



The South American Electricity Sector

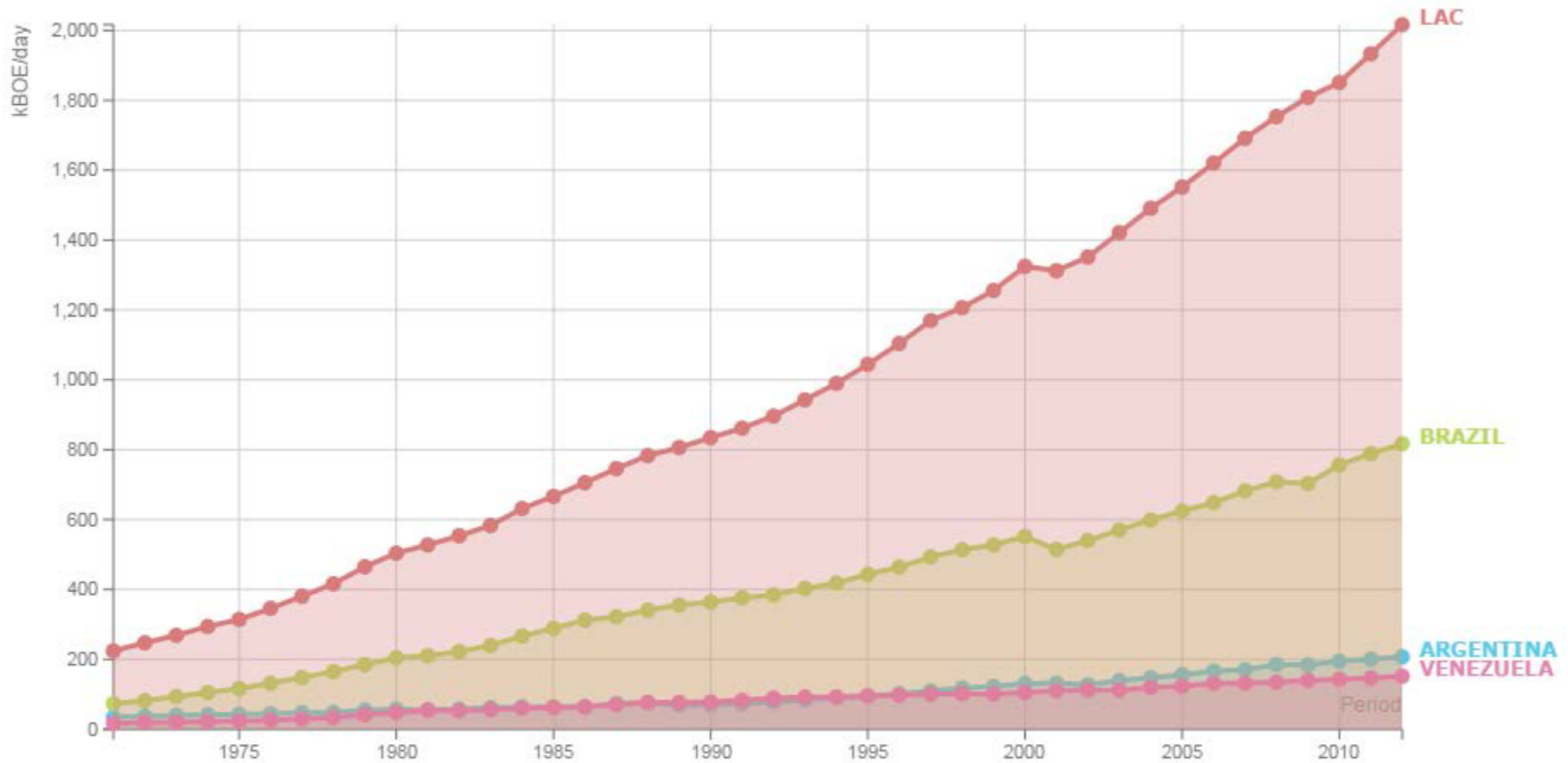
February 2015

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Latin America Overview – Electricity Consumption

