



BRAZILIAN ELECTRICITY REGULATORY AGENCY

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Superintendency of Economic
Regulation and Market Studies - SRM

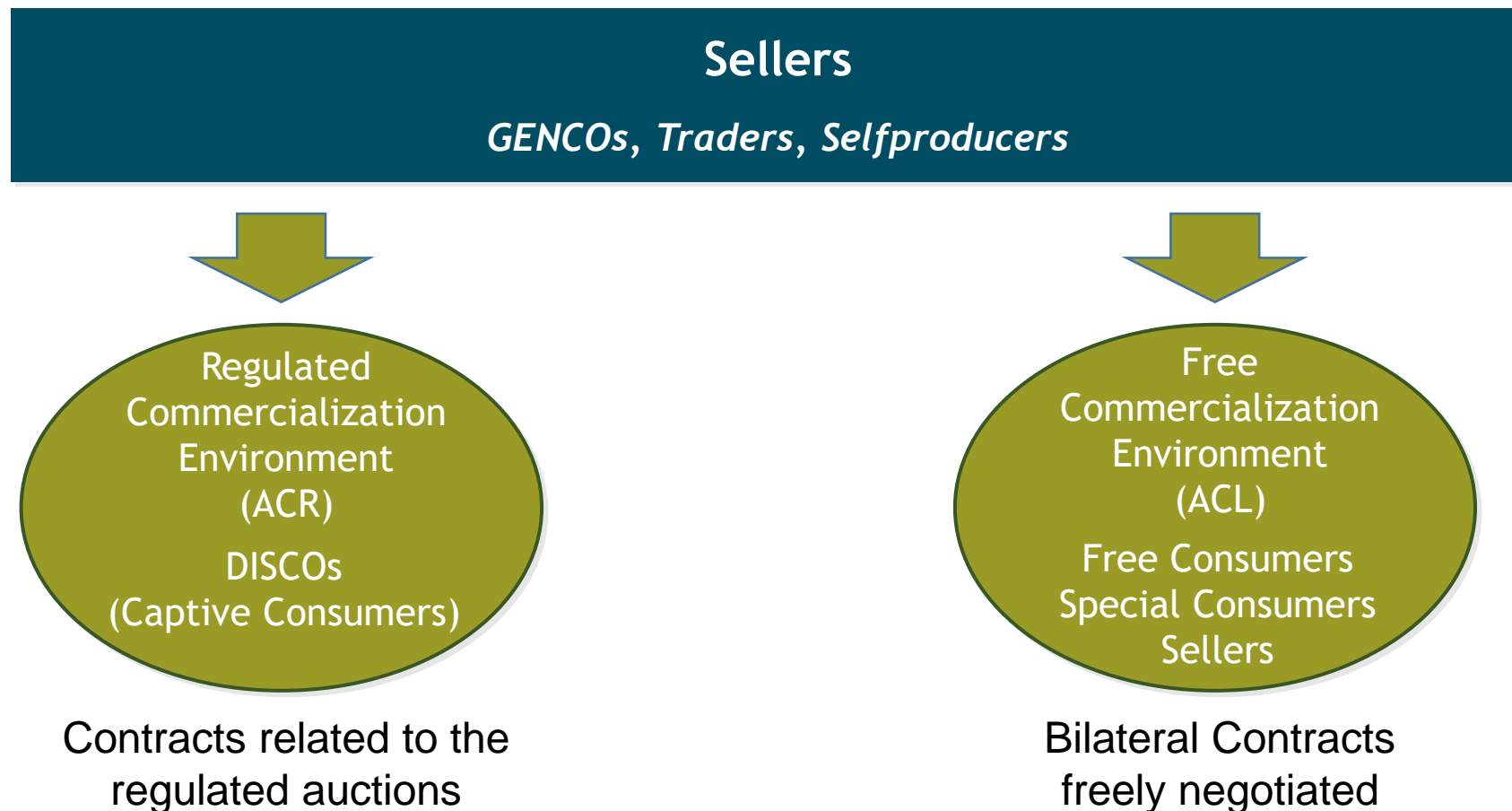
**Webinar: Canadian Renewable
Energy Investment in Brazil**

**An overview of the Brazilian
Electricity Market**

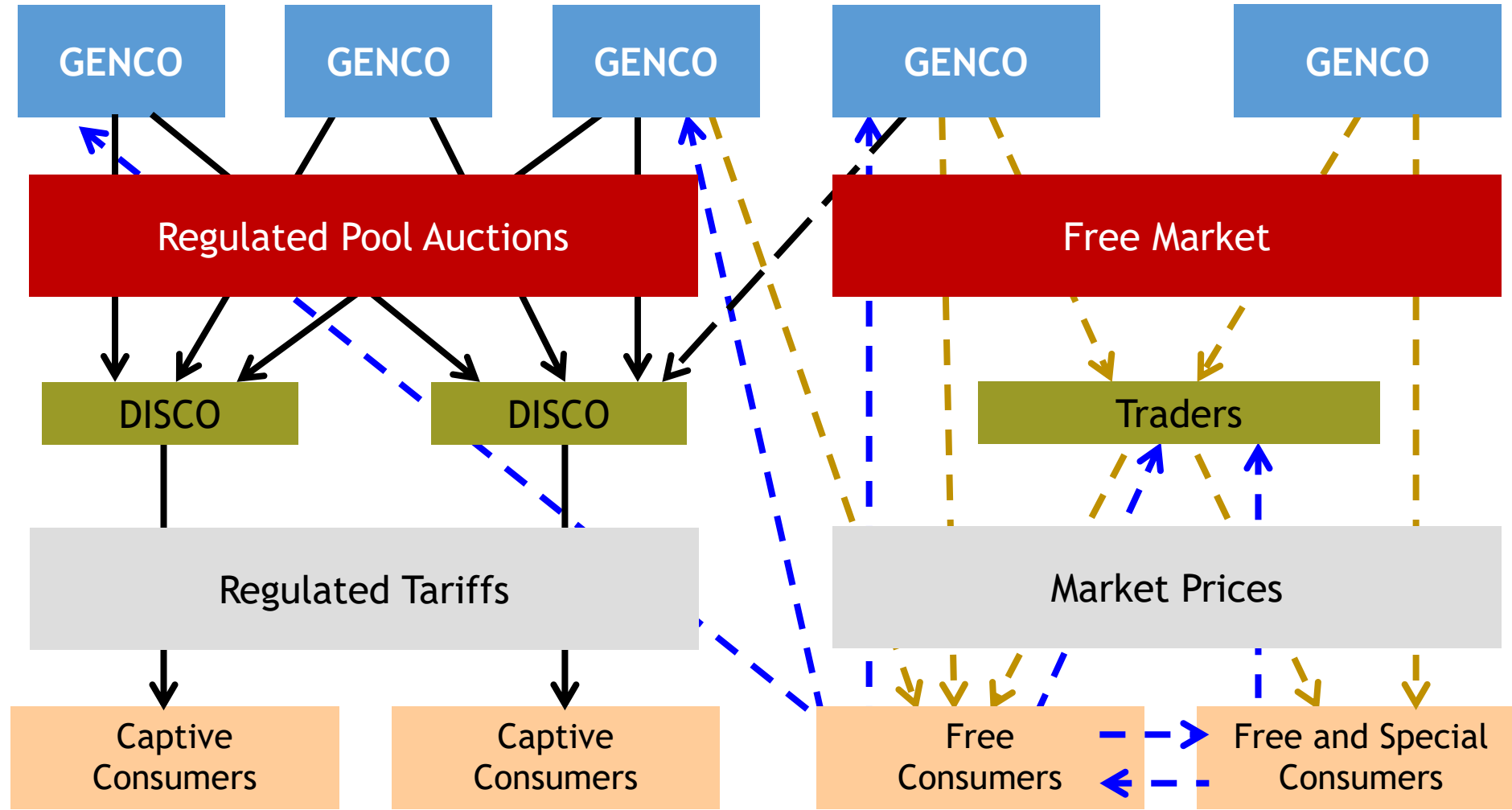
Brasília, June 22nd, 2020

Brazilian Electricity Market

- ❖ Commercialization in two environments (Law 10.848/2004)



