



The Electric Power System

- ARGENTINA -





Basic facts

- ❑ Area: 2,780,400 km²
- ❑ Population: > 40 million
- ❑ Number of electricity consumers: 97,7%
- ❑ Number of TSOs: 8
- ❑ Number of DSOs: 75
- ❑ Peak load: 26,320 MW (Feb 2018)

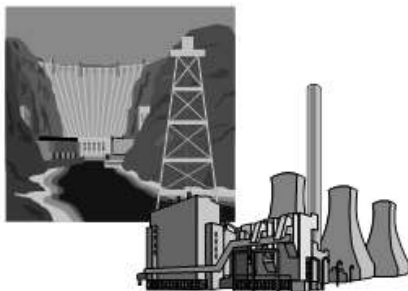




Basic facts

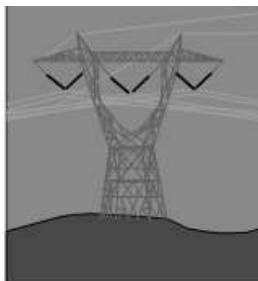
Generators:

325 Generators
26 Auto-Generators
7 Co-Generators



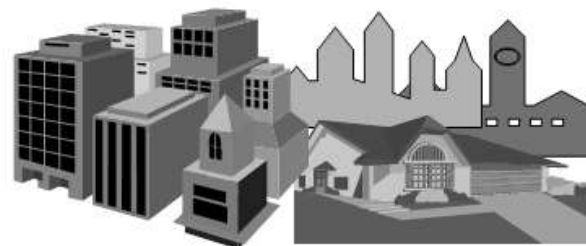
Transmission:

8 HV Companies
44 Additional
Companies



Distribution:

75 Companies



Big Consumers:

8,577 Big Consumers



Traders:

6 Companies



44

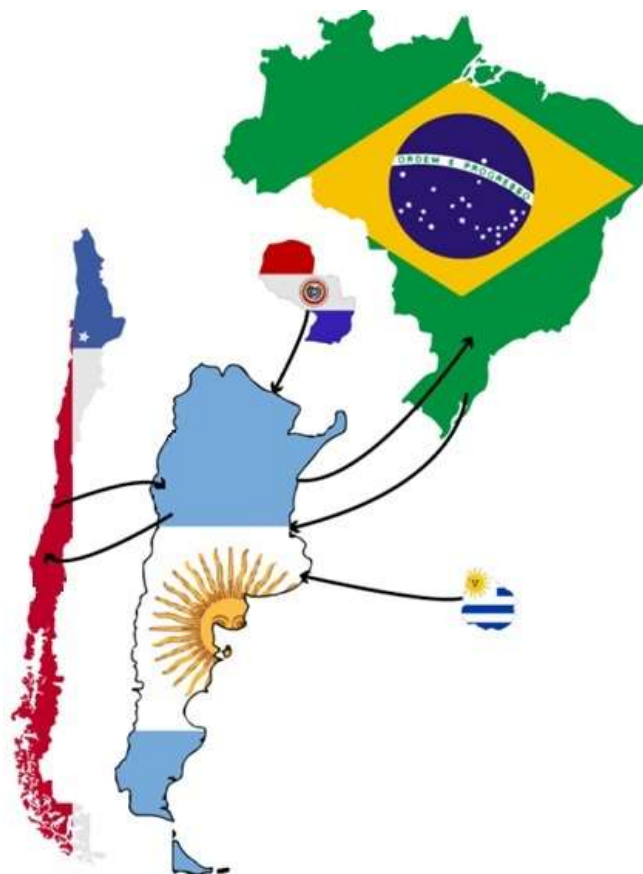




Global map of the grid and of its interconnections

□ Interconnectors with:

- Uruguay
- Brazil
- Chile
- Paraguay





Grid facts and characteristics



ELECTRICITY MARKET		
Installed Generation	35,950 MW	
Transmission Lines	500 KV	14,195 km
	330 KV	1,120 km
	220 KV	2,835 km
	132 KV	29,200 km
Demand	Energy	136,466 GWh/year
	Maximum	26,320 MW