Electricity Consumption

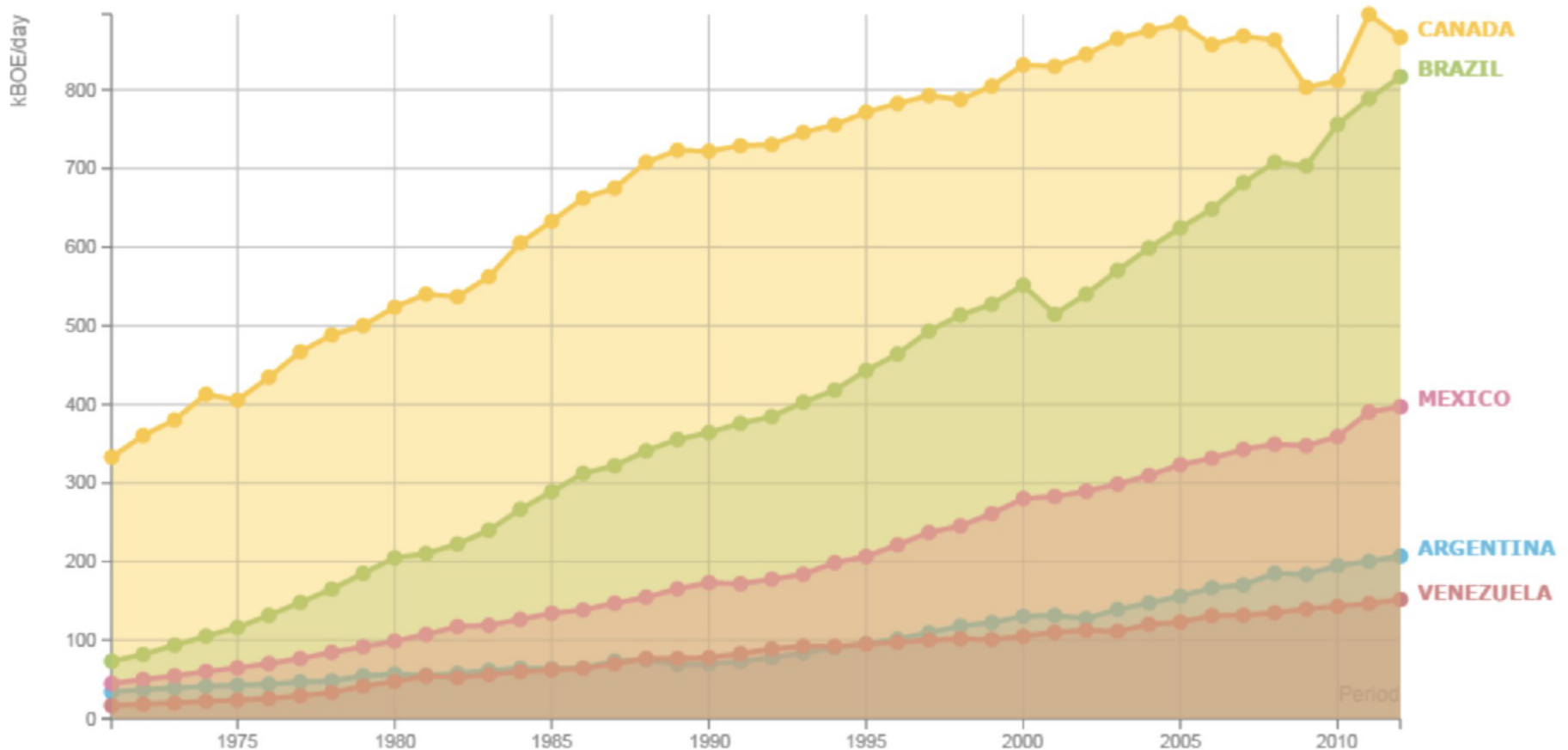


Energy Comparison > AR, BR, VE, LC > Consumption > Electricity

Source: IDB calculations based on IEA data and * based on other sources
<http://www.iadb.org/eic/visualizations/index>