Trading Arrangements



Free and special consumers

❖ Free Consumers (Law 9.074/1995)

- Have the right to choose their electricity supplier paying a rate for using the distribution or transmission system

Demand Requirement
2 MW

❖ Special Consumers

- Installed load of 500 kW or more are allowed to buy electricity from wind, small hydroelectric plants, biomass and solar sources
- Discounts on the distribution / transmission fees

Requirements

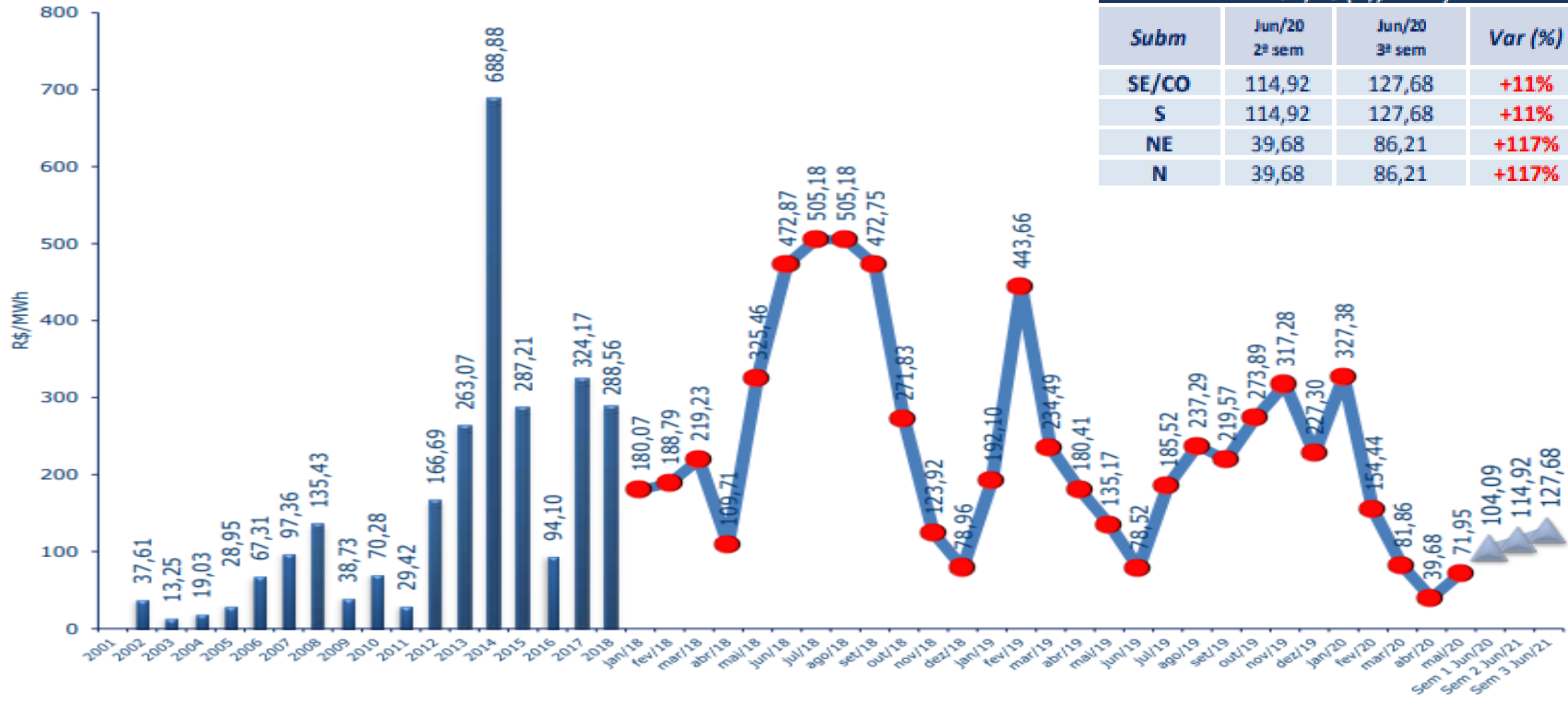
- ❖ DISCOs (on behalf of captive consumers), Free Consumers, Special Consumers and Selfproducers
 - Must have contract for 100% of their load requirements
- ❖ Generators and Selfproducers
 - Must have capacity (own generation + buying PPAs) for 100% of their selling commitments
- ❖ Traders
 - Must have capacity (buying PPAs) for 100% of their selling commitments

Market Operation

- ❖ Energy mismatches (contracted vs. measured) are settled at spot prices (calculated by Chamber of Electric Energy Commercialization (CCEE), based on the Marginal Cost of Operation, calculated by the ISO (ONS))

$$\text{Agents' Balance (\$)} = \left\{ \text{Energy measured (MWh)} - \text{Energy Contracted (MWh)} \right\} \times \text{Spot Price (\$/MWh)}$$

Spot price



PLD Jun/20 (R\$/MWh)			
Subm	Jun/20 2ª sem	Jun/20 3ª sem	Var (%)
SE/CO	114,92	127,68	+11%
S	114,92	127,68	+11%
NE	39,68	86,21	+117%
N	39,68	86,21	+117%

Residential Tariffs

2018

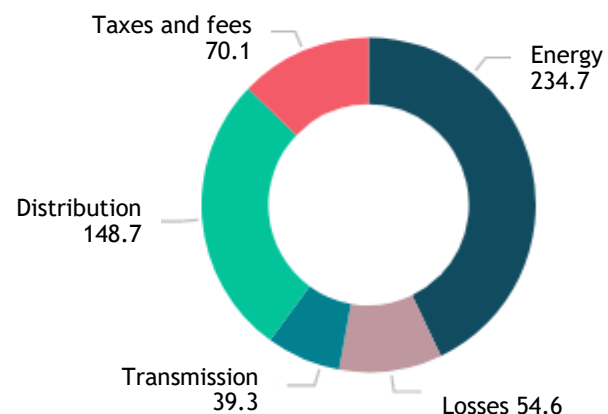
Reajuste Médio

14,99%
Homologados

Impacto Médio

11,07% Energia
0,11% Transmissão
3,29% Distribuição
0,51% Encargos

Mean tariff by cost item (R\$/MWh)



