. Suppliers may sell electricity to qualified buyers, producers, other suppliers, public supplier and traders.

Public supplier may buy electricity from producers, suppliers and traders. A public supplier may sell electricity to regulated tariff customers and qualified buyers (if they select this supplier).

Traders are registered by the Market Operator (COTEE) and buy / sell electricity from producers, suppliers and other traders on the local and international market. They import electricity or buy it from EPCG, other market participants and from the Market Operator COTEE (incentivized RES producers). Traders can trade electricity only with other market participants. They cannot sell electricity to consumers other than eligible consumers. (i.e. Montenegrin Aluminium Company KAP, Montenegrin Railroad Infrastructure, and Montenegrin Steel Company)

Qualified buyer with balancing responsibility may buy electricity from producers, suppliers and traders. Exceptionally, a qualified buyer with balancing responsibility may sell already bought electricity in the case of unexpected circumstances which lead to the decrease of electricity consumption.

As it can be seen in the following table, the majority of participants in the Montenegrin electricity market are traders. Also, it can be seen that Montenegrin Power Company (EPCG) has the most licenses of all market participants (trading, generation, supply and balancing).

Currently 54 market participants are registered, among which 36 are traders, 7 producers, 2 suppliers of end-customers and CGES, and 9 balancing responsible entity. As an exception in the region, Montenegro does not require domestic licenses for trade.



**Table 4-1: List of Montenegrin electricity market participants**

Trader	Producer	Supplier	Buyer with permit	Subjects with balancing responsibility
EPCG	EPCG	EPCG	CGES	GEN-I BEOGRAD
ALPIQ	HIDROENERGIJA-POV.PROIZ.	MONTENEGRO BONUS		DANSKE
REPOWER	KRONOR D.O.O.			MONTENEGRO BONUS
RUDNAP	SYNERGY D.O.O.			EZPADA
PETROL	IGMA ENERGY			REPOWER
EFT	HIDRO BISTRICA			EFT
DANSKE	ZETA ENERGY			EPCG
EZPADA				SEE POWER TRADING
GEN-I				GEN-i SLOVENIJA
HSE				
STATKRAFT				
AXPO				
EPCG				
ČEZ				
YILLARD				
EPCG-BG				
GSA				
INTERENERGO Beograd				
JAS				
ENERGIA NATURALIS SL				
AYEN				
GREENENERGY TRADING				
EZPADA DOO BEOGRAD				
GEN-I DOO, Ljubljana				
NETWORK FOR TRADING				
FUTURE ENERGY BGR				
NOVA COMMODITIES				
SEE POWER TRADING				
FUTURE ENERGY AL				
UGM ENERGY TRADING				
COMSAR ENERGY				
ELGAS ENERGY TRADING				
AGE				
ENERGIA NATURALIS BG				
LE Trading a.s.				
INTERENERGO Sarajevo				
HRVATSKA EP. (HEP)				

## 4.2 RELEVANT AUTHORITIES

In the following, a concise overview is given about the key, medium and indirect authorities involved, and also of key market participants as well as other market participants. Detailed information about all mentioned authorities and key market participants can be found in chapters 4.4 and 4.5.

### 4.2.1 Key Authority

The Ministry of Economy (MoE) (see 4.4.1) is the ministry in charge of the overall energy sector and as such is the key authority (the starting point in the procedure of the RES project realization). In accordance with the LoE, the MoE is responsible in particular for the Energy Policy and Strategy of the State, as well as for the preparation of laws and key bylaws in the sector.

## 4.2.2 Medium Authorities

Medium authorities issue licenses and approvals needed for electricity sale:

Energy Regulatory Agency (ERA) (see 4.4.2) was established in 2004 as autonomous, functionally independent non-profit organization that carries out its public authorizations in the energy sector in accordance with this Law, for the purpose of regulating the energy sector in Montenegro. The new LoE has kept the core concept that the regulation is done in non-discriminatory and transparent manner in accordance with EU directives. Also, LoE has specified duties and responsibilities of the ERA in terms of reinforcement of its role in control of energy entities.

Montenegrin Electricity Market Operator (COTEE) (see 4.4.3) was unbundled from CGES in December 2010 by Decision of the Government of Montenegro. Since the completion of the foundation (August 2011) COTEE operates as a new legal entity and 100% state owned energy entity. Since December 2011, COTEE owns a license as electricity market operator.

## 4.2.3 Indirect Authorities

Indirect Authorities issue various permits and approvals necessary for the implementation of RES projects:

- Ministry of Sustainable Development and Tourism, (see 4.4.4) i.e. Directorate for construction issues urban/technical conditions and building permits for RES projects.
- Environmental Protection Agency (see 4.4.5) approves and elaborates on environmental impact assessment (EIA) for RES objects. Approved EIA is a necessary part of the project documentation prior to the building permit application.
- Ministry for Agriculture and Rural Development (see 4.4.6), i.e. Directorate for water, issues approval regarding water resources use.
- Ministry of Transport and Maritime Affairs (see 4.4.7) issues approval regarding transport infrastructure aspects (connection to roads, air transport safety, etc.)
- Ministry of Culture (see 4.4.8), i.e., Directorate for protection of Montenegrin cultural heritage issues approval for construction near protected cultural sites.
- Ministry of the Interior (see 4.4.9), i.e. Directorate for emergency situation - Sector for inspection and monitoring, issues approval regarding fire safety requirements compliance of RES projects.
- Local municipalities (see 4.4.10) - Although RES projects are mainly treated by national regulation which is managed by central government institutions, there are aspects of RES project that have to be in line with local regulation and strategies. Municipalities have broad authority in regional planning and development (including for preparing spatial-planning documents) as well as in monitoring the implementation of legal acts through issuing building permits, and in enforcing the laws through inspecting construction sites.
- Institute of hydrometeorology and seismology of Montenegro (HMZ) (see 4.4.11) has an important role in estimation of hydro potential. Namely, HMZ performs monitoring of water flows in Montenegro. This data is used for studies, as well as being a part of tender documentation for hydro power plants related to concession agreements.

## 4.3 MARKET PARTICIPANTS

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### 4.3.1 Key Market Participants

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#### Gore Elektroprivreda Crne Gore AD Nikšić (EPCG) (DSO)

The Montenegrin Power Company Gore Elektroprivreda Crne Gore AD Nikšić (EPCG) (see 4.5.1) is the company that performs electric power activities as prescribed by the Energy Law. The transmission system operator CGES (TSO) was a part of EPCG, but has been detached from EPCG prior to the partial privatization of EPCG by Italian company A2A. Further unbundling of EPCG is planned for 2016, when the FU Distribution will be detached from EPCG and will start to operate as an independent institution.

EPCG currently has the status of a public supplier of electricity in Montenegro. For the time being, until planned unbundling in 2016, EPCG operates all power lines up to 35 kV, i.e. 0.4 kV, 10 kV and 35 kV, and is as such the contact point for all RES projects up to an installed capacity of 20 MW.

#### Crnogorski Elektroprenosni Sistem (CGES) (TSO)

The Montenegrin Transmission System Operator (CGES) (see 4.5.2) was unbundled from EPCG in 2009. After capital increase of CGES was performed in January 2011, the ownership structure as of end of October 2011 was as follows: State - 55%, TERNA (TSO of Italy) - 22.1%, other legal and natural persons - 22.9%. CGES owns two licenses: i) for transmission system operator (TSO) and ii) transmission of electricity.

CGES operates all power lines over 110kV, i.e. 400 kV, 220 kV and 110 kV, and is as such contact point for all RES projects with an installed capacity of more than 20 MW.

### 4.3.2 Other Market Participants

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Montenegro Bonus is a limited liability company, established by the Government of Montenegro for the supply of electricity. Until 1<sup>st</sup> March 2016, Montenegro Bonus supplied electricity to the largest customer in the country, the aluminium smelter complex, Kombinat Aluminijska Podgorica (KAP).

Zeta energy Ltd Danilovgrad is the result of a concluded agreement on the establishment of Ltd. "Zeta energy" in April 2010, which began with its operations in October 2010, when ERA issued a license for generation of electricity. The ownership structure is as follows: EPCG - 51% and NTE (Norway) - 49%. As a share capital EPCG offered two small hydroelectric power plants ("Glava Zete" and "Slap Zete") of total capacity 4.5 MW and 1.2 MW.

Privileged electricity producers include electricity production from small power plants using renewable primary energy (hydro, wind, solar and biomass). In order to promote small RES, Government of Montenegro adopted incentives for electricity production. Currently, there are 5 incentivized electricity producers that are operational.

Electricity traders are the most numerous group of electricity market participants in Montenegro. There are 36 electricity traders operational in Montenegro.

## 4.4 DETAILED DESCRIPTION OF RELEVANT AUTHORITIES AND MARKET PARTICIPANTS

### 4.4.1 Ministry of Economy (MoE)

The public authority with the greatest impact on the development of RES projects in Montenegro is the Ministry of Economy (Figure 4-1). Within the Ministry of Economy there are three directorates that impact the development of the energy sector, and therefore RES related affairs:

#### 4.4.1.1 Directorate for Energy

The Directorate for Energy performs tasks which are related to: development of strategies, programs and projects on energy and monitoring their implementation; proposes national energy policies and strategies for the long-term development, prepares drafts and proposals of laws and other regulations on energy; participates in preparation and gives opinion on drafts and proposals of laws and other regulations which are prepared by other bodies, gives expert instructions, opinions and interpretations; harmonizes national legislation with the EU legislation on energy; monitors status and trends of production and business results in energy, studies conditions for business operations in energy sector; prepares long-term and annual energy balances; politics and strategies on construction of new and reconstruction of existing energy capacities and procedures in relation thereof; monitors unbundling and reforms in the energy sector, consideration and recommendation of needs for trade in natural gas, coal and petroleum products with neighbouring countries, as well as possibility to use available domestic energy resources; promotion, preparation and implementation of the use of new technologies in energy sector, use of renewable energy source, procedures for awarding concessions for exploration of watercourses and technical-economic use of water energy potential for generation of energy in small hydropower plants; preparation of reports together with proposals on decisions and agreements regarding the award of concessions in this area; monitors implementation of agreements on concession award and makes annual calculation of concession fees; monitors activities regarding the privatization of business undertakings from this area, gives recommendations and takes care of application of current economic policy measures and systematic measures in the department's area; international and regional cooperation; prepares analysis, reports, information and other materials from the energy area; keeps prescribed records, cooperation with other bodies and organizations, scientific institutions, associations of entrepreneurs, implementation of laws and others regulations; conducts the second instance administrative procedures; supervises application of laws and regulations in the energy sector; makes decisions in administrative matters and matters of administrative supervision, inspection and supervision in the field of energy, preparation of tender documents for public procurement activities within the jurisdiction of the sector and other activities in accordance with the regulations.

Within the Directorate for Energy, there are the following departments that have a certain responsibility regarding development of RES projects:

#### → Department for Energy Development and Reforms

The Department for Energy Development and Reforms performs tasks which are related to: preparation of draft articles and proposals on laws, as well as regulations which are related to the energy; proposes national energy policies and strategies for the long-term development; proposes policies and strategies for construction of new and reconstructions of existing energy capacity and investments into the energy sector, development, harmonization and monitoring of long-term and annual energy balance, studies business conditions, status and trends in production of companies in the energy sector, proposes measures of the current energy policy, monitors activities on the reform and privatization of the energy sector; monitors prices of petroleum products, supply of coal, gas and petroleum products to consumers; harmonizes national

legislation with EU legislation in the field of department, monitors activities on the implementation of quality systems in companies in this field, monitors implementation of Montenegro's integration into the regional electricity market, monitors process of functional and legal unbundling of EPCG.

→ **Department for Renewable Energy Sources**

The department with the direct impact on RES related affairs - performs tasks which are related to: preparation of draft articles and proposals on laws, as well as others regulations and proposes policies on the renewable energy sources; promotes the use of new technologies which are related to energy; proposes measures for increased use of renewable energy sources, preparers proposals on projects of the department that are to be financed by the Government of Montenegro and international funds and loans; technical evaluation of CDM projects; implementation of procedures for awarding concessions for exploration of watercourses and technical-economic use of water energy potential for generation of electricity in small hydropower plants; harmonizes national legislation with the EU legislation for the renewable energy sources.

