

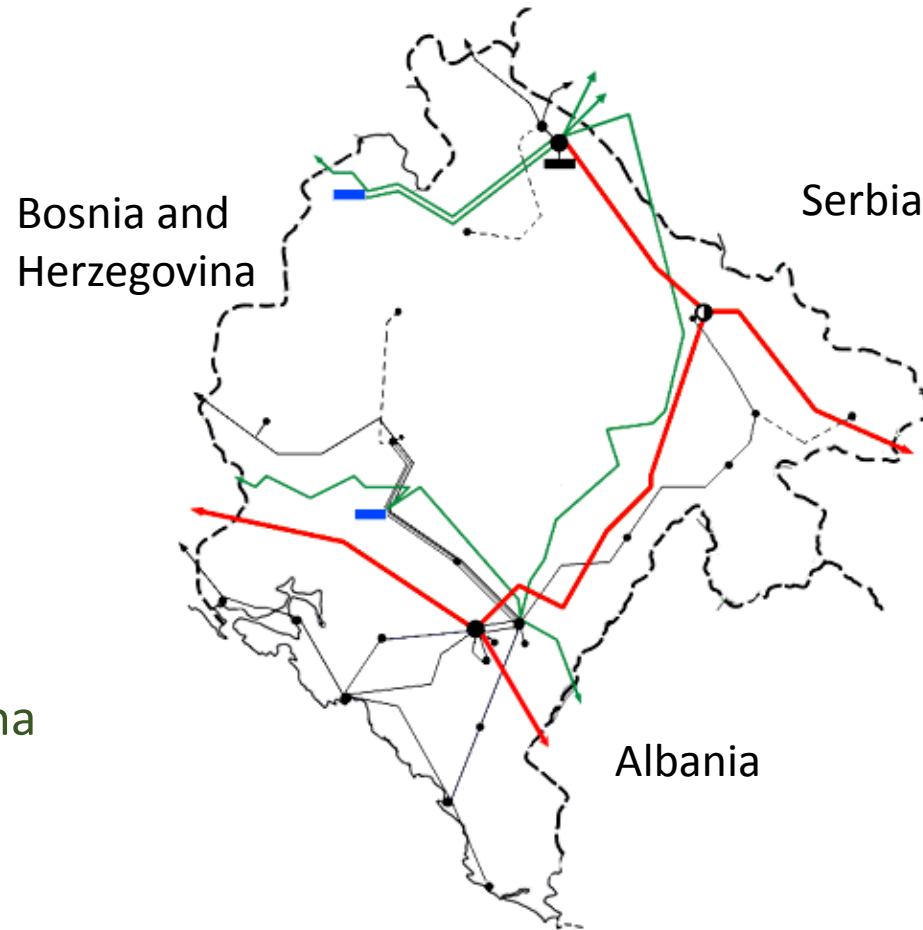
# The Electric Power System

## - Montenegro -

# Basic facts

- ❑ Area: 13 812km<sup>2</sup>
- ❑ 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:

