The Electric Power System

- Montenegro -
Basic facts

- Area: 13 812km²
- Population: 620 029 (2011)
- 1 TSO
- 1 DSO
- 320 000 consumers
- Peak load: approx. 593 GW
- Average interruption of electricity (2014): 11.6 min
Global map of the grid and of its interconnections

Interconnectors with:
- Serbia
- Bosnia and Herzegovina
- Albania
The electricity grid in Montenegro is divided into transmission grid (400kV, 220kV and 110kV) and distribution grid (35kV, 10kV and 0.6kV).

<table>
<thead>
<tr>
<th></th>
<th>Voltage Level</th>
<th>Total length</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission grid</td>
<td>400kV</td>
<td>284 km</td>
<td>TSO</td>
</tr>
<tr>
<td>Transmission grid</td>
<td>220kV</td>
<td>348 km</td>
<td>TSO</td>
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<tr>
<td>Transmission grid</td>
<td>110kV</td>
<td>607 km</td>
<td>TSO</td>
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<tr>
<td>Distribution grid</td>
<td>35kV</td>
<td>1 061 km</td>
<td>DSO</td>
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<tr>
<td>Distribution grid</td>
<td>10kV</td>
<td>4 500 km</td>
<td>DSO</td>
</tr>
<tr>
<td>Distribution grid</td>
<td>0.4kV</td>
<td>14 500 km</td>
<td>DSO</td>
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Structure of electrical power system

Montenegrin Power System
Map of the high voltage grid

- 400kV power lines
- 220kV power lines
- 110kV power lines

Montenegrin Power System
Information on TSO

- Name: CGES
- Network length: 1,239 km
- Served area: 620,029 km²
- Annual transmitted energy: 6,123 GWh
- Website: http://cges.me/
Cooperation of TSO and DSOs

Transmission grid

Distribution grid 1. Level

Distribution grid 2. Level

Montenegrin Power System
Responsibilities of TSO & DSOs

**TSO**
- Safe and reliable operation of the power system in real time
- Long-term and short-term planning of the system
- In transparent and non-discriminatory manner provide access to the transmission network to producers and eligible customers connected to the transmission network
- System services and balancing system and to this end has the right to purchase electricity
- Purchase of electricity to cover losses in the transmission network
- Approval and implementation of the electricity transit
- Calculates and monitors deviations in real time and implemented a program to balance deviations of the electric power system of Montenegro

**DSO**
- Safe and reliable operation of the distribution system in real time
- Long-term and short-term planning of the distribution system
- In transparent and non-discriminatory manner provide access to the distribution network to producers and qualified customers connected to the distribution network, as well as public suppliers and all licensed suppliers
- Buy electricity to cover losses in the distribution network
Power structure of the country
Installed capacity with reference to primary resources

- Installed capacities (GW), year 2014
  - Coal 218
  - Hydro power 661

Montenegrin Power System
Energy production with reference to primary resources

- Electricity generated (GWh), year 2014:
  - Coal 1322
  - Hydro power 1686
Development of generation capacity

- No significant power plant was built in the past 30 years
- Small hydro power „Jezerštica" was built in 2013
- Small hydro power „Vrelo" was built in 2015
Power consumption in 2014:
- distribution 2,496 GWh
- industry 793 GWh
Location of renewable energy sources

- Podgor (0.46MW)
- Rijeka Crnojevića (0.65MW)
- Rijeka Mušovića (1.95MW)
- Slap Zete (2.4MW)
- Glava Zete (6.4MW)
- Šavnik (0.2MW)
- Lijeva Rijeka (0.11MW)
- Jezerštica (1MW)
- Vrelo (0.59MW)
Development of wind power

- Currently there aren’t any wind power plants

- However two wind power plants are expected to be build soon, Možura (installed power 46MW) and Krnovo (installed power 72MW)
Development of photovoltaic power

There aren’t any photovoltaic power sources in Montenegro
RES installed capacity and production

- Small hydro power plants produced 30 GWh in 2014
Price development for households and industry consumers

Average price for electricity for households and industry consumers [cent/kWh]

- **2009**: 10.23 cent/kWh
- **2010**: 7.85 cent/kWh
- **2011**: 7.27 cent/kWh
- **2012**: 7.68 cent/kWh
- **2013**: 8.05 cent/kWh
- **2014**: 8.25 cent/kWh

*The cost to direct (industry) consumers incl. network transmission, COTEE, OIE

**The cost of distribution to consumers incl. grid fee contribution (distr., trans.), COTEE, OIE, fee supplier

**COTEE** - Montenegrin operator of the electricity market

**OIE** - Renewable electricity
Electricity market organisation

The electricity market in Montenegro is officially open from 1\textsuperscript{st} January 2009.

It consists of wholesale and retail markets.

Established the model of the wholesale electricity market including:

- long-term - market based on bilateral contracts,
- in the medium term - the day ahead market,
- in the short term - the balancing market.
Power balance in 2014

- Generation 3 809 GWh
- Consumption 2843 GWh
- Imports 388 GWh
- Exports 647 GWh
- Losses 622 GWh
Energy exchanges in 2014.

Commercial flows (GWh)
- 0,4 → 1909,4
- 101,3 → 1743

Physical flows (GWh)
- 209 → 3240
- 740 → 652
- 145 → 2691

Montenegrin Power System
Specific aspects of the electricity market

Electricity market in Montenegro has not been developed yet, so the outlines of the market will be seen when a regional electricity market in South East Europe (SEEPEX) begins to operate.