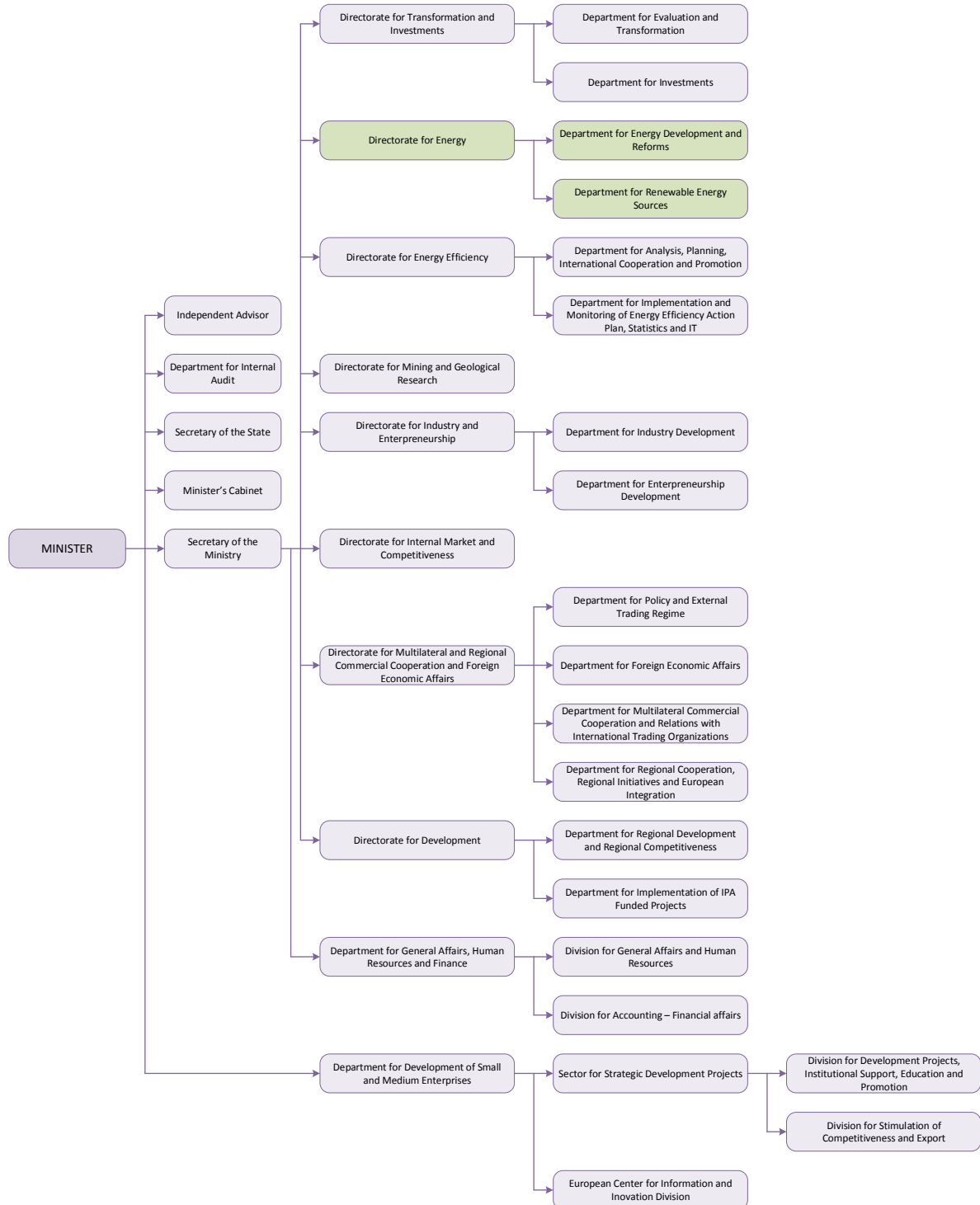
#### **4.4.1.2 Directorate for Energy Efficiency**

The Directorate for Energy Efficiency performs tasks which are related to: the development of strategies, programs, plans and projects in the energy field and monitoring of their implementation; making the texts of drafts and proposals on laws and other regulations in the field of energy efficiency, participation in preparation of and giving opinions on drafts and proposal of laws and other regulations which are prepared by other bodies; preparation of secondary legislation related to the energy efficiency; implementation of measures and activities for increase of energy efficiency at the state level and coordination and monitoring of measures that are being implemented at the local level, proposing of projects and implementation of procedures for tenders and conduct of financial evaluation of projects which is to be financed by the Energy Efficiency Fund; participate in the preparation and implementation of procedures on energy efficiency, public procurements; keeps national statistical and information systems for energy efficiency; preparation of analysis, reports, information and other materials in the field of energy efficiency, promotional and educational activities related to energy efficiency and renewable energy sources, cooperation with government bodies and local self-government and ensuring the inclusion of energy efficiency requirements into other sector 's policies, harmonization of national legislation with EU legislation in the field of energy efficiency, cooperation with international institutions and programs related to the energy efficiency and performs other tasks related to the energy efficiency that are within its jurisdiction.

#### **4.4.1.3 Directorate for Mining and Geological Research**

The Directorate for Mining and Geological Research performs tasks which are related to: development of strategies, programs and projects in the field of mining and geological research and monitoring of their implementation; development of draft articles and proposals on laws and other regulations in the field of mining and geological research; participation in preparation and giving opinions on drafts and proposals of laws and other regulations which are prepared by other bodies; giving expert instructions, opinions and interpretations, making decisions in administrative matters and matters of administrative supervision, issuing licenses for development of projects and the carrying out geological researches and studies on completed geological explorations; the conduct a second instance administrative procedures, supervision over the implementation of laws and regulations in the mining and geological exploration; exercise control and supervision of businesses that are engaged in mining and geological research and taking appropriate measures and actions, studies natural resources and proposes measures to ensure optimum conditions for their exploration and exploitation, establishing programs on geological researches that are of importance for Montenegro, monitoring, analysing and assessing the situation in the mining and geological research, monitoring and study of economic conditions and economic position of economic entities in

the mining and geological exploration; making information, reports, etc.; harmonization of national legislation with EU legislation in the field of mining and geological research; international and regional cooperation in the field of mining and geological research; supervision over the institutions of its department where the administrative control is conducted by the Ministry and which are entrusted with public authorities; cooperation with NGO`s, enforcement of laws and regulations, inspection and supervision in the field of mining and geological research, preparation of tender documents for procurement activities within the jurisdiction of the sector and other activities in accordance with the regulations.



**Figure 4-1: Organizational chart of Ministry of Economy with special focus on energy related directorates**

### 4.4.2 Energy Regulatory Agency (ERA)

The Energy Regulatory Agency (ERA) was established on 22<sup>nd</sup> January 2004 according to the Energy Law as an autonomous, non-profit organization, functionally independent from the state authorities and energy undertakings, that performs public authorizations in the energy sector.

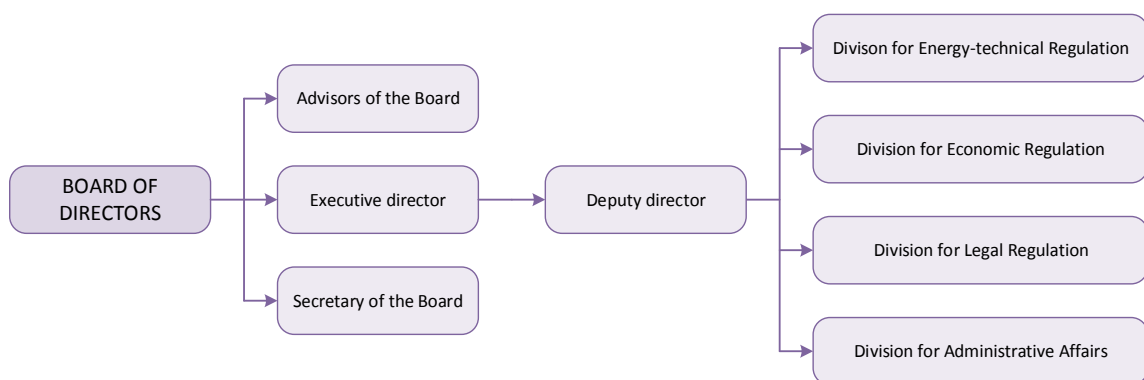
The Board consists of three members nominated by the Parliament of Montenegro for the term of five years with a possibility of one reappointment, and the director nominated by the Board after obtaining the opinion of the Government of Montenegro.

The Agency’s operation is carried out through the following professional divisions (Figure 4-2):

- Energy-technical regulation division,
- Economic regulation division,
- Legal regulation division,
- Administrative affairs division.

By definition of the Law on Energy, the authorities of ERA include:

- Licensing subjects for performing energy related activities
- Issuing a guarantee of origin for energy produced by renewable energy sources of high efficiency cogeneration
- Determining the status of a privileged producer of electricity from renewable energy sources
- Approval or determining regulatory allowed revenue, prices and tariffs for energy subjects
- Dispute resolution and decision about objections and complaints
- Resolution of disputes arising from contractual relations
- Determining regulation from Agency authority, as well as approval of regulation determined by energy subjects
- Monitoring of business and operation of energy subjects during they are performing licensed activities.



**Figure 4-2: Organizational chart of ERA**

#### Licensing subjects for performing energy related activities

Within this authority, ERA:

- Adopts rules regarding manner and closer terms for issuing, changing and revoking of licenses
- Issues, changes and revokes licenses
- Monitors operation and business of energy subjects regarding fulfilling the terms defined by the license

- Adopts annual decisions regarding determining of annual compensation for licenses
- Maintains a register of data regarding issued and revoked licenses.

### **Issuing a guarantee of origin for energy produced by renewable energy sources of high efficiency cogeneration**

Within this authority, ERA:

- Issues a guarantee of origin
- Proceeds according to the mandate for transfer and revocation of a guarantee of origin
- Determines the content and the manner of maintaining the registry of guarantees of origin.

### **Determining the status of a privileged producer of electricity from renewable energy sources**

Within this authority, ERA:

- Determines the status of a privileged producer
- Decides about termination of the status of a privileged producer
- Determines the content and the manner of maintaining the registry of privileged producers.

### **Approval or determining regulatory allowed revenue, prices and tariffs for energy subjects**

An important role of ERA regarding electricity price regulation is a consequence of the authority to determine the regulation framework for this aspect of regulation, i.e.:

- Methodology for determining the prices and conditions for:
  - ◆ Using systems for transmission and distribution of electricity
  - ◆ Providing of ancillary services and services of transmission system balancing
- Methodology for determining the prices for using transmission and distribution system paid by users of a direct line in the case when the direct line is connected to the transmission or distribution system
- Methodology for setting of regulatory allowed revenue and charge for work of electricity market operator
- Methodology determining the prices for final customers supplied by the supplier of the last resort (electricity or gas supplier, chosen in a transparent process, providing the public service of electricity or gas supply at separately regulated terms and conditions) and customers (customers which need health and social care, e.g. disabled persons, persons with special need, etc.)
- Rules for tariffs changing on demand of energy subject or ERA initiative
- Rules for settlement of the differences between reasonable and actual revenues and costs between distribution system operators

By the Law on Energy, ERA has the authority to approve:

- Regulated tariffs for electricity supply of tariff customers and tariffs for electricity supply of qualified customers supplied by the supplier of the last resort, which can be offered to qualified customers by other suppliers
- Tariffs applied by the supplier of the last resort
- Compensation for operation of Electricity Market Operator.

### **Dispute resolution and decision about objections and complaints**

ERA decides about complaints regarding:



- Decision of transmission or distribution system operator regarding denial of connection to the transmission or distribution system
- Terms stated within the issued approval for grid connection
- Billing of the electricity consumption in the case of unauthorized electricity consumption;
- Electricity supply termination for end customers.

The ERA also has the authority to resolve disputes between energy subjects, or energy subjects and their customers, arising from their contractual obligations (by the Law on Energy), if the contracted parties agree with that.

### **Determining regulation from Agency authority, as well as approval of regulation determined by energy subjects**

Beside the mentioned regulation, ERA determines the following rules for:

- Resolving disputes through arbitration
- Operation of the supplier of the last resort
- Terms for issuing approvals basing on which producers and suppliers of electricity may supply qualified customers over a direct line
- Terms and procedure for changing electricity suppliers of qualified customers
- Maintaining privacy of commercially sensitive information used by system operators

ERA determines the minimum supply quality, which specially includes:

- Service quality, especially in terms of the period needed by transmission or distribution system operators to perform connections and maintenance activities
- Electricity supply continuity
- Voltage wave form quality

ERA approves the regulation adopted by energy subjects, i.e.:

- Methodologies for:
  - ◆ determining prices, deadlines and conditions for connection to transmission and distribution system
  - ◆ billing and collection of unauthorized electricity consumption
  - ◆ determining tariffs for the supplier of the last resort
- Rules for:
  - ◆ Transmission system operation
  - ◆ Distribution system operation
  - ◆ Electricity metering in distribution systems
  - ◆ Application of transparent procedures for management and allocation of transmission capacity basing on the electricity market principles
  - ◆ Allocation of cross-border capacities in line with the correlated rules at the regional level.

ERA approves:

- General electricity supply rules,
- Electricity market rules.

ERA issues an approval on:

- Ten-year plan for development of transmission system
- Annual investment plan of electricity system operators
- Ten-year plan for development of distribution system, which is in line with the plan for transmission system development

The activities of ERA include approval of:

- program, i.e. dynamics of changing electricity meters owned by other legal and natural persons, as well as their relocation when it is needed;
- program of measures for application of non-discriminatory terms for access to transmission and distribution systems
- exceptions regarding application of defined conditions, terms and prices for using new infrastructure

### **Monitoring of business and operation of energy subjects while they are performing licensed activities**

Within this activity, ERA monitors and analyses operation and business of licensed subjects regarding:

- actual costs and revenues of subjects which perform activity for which the ERA defines or approves prices and tariffs;
- quality of electricity supply, which includes service quality, supply continuity and voltage quality;
- application of market rules and activity of subjects on the market, which includes competitiveness and protection of rights of end customers;
- electricity consumption;
- execution of incentives in the area of renewable energy sources, including conditions and prices for connection of new producers on transmission and distribution systems;
- application of regulation regarding cross-border electricity exchange, as well as operation and business of subjects that perform capacity allocation through auctions or organize electricity trading;
- application of regulation regarding publishing of the data about cross-border capacities and transmission and distribution system using;
- unbundling of transmission and distribution system operator's activities and application of program of measures for non-discriminatory terms usage for system access managed by transmission or distribution system operator;
- Activities and measures implemented by energy subjects in order to improve energy efficiency, and fulfilling the terms defined by the license.

#### **4.4.3 Montenegrin Electricity Market Operator (COTEE)**

The establishment of Montenegrin Electricity Market Operator (COTEE) is defined by the Law on Energy from 2010. This Montenegrin Electricity Market Operator was thereby established by Government Decision in December 2010, as a new, legal, energy sector entity responsible for Montenegrin electricity market organization and management.

Crnogorski operator tržišta električne energije (COTEE) was registered on 29<sup>th</sup> July 2011 at Commercial Court of Montenegro. The Energy Regulatory Agency issued the permit for activity of Electricity Market Operator for COTEE on 23<sup>rd</sup> December 2011. The first test scheduling was performed by COTEE on 1<sup>st</sup> August 2013. After two months of test operation, COTEE started with regular preparation of schedules and took over the Montenegrin electricity market management by using software providing integral synchronization of information systems of users obligated to prepare daily operation schedules with hourly resolution. At the same time the necessary assumptions for establishment of balancing system in Montenegrin electricity sector have been met.

The electricity Market Operator is a legal entity responsible for organizing and management of the electricity market in Montenegro, which represents the fundamental activity of public interest, which is performed according to the Law on Energy (14<sup>th</sup> January 2016), License, Market rules and international regulation.