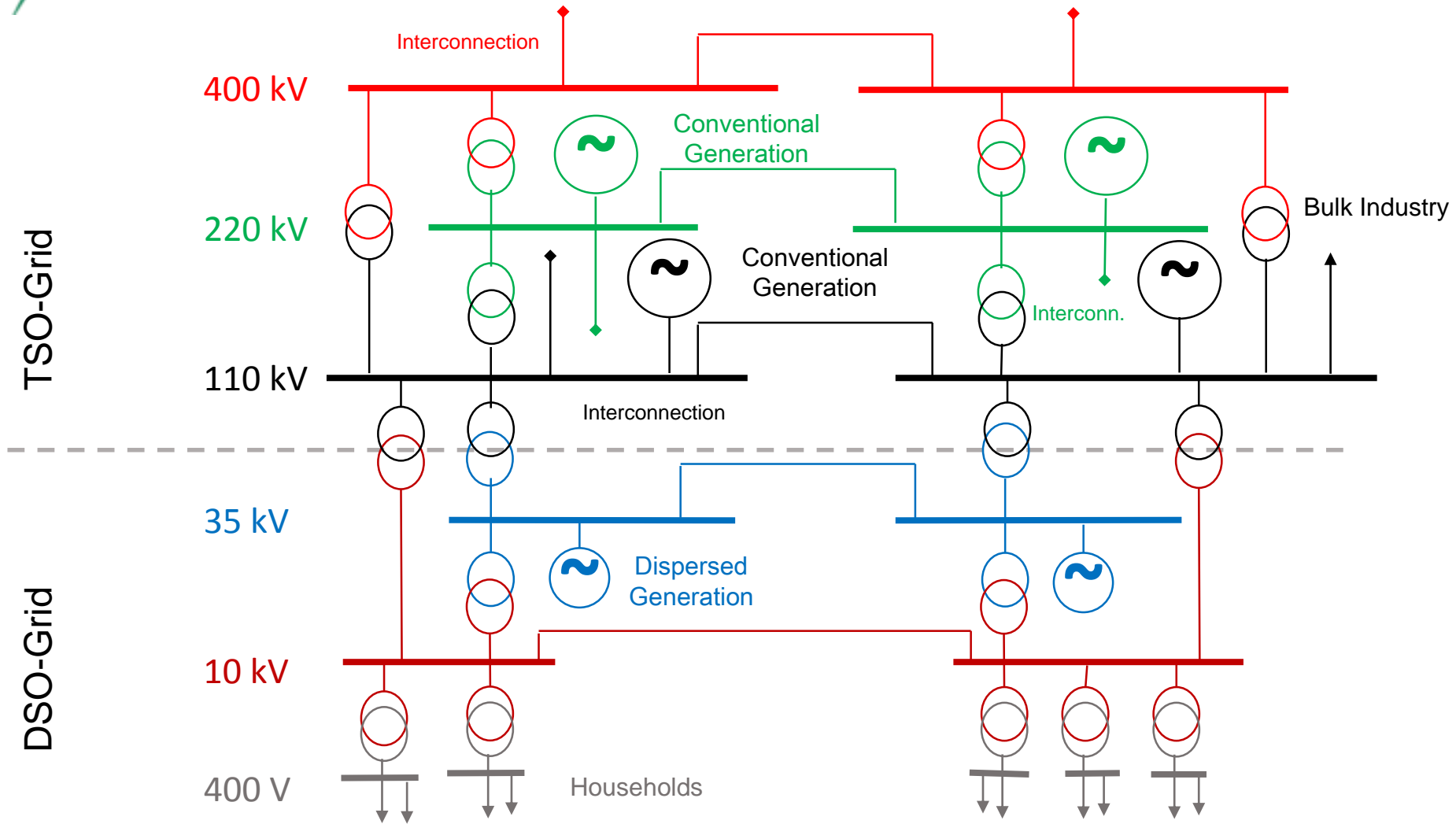
- Serbia
- Bosnia and Herzegovina
- Albania

# Grid facts and characteristics

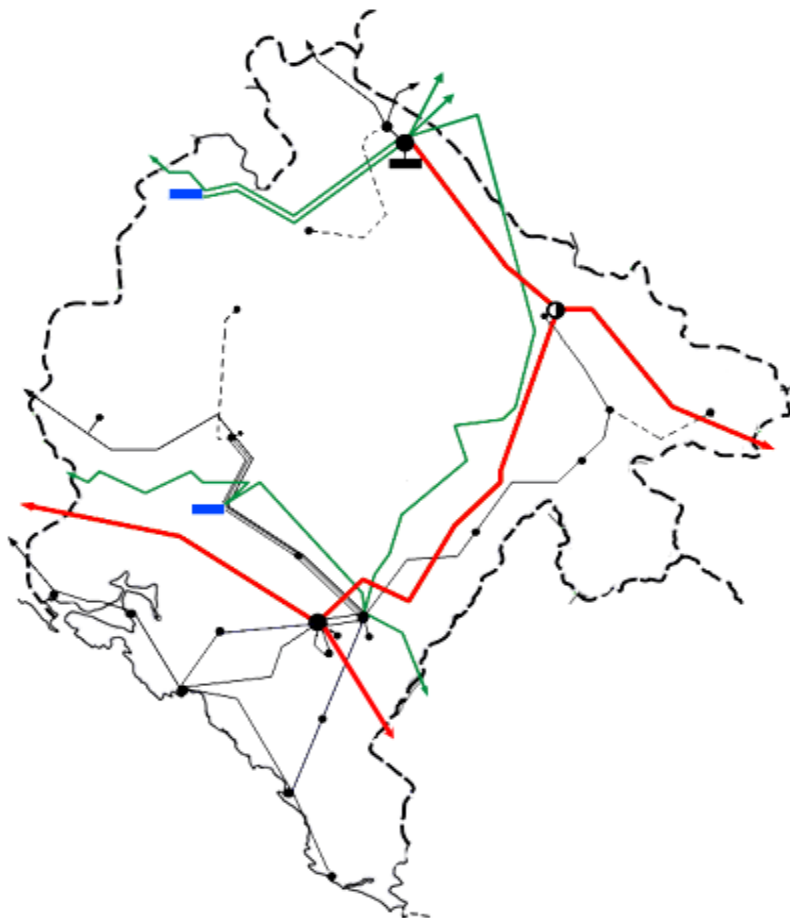
- The electricity grid in Montenegro is divided into transmission grid (400kV, 220kV and 110kV) and distribution grid (35kV, 10kV and 0.6kV)

