The Electric Power system

CHILE

cigre
For power system expertise

Power system of CHILE

Contents (1/2)

Contents (2/2)

Basic facts

- Area: 756,102 km²
- Population: 17,574,003 (2017)
- Number of electricity consumers: 1,825
- Number of ISOs: 1
- Number of DSOs: 0
- Peak load: 10,900 MW
- Average interruption of electricity: SAIDI 12.78 hours (2019)

Global map of the grid and of its interconnections

- Interconnectors with:
  - Argentina (SADI)

Grid facts and characteristics

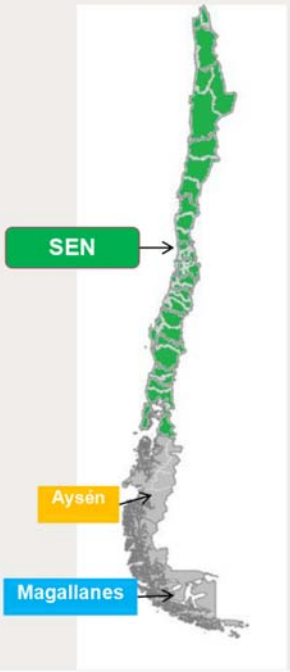
❑SEN

The National Electric System (SEN) of Chile, includes the installations for electrical generation, transmission and consumption encompassing the territory from the regions of Arica - Parinacota (North) to the Tenth Region (Isla Grande de Chiloé, South).

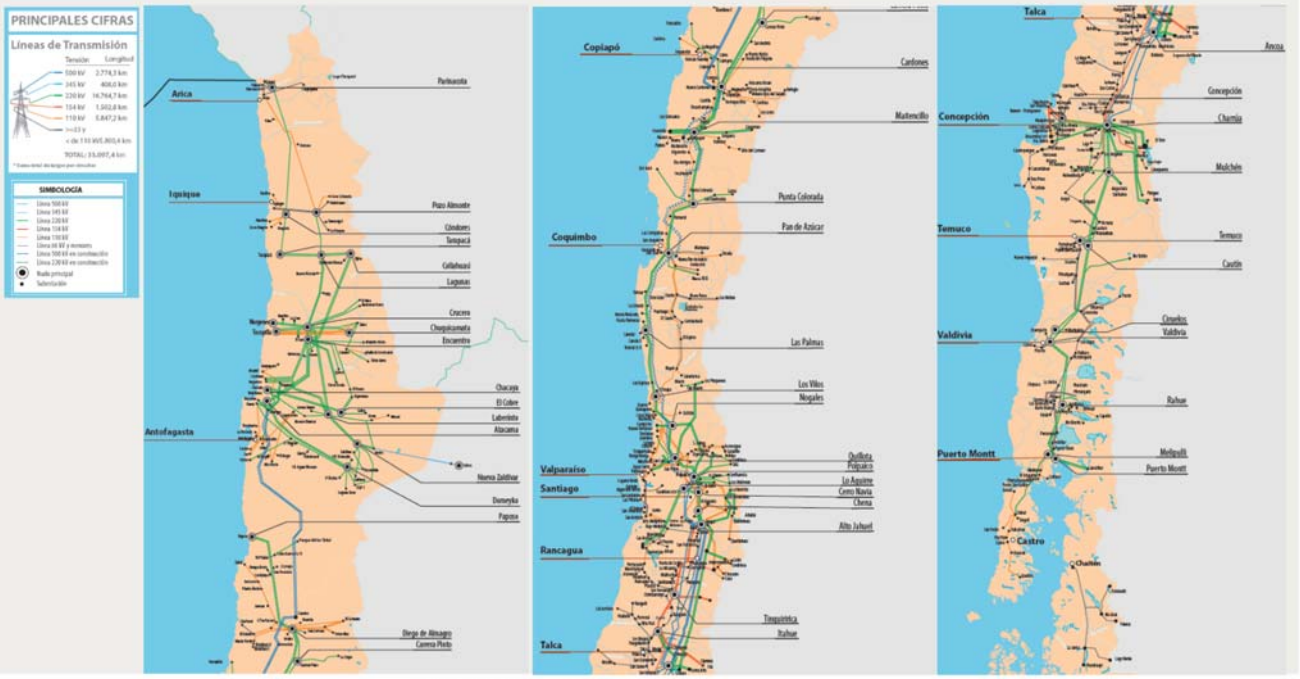
This system is the largest (35,501 km of transmission lines in 3,100 km of territory) and provides electrical energy to the Chilean territory, with an installed capacity through of 25,284 MW, and a supply coverage that reaches about 97% of the population.