#### **Rights, Duties and Responsibilities of Market Operator**

According to the Law on Energy, the Market Operator shall perform the following activities:

- organize and manage the electricity market
- keep records on all the contracts signed in the electricity market in accordance with the Market Rules
- account volume imbalance of electricity in-take and delivery relative to operating schedules, and account and control of a financial settlement of imbalance
- publish on its web page all the information required for undisturbed market operation and for carrying out of energy activities pursuant to this law

- maintain records on suppliers and final customers, including their mutual obligations;
- regulate in the Market Rules the rules and procedures on electricity purchase and sale
- define standard contracts referred to in the following paragraph and submit them to the Agency for approval,
- following obtaining the previously mentioned approval, the Market Operator shall sign the following standard contracts:
  - ◆ Contract on participation in electricity market
  - ◆ Contract on financial settlement of balancing account
  - ◆ Contract on balance responsibility
  - ◆ Contract on electricity purchase from privileged customers
  - ◆ Contract on purchase and sale of a mandatory proportional share of electricity purchased from privileged producers, and
  - ◆ Contract on membership in the balancing market
- sign contracts on electricity purchase with privileged producers entitled to the support of the Law on Energy
- sign contracts with suppliers and self-suppliers on the purchase and sale of a mandatory proportional share of electricity generated in facilities of privileged producers
- provide to suppliers and self-suppliers daily plans on supply of a corresponding portion of electricity generated in facilities of privileged producers
- collect money from suppliers and self-suppliers for electricity generated in facilities of privileged producers
- calculation of funds referred to in the previous paragraph which are used for promoting electricity generation from renewable energy sources and high-efficient cogeneration, allocating them to producers of electricity from renewable energy sources and high-efficient cogeneration on the basis of contracts concluded
- calculation of funds collected from other sources so as to promote generation of electricity from renewable energy sources and high-efficient cogeneration on the basis of the decision made by the Government, allocating them to producers of electricity from renewable energy sources and high-efficient cogeneration on the basis of contracts concluded
- provide an opinion about the rules for implementation of transparent procedures for managing congestion and allocation of cross-border capacities for transmission of electricity based on article 112, paragraph (1), clause 19) of the Law on Energy

In addition, Market Operator activities include:

- Supplier and self-supplier shall provide bank guarantee when signing contracts with Market Operator, payable at first call without rights to objection, or some other security to be provided to the benefit of the Market Operator
- The Market Operator shall keep records on signed bilateral contracts, including cross-border bilateral contracts
- The Market Rules shall regulate the manner and time frame for registering and recording of bilateral contracts
- Bilateral agreements shall be additionally registered with the Market Operator in terms of their daily volume and time frame, at least once a day for a day-ahead, through registration of a daily operating schedule
- As regards providing the service of registering bilateral agreements, the Market Operator may collect the charge defined in the price list approved by the Agency
- Bilateral agreements shall be additionally recorded with the Market Operator in terms of their daily volume and time frame, at least once a day for a day-ahead through registration of a daily operation schedule
- Energy undertaking shall ensure that the Market Operator has a continuous and unrestricted access to data which are necessary for performing Market Operator's activity

The Market Rules and the Rules for Operation of the Electricity Balancing Market (which are defined by Market Operator) regulate the manner and functioning of the electricity market.

The Market Rules and the Rules for Operation of the Electricity Balancing Market are published in the Official Gazette of Montenegro after obtaining an approval from the Agency.

#### **4.4.4 Ministry for Tourism and Sustainable Development (MSDT)**

The Ministry of Sustainable Development and Tourism of Montenegro (MSDT) is a ministry with a large number of sectors, which are responsible for the legal framework of spatial planning, environmental protection and sustainable development. The Ministry of Sustainable Development and Tourism gives opinions on drafts and approves the proposals of local planning documents, according to the Law on Spatial Planning and Construction ("Official Gazette of Montenegro", no. 51/08, 40/10, 34/11 and 47/11), which prescribes the procedure for drafting and adopting local planning documents. Also, the Ministry is the bearer of preparatory works when it comes to procedures in regard with development and adoption of state planning documents. In accordance with this Law, the Ministry issues urban-planning conditions and building permits. Monitoring of the environment is the responsibility of EPA, over which the Ministry has administrative control. Environmental and other inspections that are under the jurisdiction of the Ministry have been moved to the Directorate for Inspection Affairs, and after its establishment MSDT became responsible for the implementation of the National Strategy for Sustainable Development (NSSD).

The organizational units of MSDT which most affect the development of renewable energy projects are:

##### **4.4.4.1 Directorate for Spatial Planning**

The Directorate for Spatial Planning performs tasks related to: preparation of policies, strategies, projects and programs in the field of arrangement and management of space and spatial development, as well as monitoring and taking measures for their implementation; participation in the harmonization of national legislation with EU legislation in the field of spatial planning; integrated planning and management of space; drafting and proposing laws and other regulations in the field of spatial planning and marine resources; participation in preparing and giving opinion on regulations prepared by other bodies; supervision over the legality of acts and legality of the work of the local authorities and other entities entrusted with public authority; giving expert instructions, opinions and interpretations; making decisions in administrative matters and matters of administrative supervision; monitoring the state of the spatial circumstances (monitoring); keeping documentation base about space; preparation and submission of reports on spatial planning; data preparation, analysis and display of changes in space with the state assessment; analysis of implementation of state planning documents; the development and adoption of state planning documents; giving opinions and approvals on local planning documents; preparation and adoption of plans of temporary facilities in the area of special purpose spatial plan; the development and adoption of local planning documents by the Government of Montenegro; issuance of state planning document; issuance of the urban-technical conditions necessary for the development of technical documentation and their publication; issuance, revocation of licenses and certification for the preparation of planning documents; conduct second instance administrative proceedings; monitoring and improving the work of business entities engaged in the activity planning; monitoring and improving the human resources potential in this area; follow international best practices in the Directorate and accordingly proposing measures; cooperation with educational institutions and professional associations in the direction of improving the work in this sector; collection and analysis of data relevant for space with administrative bodies and organizations and institutions at national and local level; Monitoring spatial development of local self-government and individual activities within it; system planning of marine resources; analysing and assessing the state of marine resources and proposing measures; promotional activities in order to implement planning and other documents; participation in international cooperation financial instrument (IPA funds and instruments), projects and programs in the field of spatial planning and spatial development and EU integration; monitoring and implementation of international conventions through the preparation and adoption of strategies, laws and regulations in this field; supervision of the

institutions within its jurisdiction; harmonization of national legislation with EU legislation in the field of the Directorate; enforcement of laws and other regulations; control over the implementation of laws and other regulations in the area of spatial development; establishing cooperation with NGOs and other civil society organizations; monitoring and improving the human resources potential in this authorities; follow international best practices in the Directorate and in accordance with the proposal of measures; cooperation with educational institutions and professional associations in the direction of improving the work in this sector; promoting the activities of the Directorate; development of information, reports and other tasks in accordance with the regulations; cooperation with consulting entities; keeping a register of licenses; participation in international and regional cooperation in the field of spatial development; participation in the preparation of the budget proposal; participation in the preparation of tender documents from the scope of responsibility; coordination with the Office of Human Resources; initiation and participation in international and regional cooperation, cooperation with international organizations and participation in the preparation and implementation of international treaties and bilateral agreements from the scope of the Directorate; supervision over the legality of acts and legality of the work of the local authorities and other entities entrusted with public authority; preparation of responses to review the constitutionality and legality of laws, other regulations and general acts; preparation of lawsuits and responses to complaints; participation in the debates at the Constitutional and Administrative Court of Montenegro in the cases in these areas; preparing the foundation for the drafting and conclusion of bilateral, regional and multilateral agreements in the field of spatial planning and coordination of the participation of other representatives of the Directorate in the preparation and conclusion of bilateral, regional and multilateral agreements in the field of spatial production of information, conducting analysis and research on issues of strategic the importance of the activities within the competence development strategies, programs and projects in the field of construction land and monitoring their implementation; making information reports; monitoring legislation in the field of equipping the construction land and construction of infrastructure facilities, to make proposals for the adoption of the Montenegrin methodologies and standards in the field of equipping the construction land; monitoring of municipal regulations in the area of building land, fees for municipal construction land, especially directed towards sustainable solutions; improving the business environment; follow international best practices in the field of financing of infrastructure equipment and accordingly proposing measures; international and regional cooperation in the field of construction land; giving opinions on drafts and proposals of laws and regulations prepared by other bodies; communication with the Directorate for EU Integration and International Cooperation; participation in the preparation of tender documents for procurement within the competence of the Directorate; participation in the preparation and management of projects and programs of the European Structural Funds (IPA, funds and instruments); Preparation and submission of data to manage and update the site, promoting activities within the competence of the Directorate; other activities in line with regulations.

#### **4.4.4.2 Directorate for Construction**

The Directorate for Construction performs tasks related to: managing development and strategic policies in the field of construction, as well as monitoring and taking measures for their implementation; improving the business climate in the construction sector; participation in the harmonization of national legislation with EU legislation in the field of construction; improving aseismic design and construction; development of strategies, programs and projects in the field of building construction and monitoring their implementation; drafting and proposing laws and other regulations from the field of building construction and building products; participation in preparing and giving opinions on drafts and proposals of laws and other regulations prepared by other bodies; make proposals for the adoption of Montenegrin standards in the field of civil engineering; monitor the process of accession to the EU; harmonization of national legislation with EU legislation in the field of construction; making decisions in administrative matters and matters of administrative supervision; the issuance, verification, cancellation of licenses and revocation of the licenses for the preparation of technical documentation and construction of facilities; supervision over the legality of acts and

legality of the work of the local authorities and other entities entrusted with public authority; giving expert instructions, opinions and interpretations; preparation of responses to review the constitutionality and legality of laws, other regulations and general acts; preparation of lawsuits and responses to complaints; participation in the debates at the Constitutional and Administrative Court of Montenegro in the cases in these areas; conduct second instance administrative proceedings; enforcement of laws and other regulations in the field of building construction; control over the implementation of laws and other regulations in the field of building construction; monitoring and analysing economic conditions and economic position of economic entities in the field of building construction and proposing measures of current development policy and analysing their impact on the economic situation of economic operators in this field; monitoring and analysis of the quality of services in the construction industry; monitoring and improving the human resources potential in this area; cooperation with educational institutions and professional associations in the direction of improving the work in this sector; follow international best practices in the sector and accordingly proposing measures; monitoring the application of new technologies and best practices in the field of civil engineering, especially directed towards the EKO solutions; issuance of urban-technical conditions; issuance of construction and use permits, as well as solutions for technical inspections of objects; cooperation with other institutions involved in the issuance of urban-technical conditions, construction and use permits; international and regional cooperation in the field of building construction; supervision of the institutions within its jurisdiction; establishing cooperation with NGOs and other civil society organizations; preparation and submission of data to manage and update the web site, promoting the activities of the sector; keeping and updating a register of licenses; participation in the preparation of tender documents for procurement within the competence of the Directorate; preparation of information, reports and other tasks in accordance with the regulations; preparation and management of projects and programs in the field of building construction; preparation and management of projects and programs of the European Structural Funds (IPA, funds and instruments); participation in international and regional cooperation in the field of building construction in communication and coordination with the Directorate for European Integration and International Cooperation; realization of cooperation with other organizational units, in order to collect and consolidate data available to the Ministry; communication and coordination with the Directorate for International Cooperation and Sustainable Development.

#### **4.4.4.3 Directorate for Environment**

The Directorate for Environment performs tasks related to: policy and system protection and improvement of the environment (air, land, sea, flora and fauna in the totality of interactions); developing strategies and other development documents, programs and projects in the field of the environment; participation in the harmonization of national legislation with EU legislation in the field of the environment; participation in the negotiation process for accession to the EU in the framework of the Negotiation Chapter 27 - Environment and climate change, proposing the system of measures for the implementation of strategic documents, plans and programs in the environmental field; analysis and assessment of the environmental situation; giving opinion on regulations prepared by other bodies; ensuring the monitoring of air, land, water and marine systems, and ensuring implementation of measures to prevent the pollution of air, soil, water and the marine environment in particular through the construction of an integrated approach to environmental protection and integration of the environment into sectoral policies; monitoring and improving the human resources potential in this area; follow international best practices in the field of environment and accordingly proposing measures; cooperation with educational institutions and professional associations in the direction of improving the work in this sector; giving explanations, professional instructions for work and provision of expert assistance in the field of environmental protection; supervision over the legality and efficiency of work of the institutions over which the administrative control is performed by the Ministry; preparation and submission of data for managing and updating the website, promotion activities and sectors; establishing cooperation with NGOs and other civil society organizations; monitoring and improving the human resources potential in this area; promoting the activities of the Directorate; development of information, reports and other tasks in accordance with the regulations; development of information, reports and other tasks

in accordance with the regulations; supervision over the legality of acts and legality of the work of the local authorities and other entities entrusted with public authority; giving expert instructions, opinions and interpretations; preparation of responses to review the constitutionality and legality of laws, other regulations and general acts; preparation of lawsuits and responses to complaints; participation in the debates at the Constitutional and Administrative Court of Montenegro in the cases in these areas; cooperation with the Directorate for European Integration and International Cooperation; participation in the preparation of the budget proposal; participation in the preparation of tender documents from the scope of responsibility; coordination with the Office of Human Resources; Preparation and submission of data to manage and update the site; IPA projects and European integration; defines strategic guidelines for sustainable development through the concept of the green economy, performance analysis and research on issues of strategic importance to the activities within the competence of the Directorate and other tasks in accordance with regulations.



Figure 4-3: Organizational chart of the Ministry for Tourism and Sustainable Development



#### 4.4.5 Environmental Protection Agency (EPA)

The Environmental Protection Agency (EPA) was established on 12<sup>th</sup> November 2008. The EPA is an independent body and the operative implementation authority of the Law on Environmental Protection. It has taken over parts of the affairs and employees of the Ministry of Sustainable Development and Tourism and the Ministry of Health, Labour and Social Welfare and has also replaced the Institute for Nature Protection.