	Voltage Level	Total length	Responsibility
Transmission grid	400kV	284 km	TSO
Transmission grid	220 kV	348 km	TSO
Transmission grid	110kV	607 km	TSO
Distribution grid	35kV	1 061 km	DSO
Distribution grid	10kV	4 500 km	DSO
Distribution grid	0.4kV	14 500 km	DSO

# Structure of electrical power system



# Map of the high voltage grid



400kV power lines

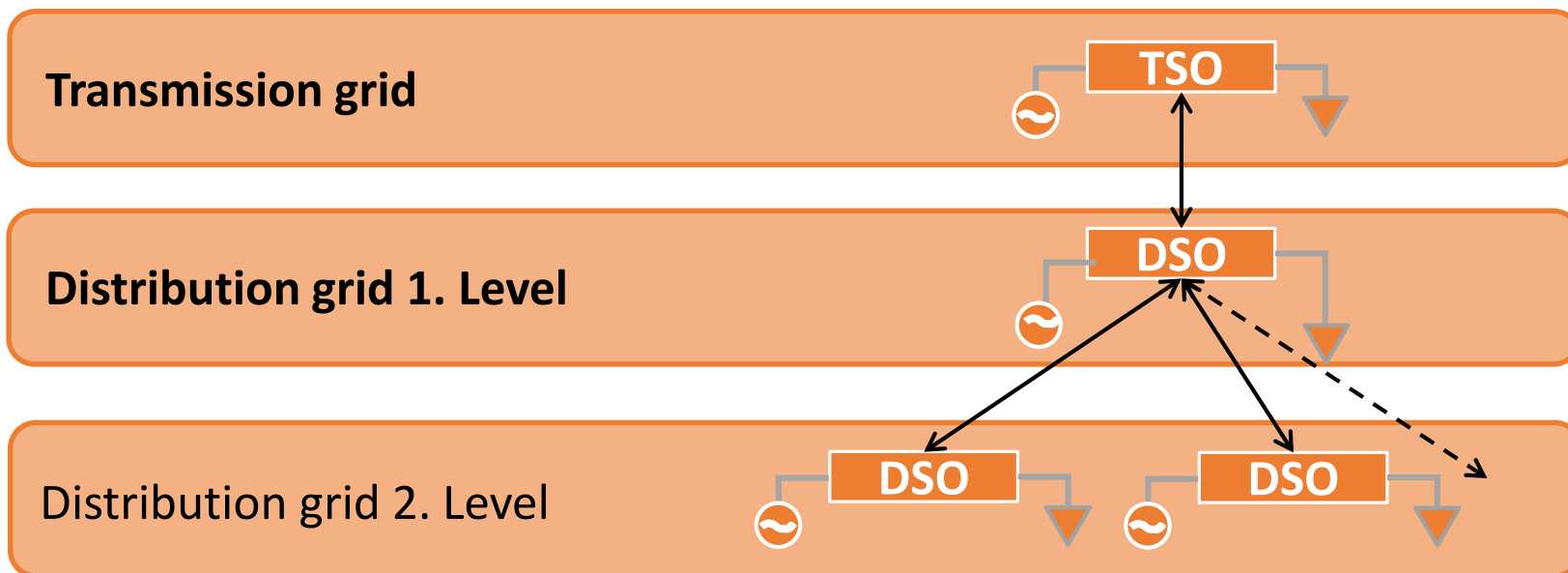
220kV power lines

110kV power lines

# Information on TSO

- Name: CGES
- Network length: 1 239 km
- Served area: 620 029 km<sup>2</sup>
- Annual transmitted energy: 6 123 GWh
- Website: <http://cges.me/>