Grid facts and characteristics

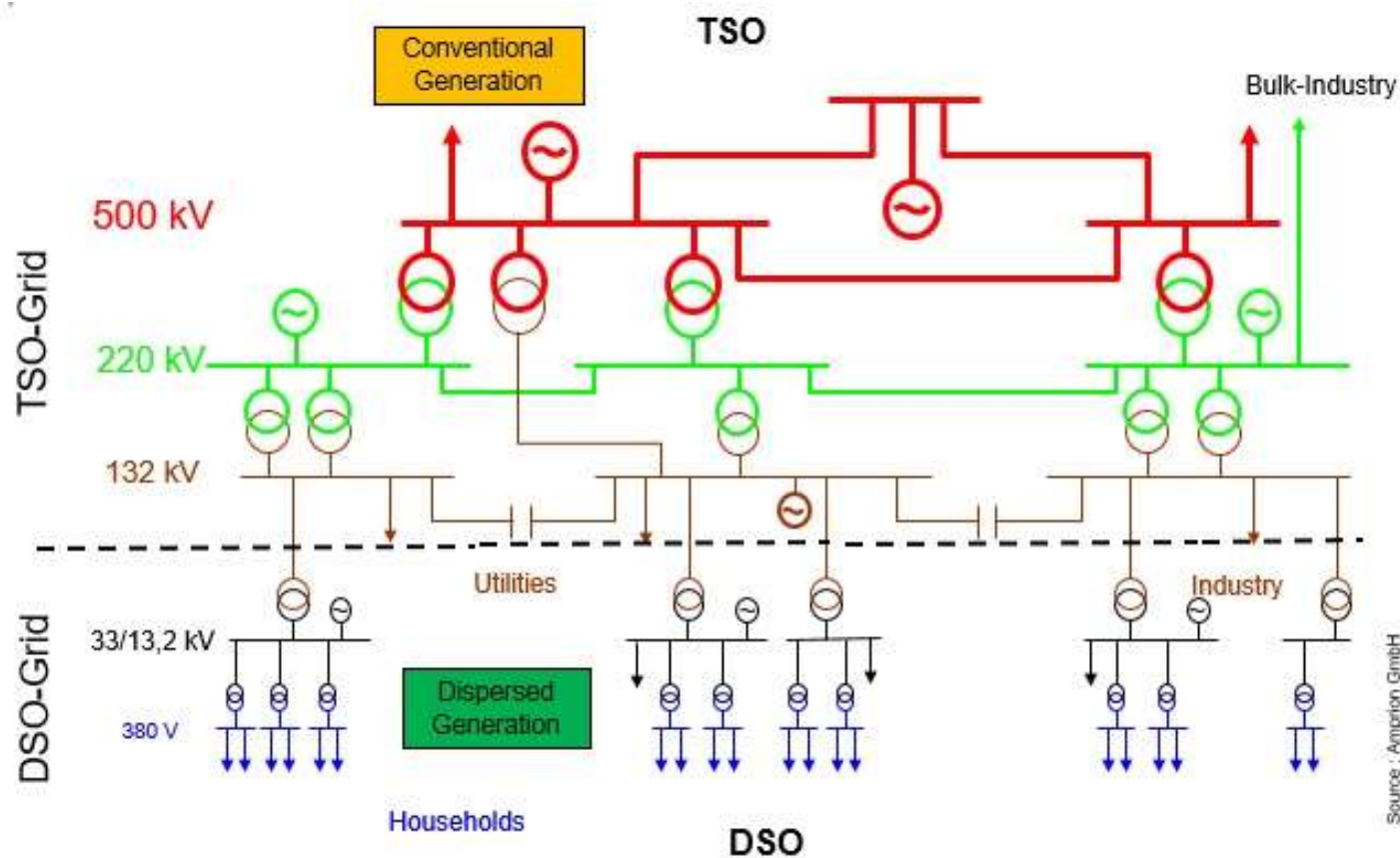
- ❑ The electricity grid in Argentina is sub-divided into transmission grids (extra high voltage) and distribution grids (high, medium and low voltage)
- ❑ Length (Km)

SISTEMA DE TRANSPORTE	500 kV	330 kV	220 kV	132 kV	66 kV	33 kV	TOTAL
Alta Tensión	14,195		556	6			14,756
Distribución Troncal		1,116	1,112	17,063	398	24	19,713
- Región Cuyo			641	626			1,267
- Región Comahue				1,368			1,368
- Región Buenos Aires			177	5,597	398		6,172
- Región NEA			30	2,148		24	2,202
- Región NOA				5,201			5,201
- Región PATAGONIA		1,116	264	2,123			3,504