EPA performs expert and management activities regarding environmental protection:

- Environmental monitoring
- Preparation of analyses and reports
- Issuing permits
- Establishing communication and cooperation with domestic and international organizations and authorities (European Environmental Agency, International Atomic Energy Agency and other organizations dealing with environmental issues) and
- Performing other tasks defined by Law on Environment.

The main goals of EPA are:

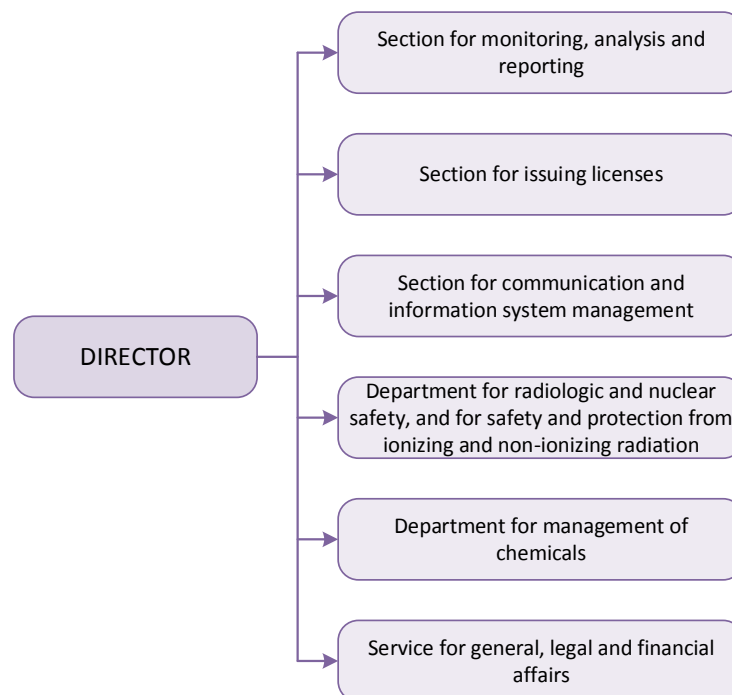
- Protection and improvement of environment in Montenegro as the basic goal of sustainable development
- Performing transparent and responsible implementation of regulation regarding environmental protection and
- Enabling timely and reliable informing of the public, national and international environmental organizations regarding the state of environment in Montenegro.

The EPA comprises of the following section units (Figure 4-4):

- Section for Monitoring, Analysis and Reporting which administers and oversees an environmental monitoring programme subdivided into six components:
  - ◆ Air Quality Monitoring Programme
  - ◆ Programme for monitoring the contents of hazardous and harmful substances in soil
  - ◆ Programme of systematic investigation of radioactivity in the environment
  - ◆ Programme for monitoring coastal sea ecosystems
  - ◆ Biodiversity monitoring programme
  - ◆ Environmental noise monitoring programme.
- Section for issuing licenses that includes for transboundary movement of hazardous and non-hazardous waste, issuing environmental consents on EIA and SEA , for import and trade of ionizing radiation sources, x-rays and linear accelerators and for import of radioactive materials and spare parts.
- Section for Communication and Information System Management which regularly liaises with NGOs dealing with environmental issues, updates its own website and information on the state of the environment, compiles databases on the licensing and environmental consents issued as a first step to implementation of the Aarhus Convention and has started work on a GIS programme.
- Department for Radiologic and Nuclear Safety, and for Safety and Protection from ionizing and non-ionizing Radiation performs tasks related to: the systematic testing of the radionuclide content in the environment (monitoring); analysis and reports on the state of radioactivity in the environment; collection and disclosure of information of interest to the life environment and human health; maintenance of the information system on the state of radioactivity in the environment etc.; issuance and revocation of licenses for the use of electromagnetic fields; issuance and revocation of licenses for

professional activities for protection against non-ionizing radiation; issuance and revocation of licenses for professional training of persons responsible for carrying out measures for protection against non-ionizing radiation; create a professional basis Programme of systematic testing of non-ionizing radiation level; preparation of information on the implementation of the program monitoring; keeping a register of non-ionizing radiation; monitoring the adoption and implementation of regulations, recommendations and directives of the EU in the field of licensing for protection against non-ionizing radiation and the preparation of reports and information from the scope of those activities.

- Department for Management of Chemicals performs tasks related to: the classification, packaging and labelling of chemicals; authorization for the use of alternative chemical name; assessment of the safety of chemicals; issuing licenses for import, export and transit of chemicals etc.



**Figure 4-4: Organizational chart of EPA Montenegro**

The EPA outsources monitoring to the following organizations:

- Centre for Eco-Toxicological Testing for Montenegro which is responsible for:
- ◆ Air quality monitoring
  - ◆ Monitoring hazardous and harmful substances in soil
  - ◆ Monitoring environmental radionuclides with a sub program to develop a Radon Map of Montenegro
  - ◆ Monitoring coastal sea ecosystems
- Nature Protection Institute (which is absorbed into the EPA) is responsible for monitoring biodiversity

The Public Institute for Development and Research in Occupational Health and Safety is responsible for environmental noise monitoring.

#### 4.4.6 Ministry for Agriculture and Rural Development

The Ministry for Agriculture and Rural Development has the authority on the use of water resources, and therefore impacts RES projects with the aim to use hydropower potential. The organizational unit within the Ministry that has the authority on the use of water resources is the Directorate for Water Economy. Its activities are:

→ Performs tasks of the Ministry relating to current and development policy in the field of water, follows the normative activities at national level, the development of EU legislation and works on the harmonization of Montenegrin legislation and system to EU legislation; supervising Water Management in accordance with the competence of the Ministry; water management and water land management of importance for Montenegro. The preparation of regulations governing the management of water and water land, and provides a general framework for water; proposing plans of water management: manages water-information system that provides preparation, maintenance, presentation and distribution of data on the state of water quality, categories and classes of surface water and groundwater, legislative, organizational, strategic and planning measures in the field of water management, scientific-technical data and other information of importance for water management, as well as the exchange of information on national and international level; proposes annual development programs to improve the quality of life in rural areas, for example: Program for encouraging projects in water management and Program for using funds for water resource management; supervises the work of the organizational units within the Water Management.

→ Directorate for Water Economy operates through 2 divisions:

Division for programming and development - Prepares, participates in the preparation or coordinates the development of strategic planning documents that are relevant to water management; proposes their implementation through the preparation of strategic development documents; follows the EU legislation and international standards regarding water management; proposes the adoption of laws and regulations governing water management; follows the modern achievements in the field of water management, implements the procedure for granting and revoking the right to use water resources; conducts the procedure of supervising the legality of administrative acts and proposes measures of supervision over legality and effectiveness of the competent authorities in other subject areas; cooperates with the European Union and other international organizations, agencies and companies that provide international support to Montenegro in the water management field.

Division for monitoring of water economy - Follows activities regarding water management planning; monitors activities related to water use, water protection, protection from adverse effects of water; adopts planning documents that serve as a professional basis for establishing policy and strategy of water resources development, helps in preparation of the planning development documents, prepares reports, information and other documents, which are of importance for the sector of water management.

Beside the mentioned Directorate, water resources are also managed through an independent organizational unit under the control of Ministry - Water Management. It consists of:

Section for water use, water protection and protection of water - Performs the tasks of the Water Management relating to: the provision of water, materials from watercourses, water land and water management facilities owned by the state, through concessions, transfer rights to use, lease or in any other prescribed manner as the preparation of documentation basis in this regard; maintenance of facilities for the protection and

defence against floods, erosion and other hazards; participation in development of plans, programs and balance in water management and in the preparation of terms of reference and the basis for drafting water management plan; conduct of investment activities; professional supervision and quality control of the works performed; technical inspection and acceptance of works; calculation of fees for the use of gravel and sand, providing for specific and rational use of the collected funds; ensuring the implementation of plans and programs in the field of water management; preparation of documentation to determine the source of the regional water supply and the water supply of cities, and for determining the sanitary protection zones of these sources if they are not brought to the purpose or use; preparation of documents for the issuance of water conditions, water approvals and water permit; preparing documents for the declaration of erosion areas in order to protect commercial traffic and other structures; ensuring the improvement of the water regime in watercourses and participation in the preparation of documents in this regard; rational use of water, water protection and protection of water; organizing and managing water information systems; preparation of expert basis for drafting legislation and participation in their development in water management; participation in development studies, technical solutions and investment-technical documentation; providing technical assistance to agencies and organizations in the field of water management, as well as the other activities in accordance with the regulations.

Division for management affairs in the area of water management - Performs tasks related to: preparation and implementation of public tender for the provision of water use, materials from watercourses, water land and water management facilities owned by the state through concessions, transfer rights to use, lease or in any other prescribed manner; establishing the conditions for the entry of water acts in the appropriate register; tracking the expiry date of these documents and verify timely submitted requests for the extension of water acts, determining water charges; participation in organizing and conducting public hearings on the plans and programs of water management; participation in the preparation of expert basis for drafting legislation and participation in their development in water management; cooperation with bodies and institutions responsible for combating illegal activities in the use of water and water resources; cooperation with other state bodies and organizations in order to enable correct and consistent implementation of regulations in the area governed by the Law on Waters; as well as other tasks in accordance with regulations.

#### **4.4.7 Ministry of Transport and Maritime Affairs**

Since RES projects may have an impact on the transport infrastructure (roads, railroads and air traffic) there is a need for approvals from Ministry of Transport and Maritime Affairs, i.e. from the corresponding organizational units within the ministry, during the preparation of the project design documentation and construction. These organizational units are:

- Division for Traffic - Division for issuing permits and approvals - perform the tasks of issuing approvals for: connecting access roads, connection of local and unclassified roads and streets in settlements on state roads, installation of pipelines, plumbing, electrical and telephone lines and other lines along the state roads, installation of overhead and cable lines and low voltage power lines for lighting of the intersection of state roads with railway and other facilities; issuing permits for special transport, excavations, undermining and other works on state roads; authorization for: posting signs and advertisements on state roads and next to them, the authorization for the construction of parking lots, gas stations and other commercial facilities next to public roads; approvals for the design of the state roads connections and the approval for the prepared technical documentation, approval for the design of bus stops and licensing of bus stops built on state roads; approvals for land lease of state roads, approval for the development, construction, reconstruction, maintenance, protection, use and management of municipal roads in the grip of special purpose areas (national parks,

etc.) to the competent authority of local governments, publishing and other approvals and consents in accordance with the regulations; adoption of the plan for emergency treatment in the event of traffic disruptions due to natural disasters on public roads and other appropriate activities.

- Division for Railroads - among other activities (that do not impact RES project development), organizes expert and quality control of the projects regarding safety of railway transport; issuance of licenses, certificates, permits, consents and approvals from the jurisdiction of the Directorate and keeping the corresponding records.
- Directorate for Air Traffic - among other activities (that do not impact RES project development), issues approvals for project that can impact the air traffic safety.
- Directorate for Maritime Transport - among other activities (that do not impact RES project development), through organizational units Port of Bar and Port of Kotor, issues approvals for project that can impact the maritime traffic safety.

#### **4.4.8 Ministry of Culture**

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The Ministry of Culture has an impact on those RES project whose construction site is near the location of Montenegrin cultural heritage objects. The organizational unit within the Ministry of Culture which deals with the protection of cultural heritage is Directorate for cultural heritage. However, the organizational unit under the jurisdiction of Directorate, i.e. Management of Cultural Heritage Protection Affairs has the direct impact on RES project development through the issuing approval for geological exploration works near the cultural heritage sites and approval necessary for construction permit issuing procedure (confirming that there is no negative impact on cultural heritage objects). The section within Management of Cultural Heritage Protection Affairs that issues the mentioned approvals is the Section for implementation of measures for cultural heritage protection.

#### **4.4.9 Ministry of the Interior**

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In general, the Ministry of the Interior does not have an impact on RES project development. However, RES projects realization, as for all other projects, is followed by the need for satisfying certain safety requirements. The safety requirements regarding fire safety are treated through the elaborate for fire protection which is a standard part of project design documentation. The approval of this elaborate is issued by Directorate for emergency situation - Sector for inspection and monitoring. This sector also has a role in periodic inspections of the state of fire protection system of the RES project objects during RES plant operation.

#### **4.4.10 Local Municipalities**

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There are 23 municipalities in Montenegro (Figure 4-5). With respect to the RES projects, they cover spatial planning and urban development issues (adopting local plans and strategic documents), as well as issuing of the necessary permits for the RES projects construction, and in enforcing the laws through inspecting construction sites. In the case of large scale RES projects (installed capacity >1 MW or >35 kV in case of electricity grid infrastructure), the major part of the issuing of the necessary permits is undertaken by institutions of the central government (ministries with their departments), but in the case of small scale RES projects (installed capacity <1 MW or <35 kV in case of electricity grid infrastructure), the role of the local municipalities is more emphasized. According to the Law, municipalities are also in charge of preparing and implementing local energy efficiency programmes and plans.



**Figure 4-5: Municipalities of Montenegro**

#### 4.4.11 Institute of Hydrometeorology and Seismology of Montenegro

The activities of Institute for Hydrometeorology and Seismology (HMZ) that are of interest for RES project development are defined by the Law on Hydro Meteorological Affairs. In general, these activities include systematic monitoring, research and forecasting of weather and climate, sea, air quality and water flows. These activities are performed through the network of monitoring stations distributed throughout Montenegro. The activities of HMZ that directly impact the development of RES projects that rely on hydro energy potential are:

- ➔ Monitoring of the state and regime of water flows, research of water resources and their changes
- ➔ Research, development and calibration of hydrological models and models for forecasting of water flows and water quality

- Analysis of spatial and weather characteristics of hydrological elements
- Development of hydrological base studies, analyses and requirements for spatial planning, design, construction and exploitation of large investment objects in accordance with the Law

Therefore, HMZ is a valuable partner in development of RES projects related to hydro potential usage since HMZ can provide the necessary base data regarding water resources for feasibility studies.