Structure of electrical power system

The National Electric System of Chile (SEN) functions along in Chile as well as the Electrical System of Aysén and Magallanes.



Map of the high voltage grid



Information on ISO(s)

- Name: Coordinador Eléctrico Nacional (*)
- Network length (km): 35,501
- Served area (km²): 515,569
- Annual transmitted energy (TWh): 77.4
- website: https://www.coordinador.cl/

(*) Coordinador is an Independent System Operator (ISO)

Cooperation of ISO and DSOs

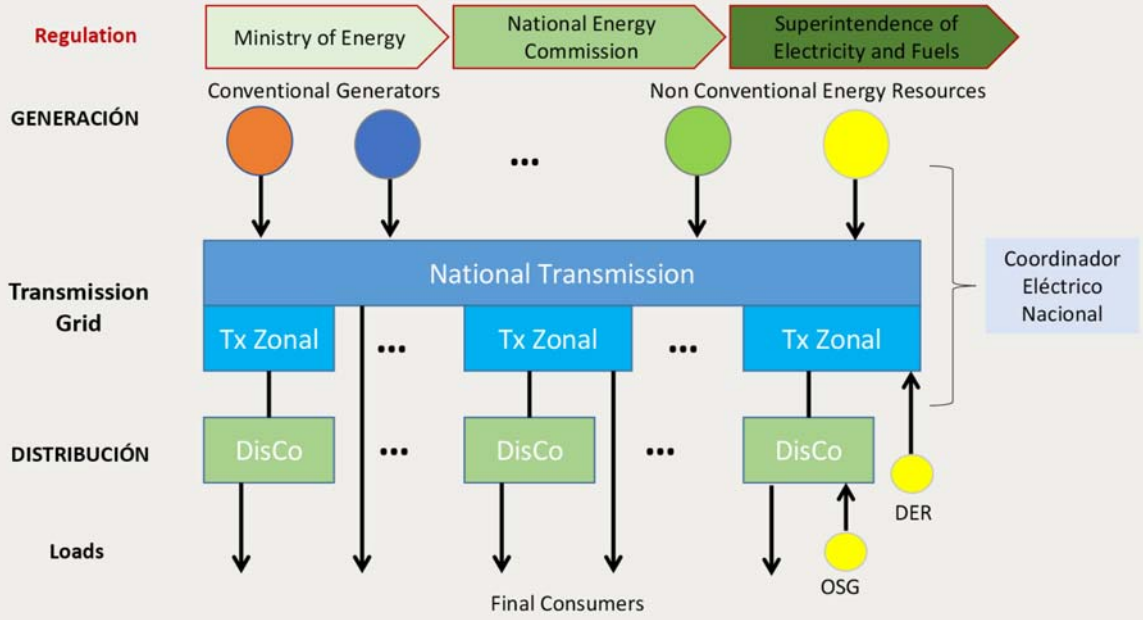
- Currently there are no DSOs in Chile.