(*) DSOs' HV lines are not included



Structure of electrical power system





Map of the high voltage grid



8



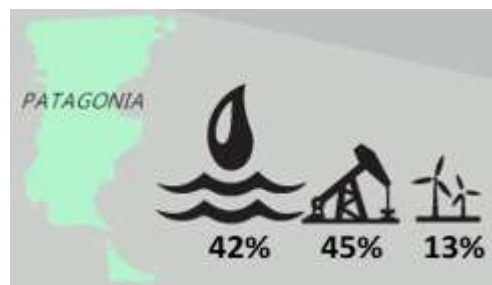
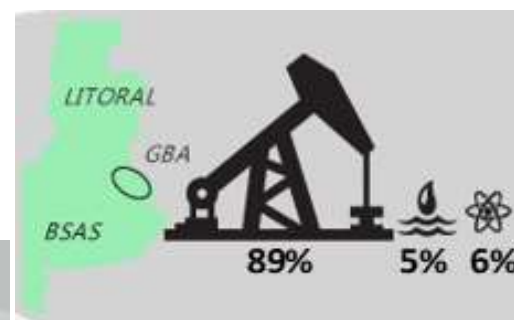
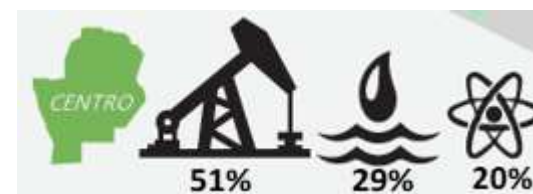
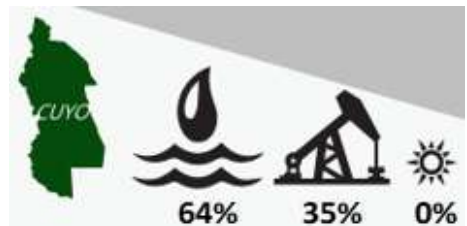
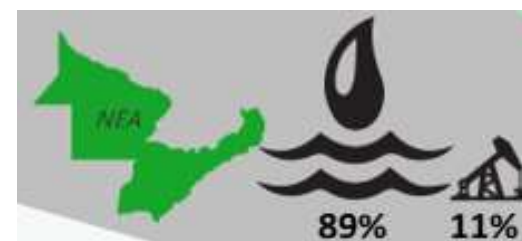
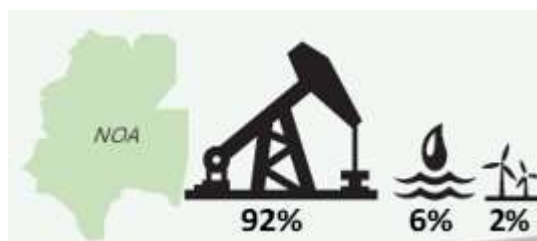


Information on TSO

- ☐ Name: TRANSENER S.A.
- ☐ Network length (km): 14,471
- ☐ Served area (km²): 2,758,829
- ☐ Website: <http://www.transener.com.ar/>



Power structure of the country





Installed capacity with reference to primary resources

❑ Installed capacities (MW), year 2017

Thermal	ST	GT	CC	DI
MW	4,451	6,006	10,436	1,825
%	20%	26%	46%	8%

Thermal	Hydro	Nuclear	Wind	Solar	TOTAL
22,718	11,243	1,755	227	8	35,950
63%	31%	5%	1%	0%	100%





Energy production with reference to primary resources

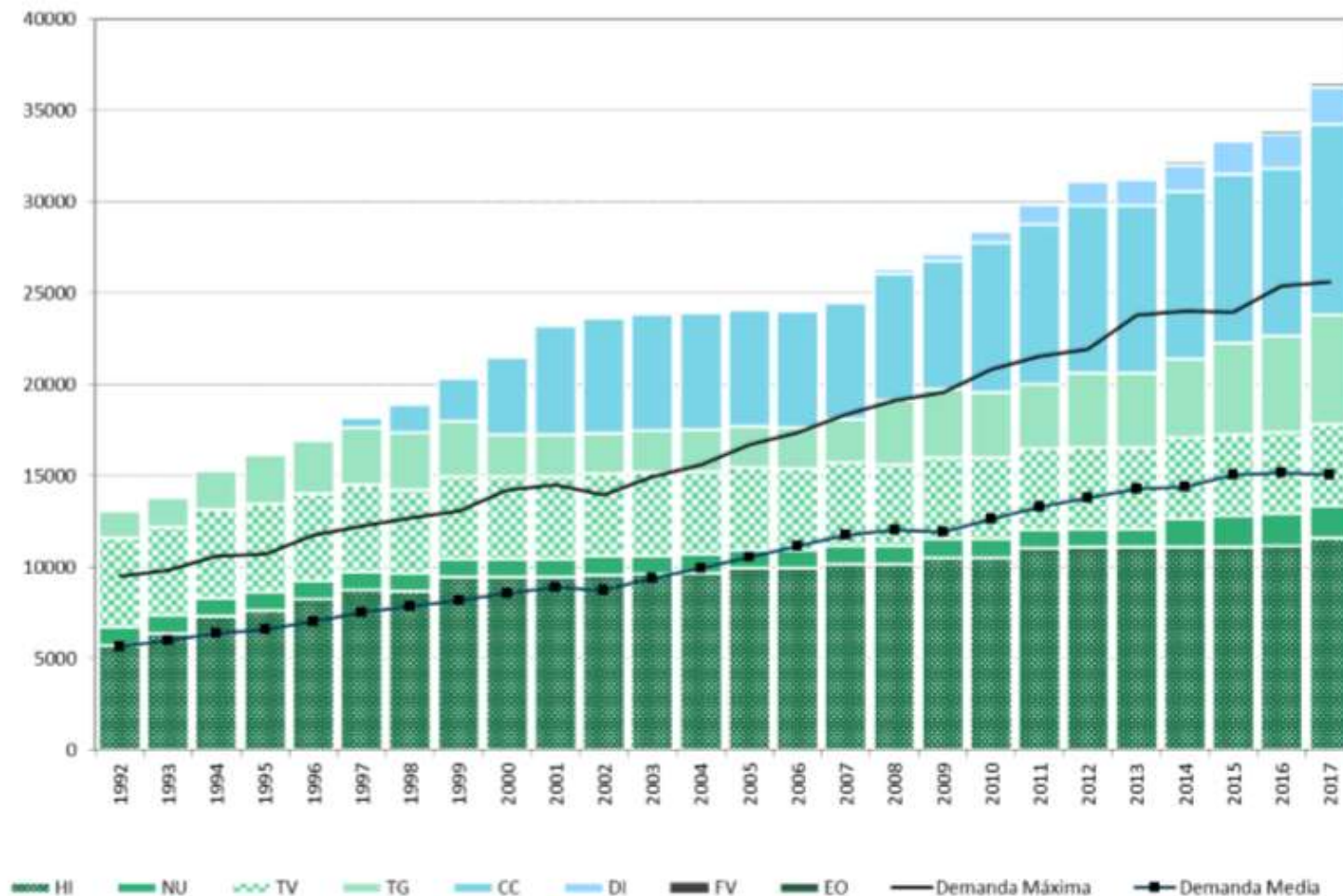
□ Electricity generated (GWh), year 2017