#### 4.4.12 Other Institutions

In some case other institutions may also be a significant stakeholder in the process of realization of RES projects. These institutions are:

- JP Morsko Dobro (Public Enterprise for Coastal Zone Management) – (MD) has been operational since 1992 and has three offices; Budva the headquarter, Herceg Novi and Ulcinj. MD has a staff of 44 persons spread between six departments: i) control, ii) rental space, iii) economy/finance, iv) sustainable development, v) spatial planning and construction, and vi) legal issues and administration. MD is responsible for monitoring bathing water quality along the beaches of the Montenegrin coastline. This data is provided to the EPA.
- Institute for Marine Biology was established in 1961 and has been attached to the University of Montenegro since 2004. The main goal of the IMB is to provide research on animals and plants in the Southern Adriatic Sea and their relationships and interactions with marine and littoral ecosystems. IMB has a staff of 37 and is split into five laboratories: i) General Biology and Marine Conservation, ii) Ichthyology and Marine Fisheries, iii) Neurophysiology and eco-physiology, iv) Chemistry, Bio-Chemistry and Molecular Biology, and v) Research Development and Mariculture. Monitoring data concerning sea water quality (physical-chemical parameters and heavy metals) is sent on a regular basis to EPA.
- The NGO community in Montenegro is quite extensive for the size of the country and very well organized. Some of the main actors include the organizations Green Home, OZON and Priroda. The NGOs are well supported by international organizations, for example Green Home cooperates with: WWF Mediterranean Program and funding is received from a number of embassies and other multi-lateral organizations.
- Statistical Office of Montenegro (MONSTAT) is competent body for the production of official statistics and is recognized nationally and internationally as a provider of official statistics in Montenegro's statistical system. As the statistical leader, MONSTAT is obliged to collect data and to process and disseminate statistics, performed in an independent, professional, transparent and highly expert manner. It relies on contemporary European trends related to the production of statistics (supreme European statistics body Eurostat). MONSTAT performs jobs related to: organization and conducting of statistical surveys; collection, procession, statistical analysis and publishing of statistical data, development, updating and usage of state level registers determined by law in cooperation with public administration body competent for information society; making of methodologies for statistical surveys; preparation of programs of statistical surveys; cooperation and coordination in preparation of program of statistical surveys with bodies and organizations competent for conducting statistical surveys, harmonization and implementation of uniform methodological solutions; making of publications, application of statistical standard, development of statistical informational system in cooperation with public administration body competent for information society; training for employees related to statistical information; control of accuracy of responding units data as well as other jobs related to its competency.

## 4.5 DETAILED DESCRIPTION OF KEY MARKET PARTICIPANTS

### 4.5.1 Montenegrin Power Company JS (EPCG)

The Montenegrin Power Company JS Niksic (EPCG) was established on 16<sup>th</sup> October, 1998. The company is controlled by the State (57.02 % of the shares) and the Italian A2A (41.75 % of the shares). EPCG performs the following electric power activities, as prescribed by the Energy Law, licenses in the energy sector and by its Statute:

- Generation of electricity
- Distribution of electricity
- Supply of electricity to customer
- Sale and purchase of electricity
- Energy management (import / export)
- Distribution network operator
- Construction and maintenance of power facilities
- Design and supervision

In respect of organization of the Company, the Company consists of three functional units (FU's):

- FU Electricity Generation (production)
- FU Electricity Supply
- FU Electricity Distribution (Distribution System Operator - DSO).  
(0.4 kV, 10 kV and 35 kV)

The Company is represented by the President of the Board of Directors and the Executive Director, each within the limits of their competence determined by the Statute and the decisions of the Board of Directors.

The Company's corporate bodies are:

- the Shareholders' Meeting
- the Board of Directors
- the Executive Director
- the Company's Secretary
- the Auditor

Further unbundling of EPCG is planned for 2016, when the FU Distribution will be detached from EPCG and will start to operate as an independent institution.

The transmission system operator, COTEE (TSO), was once part of EPCG, but has been detached from EPCG prior to the partial privatization of EPCG by Italian company A2A. The activities related to the transmission system operation, management and development are performed by Crnogorski Elektroprenosni Sistem (CGES), i.e. Montenegrin Transmission System Operator (TSO).

A more detailed description of the key market participants in the field of electricity generation, transmission and distribution is given in the following chapters.

#### 4.5.1.1 Montenegrin Power Company JS (EPCG) - FU Generation

The FU Generation organizes, coordinates and performs activities regarding electricity production. The activities are performed through two organizational units within the FU Generation:

- Sector for planning and monitoring and
- Power plants: HPP "Perucica", HPP "Piva" and TPP "Pljevlja".



The sector division for planning and monitoring performs the following activities:

- Consolidation of operational plans and data for all three plants,
- Defining of general guidelines
- Interaction with other operational and organizational units of the Company.

The power plant division performs following activities:

- The organization and management of the process of generation of electricity,
- Production of electricity
- Cooperation in the preparation of business plans
- Preparing plans for maintenance and annual overhaul
- Current and preventive maintenance
- Budgeting costs, monitoring their execution and reporting and
- Organizing machinery and transportation.

The Division for energy management operates as an independent organizational unit within EPCG and organizes, coordinates and performs activities related to electricity trading, and especially:

- Selling produced electricity
- Electricity import for satisfying the needs of EPCG customers
- Electricity export
- Continuous analysis of electricity market
- Other activities related to the optimal electricity trading, in order to achieve profit maximization and reliable supply

Division for energy management includes 3 sectors:

- Sector for Portfolio management
- Sector for electricity trading
- Sector for support

#### **4.5.1.2 Montenegrin Power Company JS (EPCG) - FU Electricity supply**

The activities of the FU Electricity Supply are:

- Supplying customers with electricity
- Purchase or otherwise purchase the energy needed to supply tariff, eligible and direct customers
- Giving orders to disconnect customers for non-payment of electricity bills,
- Research and market monitoring
- Creating a summary of monthly and annual consumption plans for energy and power on the basis of the quantity contracted with customers
- Creating electricity consumption balance for tariff, eligible and direct customers, continuous monitoring of the consumption balance realization, signing contracts with FU Production, CGES, FU Distribution and Market Operator
- Analysis of the tariff system from an energy and economic point of view,
- Proposing changes in the tariff system
- Preparing plans for the sale of electricity
- Marketing activities in terms of an improvement in sales and billing
- Drafting, signing and monitoring of contracts for electricity supply of tariff, qualified and direct customers
- Billing of electricity for tariff, qualified and direct customers,
- Creation of billing plans
- Collection of receivables
- Monitoring and evaluation of the creditworthiness of customers

- Processing of complaints and objections by customers
- Informing customers of any changes of the tariff system, the quality and types of services

The FU Electricity Supply is organized in the following sectors:

- Sector for work process monitoring
- Sector for operative works
  - ◆ Division for demand management
  - ◆ Division for billing and reporting
- Sector for marketing and sales:
  - ◆ Division for marketing and sales
  - ◆ Division for electricity analyses and reporting
- Centre for customer relations:
  - ◆ Call centre
  - ◆ Contact centre

The FU Electricity Supply has 4 regional centres:

- Regional centre Podgorica
- Regional centre Niksic
- Regional centre Bijelo Polje
- Regional centre Bar.

#### **4.5.1.3 Montenegrin Power Company JS (EPCG) FU Distribution - Distribution System Operator**

The role of Montenegrin Distribution System Operator is performed by the public company (57% of the shares are owned by the State) Elektroprivreda Crne Gore AD Niksic (EPCG), Functional Unit (FU) Distribution. This functional unit of EPCG has the same role as CGES regarding RES projects with the difference being in the voltage level of the grid connection.

EPCG has 2311 employees, of which slightly more than 50 % work within the EPCG FU Distribution. Currently there are 7 distribution regions with about 300,000 consumers. The Montenegrin distribution grid includes 3 voltage levels 35 kV (about 1,000 km of lines), 10 kV (about 4,800 km of lines) and 0.4 kV (about 12,000 km of lines). The most important are two voltage transformations: 35/10 kV (about 710 MW of installed power) and 10/0.4 kV (about 1920 MW of installed power). The following activities are organized, coordinated and executed by EPCG FC Distribution:

- Organization, control and management of the electricity distribution process
- 35 kV distribution grid control
- Central maintenance of 35 kV overhead lines and 35/10 kV substations, preventive maintenance and protection
- Data acquisition and analysis of the grid operation data during the electricity distribution process and executing of the needed measures
- Metering, power meter control, calibration, coordination and analysis of technical and commercial electricity losses
- Coordination with EPCG FU Power Supply
- Long term business planning regarding financial and economic feasibility of investments in distribution grid objects, and capital cost monitoring
- Issuing of technical documentation to consumers connected to the distribution grid and connection of new consumers according to the development plans and regulation
- Grid development and modernization
- Activities regarding billing of the distribution grid usage taxes
- Electricity consumption metering for billing purposes

The activities regarding access to the electricity distribution system are defined by the Law on Energy:

- Electricity Distribution System Operator shall provide non-discriminating access to Electricity Distribution System within the limits of distribution capacities in line with technical rules.
- The Electricity Distribution System Operator may deny access to the system if it lacks capacity.
- In cases referred to in paragraph (2) of this Article, the Distribution System Operator shall submit relevant information to the requester on necessary measures being carried out on improvement of the Distribution System.
- The Electricity Distribution System Operator may deny or limit access to the system if allowing access to the Distribution System in a requested extent could jeopardize carrying out of public services referred to in Article 88 herein.
- Costs of submission and preparation of information referred to in paragraph 3 of this Article shall be borne by the system user that has required the concerned information.

The FU Distribution is organized in 4 sectors:

- Sector for distribution grid control
  - ◆ Division for operational control
  - ◆ Division for operation analysis and planning
- Sector for maintenance
  - ◆ Division for maintenance of substations 35/10 kV
  - ◆ Division for maintenance of 35 kV lines
    - Overhead line (OHL) team Seaboard
    - OHL team Centre
    - OHL team North.
  - ◆ Division for testing and relay protection
  - ◆ Division for technical support
- Sector for development
  - ◆ Division for development and investment
  - ◆ Division for grid connections
- Sector for metering
  - ◆ Test laboratory for electric meters,
  - ◆ Division for metering, monitoring, acceptance and maintenance of metering sites
  - ◆ Division for exploitation, maintenance, development and implementation of AMM (Advanced Meter Management) system.

#### 4.5.2 Montenegrin Transmission System Operator (CGES)

The role of Montenegrin Transmission System Operator is performed by the public company Crnogorski Elektroprenosni Sistem (CGES). With respect to RES projects, CGES directly impacts only those projects which are connected to the grid with voltages of 110 kV or higher (220 kV and 400 kV in Montenegro).

The majority owner is the state of Montenegro with 55 % of the company shares, while the strategic partner of the majority shareholder - Terna Rete Nazionale S.p.a. holds 22 % of the shares. 90% of the total shares are held by 10 shareholders. These are: The State of Montenegro, Terna Rete Nazionale S.p.a., HB – Cumulative custody accounts 3, Open-end investment fund "Trend", Company for management, operations and real estate administration "Mig", then CK - Cumulative custody account 1, ROBOTI GLOBAL FUND, Open-end investment fund "Moneta", Open-end investment fund "Eurofond" in transformation process and BULL AND BEAR BROKER DILER, investment consultants.

##### → National Dispatching Centre

The National Dispatching Centre (NDC) is an organizational part of CGES responsible for operational control over the electric power system. For that purpose, the Centre is equipped with up-to-date equipment for data acquisition from all network facilities. Control over system elements and power and frequency regulation are based on SCADA system, completely developed and implemented by its own capacities.

Monitoring and system control is performed permanently (24/7) from the NDC control room. Support in implementation of permanent monitoring is provided by the Department for Development and Exploitation of Secondary and Information Systems and Telecommunication Department.

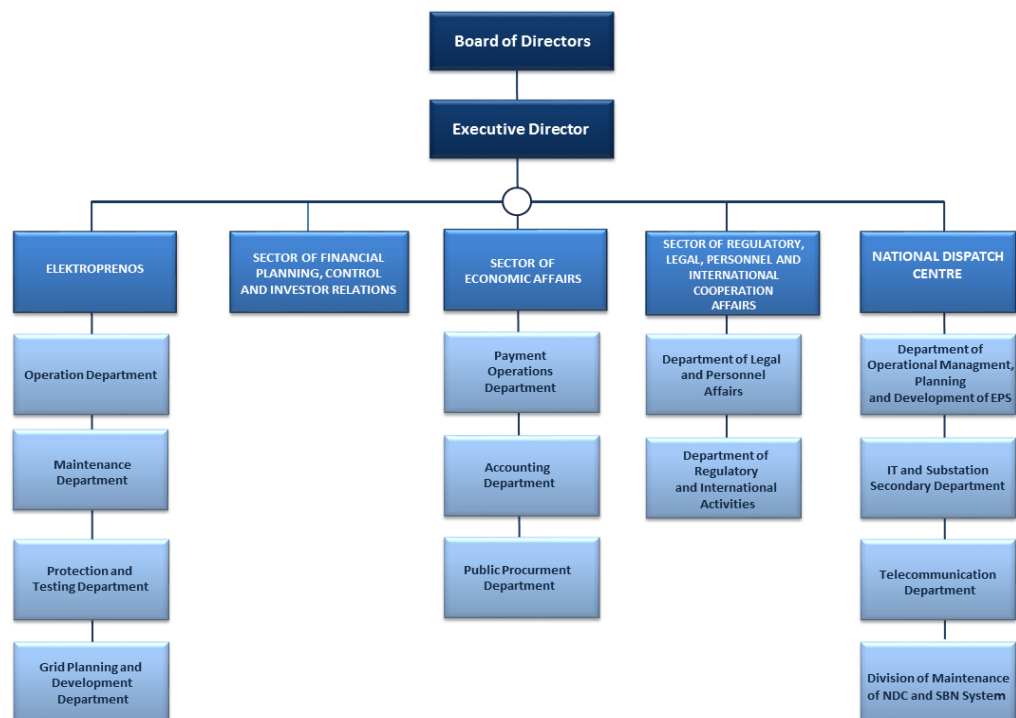
→ Elektroprenos

Elektroprenos is an organizational part within CGES whose competence are the development, maintenance and exploitation of electric power system elements. By controlling over 1300km of overhead lines with voltage levels of 400kV, 220kV and 110kV, as also substations of 400kV, 220kV and 110/x kV voltage levels, Elektroprenos provides preconditions for real-time control and energy supply to end system users. The Grid Planning and Development Department is responsible to follow time dependent increasing needs for electricity. The Maintenance Department, together with the Protection and Testing Department, is responsible for maintaining elements in a functional and highly reliable condition, while equipment management for the same facilities is provided by the Operating Department.