South America Overview – Electricity Consumption

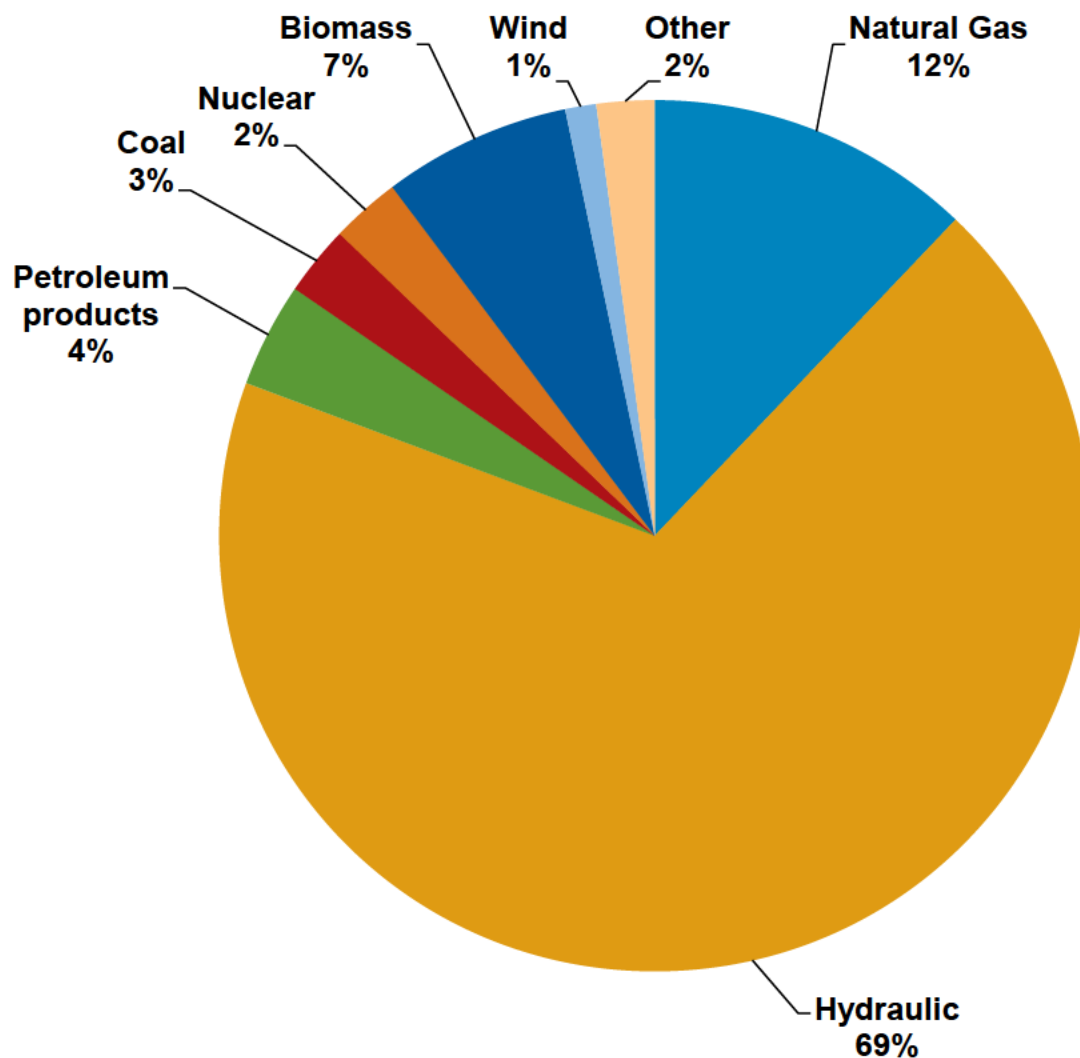
Electricity Consumption



Energy Comparison > AR, BR, MX, VE, CA > Consumption > Electricity

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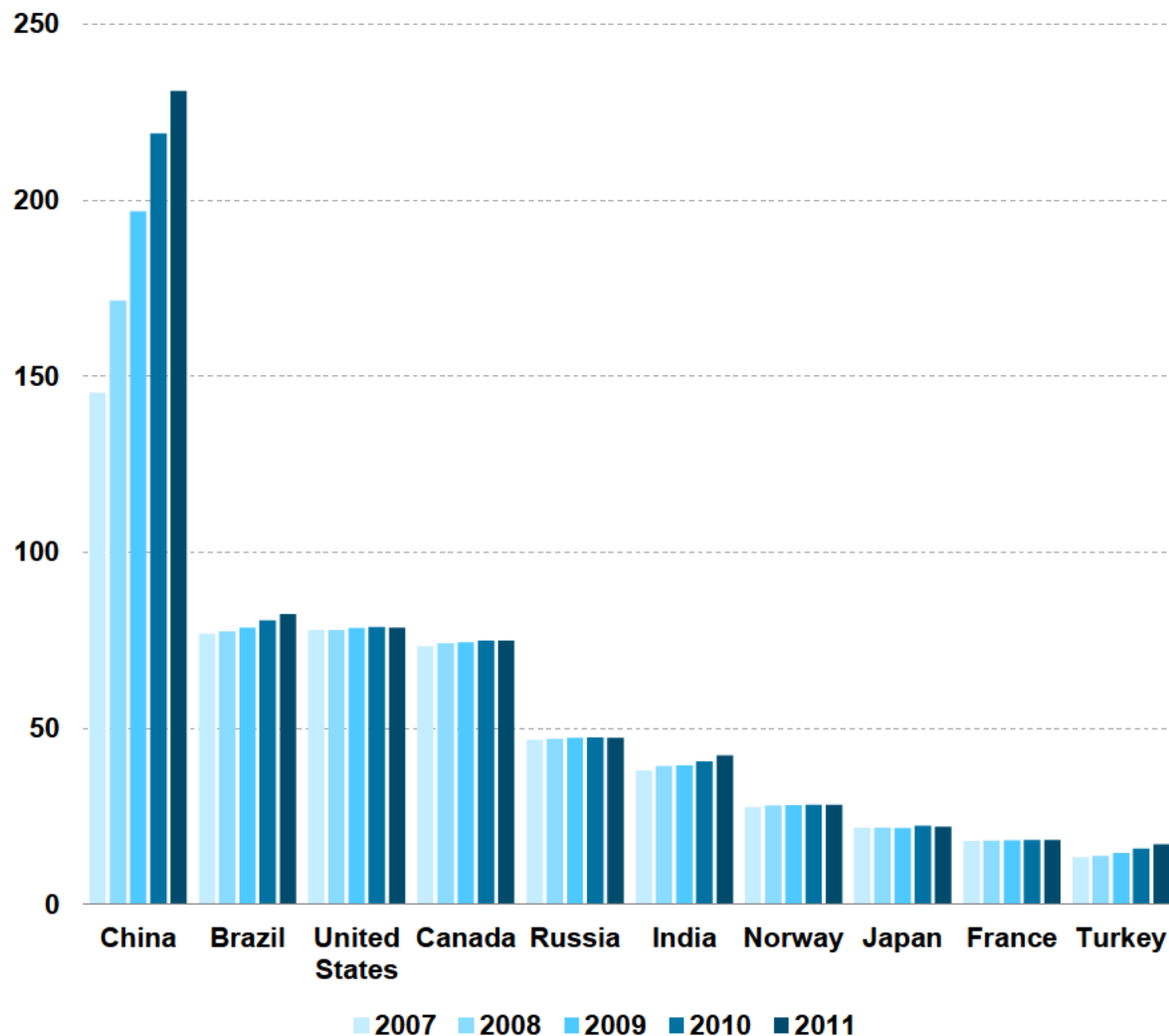
Current Status – Electricity Generation in Brazil