GWh	TOTAL	%
ST	11,749	8.60%
GT	13,145	9.60%
CC	61,051	44.70%
DI	2,893	2.10%
THERMAL	88,838	65%
HIDRO	41,280	30.20%
NUCLEAR	5,716	4.20%
WIND+SOLAR	632	0.50%
TOTAL	136,466	100%



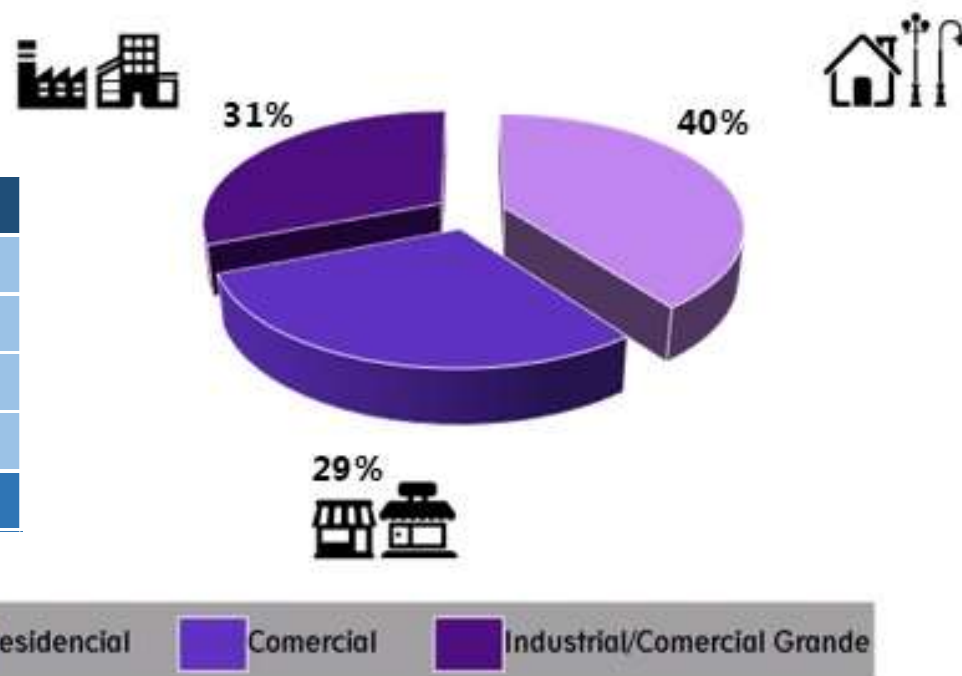


Development of generation capacity since 1992



Consumption per customer groups

GWh	per year	%
DSO	107,508	81.0%
GUME	4,706	3.6%
GUMA	19,585	14.8%
Autogenerator	637	0.5%
TOTAL	132,436	100%