→ Telecommunications

Crnogorski elektroprenosni sistem (CGES), pursuant to the Law on Electronic Telecommunications ("Official Gazette of Montenegro", no. 50/08), is registered in the Register of Operators of the Agency for Electronic Communications and Postal Services (Decision no.0205-3719/2 of 01.10.2010), for providing the service of optical fibre lease. CGES provides wholesale services by an operator approach, i.e. it leases optical fibres and other infrastructure to telecommunication operators which, if interested, can begin to offer also services of signal transmission through the NGSDH network. In case of expressed interest, it shall begin to offer services also to entities which are not telecommunication operators.

The basis of telecommunication network is the optical fibre realized through OPGW cable in technological performance as optical cables in ground wires of high-voltage lines (OPGW- Optical Fibre in Ground Wire) as main transmission medium and NGSDH (Next Generation Synchronous Digital Hierarchy) transmission systems based on optical transport infrastructure. The total length of optical cable is 656 km.



**Figure 4-6: Organizational chart of CGES**

The activities regarding access to the electricity transmission system are defined by the Law on Energy:

- Electricity Transmission System Operator shall provide non-discriminating third party access to Electricity Transmission System within the limits of transmission capacities and in line with technical rules.
- Electricity Transmission System Operator may deny access to the system if it lacks the capacity.
- In case referred to in paragraph (2) of this Article, Transmission System Operator shall submit relevant information to the requester on necessary measures being carried out on the improvement of the system and creation of possibilities for allowing access to the system.
- Electricity Transmission System Operator may deny or limit access to the system if allowing access to the Transmission System or use in a requested extent could jeopardize carrying out of public services referred to in Article 88 herein, according to its own estimate or upon request of the entity which performs the public service.
- Costs of submission and preparation of information referred to in paragraph (3) of this Article shall be borne by the system user that required the concerned information

## 4.6 AUSTRIAN COMPANIES ACTIVE IN THE RES SECTOR IN ME

According to the communication with various stakeholders in the field of RES in Montenegro (investors, designers, engineers from Ministry of Economy and transmission and distribution system operator, i.e. CGES and EPCG), the following companies from Austria have experience in the realization of RES projects in Montenegro:

- Geppert Hydropower Austria
- Andritz Hydro Austria
- Kössler Austria.
- Kelag
- PORR
- STRABAG Societas Europaea

### 4.6.1 Geppert Hydropower Austria

The core competence of Geppert Hydropower is in the production of small hydro power plants. Geppert Hydropower provides various turbines and individual solutions, also as a turnkey contractor. Various plant configurations are applicable for small hydro power plants, depending on net head, nominal discharge and operating mode. According to the requirements and the annual flow duration curve Geppert Hydropower offers Pelton, Francis, Diagonal or Kaplan turbines. Beside turbines, Geppert Hydropower provide turbine governors and automatization, inlet valves and accompanying equipment. The plants are usually fully automated and equipped with remote control and visualization.

The company from Montenegro that closely cooperates with Geppert Hydropower (regarding sales and distribution) is Potencijal d.o.o. Kolasin, managed by Dragan Vlahovic.

*Contact Details: Dalmatinska 47c, Podgorica, Montenegro; Phone: +38267254721; E-mail: potencijalplus@yahoo.com, potencijal@t-com.me*

### 4.6.2 Andritz Hydro Austria

Andritz Hydro is a leading supplier in the service and rehabilitation market and a world market leader for large and small hydropower solutions.

Andritz Hydro has its headquarters in Vienna, Austria and has more than 50 locations in more than 25 countries worldwide. The company is organized in five main divisions, whereas for RES projects mainly two divisions are relevant: Large Hydro and Compact Hydro.

Andritz Hydro has a worldwide network of distributors. There is no officially designated company as a distributor for Andritz Hydro in Montenegro, but the company is a significant market participant in the field of small hydro power (supplier of hydro turbines and accompanying equipment).

#### **4.6.3 Kössler Austria**

Since 2007, Kössler has been a subsidiary of Voith Hydro. Voith Hydro is Group Division of Voith and, with over 5 000 employees and an order volume of more than one billion Euro per year, it is one of the worldwide leading suppliers in the hydro power industry. Kössler is the "Center of Competency" for small hydro power plants in Europe at Voith Hydro, and, in this role, makes an active contribution to the eco-friendly generation from hydropower.

The company in Montenegro that represents Kössler is Voith Hydro Podgorica.

Contact Details: *Bul. Sv. Petra Cetinjskog br. 149, 81000 Podgorica, Montenegro; Phone: +382 20 205 305; Fax: +382 20 235 172; E-mail: marjana.batricevic@voith.com*

Since 2013 Kössler supplied equipment for several small hydro power plants in Montenegro (Jezerstica, Rmus, Spalevici, Orah, Bistrica, Jara and Babino Polje). 5 of the mentioned HPPs are already in operation, 2 are under construction.

#### **4.6.4 KELAG-Kärntner Elektrizitäts-Aktiengesellschaft (Carinthia Electricity joint-stock company)**

KELAG is an Austrian power company and one of the largest electricity producers from hydropower in Austria. KELAG was founded in 1923 and consists of several group companies, active in electricity, gas and heating throughout Austria, with a special focus on Carinthia.

The international business of Kelag is bundled within the KI-KELAG International GmbH, founded in 2009 as a 100% subsidiary of KELAG. KI-KELAG International itself holds 100% of the shares of InterEnergO.

InterEnergO is based in Ljubljana and is active in Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro, Macedonia and Kosovo in electricity trading and developing of hydropower and photovoltaic projects.

Via InterEnergO, KI-KELAG International holds 70% of the shares of MHE Vrhnica d.o.o. (Podgorica ME), which itself holds the concession for the construction of the SHPPs Vrhnica I (2.2MW, 7.6GWh) and II (3.15MW, 12.7GWh). Their presumably operation start is scheduled for 2017.

Contact Details: INTERENERGO d.o.o., Tivolska cesta 48, 1000 Ljubljana, Slovenija

Phone: +386 1 620 37 00; Fax: +386 1 620 37 01; E-mail: info@interenergo.si

#### **4.6.5 PORR**

PORR is an Austrian based construction company established in 1869. The company has a long track record, over 140 years, and extensive experience in planning, development and execution of roads construction, apartment buildings, hotels or office complexes, power plants, stadiums, etc.

In Montenegro, Porr is represented through its local subsidiary PORR Technobau and Umwelt AG d.s.d. Podgorica. In regard to RES, PORR is currently finalizing, together with Bemax d.o.o., the civil works (BoP – Balance of Plants, everything, except the wind turbine) of the Krnovo WPP in Niksic.

Contact Details: PORR (Montenegro) d.o.o., Ul.Džordža Vašingtona 44, MNE-81000 Podgorica

Phone: +382 20 20 53 55; Fax: +382 20 20 53 56; porr.pod@t-com.me

#### 4.6.6 STRABAG

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STRABAG SE is a European construction company based in Villach, Austria, with its headquarters in Vienna. STRABAG SE is the largest construction company in Austria and one of the largest construction companies in Europe. The company is active in its home markets Austria and Germany and in all countries of Eastern and South-East Europe. Furthermore, in selected markets in Western Europe, on the Arabian Peninsula, as well as in Canada, Chile, China and India. In these markets STRABAG has subsidiaries or operates on a project-basis.

In 2007, STRABAG SE bought a local construction company in Montenegro. Since that STRABAG SE is active in Montenegro through its 100% subsidiary STRABAG AG, Podgorica. STRABAG AG, Podgorica is active in the same fields as the holding company itself, in particular in underground construction, building construction and civil engineering. In regard to RES, STRABAG AG, Podgorica has just recently finished construction works of a small dam on River Morača.

Contact Details: STRABAG AG, Zetskih vladara br.5 , MNE-81000 Podgorica

Phone: +382 20 448 303; Fax: +382 20 448 333; milos.zivaljevic@strabag.com

#### 4.7 LOCAL COMPANIES ACTIVE IN THE RES SECTOR IN ME

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In the following local and international companies active in the RES sector of Montenegro are described more detailed. Contact details are attached in chapter 5.2. Most of the local companies involved in the RES sector are small companies (up to 10 employees) and most of them have been established recently (5-6 years ago). Their main goal is to develop SHPPs for which they have been awarded with a concession.

##### 4.7.1 Hidroenergija

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Hidroenergija d.o.o., established in 2007, is one of the most experienced local companies active in the RES sector (5 SHPPs built, 3 more in development). Hidroenergija provides construction and engineering of power plants. The company is based in Berane, Montenegro. Since 2<sup>nd</sup> March 2013, the company operates as a 100% subsidiary of Bemax d.o.o..

##### 4.7.2 Bemax

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Bemax d.o.o. is a privately owned construction company, registered in 2007 and is the leading construction company for road infrastructure in Montenegro. The main activity of Bemax is concrete production. Bemax often acts as subcontractor for foreign construction companies active in Montenegro, such as currently for PORR at WPP Krnovo.

Contact Details: Bemax LLC, Moskovska 2/B, 81000 Podgorica

Phone: +382 20 234 321; office@bemax.me

##### 4.7.3 Igma Energy

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Igma Energy, established in 2014, operates a SHPP with an installed capacity of 0.95 MW, Bradavac, Andrijevica, built in 2015. Besides this, the company is also already in an advanced planning stage for the implementation of their second SHPP, Piševska, also located in Andrijevica.

Contact Details: Igma Energy d.o.o. Andrijevica,

Phone: +382 67 488 488; igma@t-com.me

##### 4.7.4 Synergy

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Synergy is a Montenegrin company, currently operating one SHPP, named SHPP Vrelo. SHPP Vrelo is located in Lijeska (Municipality of Bijelo Polje), has an installed capacity of 615 kW and an annual electricity output of 2.7 GWh.

## **5 OVERVIEW OF RE PROJECTS**

### **5.1 LIST OF PROJECTS**

In this chapter, information and data about planned, already constructed and currently operated RES projects is summarized for Montenegro. The collected data comprises: the utilized energy source, installed capacity, annual energy production, sponsors, investors, involved engineers, involved contractors, financing source, and all other significant data as far as available. For comparison purposes, to make interpretation easier and to give a better overview, the results have been summarized in a table:



**Table 5-1: Overview of current RES Projects**

No.:	Project Title and location	Water, Wind, Solar	Capacity (MW)	Annual Energy Production (GWh/y)	Project Status (Completed, ongoing, in the pipeline)	Investors	Source of Financing/Comment [11]
1	Perućica (Nikšić)	Water	307	1300	Built in 1960		Owned by EPCG (Electric Power Company of Montenegro)
2	Piva (Plužine)	Water	342	737.25	Built in 1976		Owned by EPCG Urban and Technical Specifications to prepare technical documents for the reconstruction of HE Piva issued on 9 April 2015
3	Morača (HPP Andrijevo, HPP Raslovići, HPP Milunovići, HPP Zlatica), Podgorica, Kolašin	Water	238.4	616	Planned		
4	Komarnica (Plužine, Šavnik)	Water	172	227 to 232	Planned		great interest expressed
5	Glava Zete (Nikšić)	Water	4.5		Built in 1955 (planned for reconstruction)	ZETA ENERGY DOO	EPCG Urban and Technical Specifications for the preparation of technical documents for the reconstruction issued on 24 March 2015
6	Slap Zete (Danilovgrad)	Water	1.2		Built in 1952 (planned for reconstruction)	ZETA ENERGY DOO	EPCG
7	Rijeka Crnojevića (Cetinje)	Water	0.754		Built in 1952		EPCG
8	Podgor (Cetinje)	Water	0.25		Built in 1937		EPCG
9	Rijeka Mušovića (Kolašin)	Water	1.36		Built 1950		EPCG
10	Jezerštica (Berane)	Water	0.88		Built in 2013	HIDROENERGIJA MONTENEGRO DOO, BERANE	SHPP, acquired the status of eligible producer and has a use permit
11	Bistrica (Berane)	Water	5.641		Built in 2014	HIDROENERGIJA MONTENEGRO doo Berane	Small hydropower plants acquired the status of eligible producer and has a use permit
12	Orah (Berane)	Water	0.99		Built in 2014	HIDROENERGIJA MONTENEGRO doo Berane	Small hydropower plants acquired the status of eligible producer and has a use permit issued on 27 April 2015
13	Rmuš (Berane)	Water	0.518		Built in 2014	HIDROENERGIJA MONTENEGRO doo Berane	Small hydropower plants acquired the status of eligible producer and has a use permit /issued on 30 Apr 2015/
14	Spalevići (Berane)	Water	0.659		Built in 2014	HIDROENERGIJA MONTENEGRO doo Berane	Small hydropower plants acquired the status of eligible producer and has a use permit
15	Vrelo (Bijelo Polje)	Water	0.648	3.067	Built in 2015	SYNERGY DOO	Application for energy permit submitted; use permit issued on 14 May 2015
16	Bradavac (Andrijevica)	Water	0.95	3.823	Built in 2015	IGMA ENERGY DOO	Use permit issued on 30 September 2015
17	Šekular (Berane)	Water	1.665	4.896	Built in 2015	HIDROENERGIJA MONTENEGRO DOO, BERANE	Use permit Building permit issued on 4 May 2015
18	Kaludra (Berane)	Water	1.800	6.288	Under construction		Local Location Study prepared