2019

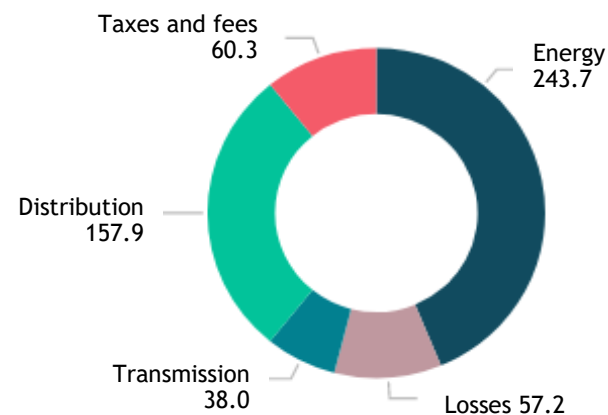
Reajuste Médio

1,85%
Homologados

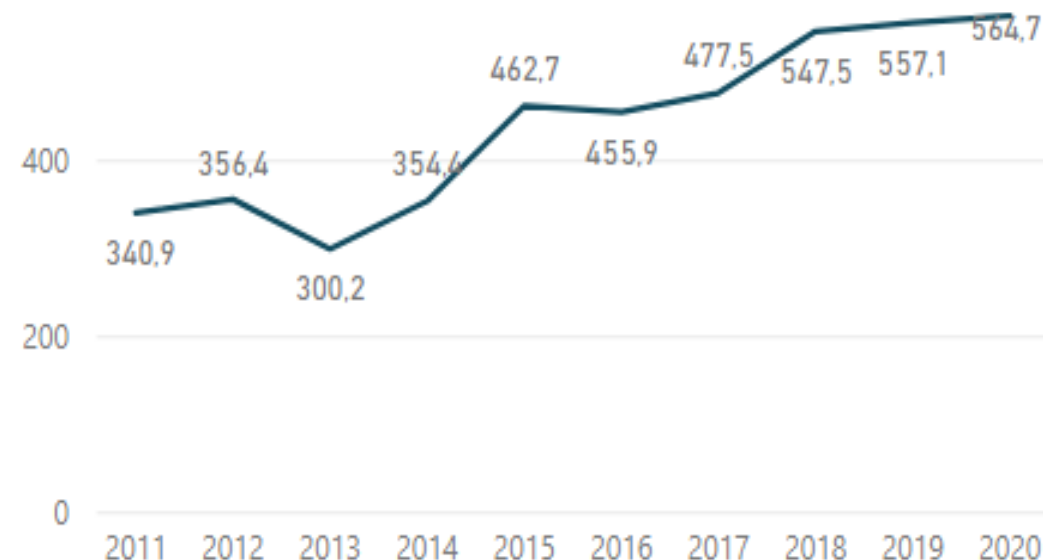
Impacto Médio

2,20% Energia
-0,24% Transmissão
1,67% Distribuição
-1,78% Encargos

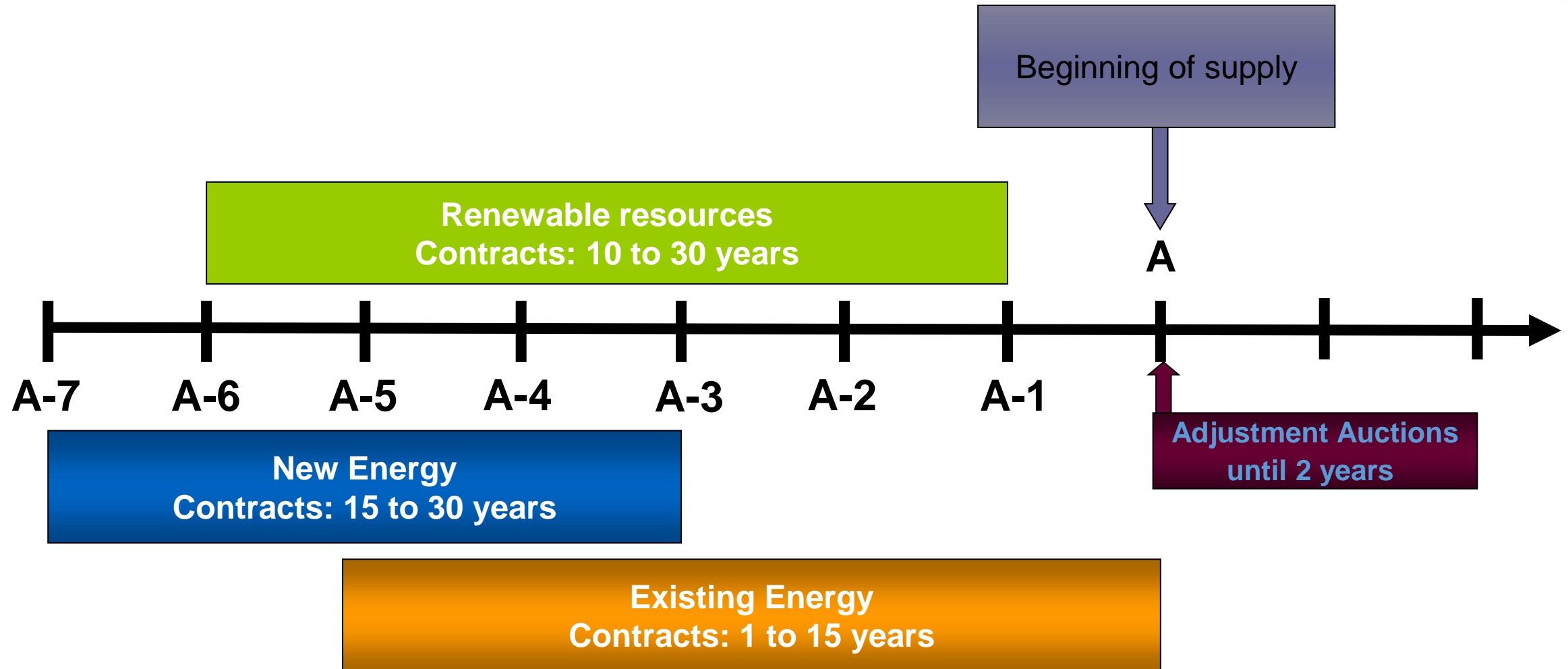
Mean tariff by cost item (R\$/MWh)



Final Residential Tariff (R\$/MWh)



Energy Auctions (Dec. 5163/2004)



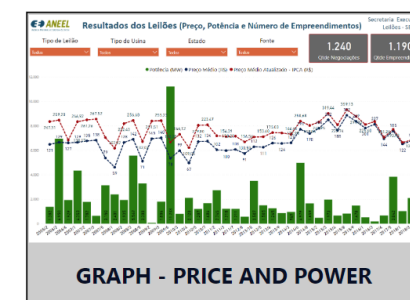
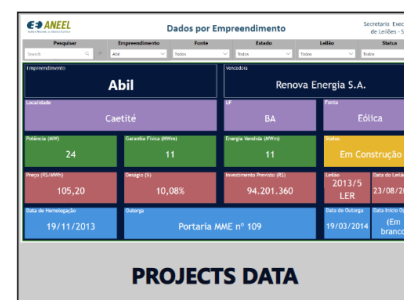
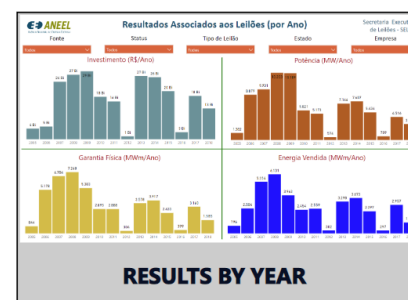
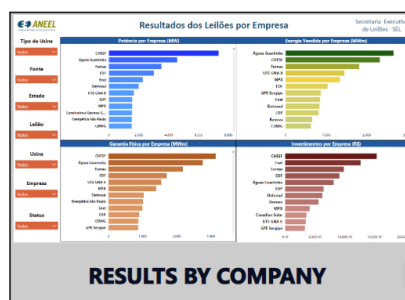
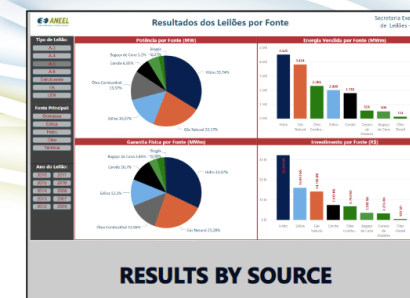
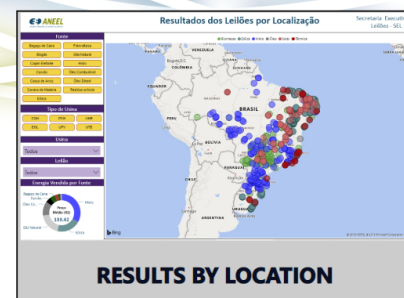
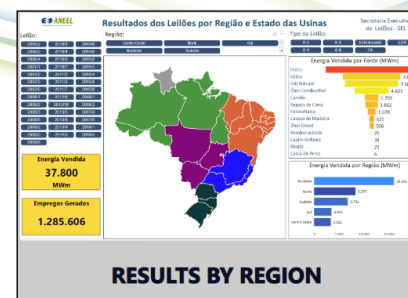
Energy Auctions Results