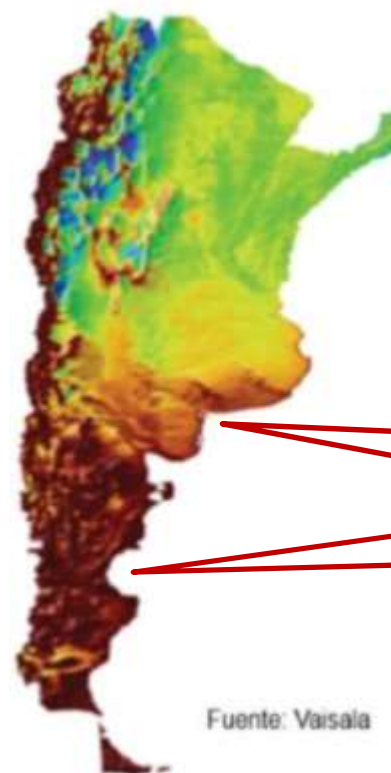


Location of renewable energy sources

SOLAR



WIND

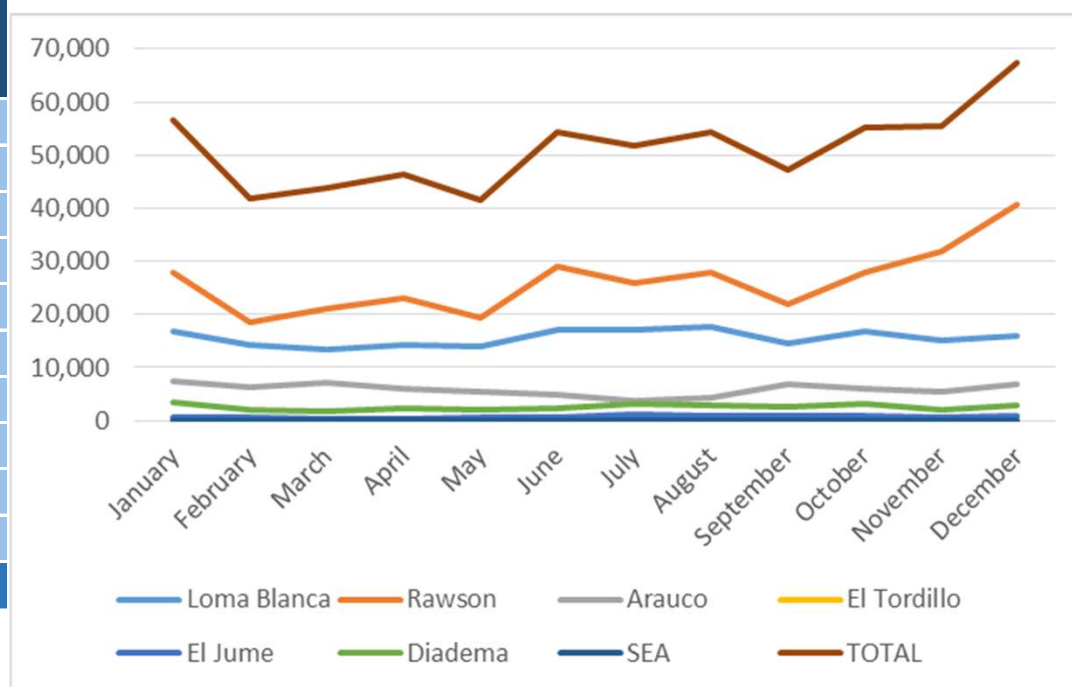




Development of wind power

WIND POWER PLANT	REGION	INSTALLED CAPACITY [MW]
ARAUCO	Noa	25.2
ARAUCO II	Noa	25.2
DIADEMA	Patagonia	6.3
LOMA BLANCA IV	Patagonia	50.0
SEA ENERGY	Buenos Aires	0.3
RAWSON I	Patagonia	52.5
RAWSON II	Patagonia	31.2
RAWSON III	Patagonia	25.1
EL TORDILLO	Patagonia	3.0
EL JUME	Noa	8.0
TOTAL		226.7

Wind Generation per month in 2017 [MWh]

