



A Growth Platform for Renewables in Brazil

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1. Our Group: SPIC and Pacific Hydro
2. Business Context



SPIC Pacific Hydro - Brazil



Mataraca , PB – Brazil

Pacific Hydro Brasil – Wind

Timeline: key events

**August
2005**

Pacific Hydro
acquires Vale
dos Ventos and
Millennium
projects

**November
2006**

Pacific Hydro
opens the
office in Brazil

**April - November
2007**

Pacific Hydro
structures
Project Finance
with BNB and
BNDES

**November
2007**

10.2 MW inst
Millennium
starts
operations

**March
2009**

48 MW inst
Vale dos
Ventos starts
operations

Pacific Hydro Brasil

✓ Long term project finance funding by local development banks

- Vale dos Ventos obtained a 16 year loan from BNDES (Brazilian Development Bank) and Millennium a 19 year loan from BNB



✓ Fully contracted quality operating portfolio

- 20 year PPAs with Eletrobras under PROINFA Program, price indexed to IGP-M inflation (steady cash flows)
- PPA in the free market with anticipated commissioning of wind farms
- All contracts liquidated on CCEE platform



✓ Outstanding reputation and track record with strong HSE culture

- Assets availability 98% historically (one of the highest in the market)
- Both assets are ISO 14001 and OHSAS 18001 certified
- Zero accidents in the last 60 months



Pacific Hydro Brasil

	Vale dos Ventos	Millennium
Installed capacity	48 MW	10 MW
Annual generation	119 GWh	32 GWh
COD	2007	2009
# Turbines	60	13
Homes Supplied (equiv)	100,000	40,000
Carbon abatement (tonnes pa)	17,000	40,000
Project Finance	BNDES	BNB
PPA	PROINFA Eletrobras	PROINFA Eletrobras
Location	Mataraca-PB	Mataraca-PB



Sustainability at Pacific Hydro Brasil



Community Programs at Pacific Hydro Brasil



Project Barra Limpa

- Objectives: **Educate local population about sustainability /environment protection**
- In partnership with the municipal schools, promote educational activities environmental protection
- Activities : **upcycling in handicrafts, population engagement on debates and lectures on renewable energy**



Project Portas Abertas

- Objectives: **provide transparency on Company's activities in the region, with organized site visits to wind farms**
- Local community is invited to visit wind farms, learn about all its sustainable practices and technologies that contribute for a better environment, promoting awareness for sustainable development



Cidadania ao alcance de todos

- Objectives : Together city hall and local institutions promote “Ação Cidadania” citizenship event providing services to the population, such as documents issuance, educational workshops, entertainment and health assessment
- Maintenance of essential local roads to keep villagers' ability to attend schools, seek medical treatment and access other essential services

Growth Platform

An aerial photograph of the São Simão Dam and its associated power plant. The dam is a large concrete structure with multiple spillways, situated on a river. The power plant is a long, rectangular building with a corrugated metal roof, located downstream of the dam. The river water is turbulent and brownish, indicating a high flow rate. The surrounding landscape is hilly and covered with green vegetation.

São Simão , GO/MG – Brazil

SPIC acquired PHB in 2017

Shareholder's Overview



Top 5 energy
generators in China



Present **41 countries**



140,000
employees

SPIC growth plan through PHB Platform

Acquisition of Pacific Hydro
April 2017



SPIC acquired assets
Pacific Hydro Brazil

Wind farms Northeastern Brazil
58 MW of installed capacity

Acquisition of HPP São Simão
Sept 2017



SPIC won 30 year concession of **São Simão hydroelectric plant**,

the largest of power plant
offered at the last privatization auction,
1,710 MW inst capacity