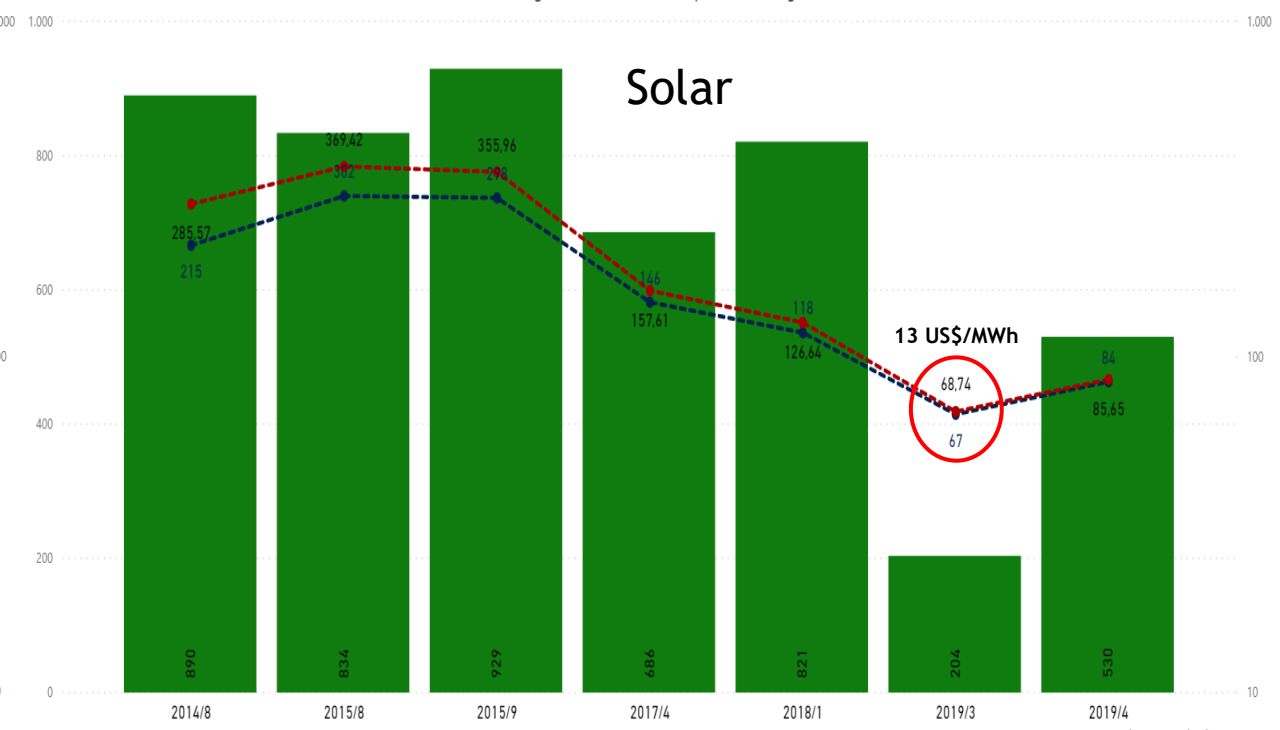
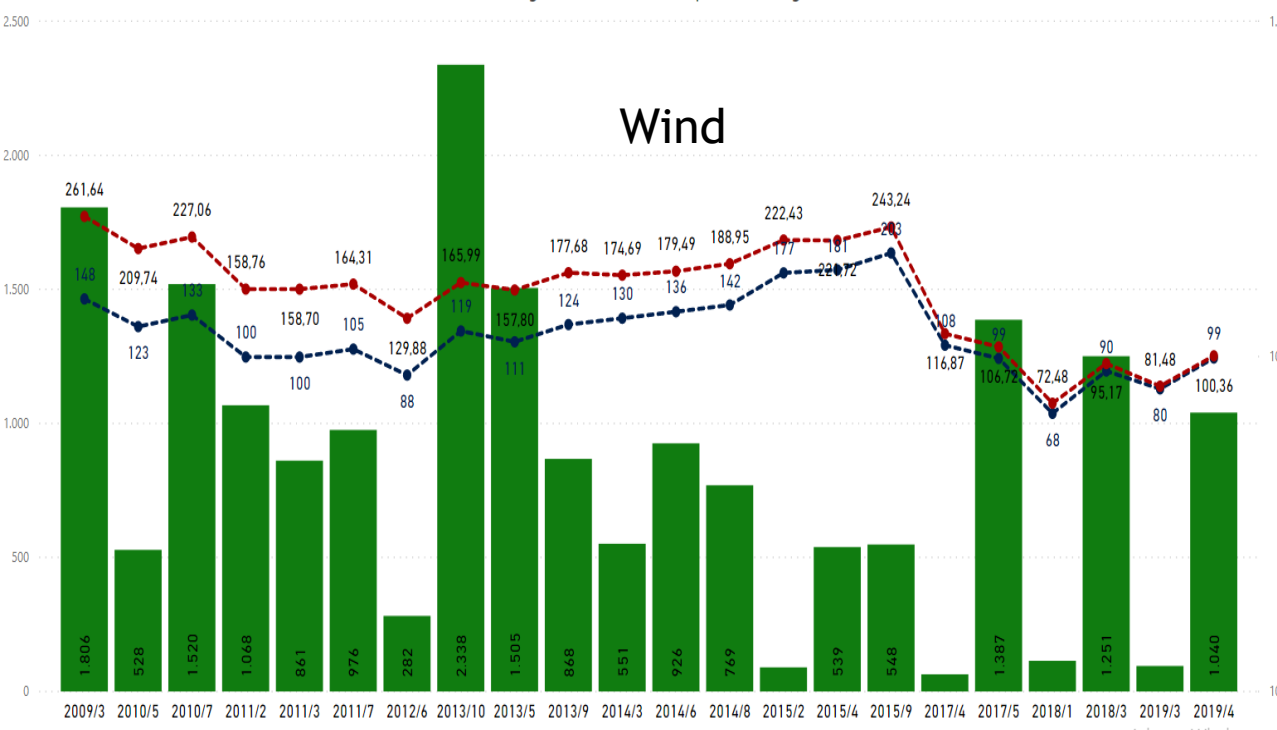
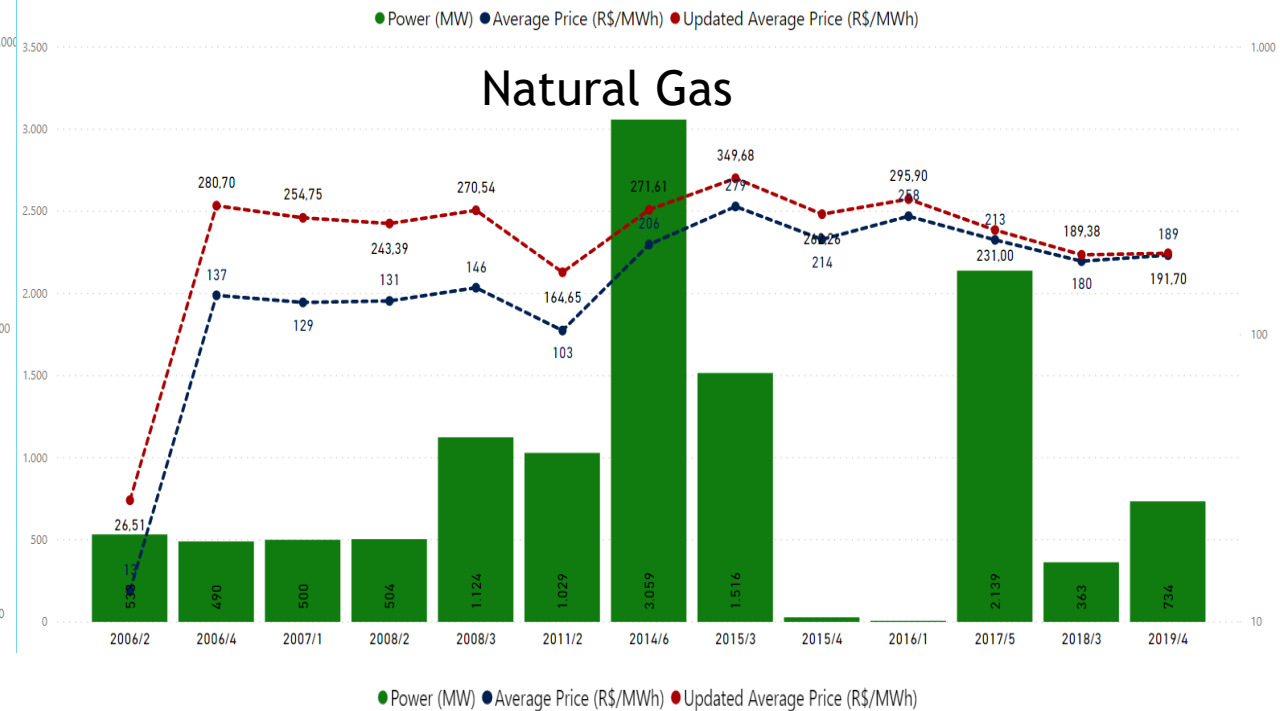
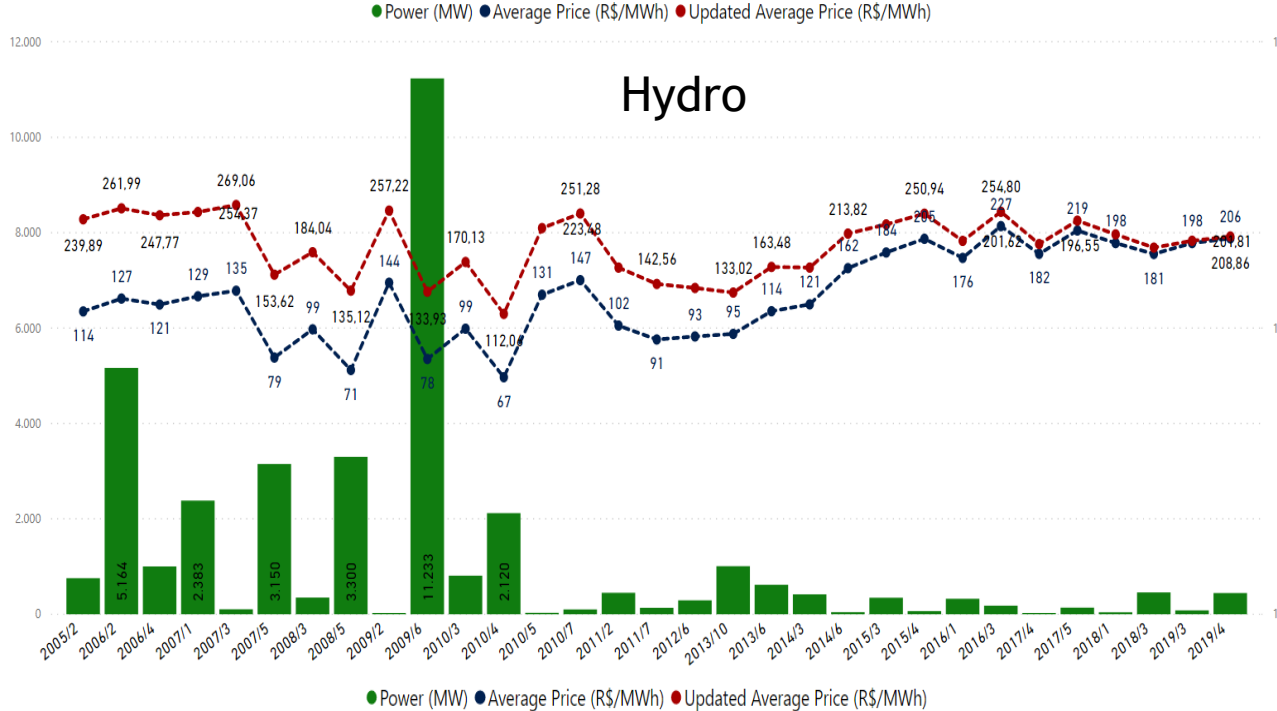
Notes