No.:	Project Title and location	Water, Wind, Solar	Capacity (MW)	Annual Energy Production (GWh/y)	Project Status (Completed, ongoing, in the pipeline)	Investors	Source of Financing/Comment [11]
19	Konjska (Berane)	Water	1.125	3.305	Under construction		
20	Jara (Andrijevica)	Water	4.86	13.967	Under construction		About to be completed, will be put into operation soon
21	Babino Polje (Andrijevica)	Water	2.258 MVA	6.378	Under construction		About to be completed, will be put into operation soon
22	Jelovica 1 (Berane)	Water	3		Construction started 2016		
23	Jelovica 2 (Berane)	Water	0.8		Construction started 2016		
24	Trepačka 1 and 2 (Andrijevica)	Water	9.6 + 2.195	29.773 + 3.48	Planned		
25	Crnja, Crni potok and Ljubaštica (Andrijevica)	Water	3.645 + 0.419 + 2.25		Planned		3 building permits issued, under construction
26	Kraštica (Andrijevica)	Water	0.803	3.1	Planned		No interest expressed
27	Zlorečica (Andrijevica)	Water	3.95	15.1	Planned		Concession Plan for 2016
28	Piševska (Andrijevica)	Water	0.945	2.914	Planned	IGMA ENERGY DOO Andrijevica	Urban and Technical Specifications (UTU) issued on 14 December 2015
29	Peročica (Andrijevica)	Water	2	9.036	Planned		Concession Plan for 2016
30	Desna Rijeka (Andrijevica)	Water	0.65	2.3	Planned		
31	Mojanska 1, 2 & 3 (Andrijevica)	Water	1.6 + 1.05 + 0.72	5.72 + 3.46 + 2.04	Planned		
32	Šermet (Andrijevica)	Water	0.571	1.21	Planned		
33	Šermetski potok (Andrijevica)	Water	0.829	3.5	Planned		
34	Murinska Rijeka (Andrijevica)	Water	1	3.481	Planned		
35	Dosova Rijeka (Andrijevica)	Water	1.2	4.395	Planned		
36	Kutska 1 & 2 (Andrijevica)	Water	1.672 + 0.747	7.75 + 3.37	Planned		
37	Umski potok (Andrijevica)	Water	0.784	3.2	Planned		
38	Krkori (Andrijevica)	Water	0.374	2.17	Planned		
39	Štitska (Andrijevica)	Water	0.897	3	Planned		
40	Meteh (Andrijevica)	Water	4	9.437	Planned		
41	Meteska rijeka (Andrijevica)	Water	0.72		Planned		
42	Vođenički potok (Anrijevica)	Water	0.25	0,462	Planned		
43	Bjelojevička (Mojkovac)	Water	0.339 + 0.774 + 0.571	1.917 + 3.72 + 2.76	Planned		

No.:	Project Title and location	Water, Wind, Solar	Capacity (MW)	Annual Energy Production (GWh/y)	Project Status (Completed, ongoing, in the pipeline)	Investors	Source of Financing/Comment [11]
44	Lještanica (Bijelo Polje)	Water	1.32	5.882	Planned		
45	Sjevernica (Kolašin)	Water	0.484 + 0.504	2.025 + 2.11	Planned		
46	Bukovica (Šavnik)	Water	1.332 + 2.55	5.5 + 10.5	Planned		Tender will be repeated; no bid submitted.
47	Bistrica (Bijelo Polje)	Water	2.995 + 1.555	14.2 + 7.38	Planned	HYDRO BISTRICA DOO PODGORICA	Amendments to the Plan for 2015 for 4 watercourses (Bistrica, Bjelojevička, Ljestanica, Sivenica/Kolasin)  Amendments adopted. Concession Act will be prepared. Tender will be published. MoE has to prepare a Study on the connection  Building permit issued on 16 March 2015, to build SHPP and 10 kV cable to connect it to the power grid  Use permit issued on 30 April 2015
48	Krnovo (Nikšić)	Wind	50 + 22	160	Under construction		Implementation in progress
49	Možura (Ulcinj)	Wind	46	100	Planned	Fersa Energias Renovables, Celebic doo	Implementation in progress
50	UNDP Building (Podgorica)	Solar	0.160		Built in 2014		
51	Slatina (Andrijevica)	Solar	0.597	2.063	Planned	„BB Hidro“ d.o.o., Podgorica	
52	Hilton (Podgorica)	Solar	0.143	0.22	Planned		
53	Baloča (Podgorica)	Solar	0.08 + 0.15	0.105 + 0.214	Planned		
54	Ljeviška rijeka (Kolasin)	Water	0.980	3.321	Under construction	Dekar doo, 4. Jula 17, Podgorica	
55	Raštak 1	Water			Under construction		
56	Grla/Vusinje (Near Prokletije National Park)	Water			Under construction		
57	Vrbnica 1 & 2	Water					
58	Djuricka 1 & 2	Water	2.81 + 1.759	7.909 + 4.551			
59	Jasičje (Kolasin)	Water	0.560	2.240		“MN Energy Plus doo” Podgorica	
60	Ocka Gora (Kolasin)	Water	0.495	2.180		“MN Energy Plus doo” Podgorica	
61	Ljevak (Mojkovac)	Water	0.551	2.794		“Simes inženjering doo”, Podgorica	

No.:	Project Title and location	Water, Wind, Solar	Capacity (MW)	Annual Energy Production (GWh/y)	Project Status (Completed, ongoing, in the pipeline)	Investors	Source of Financing/Comment [11]
62	Pecka (Kolasin)	Water	0.407	1.800		"Djekic doo", Podgorica	
63	Paljevinska (Kolasin)	Water	0.534	2.100		"Viridi Progressum doo" Kolasin	
64	Raštak II (Kolasin)	Water	0.624	2.496		"Kol Energy" doo	
65	Rijeka Reževića (Budva)	Water	0.950	3.2		Mr Radostav Kovacevic, Velji Vinogradi bb, Budva	
66	Slatina (Kolasin)	Water	0.453	1.224		"BB HIDRO" DOO, Ivana Milutinovica 7, Podgorica	
67	Rujška Rijeka	Water					
68	Brzava	Water					
69	Zagradaska rijeka	Water					
70	Trnovička Rijeka (Kolasin)	Water			Planned for 2016		Concession Plan for 2016
71	Ibrištica (Kolasin)	Water	3.1	13.8	Planned in 2015		
72	Štitarička (Mojkovac)	Water	0.9	2.9	Planned in 2015		Contract concluded on 11 Feb 2016
73	Bandici (Danilovgrad)	Solar	0.416	0.568		"Invista doo" Podgorica	
74	Kunje (Bar)	Solar	0.0097	0.01047		Milisav Kijanovic	
75	Klenak (Niksic)	Solar	0.083	0.113		"Solpan" doo Risan	
76	PV "Semir" (Gusinje – Plav)	Solar	0.00897	0.00946		"Semir doo" Gusinje	
77	PV "Brod" (Niksic)	Solar	0.0022	0.0039		"Monte Solar doo" Niksic	
78	Mataguži (Podgorica)	Biogas	0.526	4		Višnjic komerc doo, Admirala Zmajevica 52	
79	Briska gora (Ulcinj)	Wind				NATURWIND doo, Kodre bb, Ulcinj	
80	Koštanica (Tara)	water			Planned by the Energy Development Strategy of Montenegro by 2030		
81	Kruševo (Piva)	water			Planned by the Energy Development Strategy of Montenegro by 2030 (it is previously necessary to reach an interstate agreement on the use of hydropower)		
82	Buk Bijeka (Tara)	water			Planned by the Energy Development Strategy of Montenegro by 2030		
83	Ljutica (Tara)	water			Planned by the Energy Development Strategy of Montenegro by 2030		

No.:	Project Title and location	Water, Wind, Solar	Capacity (MW)	Annual Energy Production (GWh/y)	Project Status (Completed, ongoing, in the pipeline)	Investors	Source of Financing/Comment [11]
84	HPP Boka (Trebisnjica)	Water			Planned by the Energy Development Strategy of Montenegro by 2030 (it is previously necessary to reach an interstate agreement on the use of hydropower)		
85	HPP on the Čehotina river	Water			Planned by the Energy Development Strategy of Montenegro by 2030		
86	Rošca (Zeta)	water	7	35	Planned by the Energy Development Strategy of Montenegro by 2030		
87	Otilovići (Čehotina)	water	2.96	11.5	Planned by the Energy Development Strategy of Montenegro by 2030		
88	Incinerator (municipal waste – location not identified)	biomass	39	118	Planned by the Energy Development Strategy of Montenegro by 2030		
89	Spaljevići 1 (Šekularska River, Berane)	water				HIDROENERGIJA MONTENEGRO DOO	Use permit issued on 27 April 2015

## 5.2 MARKET PARTICIPANTS WITH EXPERIENCE IN THE RES SECTOR

### 5.2.1 Project Developers:

**Table 5-2: Project developers with experience in Montenegro**

Project Developer	Contact Details	Project
BEMAX LLC Hydroenergija d.o.o. (100% subsidiary of BEMAX LLC)	Moskovska 2/B 81000 Podgorica Montenegro +382 20 234 321 +382 69 388 100 <a href="mailto:office@bemax.me">office@bemax.me</a> <b>General manager</b> Veselin Kovačević +382 69 015 400 <a href="mailto:vesko.kovacevic@bemax.me">vesko.kovacevic@bemax.me</a>	Krnovo wind power plant (72MW)
KELAG	INTERENERGO d.o.o., Tivolska cesta 48, 1000 Ljubljana, Slovenija Phone: +386 1 620 37 00 Fax: +386 1 620 37 01 E-mail: <a href="mailto:info@interenergo.si">info@interenergo.si</a>	Several SHPPs in BiH & Serbia, several photovoltaic projects in Slovenia,

### 5.2.2 Manufacturer, construction and engineering companies

**Table 5-3: Manufacturers with experience in Montenegro**

Manufacturer	Contact Details	Projects
ENERGY TEAM	Bulevar Miloša Rašovića 6, 20000 Podgorica +382 206 759 53, +382 67 328 093 <a href="mailto:energyteam.me@gmail.com">energyteam.me@gmail.com</a> <a href="http://www.energyteam.me">www.energyteam.me</a>	Solar systems
Kössler GmbH & Co KG represent by: Voith Hydro Podgorica	Bul. Sv. Petra Cetinjskog br. 149 81000 Podgorica, Montenegro +382 20 205 305 +382 20 235 172 <a href="mailto:marjana.batricevic@voith.com">marjana.batricevic@voith.com</a> Headquarter: St. Georgener Hauptstraße 122, 3151 St. Georgen +43 274 288 5272 <a href="mailto:office@koessler.com">office@koessler.com</a>	Hydro
Andritz Hydro	ANDRITZ HYDRO S.A.S. 49-51 Bd Paul Langevin, 38601 Fontaine cedex, France +33 476 855 645 +33 628 955 808 Rudy Yvrard, Mini Compact Hydro, Head of Sales Headquarter: ANDRITZ HYDRO GmbH Eibesbrunnengasse 20 1120 Vienna, Austria	Hydro
Geppert, represented by: Potencijal d.o.o. Kolasin	Dalmatinska 47c, Podgorica, Montenegro; +382 672 547 21 <a href="mailto:potencijalplus@yahoo.com">potencijalplus@yahoo.com</a> <a href="mailto:potencijal@t-com.me">potencijal@t-com.me</a> Headquarter: Geppert GmbH Breitweg 8-10b A-6060 Hall in Tirol, Austria +43 522 357 788	Hydro

**Table 5-4: Construction and engineering companies with experience in Montenegro**

Engineer	Contact Details	Projects
BEMAX LLC	Moskovska 2/B 81000 Podgorica Montenegro Phone: +382 20 234 321 Fax: +382 69 388 100 Email: <a href="mailto:office@bemax.me">office@bemax.me</a> <b>General manager</b> Mr. Veselin Kovačević Phone: +382 69 015 400 Email: <a href="mailto:vesko.kovacevic@bemax.me">vesko.kovacevic@bemax.me</a>	Krnovo wind power plant (72MW)
PORR	PORR (Montenegro) d.o.o., Ul.Džordža Vašingtona 44, 81000 Podgorica Montenegro Phone: +382 20 20 53 55 Fax: +382 20 20 53 56 Email: <a href="mailto:porr.pod@t-com.me">porr.pod@t-com.me</a>	Krnovo wind power plant (72MW)
STRABAG	STRABAG AG, PODGORICA Zetskih vladara br.5 81000 Podgorica Montenegro Phone: +382 20 44 83 03 Fax: +382 20 44 83 33 Mr. Miloš Živaljević Mobil: + 382 67 24 98 70 Email: <a href="mailto:milos.zivaljevic@strabag.com">milos.zivaljevic@strabag.com</a>	

