The Electric Power System

- Republic of Korea -
Basic facts

- Area: 49,720 km²
- Population: 51,465,228 (2014)
- Number of electricity consumers: 21,209 thousand
- Number of TO (Transmission Owner): 1 (KEPCO)
- Number of ISO: 1 (KPX)
- Number of DSO: 1 (KEPCO)
- Peak load: 77,295 (2014)
- Average interruption of electricity: 10.9 min (2014)
Global map of the grid and of its interconnections

- Interconnectors with:
  - No interconnection between other countries
The electricity grid in Korea is sub-divided into transmission grids (EHV, HV, DC) and distribution grids (medium and low voltage).

<table>
<thead>
<tr>
<th>Voltage Level</th>
<th>Total length</th>
<th>Responsibility</th>
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<tr>
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Structure of electrical power system

- **765 kV**
- **345 kV**
- **154 kV**
- **22.9 kV**
- **220 V**

**Conventional Generation**

**Industry**

**Dispersed Generation**

**Households**

**Bulk-Industry**

Republic of Korea Power System
Map of the high voltage grid
Information on ISO, TO & DSO

- Name: KEPCO, KPX
- Network length (km): 485,770
- Served area (km²): 49,720
- Website: [http://www.kepco.co.kr](http://www.kepco.co.kr), [http://www.kpx.or.kr](http://www.kpx.or.kr)
Cooperation of ISO, TO and DSO

- **Transmission System**
  - ISO builds transmission operations planning
  - TO implements the planning built by ISO

- **DSO (KEPCO)**
  - DSO builds distribution operations planning and implements the planning
Responsibilities of ISO, TO and DSO

- **ISO(KPX)**
  - Responsible for maintaining the generation and the transmission system reliabilities

- **TO(KEPCO)**
  - Responsible for maintain the transmission asset

- **DSO(KEPCO)**
  - Responsible for distribution system qualities
Power structure of the country
Installed capacity with reference to primary resources

Installed capacities (MW), 2014

- Gas: 26742 MW
- Coal: 26274 MW
- Nuclear: 20716 MW
- Oil: 3850 MW
- Solar: 1791 MW
- Wind: 604 MW
- Biomass: 137 MW
- Others: 11335 MW
Energy production with reference to primary resources

Electricity generated (TWh), year

- Gas: 114.7 TWh
- Coal: 203.4 TWh
- Nuclear: 156.4 TWh
- Oil: 25 TWh
- Solar: 2.1 TWh
- Wind: 1.1 TWh
- Biomass: 8.3 TWh
- Others: 2.6 TWh
Development of generation capacity since 2009

![Chart showing the development of generation capacity in the Republic of Korea from 2009 to 2014. The chart displays the percentage contributions of renewable, hydro, coal, nuclear, gas, and oil sources over time.](image-url)
Power consumption by consumer groups, 2014

- Industry: 57%
- Households: 13%
- Other: 21%
- Public institutions: 2%
- Agriculture: 3%
- Streetlight: 1%
- Midnight: 3%
Location of renewable energy sources
Development of wind power

Development of Capacity

Accumulated capacity

Republic of Korea Power System
Development of photovoltaic power
RES installed capacity and production since ...

![Graph showing RES generation and installed capacity](image-url)
Price development for industry consumers

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

Average price for electricity for households [cent/kWh]

Republic of Korea Power System
Energy exchanges in ....
Power balance in 2014

- Generation: 521.97 TWh
- Consumption: 503.7 TWh
- Losses: 18.27 TWh
Electricity market organisation

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Specific aspects of the electricity market

- Cost Based Pool (CBP)
- Compulsory Power Pool
- A Day Ahead Market
- Uniform Pricing
- Capacity Payment (CP)
- Ancillary Service Fee