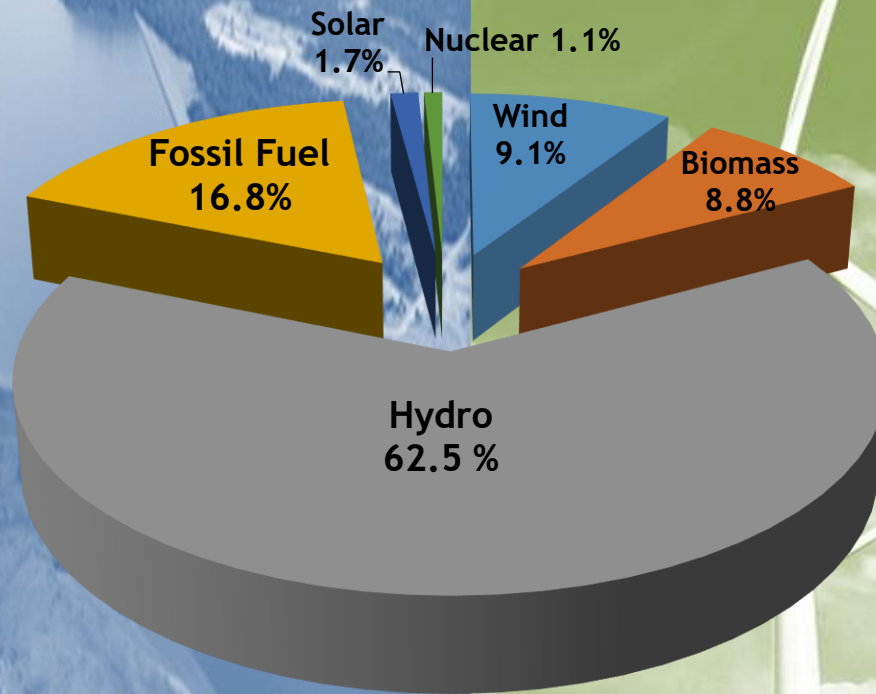
Results of Generation Auctions in the Regulated Environment



Sources: <https://www.aneel.gov.br/leiloes> or <https://tinyurl.com/aneelpowerauctions>