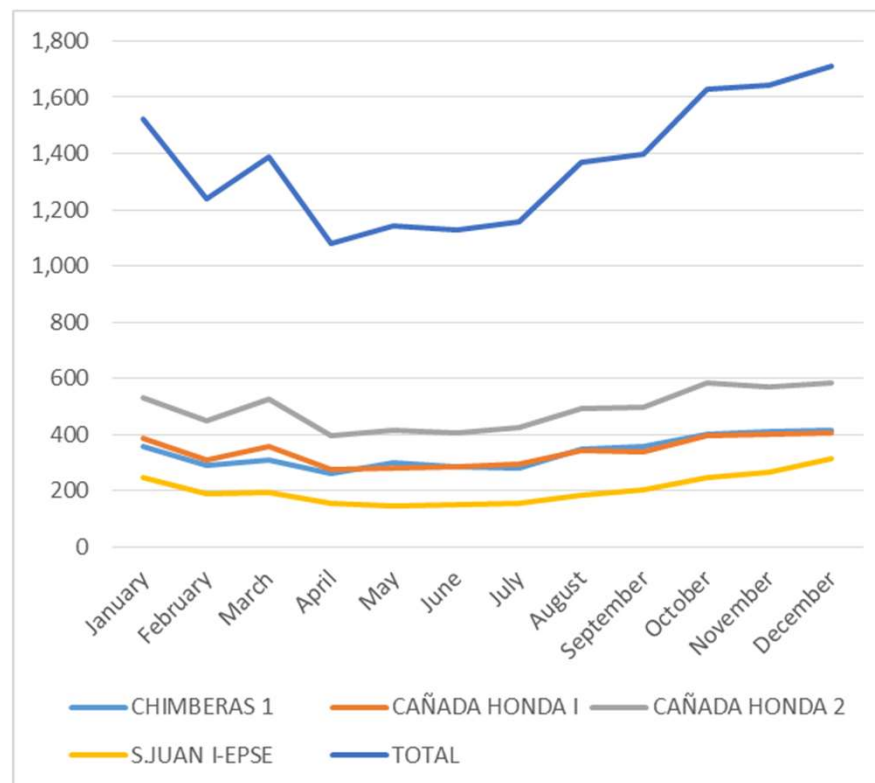




Development of photovoltaic power

SOLAR POWER PLANT	REGION	INSTALLED CAPACITY [MW]
CHIMBERAS 1	CUYO	2.0
CAÑADA HONDA I	CUYO	2.0
CAÑADA HONDA 2	CUYO	3.0
S.JUAN I-EPSE	CUYO	1.2
TOTAL		8.2

Solar Generation per month in 2017 [MWh]





RES installed capacity and production since 2011

ENERGY SOURCE	2011	2012	2013	2014	2015	2016	2017	TOTAL [GWh]	Total Avg. [MW]
Biofuel	32	170	2	2	0	1	0	207	3
Biomass	98	127	134	114	155	193	243	1,064	17
Wind	16	348	447	613	593	547	616	3,180	52
Hydro < 50 MW	1,255	1,453	1,274	1,457	1,624	1,820	1,696	10,579	172
Solar	2	8	15	16	15	14	16	86	1
Biogas	0	36	108	103	84	58	64	453	7
Total GWh	1,403	2,142	1,981	2,304	2,470	2,633	2,635	15,568	254

DEMAND	2011	2012	2013	2014	2015	2016	2017	TOTAL [GWh]	Total Avg. [MW]
	116,507	121,227	125,239	126,467	132,110	133,111	132,436	887,096	14,455
% of demand covered by renewable energy	1.2%	1.8%	1.6%	1.8%	1.9%	2.0%	2.0%	1.8%	





Price development for industry consumers

	Reference price of Power	Estabilized energy price		
	[\$/MWh per month]	Peak hours [\$/MWh]	Day hours [\$/MWh]	Off-peak hours [\$/MWh]
Big consumers $\geq$ 300 kW	3,157.3	1,395.5	1,329.0	1,262.6