Responsibilities of ISO

❑SEN

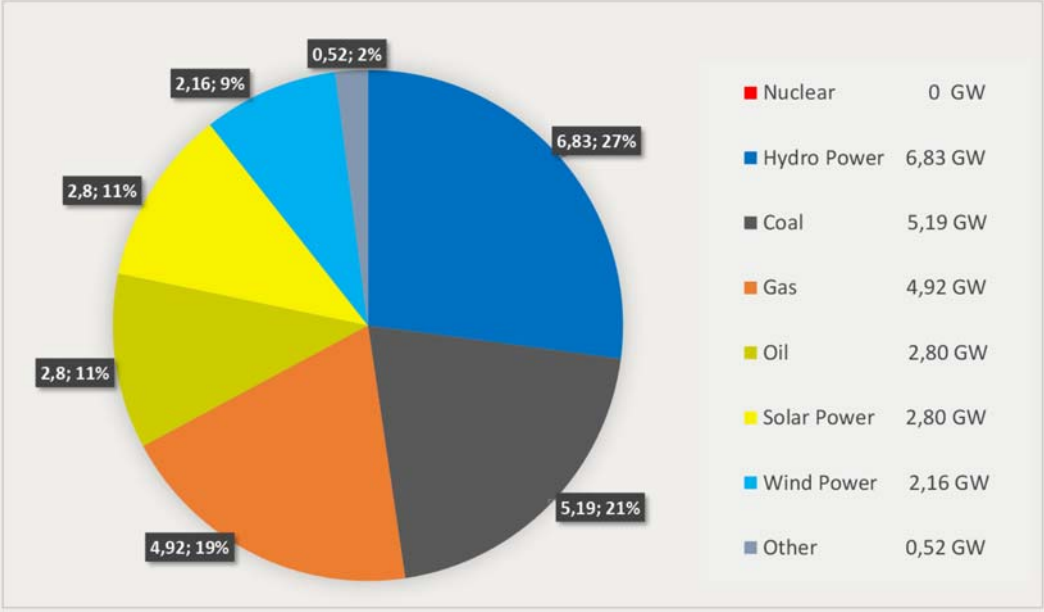
- Preserve the security of service in the electrical system.
- Ensure the most economical operation for all the facilities of the electric system.
- Ensure open access to the grid.

Power structure of the country / countries



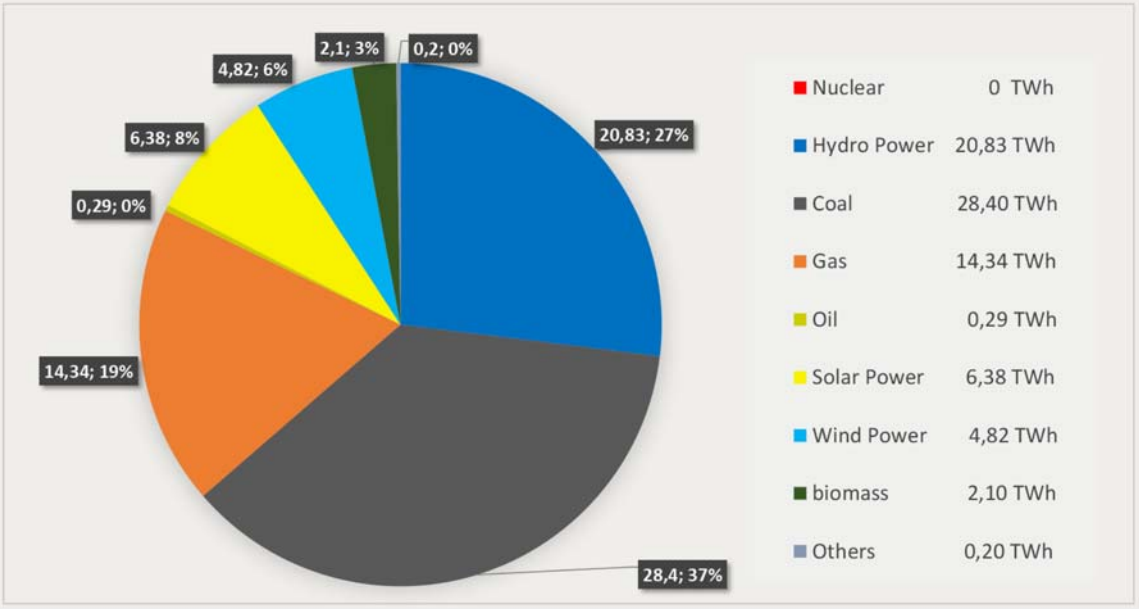
Installed capacity with reference to primary resources