Generation - Installed Capacity



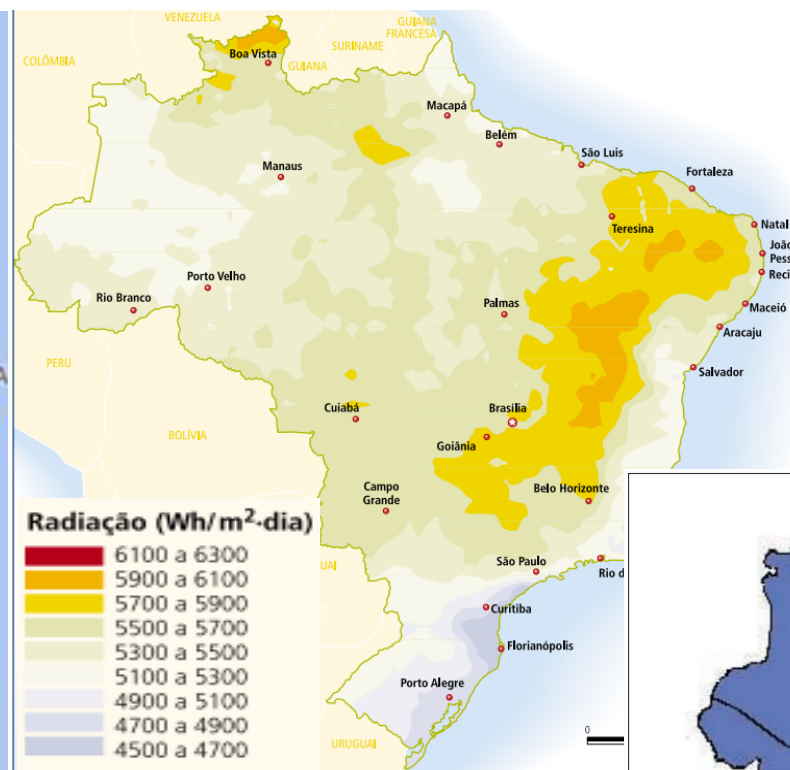
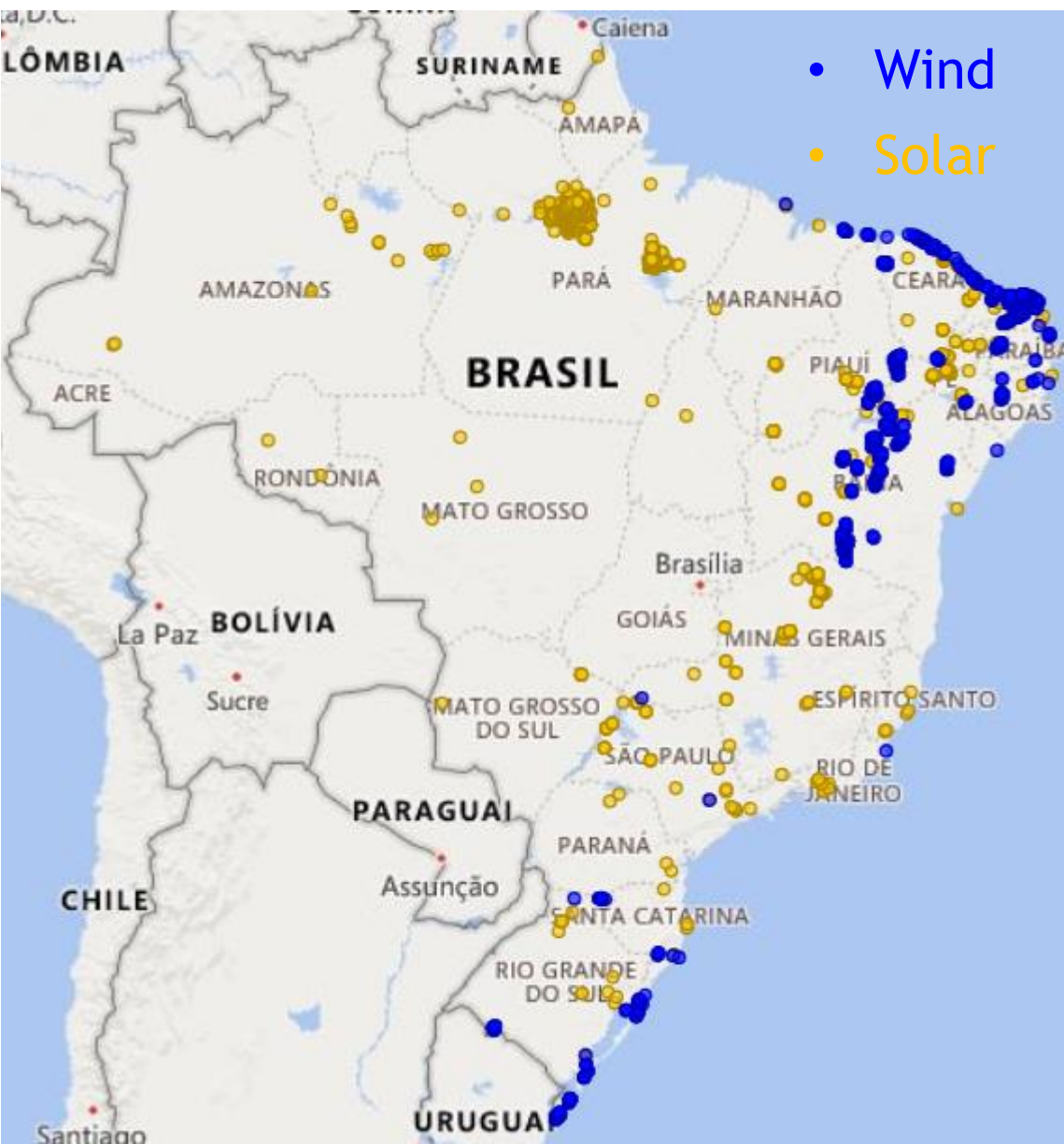
Power Installed by Source
(MW)

More than 82% of the energy supply mix **is renewable**

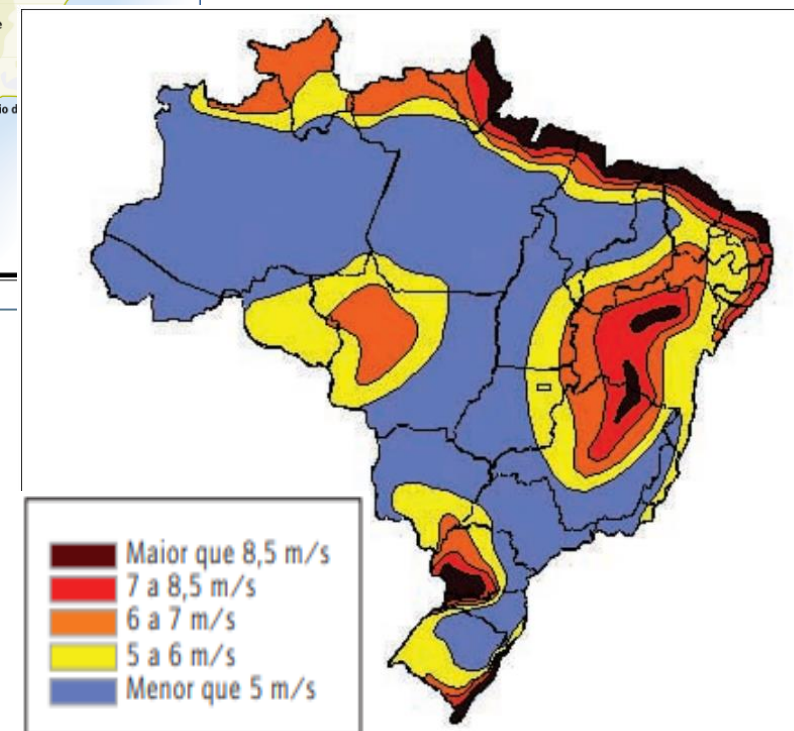
8,970 projects in operation, **172,693 MW** of installed capacity

187 projects under construction and **636** to begin construction will increase the generation capacity by **30.7 GW (15 %)**

Generation - Solar and Wind



Fonte: ATLAS de Irradiação Solar no Brasil, 1998 (adaptado).

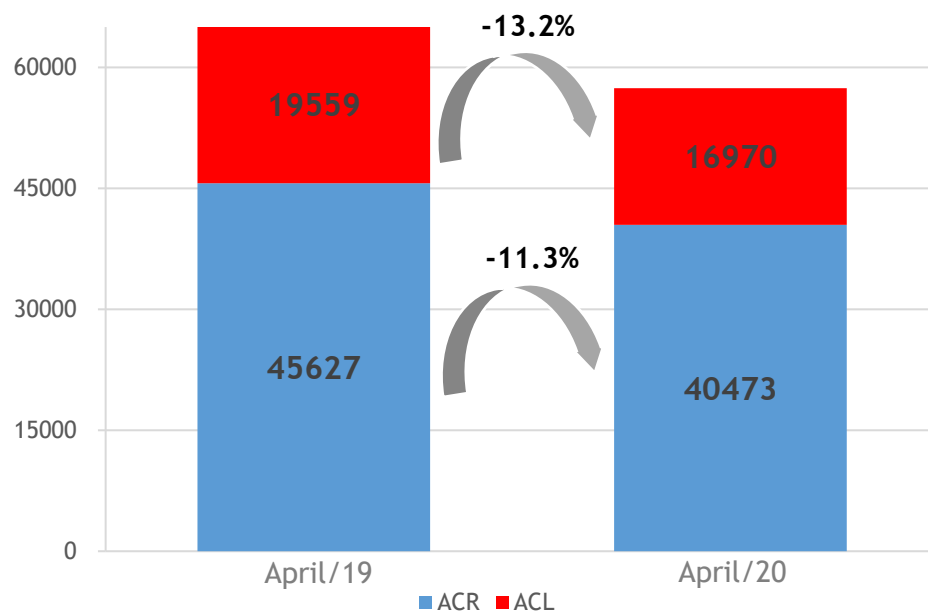


Fonte: CBEE, 1999 (adaptado).