Total GWh (2013)	570,025
Hydraulic	390,992
Natural Gas	69,003
Biomass	39,679
Petroleum products	22,090
Coal	14,801
Nuclear	14,604
Other	12,244
Wind	6,576

Current Status – Electricity Generation in Brazil

World hydroelectric generation installed capacity
Top 10 countries in 2011 (in Gigawatt)



Brazil - Hydropower Plants	
Plant	MW
Itaipu	14,000
Belo Monte	11,233*
Tucuruí	8,370
São Luiz do Tapajós	6,133**
Jirau	3,750*
Santo Antônio	3,568*
Ilha Solteira	3,444
Xingó	3,162
Paulo Afonso IV	2,462
Jatobá	2,338**
* Under construction	
** Planned	

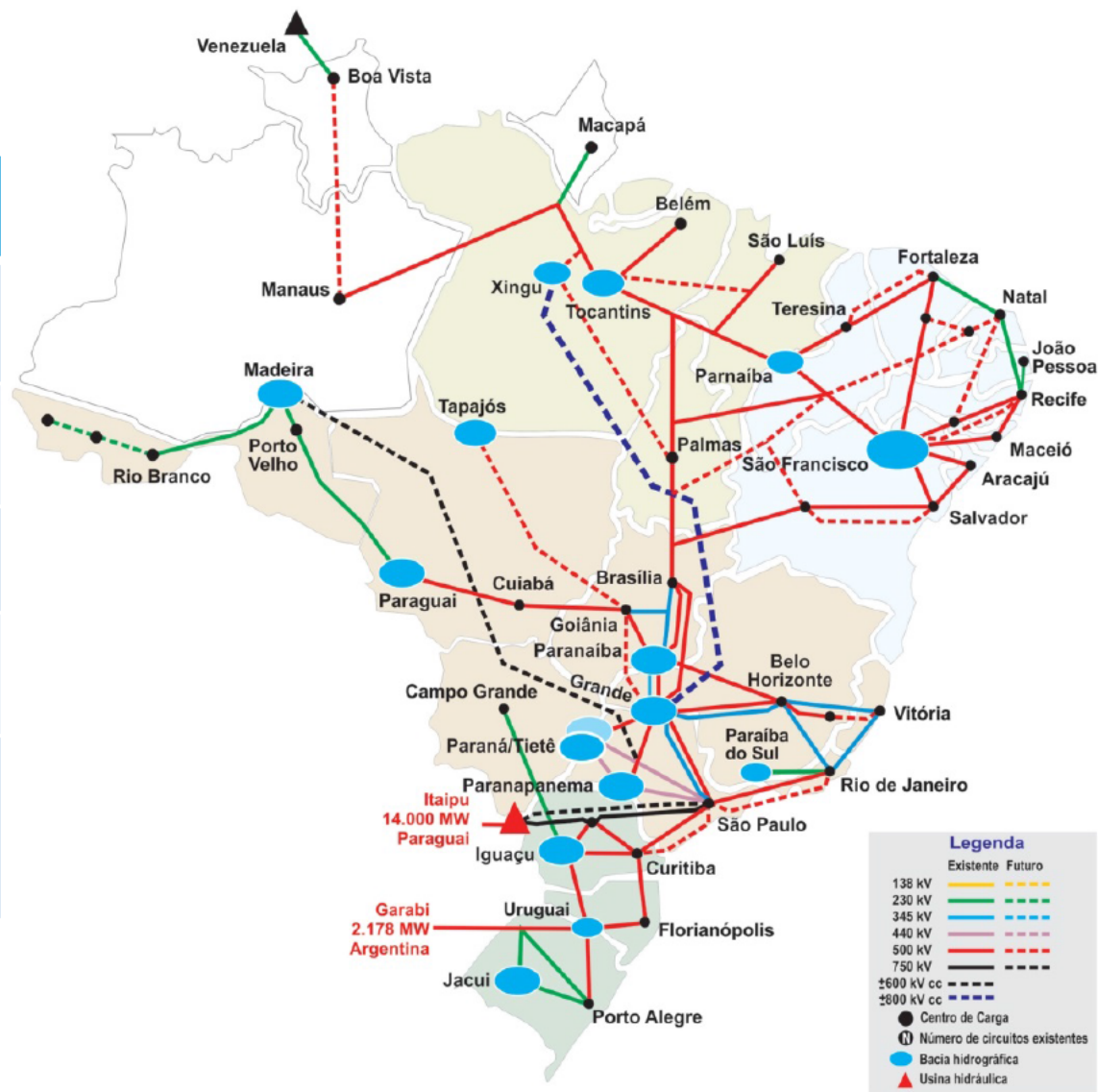
Current Status – Transmission Line Length