- Installed capacities (GW), year 2019

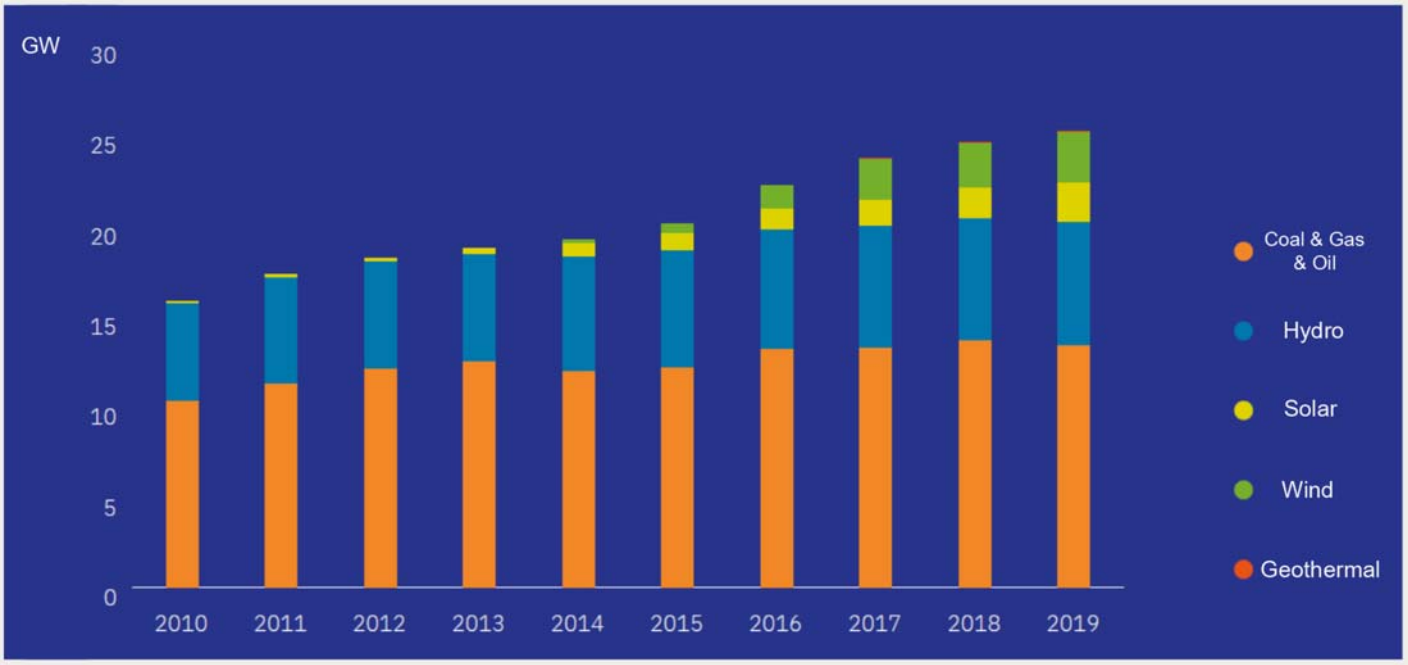


Energy production with reference to primary ressources

- Electricity generated (TWh), year 2019



Development of generation capacity

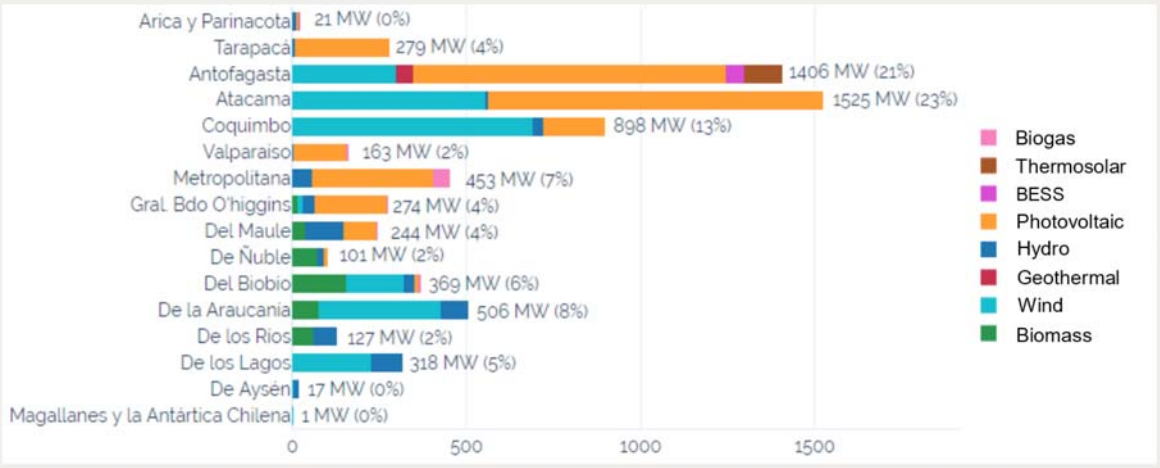


Comsuption per customer groups

Customer Group	SEN
	Clients Sales [GWh]
Mining	25,363
Industrial	14,951
Energetic	398