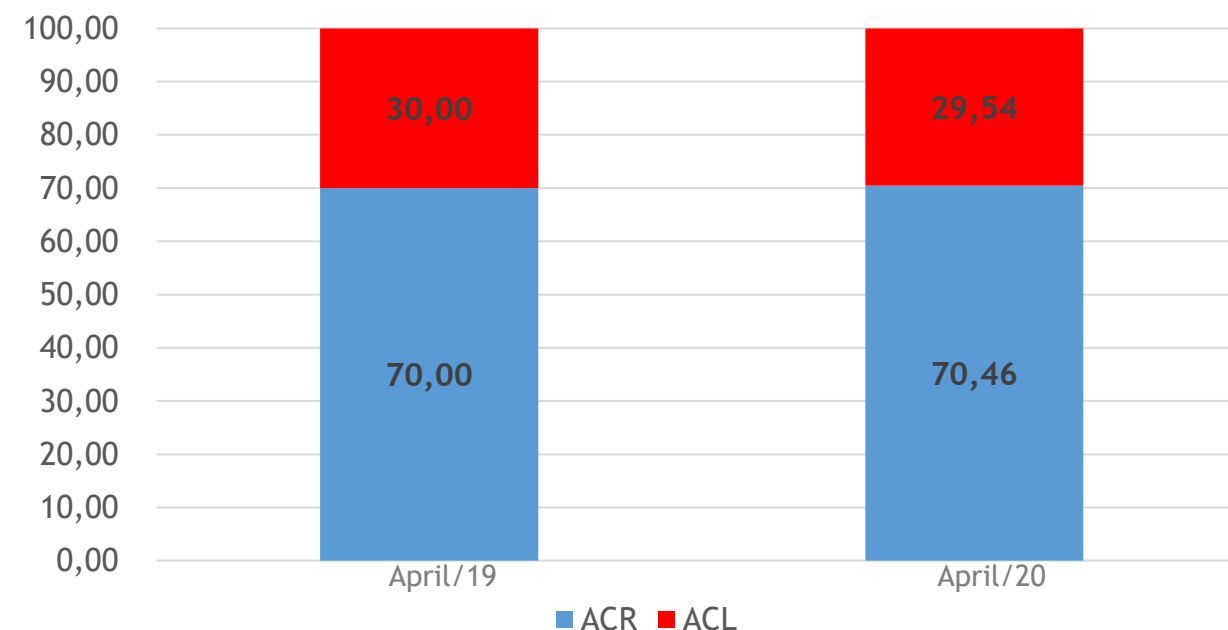
Free Market (ACL)

- ❖ 30% of consumption
- ❖ Strong migration after 2016: tariff elevation, spot price drop, relaxation of energy metering requirements, market opening

❖ Consumption (MW avg)



❖ Consumption (%)



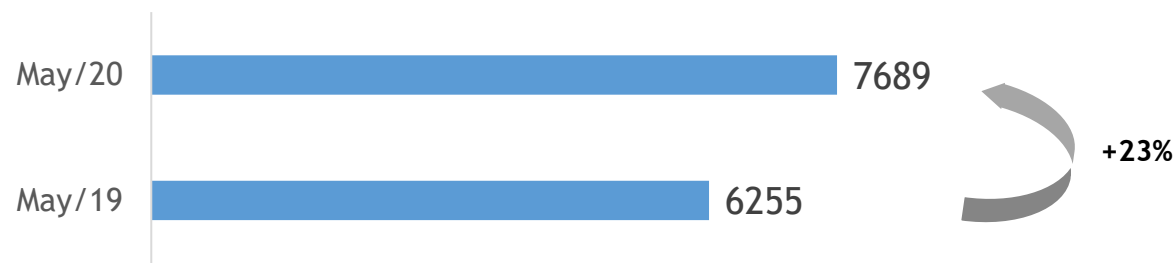
Free Market (ACL)

New players (2020)

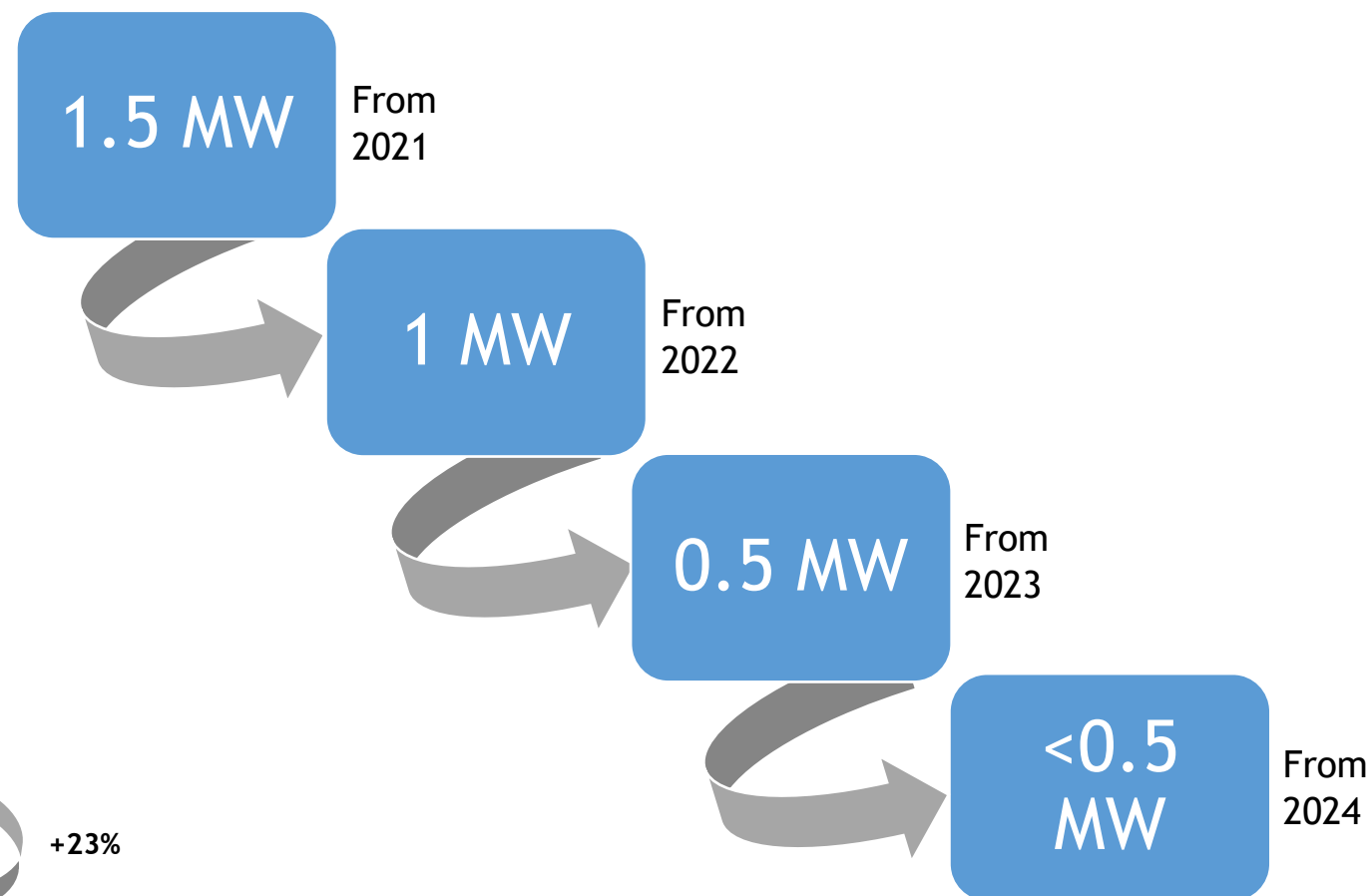
Type	Jan-May/20
IPP	64 (ACR+ACL)
Selfproducer	2
Trader	27
Free Consumer	50
Special Consumer	668
Total	811