National grid (SIN) in kilometers

	2012	2013	$\Delta\%$ (2013/2012)	Share of Total % (2013)
230 kV	47,894	49,969	4.3	42.8
345 kV	10,224	10,272	0.5	8.8
440 kV	6,728	6,728	0.0	5.8
500 kV	35,726	29,123	9.5	33.5
600 kV CC	3,224	7,992	147.9	6.8
750 kV	2,683	2,683	0.0	2.3
Total	106,479	116,768	9.7	100.0

Brazil Major Statistics – 2015

Population	201,901,000
Consumption total	463,335 GWh
Consumption per capita	2,295 kWh/year
Total costumers	74,818,000
Residential costumers	63,862,000
Residential average consumption	163 kWh/month



Institutional Framework Timeline – 1970 - 1990

State-Owned Model

1970

- Sector developed to keep pace with electricity demand given industry growth

1980

- State-owned model had significant financial challenges as a result of heavily subsidized tariffs:
 - Large shortfall in revenues
 - Underinvestment in the sector

1990

- Power sector in Brazil still in government hands and characterized by:
 - Centralization of operation and planning
 - Vertical integration of transmission, distribution and generation
- Power sector model on verge of collapse and unable to guarantee system expansion

Institutional Framework Timeline – 1970 - 1990

Sector Reform – 1st Phase (1990s)

1993

- Start of reform in the Brazilian electric sector, aimed at:
 - Establishing a competitive sector
 - Allowing participation of private capital

1996 – 1998

- New model defined:
 - Unbundling electric power companies
 - Regulated tariffs set to cover **cost of service**
 - **Privatization** of some distribution and generation assets
 - Creation of **Independent Power Producer** and **Free Consumer**
 - Creation of a regulating agency, **ANEEL** (1996)
 - Creation of an operator for the national electric system, **ONS** (1998)
 - Creation of an operator for the commercial market, **CCEE** (1998)

Institutional Framework Timeline – 1970 - 1990

Sector Reform – 2nd Phase (2000s)

2001

- Serious supply crisis due to under-investment in generation and transmission,
 - Aggravated by severe drought; culminated in an electricity rationing plan

2002 – Present

- Committee for the Revitalization of the Electric Sector Model formed.
- Work resulted in a series of change proposals to strengthen the model to ensure
 - Security of supply
 - Universal access to electricity
 - Affordable tariffs
- New model not attempted to correct some imperfections of 1st Phase. It created
 - Energy Research Company (EPE), long term planning of the sector.
 - Committee for the Monitoring of the Electric Sector (CMSE), security of the supply of electric power.