Transport	369
Distributors	29,331
Other	1,257
TOTAL	**71,669**

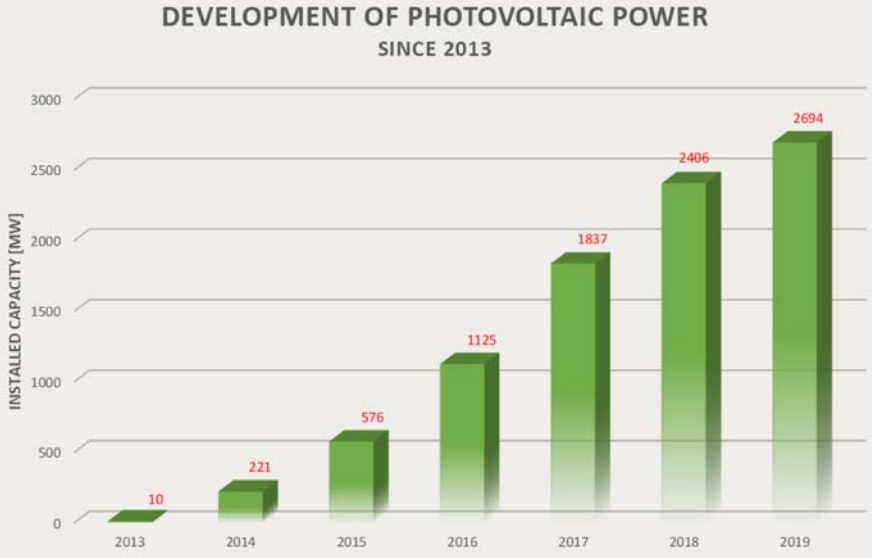
Location of renewable energy sources

- Renewable energy in Chile is a fast-growing sector that in 2019 provided 19.1% of the country's electricity.
- Chile has solar and wind energy, which are located mainly in the Second Region, Third Region and Fourth Region.

