The Electric Power System

- Romania -
Basic facts

- Area: 238 397km$^2$
- Population: 19, 71 mil
- Number of electricity consumers: 9,15 mil
- Number of TSOs: 1
- Number of DSOs: 8
- Peak load (2017): 9 865 MW
- Average interruption of electricity (2017): 2,76 min
Global map of the grid and of its interconnections

- Interconnectors with:
  - Ukraine
  - Hungary
  - Serbia
  - Bulgaria
Grid facts and characteristics

- The power grid in Romania is divided into transmission grids (maximum voltage) and distribution grids (high, medium and low voltage).

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Voltage Level</th>
<th>Total length (approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSO</td>
<td>750 kV</td>
<td>3,1 km</td>
</tr>
<tr>
<td>TSO</td>
<td>400 kV</td>
<td>4 915,2 km</td>
</tr>
<tr>
<td>TSO</td>
<td>220 kV</td>
<td>3 875,6 km</td>
</tr>
<tr>
<td>TSO</td>
<td>110 kV</td>
<td>40,4 km</td>
</tr>
<tr>
<td>DSO</td>
<td>≤ 110 kV</td>
<td>337 500 km</td>
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</tbody>
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Structure of electrical power system
Map of the high voltage grid
Information on TSO

- Name: CNTEE TRANSELECTRICA SA
- Network length (km): 8 834 km
- Served area (km²): 238 391 km²
- Annual transmitted energy (TWh): 56,9 TWh
- Website: http://www.transelectrica.ro
Cooperation of TSO and DSOs

Romanian Power System
Responsibilities of TSO & DSOs

- **Operational planning** activity covers the following components:
  - Planning the normal operational diagram;
  - Planning the withdrawing from operation of generation, transmission and distribution installation within the RPS;
  - Planning the protection and automation systems;
  - Voltage levels planning.

- **Operational management**
  - **Operational scheduling** and
  - **Operational control**

- **Balancing market (only for TSO)**
Power structure of the country

Installed capacities: 24 601 MW in 2018

- Coal: 25.36%
- Gas: 22.98%
- Nuclear: 5.74%
- Hydro: 27.48%
- Photo: 5.59%
- Wind: 12.31%
- Biomass: 0.53%

Romanian Power System
Installed capacity with reference to primary resources

- Installed capacities 24,601 GW, in 2018
  - Coal: 6240,267 MW
  - Gas: 5654,48 MW
  - Hydro: 6761,007 MW
  - Nuclear: 1413,000 MW
  - Solar: 1374,787 MW
  - Wind: 3029,739 MW
  - Biomass: 130,435 MW
  - Others: 0,05 MW
Energy production with reference to primary resources

- Electricity generated 59.8 TWh in 2017
  - Coal and Gas: 25.1 TWh
  - Nuclear: 10.6 TWh
  - Hydro: 14.5 TWh
  - Renewables: 9.6 TWh
Development of generation capacity since 2009

Instaled Capacity (MW)


Consumption per customer groups

- Industry (including Mining): 55%
- Households: 24%
- Agriculture: 2%
- Construction: 1%
- Others (Services & Transports): 18%
Location of renewable energy sources

Installed PV panels

Installed Wind turbines
Development of wind power

Installed capacity (MW)

Year


Development of capacity
Accumulated capacity (end of year)
Development of photovoltaic power
Electricity market organisation

State ownership interests in the sector
- Bulk of generation (Ministry for Energy)
- Transmission (Ministry of Economy)

Large state-owned businesses recently listed to the stock exchange
- Generation: small stakes of Nuclearelectrica, Romgaz
- Distribution & Sale: majority share of Electrica

Unbundling ✓
- Network business fully separated from market side (generation and sale)

Corporate governance Ordinance (no. 109/2011) being gradually implemented at state-owned companies

Romanian Power System
Power balance in 2017

- Generation: 59.8 TWh
- Consumption: 56.9 TWh
- Imports: 3.2 TWh
- Exports: 6.1 TWh
- Losses: 0.965 TWh
Specific aspects of the electricity market

Romanian Market Structure 2005 - present

- Market for bilateral contracts – 100% centralized market since 2012
- Day Ahead Market – voluntary and centralized market (2005); 4M MC (CZ-SK-HU-RO Day Ahead Market Coupling) since November 2014
- Intraday Market – voluntary and centralized market (2011)
- Balancing Market – mandatory and centralized market (2005)
- Ancillary Services Market – mandatory / voluntary centralized market
- Green Certificates Market – centralized market
Specific aspects of the electricity market

Romanian Market Structure

ADVANTAGES

- System balancing – using market based mechanisms
  - Balancing energy suppliers receive at least the offered price;
  - The imbalances are penalized (imbalance price);
  - Contractual obligations are guaranteed (bilateral, day-ahead and intraday contracts);
  - Congestion management – costs supported by TSO.

- Self-scheduling
Specific aspects of the electricity market

**Romanian Market Structure**

**Energy**
- Market for bilateral contracts
- Day Ahead Market
- Intraday Market
- Balancing Market

**Capacity**
- Cross Border Capacity Allocation Market
- Ancillary Services Market

**Promote**
- Green Certificates Market

**Romanian TSO - administrates**

- Cross Border Capacity Allocation Market
- Ancillary Services Market
- Balancing Market

integrated under one market platform (DAMAS)

- The monitoring activity is done according with the Regulator Authority Methodology and the internal procedures, in compliance with the international practice.