# Cooperation of TSO and DSOs





# 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

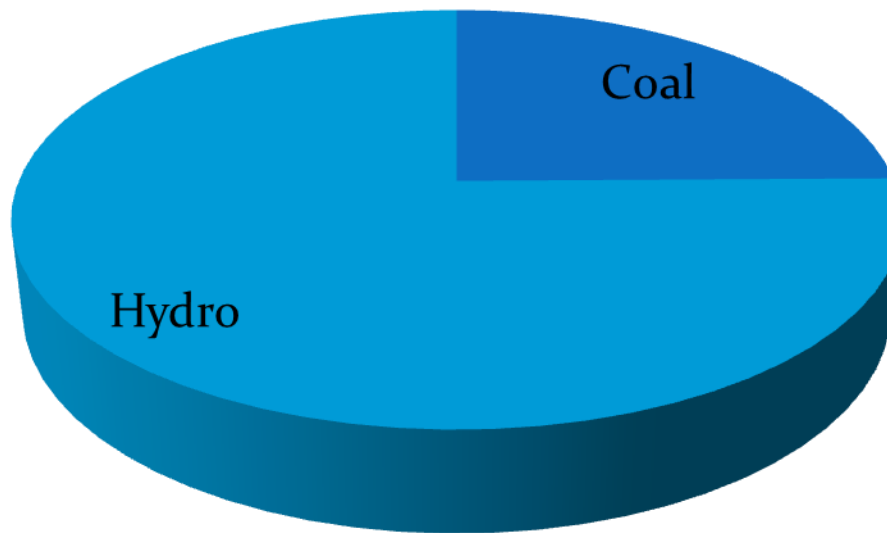
- Safe and reliable operation of the distribution system in real time
- Long-term and short-term planning of to the distribution system
- In transparent and non-discriminatory manner provide access to the distribution network to producers and qualified customers connected to the distribution network, as well as public suppliers and all licensed suppliers
- Buy electricity to cover losses in the distribution network

# Power structure of the country



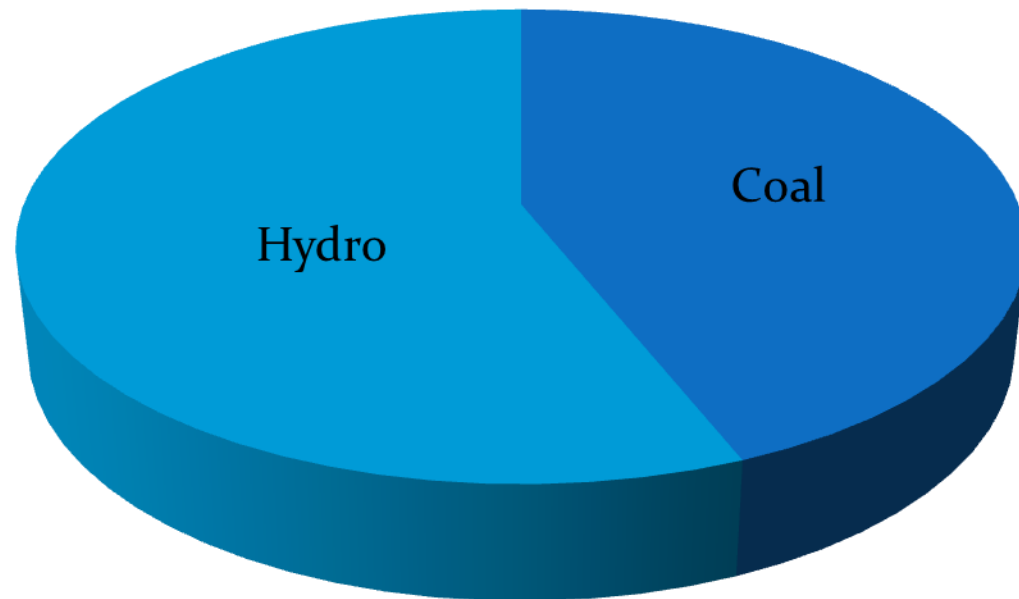
# Installed capacity with reference to primary resources