Current exchange rate USD 1 = \$ 28





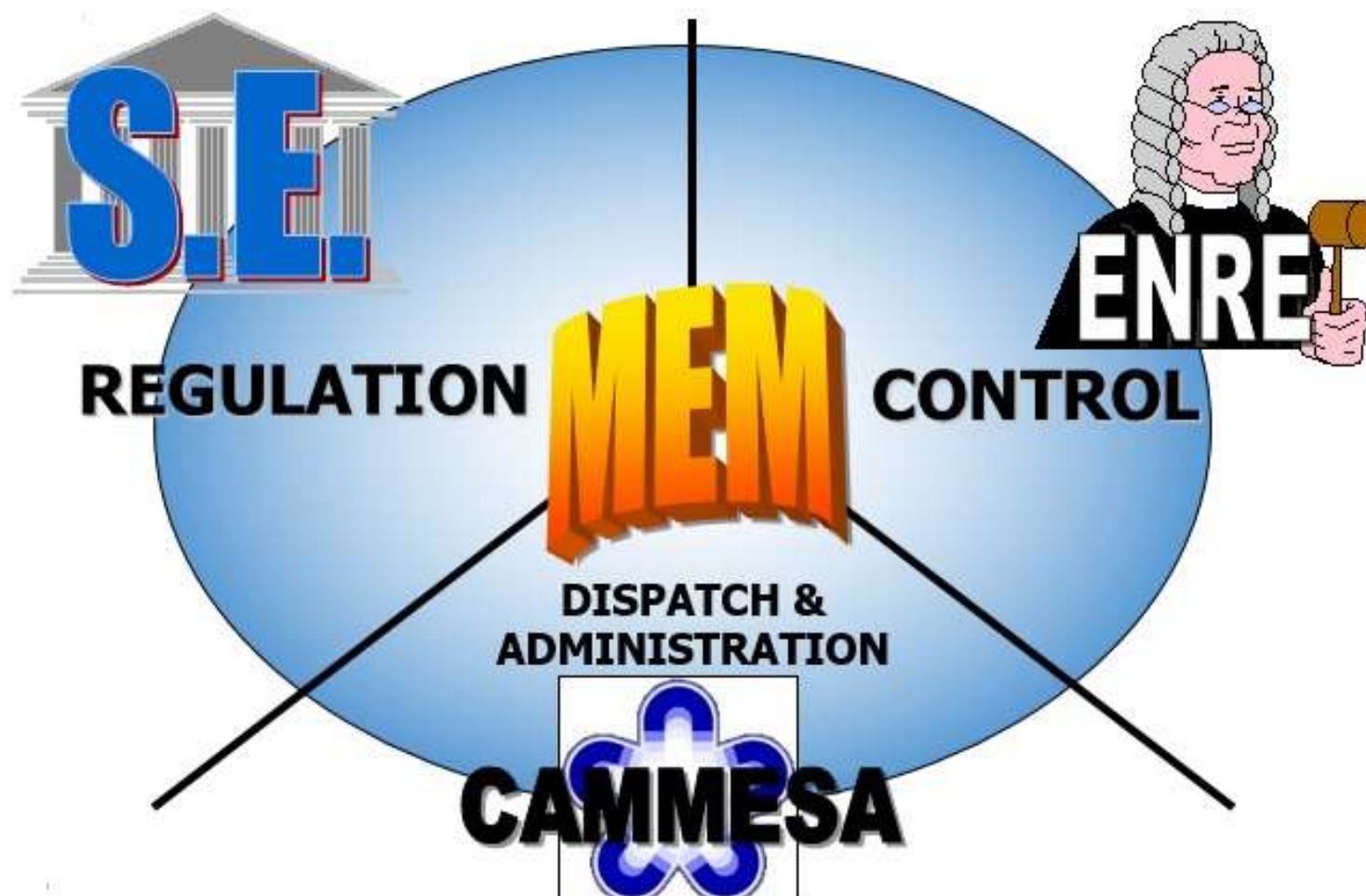
Price development for households

	Reference price of Power	Estabilized energy price		
	[\$/MWh per month]	Peak hours [\$/MWh]	Day hours [\$/MWh]	Off-peak hours [\$/MWh]
General demand	3,157.3	1,080.5	1,029.0	977.6

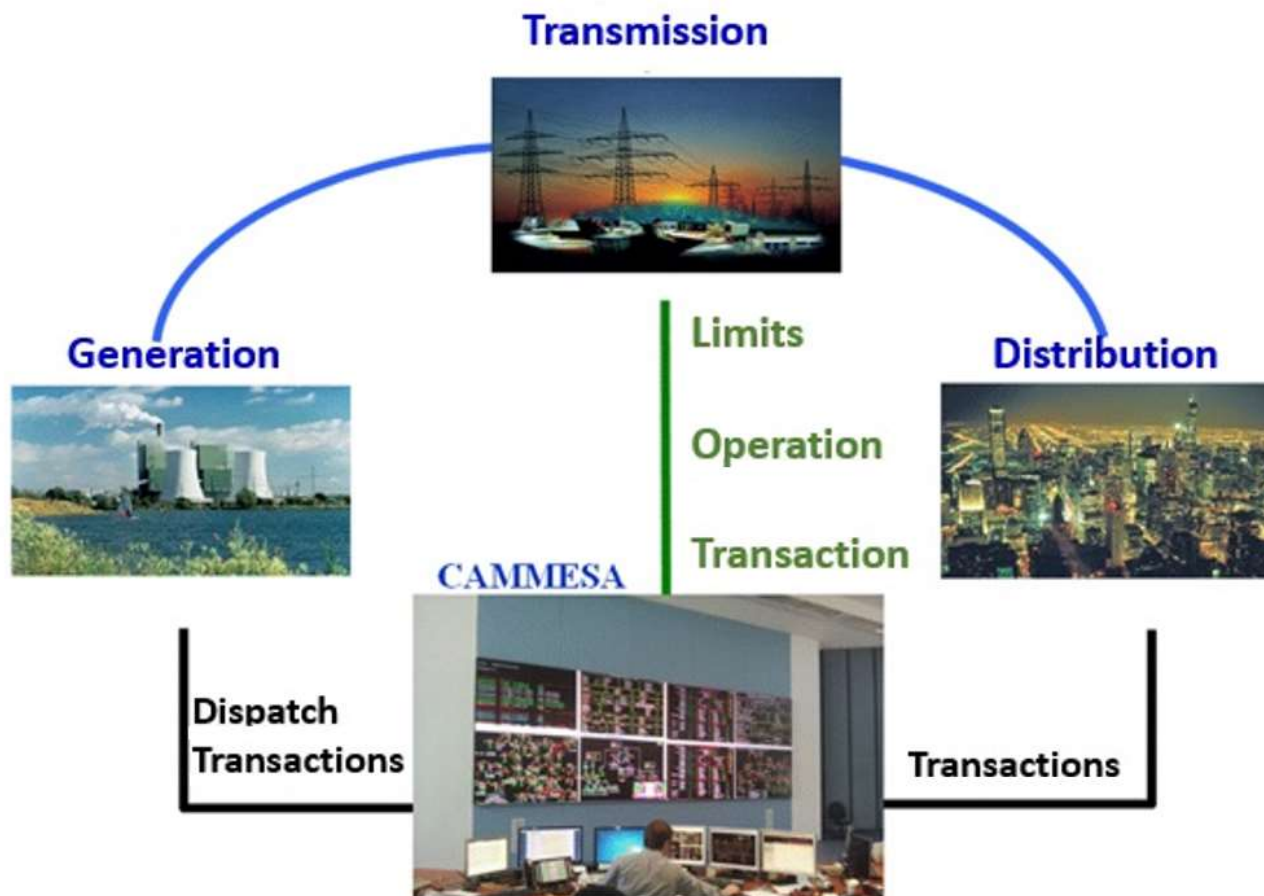
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Electricity market organisation