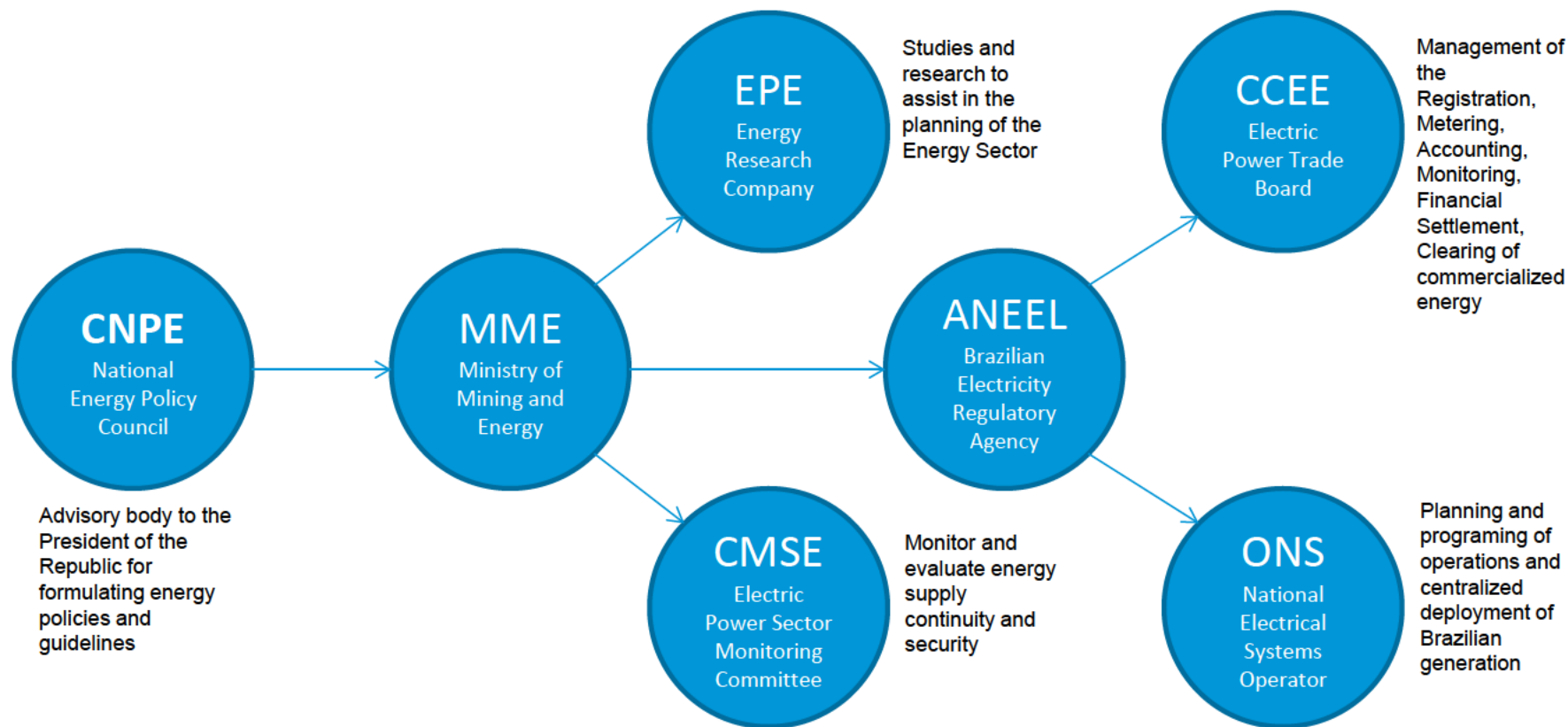
Institutional Framework Timeline – 1970 - 1990

Sector Reform – 2nd Phase (2000s)

2002 – Present

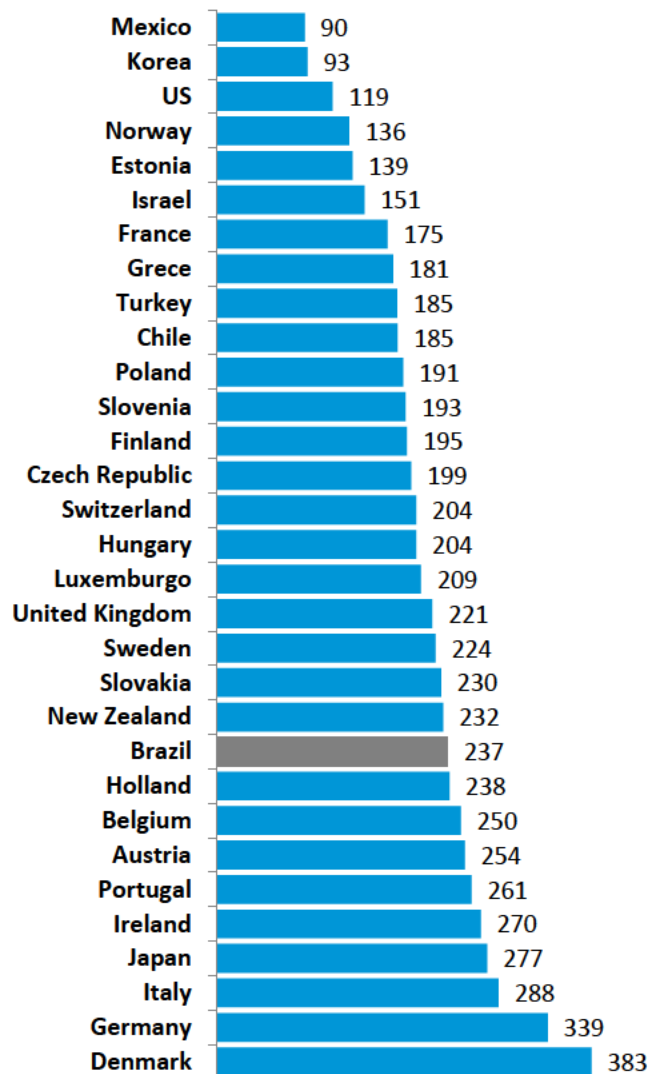
- Projected demand of distribution companies needed to be 100% secured by physical contracts
 - Adequate **regulatory framework** (with clear definition of policy formulation, regulator and operator roles) **creates basis** for private investment
 - Important expansion of generation capacity based on energy auctions to improve energy security:
 - 500 new plants with 65,000 MW.
 - 99.3% of the country has access to electricity
 - All changes introduced until 2004 constitute current framework for the sector