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



# Energy production with reference to primary resources

- Electricity generated (GWh), year 2014:
  - Coal 1322
  - Hydro power 1686



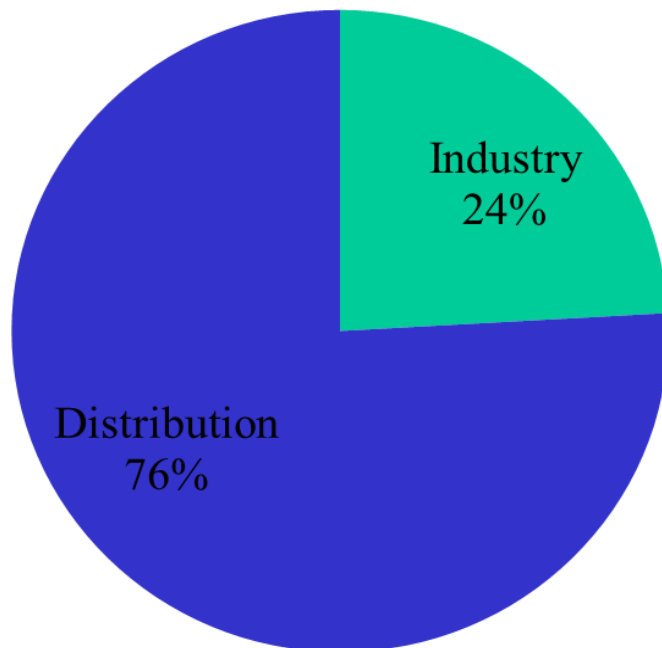
# Development of generation capacity

- 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

# Consumption

## □ 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

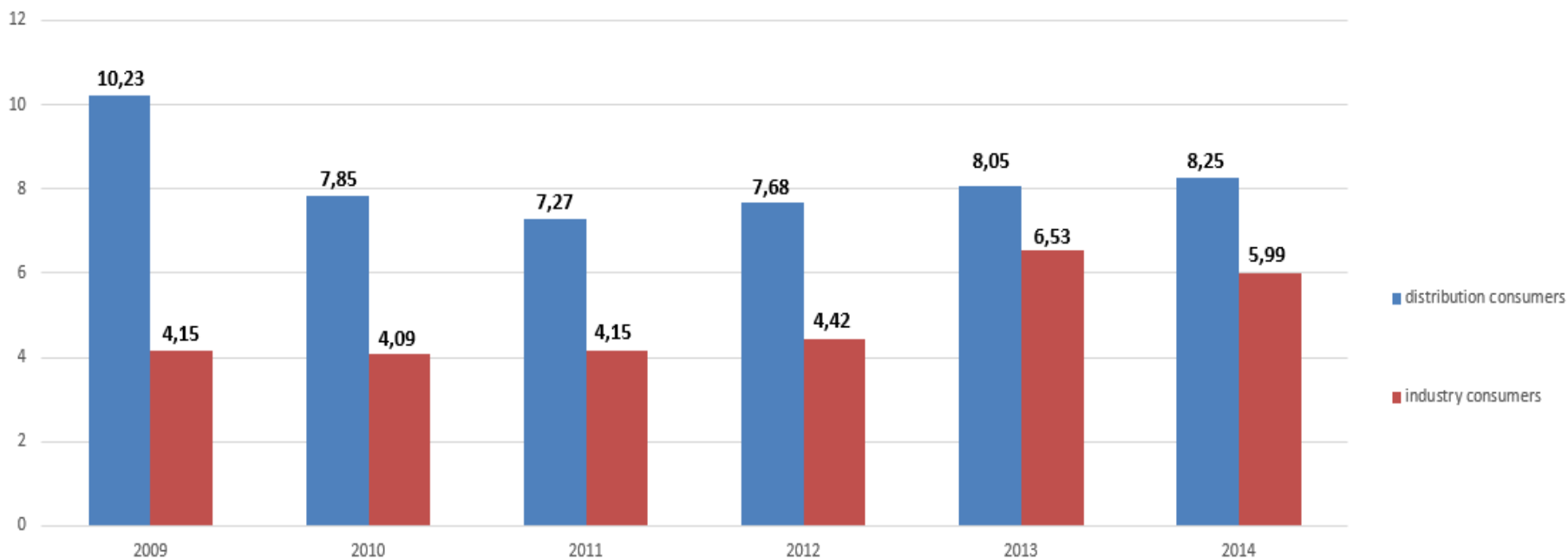


# RES installed capacity and production

- ❑ Small hydro power plants produced 30 GWh in 2014

# Price development for households and industry consumers

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



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

COTEE<sup>1</sup> - Montenegrin operator of the electricity market  
OIE<sup>2</sup> - Renewable electricity