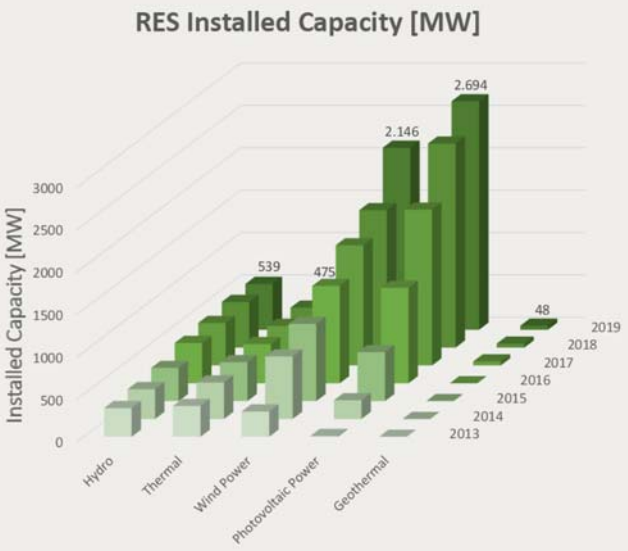


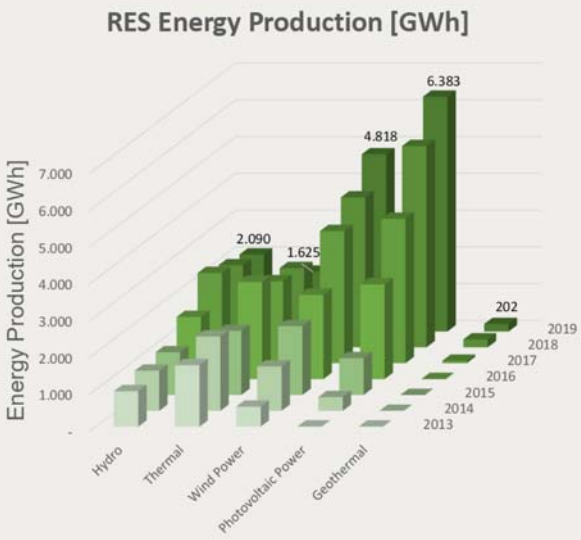
Development of wind power

Development of photovoltaic power & CSP



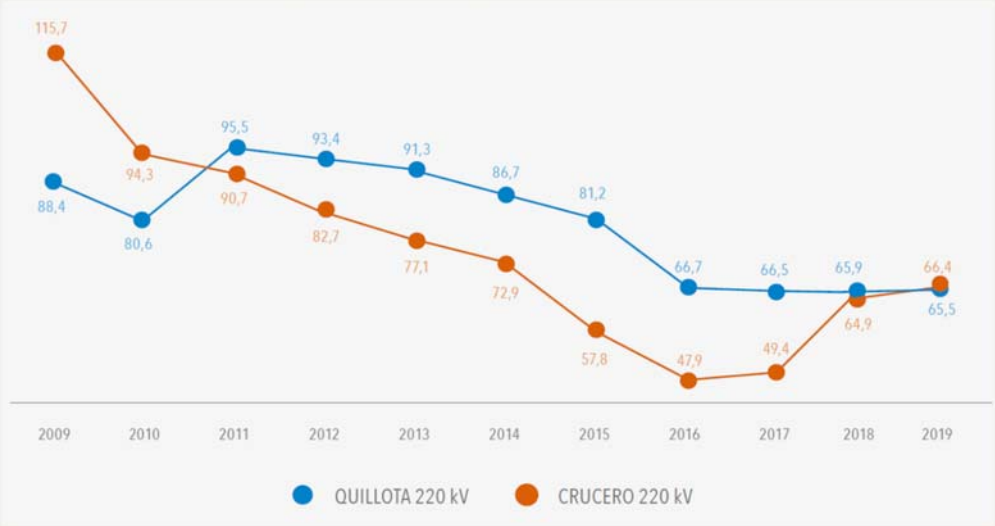
RES installed capacity and production per annum