Structure of the Electric Sector - Institutions

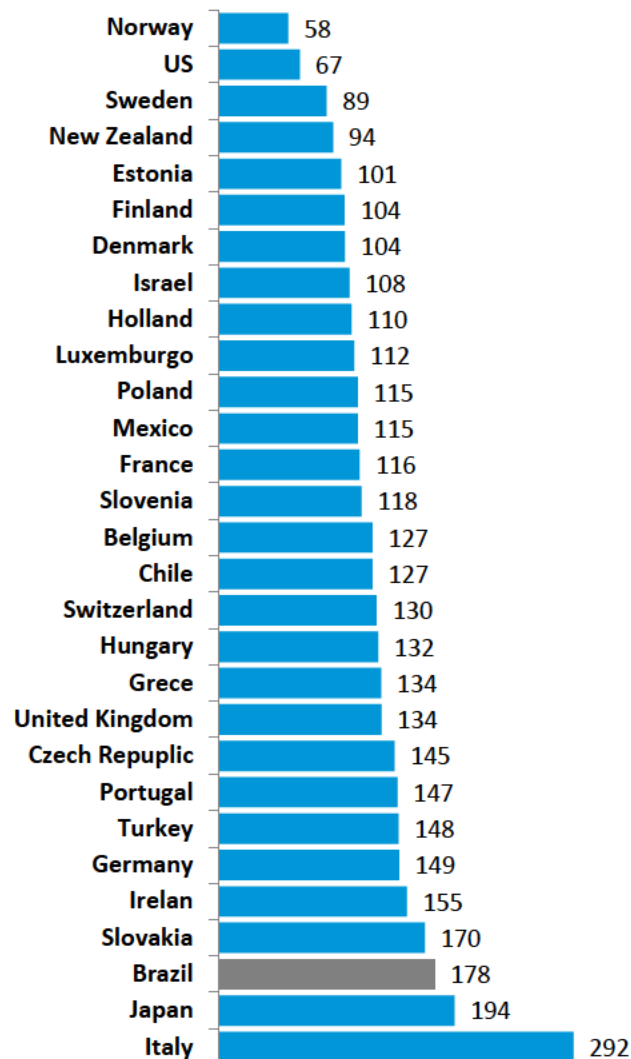


Electricity Average Rates US\$/MWh(2012)

Residential



Industrial



Law 12.783

- Electricity cost structure
 - 60% cost of service (generation, transmission and distribution)
 - 40% sector fees and taxes
- Government promoted electricity price reduction with **Provisional Rule MP579/12** which eventually became **Law 12.783/13**

Objective: Reduce electricity prices by 20%

Strategy to meet objective

- **Reducing costs of generation and transmission**
 - 2013 renewal of generation and transmission concessions contracts that will expire in 2015-2017 with a lower price.
- **Reducing sector fees and taxes**
 - E.g.: CCC (*Conta de Consumo de Combustíveis*), RGR (*Reserva Global de Reversão*), CDE (*Conta de Desenvolvimento Energético*)