\*\* the cost of distribution to consumers incl. grid fee contribution (distr., trans.), COTEE<sup>1</sup>, OIE<sup>2</sup>, fee supplier

# Electricity market organisation

The electricity market in Montenegro is officially open from 1<sup>st</sup> 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.

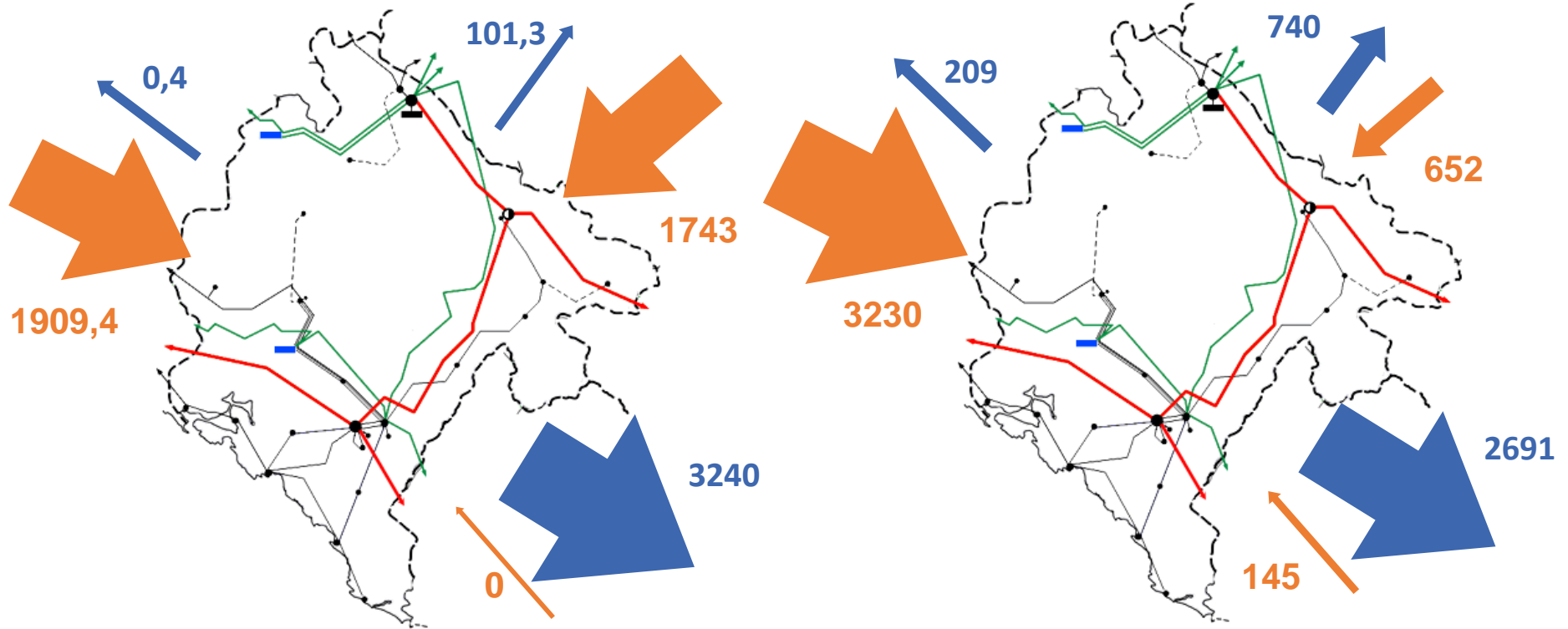
# Power balance in 2014

- Generation 3 809 GWh
- Consumption 2843 GWh
- Imports 388 GWh
- Exports 647 GWh
- Losses 622 GWh

# Energy exchanges in 2014.

Commercial flows (GWh)

Physical flows (GWh)





# 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.