Electricity market organisation



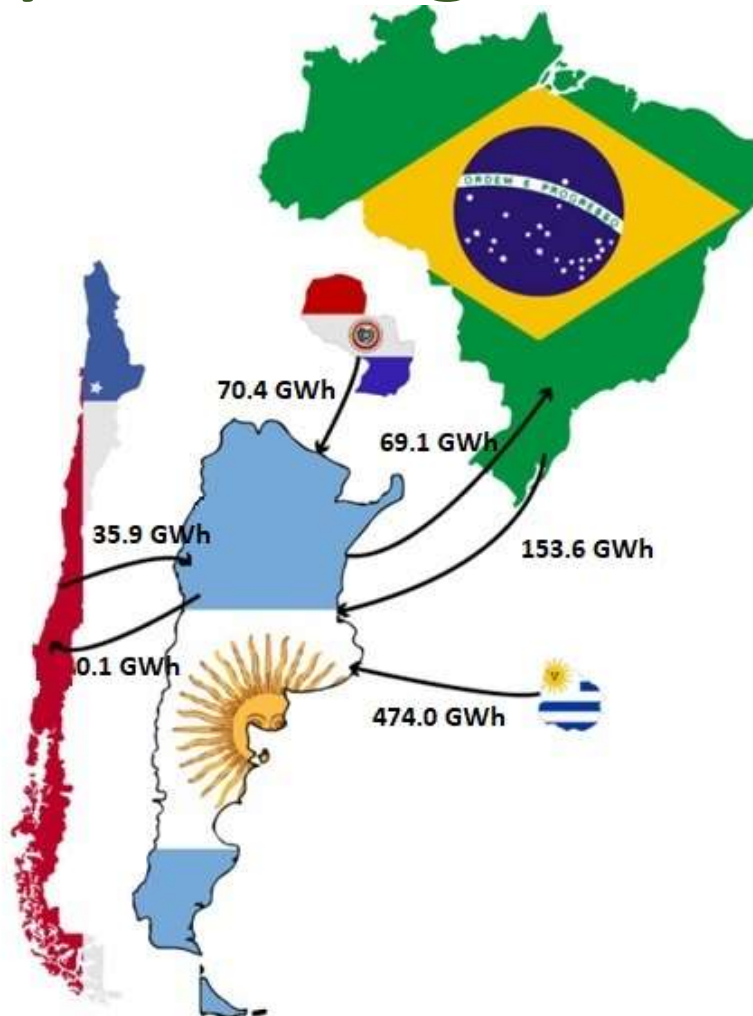


Power balance in 2017

- ❑ Generation 136,466 (GWh)
- ❑ Consumption 132,436 (GWh)
- ❑ Imports 734 (GWh)
- ❑ Exports 69 (GWh)
- ❑ Pumping 401 (GWh)
- ❑ Losses 4,294 (GWh)



Energy exchanges in 2017





Specific aspects of the electricity market

☐ Operation in the wholesale electric market (MEM)

The agents and participants of MEM buy and sell electrical energy by:

☐ Contract market

☐ SPOT market

In contract market, the producers and buyers freely agree on quantities, prices, guaranties, delivery point and penalties for noncompliance. They comply with the MEM regulation only for information needed for administration and minimum terms of duration.

The energy that is not traded in the contract market is traded in the SPOT market.