Price development for industry consumers

- Evolution of energy marginal costs (annual average) per system between the years 2007 – 2019 [USD/MWh]



Note: SIC (Quillota) and SING (Crucero) systems were interconnected to form SEN in November 2017

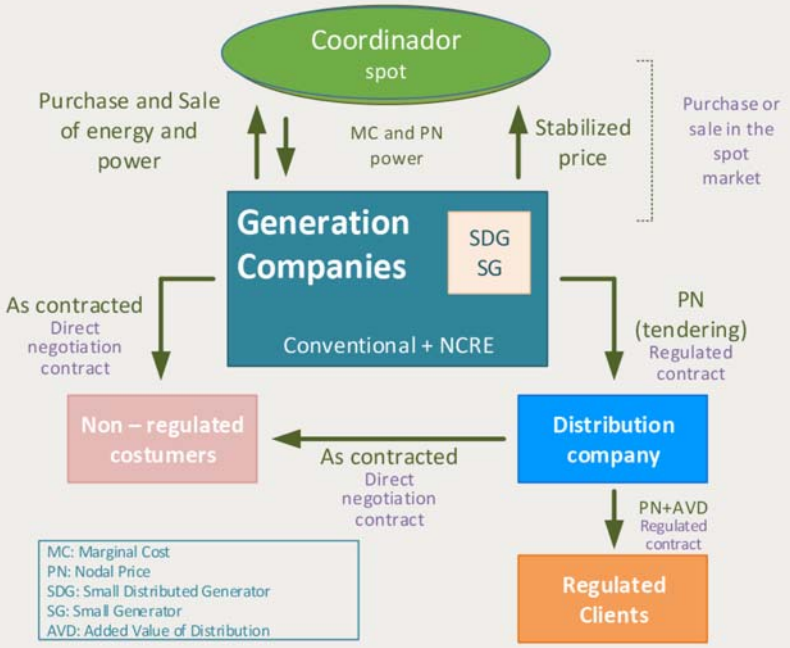
Price development for households

Region	Price Dec-2019 [USD/MWh]
Arica y Parinacota	173
Tarapacá	173
Antofagasta	154
Atacama	166
Coquimbo	188
Valparaíso	186
Metropolitana	143
O'Higgins	162
Maule	174
Ñuble	180
Biobío	171
La Araucanía	182
Los Ríos	184
Los Lagos	185
Aysén	170
Magallanes	164

Región	Consumo residencial per cápita (kWh-año)
Arica y Parinacota	1208,3
Tarapacá	1239,8
Antofagasta	1407,0
Atacama	1487,7
Coquimbo	1411,5
Valparaíso	1505,7
Metropolitana	1660,0

Región	Consumo residencial per cápita (kWh-año)
O'Higgins	1686,3
Maule	1571,2
Ñuble	1226,5
Biobío	1331,1
Araucanía	1306,8
Los Ríos	1385,6
Los Lagos	1543,8

Electricity market organisation



Open Access to Transmission Grid

Regulated Payment of Toll

3 Grid Segments: National, Zonal and Distribution

Power balance in 2018 / 2019

	SEN 2018	SEN 2019
Generation (TWh)	76.74	77.40
Consuption (TWh)	71.18	71.67
Imports (TWh)	0.0	0.0
Exports (TWh)	0.0	0.0
Losses (TWh)	5.56	5.73

Specific aspects of the electricity market

- Chilean Market operates as pool

  There are no bilateral markets

- By using Locational Marginal Prices (LMP), the congestion management is not an issue.

- In 2016 the Chilean Electricity Law was reformed on transmission regulation and a unique independent system operator (ISO) was created (Coordinador Eléctrico Nacional).
- Chile is analyzing a new legislation in Distribution that seeks to incorporate the figure of an energy trader, improve the quality of services and promote the incorporation of distributed generation.