Law 12.783 – Factors

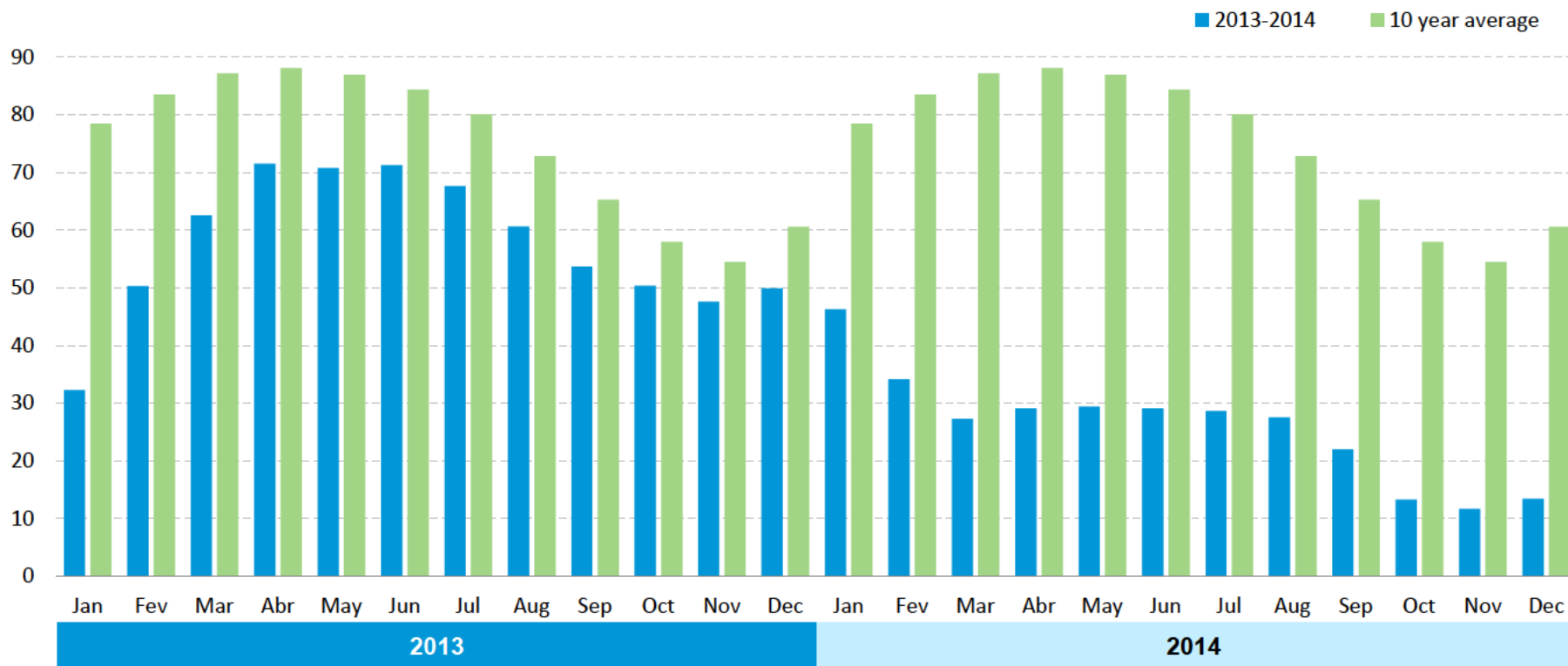
Factor: Adverse climate

In 2013, price reduction strategy met with **diminished rainfall**

Factor: New Plant Delays

Larger volumes from existing thermal plants had to be dispatched

Furnas Dam - Useful Volume (%)

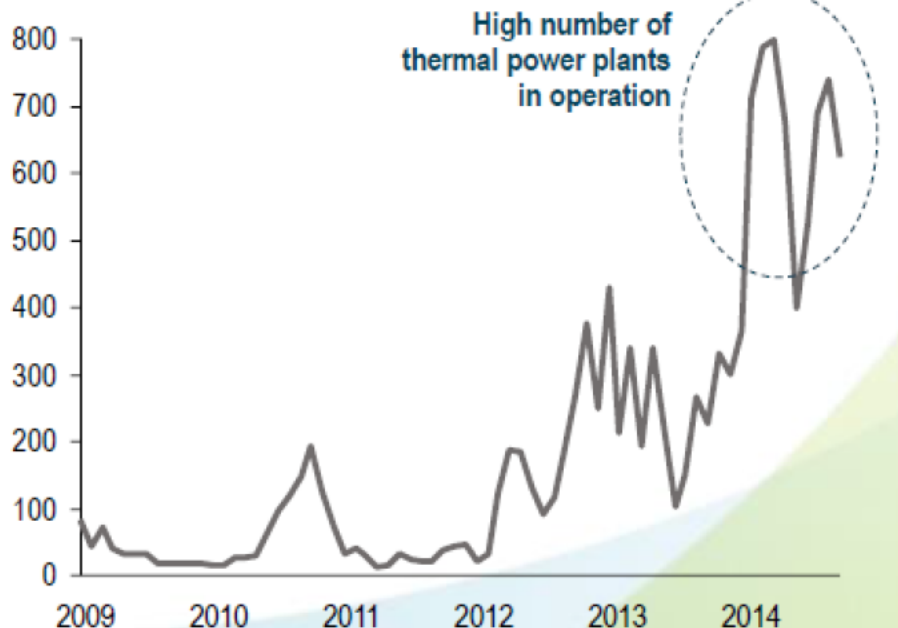


Law 12.783 – Consequences

Adverse climate and delays in start date for new plants had a **direct impact** on spot market **price**.

Evolution of energy prices on the spot market

BRL / MWh



What would you do?



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