## 5.2.3 Investors

**Table 5-5: Investors with experience in Montenegro**

Investors	Contact Details	Project
Igma Energy doo Andrijevisa	Igor Mašović, +382 67 488 488, <a href="mailto:igma@t-com.me">igma@t-com.me</a>	SHPP Bradavac (Andrijevisa) Piševska (Andrijevisa)
Nord Energy doo Andrijevisa	Radenko Vulekić, +382 67 180 157, <a href="mailto:nordenergy.andrijevisa@gmail.com">nordenergy.andrijevisa@gmail.com</a> <a href="mailto:radenko.nordenergy@gmail.com">radenko.nordenergy@gmail.com</a> Momo Jokić, 069-047-735, <a href="mailto:jokic@t-com.me">jokic@t-com.me</a>	
Hydroslavan doo Andrijevisa	Stanislav Košut, Dejan Miš +42 191 110 73 40, +42 190 890 8938 <a href="mailto:kosut@4energygroup.eu">kosut@4energygroup.eu</a> <a href="mailto:mis.dejan@gmail.com">mis.dejan@gmail.com</a>	
Small Hydro Power Mojanska doo Andrijevisa	Andras Horvath, Jelena Stojković +382 69 100 411, +382 69 100 410 <a href="mailto:andras.horvat@hydrologistics.me">andras.horvat@hydrologistics.me</a> <a href="mailto:jelenastojkovic@t-com.me">jelenastojkovic@t-com.me</a>	
Small Hydro Power Kutska doo Andrijevisa	Andras Horvath, Jelena Stojković +382 69 100 41, +382 69 100 410 <a href="mailto:andras.horvat@hydrologistics.me">andras.horvat@hydrologistics.me</a> <a href="mailto:jelenastojkovic@t-com.me">jelenastojkovic@t-com.me</a>	
Dekar – Hydro doo Podgorica	Momčilo Miranović +382 67 624 620 <a href="mailto:dekar@t-com.me">dekar@t-com.me</a>	
PM Hydro doo Podgorica	Andras Horvath, Tanja Kovačević +382 69 100 41, +382 68 888 881 <a href="mailto:andras.horvat@hydrologistics.me">andras.horvat@hydrologistics.me</a> <a href="mailto:kovacevic.tanja@yahoo.com">kovacevic.tanja@yahoo.com</a>	
Hydroenergija Berane	Stevan Knežević, +382 67 640 659	
Hydroenergija Andrijevisa doo	Dragan Šekularac, +382 67 253 401 <a href="mailto:dsekularac66@gmail.com">dsekularac66@gmail.com</a>	
Hydroenergija Montenegro doo Berane		SHPP Jezerstica (Berane), Bistrica (Berane) Orah (Berane), Rmus (Berane) Spalevici (Berane)
Synergy doo		SHPP Vrelo (Bijelo Polje)
„BB Hidro“ doo Podgorica		Solar/ Slatina (Andrijevisa)
Dekar doo, 4. Jula 17, Podgorica		SHPP Ljeviška rijeka (Kolasin)
“MN Energy Plus doo” Podgorica		SHPP Jasičje (Kolasin) Ocka Gora (Kolasin)
“Simes inženjering doo” Podgorica		SHPP Ljevak (Mojkovac)
“Djekic doo”, Podgorica		SHPP Pecka (Kolasin)
“Viridi Progressum doo” Kolasin		SHPP Paljevinska (Kolasin)
“Kol Energy” doo		SHPP Raštak II (Kolasin)
Mr Radostav Kovacevic, Velji Vinogradi bb, Budva		SHPP Rijeka Reževića (Budva)
“Invista doo” Podgorica		Solar/ Bandici (Danilovgrad)
Milisav Kijanovic		Solar/ Kunje (Bar)
“Solpan” doo Risan		Solar/ Klenak (Niksic)
“Semir doo” Gusinje		Solar/ PV “Semir” (Gusinje – Plav)
“Monte Solar doo” Niksic		Solar/ PV “Brod” (Niksic)
Višnjić komerc doo, NATURWIND doo, Kodre bb, Ulcinj	Admirala Zmajevica 52	Biogas/ Mataguži (Podgorica) Wind/ Briska gora (Ulcinj)



### 5.3 MARKET PERCEPTION

- Currently 5 privileged SHPP operators using RES are active.
- The market for renewable energy is good, and also the price granted to privileged producers is good. Montenegro provides adequate technical potential for the utilization of RES for electricity production, in particular for the utilization of hydro, solar and wind energy. This utilization could not only supply Montenegro with electricity as such, but also other countries within the former Yugoslavia region as well as Italy (due to the submarine power cable connecting the grid between Italy and Montenegro, which is currently being built and planned to be put into operation in 2018). Besides bringing other benefits, this could also contribute to increased GDP of Montenegro and improved foreign trade balance.
- The market is well regulated, with detailed technical specifications and clear deadlines for local authorities to act. The deadlines have been significantly shortened. Everything is much easier than it used to be.
- A legal basis for the RE market is established. The Energy Law provides two ways to build a power plant, through concessions (over 1 MW), and by obtaining of an energy permit (up to 1 MW). Based on the energy permit, the status of a privileged producer is granted for a period of 12 years, which means guaranteed offtake of generated electricity for 12 years at a regulated feed-in tariff, which is usually sufficient for the investment to be repaid.

In 2010, the Governments of Italy and Montenegro signed an approximately EUR 800 million deal to construct a submarine power cable between Italy and Montenegro. The cable runs from Tivat (ME) to Pescara (Italy), at a depth of up to 1,200 m, 390 km under the Adriatic Sea, with 10 km (Tivat side) and 15 km (Pescara side) constructed onshore. The cable will be able to supply 2 x 500kV (DC). According to TERNA, the Italian company which is implementing the project, the installation of the power cable is proceeding as scheduled and operation will start in 2018.

The most important fact for Montenegro is that it will be a connection through which primarily Montenegro and then other countries will be able to supply their electricity to Italy, which may be further diverted to France or Greece if the announced possible connection to these countries is realized.

This is a major opportunity for the development of RES in Montenegro and investors are aware of this. Both, ERA and the Chamber of Commerce mentioned the submarine cable during the interviews.

- Activities for developing the energy sector in Montenegro are defined by the Energy Development Strategy of Montenegro by 2030. An Action Plan for implementation of the Strategy for the period 2016 - 2020 has been prepared, which defines all activities planned for the implementation, including the RES, during this period.
- On 1<sup>st</sup> February, 2015 the market opened for the selection of power suppliers, but for the time being EPCG is the only licensed electricity supplier that can sell electricity to all consumers, incl. households.
- A study was prepared to build a biogas plant at the landfill of Livade in Podgorica (400 kW). The tender for the works has been completed.
- Large wind energy projects are currently implemented (Krnovo, Mozura).
- There is a significant interest in RES development. The market in Montenegro is growing and is a very much encouraged and promising market.

## 5.4 RISKS

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- Poor local infrastructure and slow, partly cost intensive, grid condition.
- Regulatory obstacles (often unclear, complicated and extremely slow processes within relevant State institutions).
- Low interest of financial institutions in financing of RES in Montenegro.
- Administrative barriers (limitation that a person can be CEO in one company only; obligation to pay minimal salary to CEO; complicated process of hiring foreign personnel – such as obligatory health check, etc.)
- Long-term political stability (influence of Russia vs influence of USA, combined with EU compliance).
- Process of joining the EU goes very slowly.
- Potential religious conflicts (Muslim vs Christian community) threatening the country's stability.
- Historically unsettled conflicts between local minorities (partially related to religion).
- Corruption.
- If property issues are not resolved, expropriation may be required, which may take a long time. If private land has to be purchased for the development of RE projects, there are two options: land can be purchased directly from land owners, or it can be proclaimed to be of public interest, and then expropriation procedure will apply.
- The risk of what will happen after 12 years, when the status of privileged producer expires and the electricity generated will have to be sold on the free market.

## 5.5 BARRIERS

- Poor condition of the Montenegrin electricity grid and its infrastructure.
- Low interest of international financial institutions in financing of RE projects in Montenegro (resulting in unattractive financing conditions), as well as regulatory obstacles, all those factors significantly complicate utilization of this potential and result in growing disappointment of foreign investors in the Montenegrin RES market.
- The market for RE is open, but not all the necessary procedures have been specified in detail yet.
- Issuing of opinion on possibility of grid connection of a project to the distribution grid takes an extremely long time, well beyond the period stated by the law.
- Generally, terms stated by law are not kept by state institutions.
- Tenders for concessions don't have any clear and in advance defined schedule.
- Necessity to hold 2 bank accounts for one company (in case of international transfers in the company).
- Necessity to report all foreign transfers.
- Rather high bank fees.
- Slow process of claiming back VAT.
- Property issues may last long (if private land has to be purchased to complete the project).
- No grid-tied systems for solar energy plants have been put into operation so far; an extensive documentation is required by the Electric Power Company of Montenegro.
- As for future RES incentives policy, it is expected that Government abate or even remove the incentives when the national goal of RES is achieved (33 %). Whether the goal will be achieved depends on the KAP Aluminium Company activity (the single greatest consumer in Montenegro whose share in the electricity consumption on the country level was some years ago almost 50 % prior to the drastic decrease of production).

There are no risks with respect to a retroactive amendment of the feed-in tariff (for already awarded privileged producers). But, in accordance with article 98 of the LoE, the Government will cease to provide support schemes for construction of new capacities for generation of electricity from renewable sources in case the national objective for the share of energy from RES has been accomplished. The Energy Regulatory Agency will cease granting the status of a privileged producer if by construction of RES facilities the share of energy from renewable sources in the total gross consumption of electricity would become higher than is compulsory, as well as to restrict the support scheme prior to achievement of the national objective in the event of negative impact on the economy or social status of the final customers.

- The Energy Law does not provide for installation of solar panels on the ground, only on the roofs of buildings. An amendment of the legislation in this regard should be seriously considered.
- Small hydropower plants are built mainly on watercourses in rural areas where the power grid is not sufficiently developed to allow a connection without additional investment, which in some cases can be significant.
- A development master plan for existing and potential hydropower plants, including the capacity of each plant, has not been defined for each river basin. Such a plan would enable investors to know exactly what number of small powerplants can be

built in a respective river basin, and would help EPCG to plan the power grid development in those areas of interest accordingly. The Ministry of Economy needs to adopt a connection plan for each river basin, covering the entire basin, so that decisions will not be made on a case-by-case basis. The plans should be made in cooperation with municipalities.

## **5.6 SUCCESS FACTORS TO BE OBSERVED**

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- Good relationship to local municipality in which project is located.
- Local population feel the benefits of the project (through employment).
- Hiring/working with experienced project development team.
- Sufficient financial resources of investor.
- Strong members of a tender consortium.
- Use of suppliers with a good track record and local experience.
- The prescribed procedures need to be consistently adhered to.

## 6 LIST OF PEOPLE INTERVIEWED

The Consultants would like to express their gratitude and appreciation to all persons and organisations providing excellent support and cooperation for information and data collection and preparation of this study, in particular to the institutions, investors and interviewed persons mentioned in the following.

The following institutions and persons have contributed to this study with their experience and knowledge:

**Table 6-1: List of institutions and persons who have contributed to this study**

Institution	Contact Person	Phone	Email
Ministry of Economy, Directorate for Energy - Department for Renewable Energy	<b>Ana Asanovic</b> Advisor	+382 67 826 783	ana.asanovic@mek.gov.me
Energy Regulatory Agency	<b>Pero Vučković</b> Executive Director	+382 69 013 211	pero.vuckovic@regagen.co.me
	<b>Nasata Vojvodic-Peric</b> Lawyer – Analyst	+382 20 229 615	nasata.peric@regagen.co.me
	<b>Predrag Damjanovic</b> Engineer – Analyst		predrag.damjanovic@regagen.co.me
	<b>Radeta Sukovic</b> Head of Economic Regulation Department		radeta.sukovic@regagen.co.me
Montenegrin Electricity Market Operator	<b>Vojislav Srdanović</b> Deputy Executive (Zamjenik izvršnog direktora)	+382 20 223 704	vojislav.srdanovic@cotee.me
Electric Power Company of Montenegro, JSC Nikšić (EPCG) FU Production (HPP Perucica 1960; HPP Piva 1976)	<b>Fulvio Ivo Guidi</b> CEO	+382 40 204 162	fulvioivo.guidi@epcg.com
Electric Power Company of Montenegro, JSC Nikšić (EPCG) Directorate for Energy Management	<b>Momir Grbović</b> Executive Director	+382 40 204 239	momir.grbovic@epcg.com
Elektroprivreda Crne Gore AD Nikšić (EPCG) FU Distribution	<b>Ranko Vuković</b> Director of Development		ranko.vukovic@epcg.com
Montenegrin Electric Power Transmission System (CGES)	<b>Ivan Bulatović</b> Executive Director, Podgorica		ivan.bulatovic@cgcs.me
Chamber of Economy of Montenegro The Committee of the Association of Energy and Mining	<b>Ranko Vukmirović</b> Secretary of the Association for Energy and Mining, Chamber of Economy of Montenegro	+382 69 318 180	rvukmirovic@pkcg.org
	<b>Igor Popovic</b> Board Member of the Chamber of Economy Assembly	+382 67 616 492	ipopovic@pkcg.org
	<b>Marga Kokovic</b> Secretary	+382 20 230 706	mkokovic@pkcg.org

The following investors have contributed to this study with their experience and knowledge:

**Table 6-2: List of investors who have contributed to this study**

Investors	Contact Person	Phone	Email
Igma Energy d.o.o. Andrijeva (Bradavec 2015; Piševska planned)	Igor Mašović	+382 67 488 488	igma@t-com.me
Nord Energy d.o.o. Andrijeva	Radenko Vulekić	+382 67 180 157	nordenergy.andrijeva@gmail.com radenko.nordenergy@gmail.com
Nord Elektro d.o.o. Andrijeva	Momo Jokić	+382 69 047 735	okic@t-com.me
Vodovod Andrijeva d.o.o. Andrijeva	Kuburović Dušan	+382 67 622 186	1vodovodikanalizacija@gmail.com
Hydroslavan d.o.o. Andrijeva	Stanislav Košut Dejan Miš	+421 911 107 340 +421 908 908 938	kosut@4energygroup.eu mis.dejan@gmail.com
Small Hydro Power Mojanska d.o.o. Andrijeva	Andras Horvath Jelena Stojković	+382 69 100 411 +382 69 100 410	andras.horvat@hydrologistics.me jelenastojkovic@t-com.me
Dekar – Hydro d.o.o. Podgorica (Ljeviska Rijeka Kolasin, under construction)	Momčilo Miranović	+382 67 624 620	dekar@t-com.me
PM Hydro d.o.o. Podgorica	Andras Horvath Tanja Kovačević	+382 69 100 411 +382 68 888 881	andras.horvat@hydrologistics.me kovacevic.tanja@yahoo.com
Hidroenergija Andrijeva d.o.o. Andrijeva (Jezerstica 2013, Bistrica 2014, Orah 2014, Rmus 2014, Spalevici 2014)	Dragan Šekularac	+382 67 253 401	dsekularac66@gmail.com
Hidroenergija Berane	Stevan Knežević	+382 67 640 659	

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