Source: CCEE

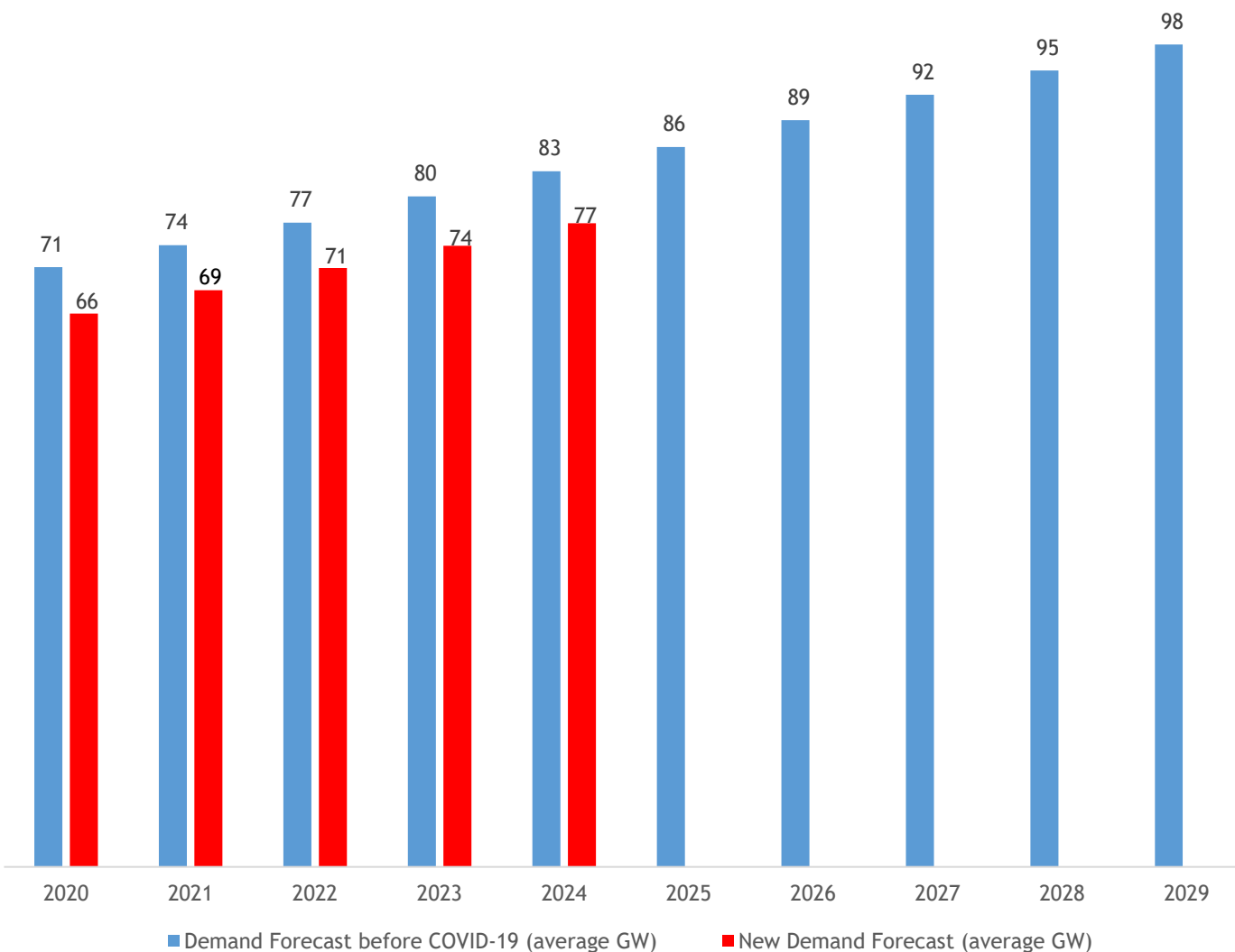
Free and Special Consumers (ACL)



Market Opening

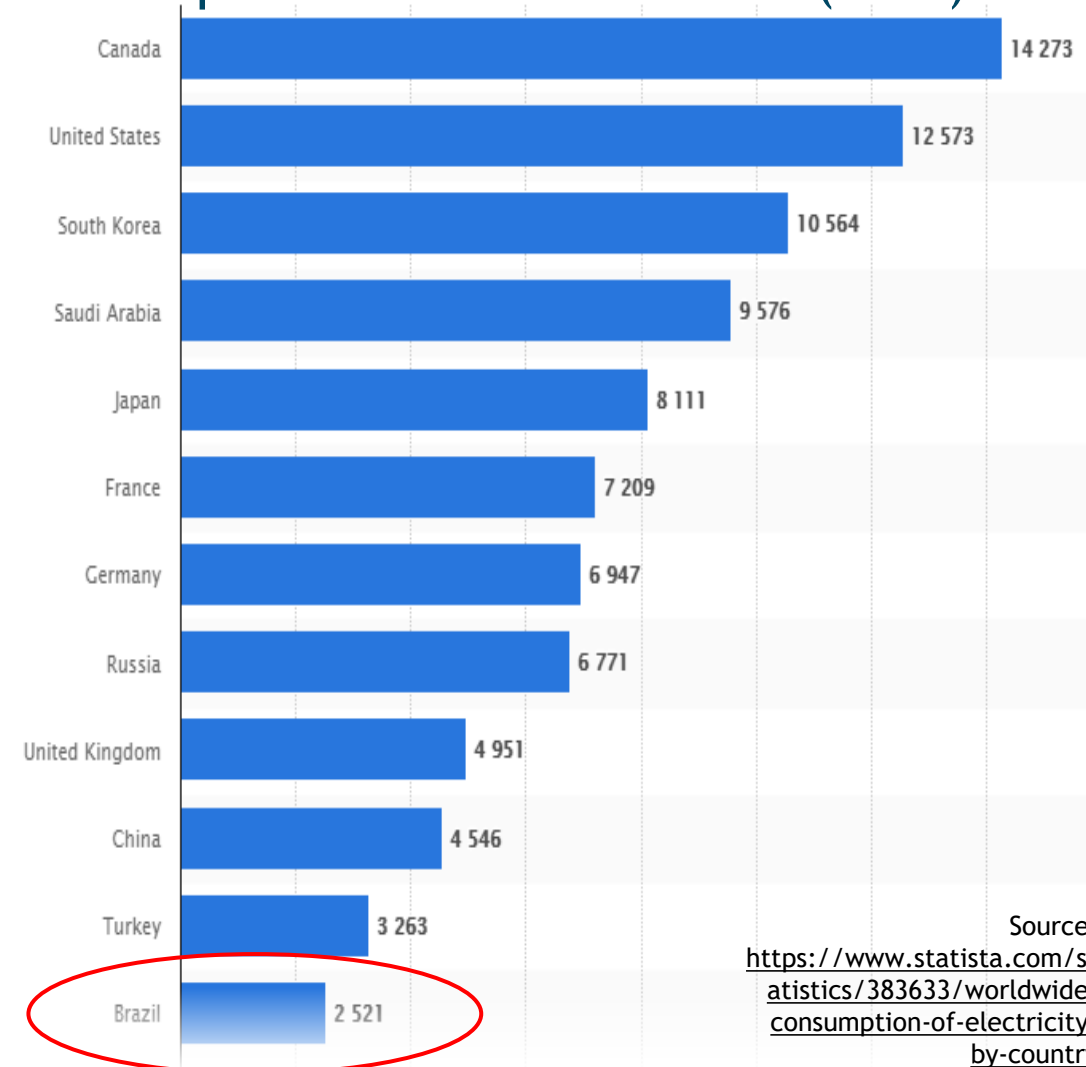


Load Forecast (2020 to 2029)



Sources: EPE and CCEE

Consumption of electricity per capita worldwide in 2017 (kWh)



Source:
<https://www.statista.com/statistics/383633/worldwide-consumption-of-electricity-by-country>

Model Improvements, Challenges and Future Work

- ❖ Law Projects 1917/2015 and 232/2016: modernization of the model
- ❖ Implementation of hourly price: 2021
- ❖ Development of market based approaches
- ❖ Market monitoring
- ❖ Distributed energy resources and innovation
- ❖ Demand response
- ❖ Storage and hybrid power plants

Recommended Sites

- <http://www.aneel.gov.br>
- <http://www.mme.gov.br>
- <http://www.ccee.org.br>
- <http://www.ons.org.br>
- <http://www.epe.gov.br>



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Thank You!
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