Business Expansion



- Hydro Concessions
- Auctions
- M&A

SPIC Brasil

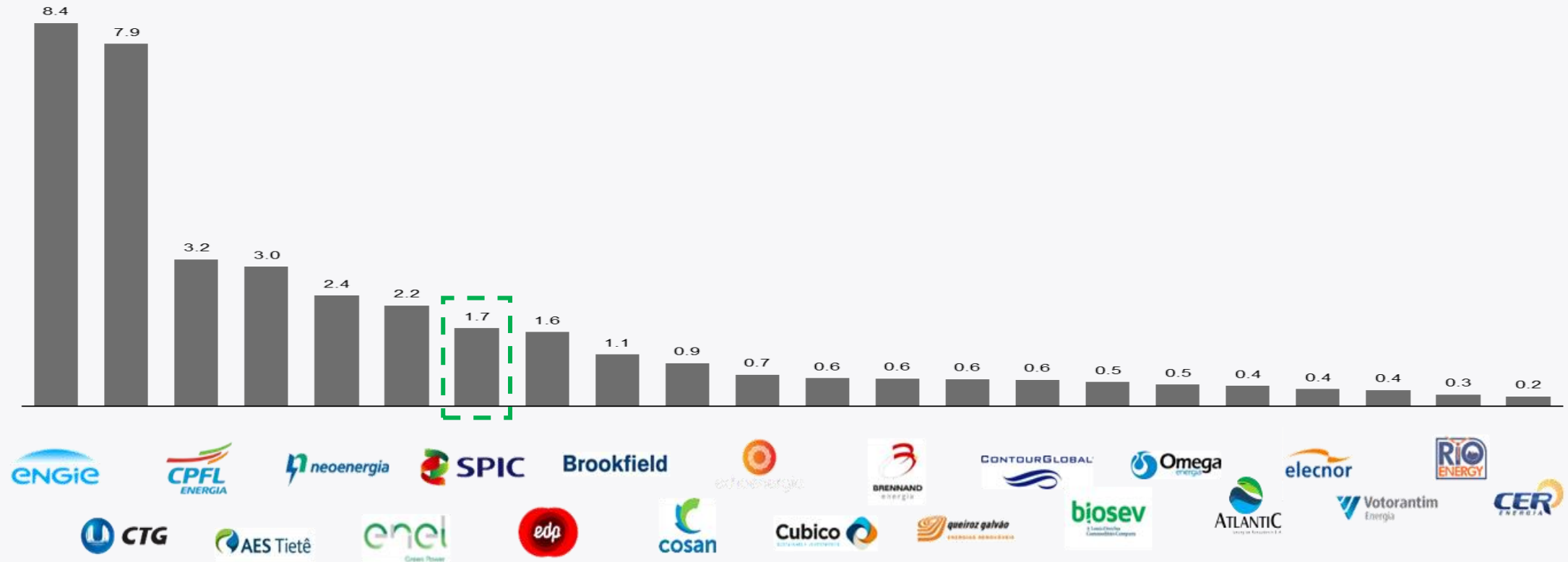
São Simão HPP

Installed capacity	1,710 MW
Annual generation	10,538 GWh
Commencement/COD date	1973/1978
Units	6
Unit capacity	285 MW
Turbine discharge	425 m3/s
Average annual flow	2,306 m3/s
Spillway capacity	24,100 m3/s
Dam length	3,440 m
Dam height	127 m
Fall head	72 m
Reservoir area	703.29 km2



SPIC Brasil 2018

Leading Private Renewable Generation Companies – Operating Capacity (GW)



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Brazil Business Context

- Market turn around of recession
- Consumption and population profile demonstrate growth potential
- Stable Sector Rules (Auctions, PPAs, Funding)
- Regulated auctions as main Sector expansion mechanism (Long Term PPAs)
- Free Market PPAs as opportunity for greenfield PPAs



Investment Thesis

Stable and inflation protected cash flows

- Transparent public auctions for all regulated energy contracting
- Long term PPAs, inflation indexed

PPAs with Free Market (ACL)

- Partnership opportunities with large off takers (Industrials, Trading Cos) for wind and solar PPAs

Debt Financing

- Long term funding with federal banks (BNDES, BNB, BRDE)
- Loans from Foreign Developing Banks

Abundant high quality development pipeline, privatizations and M&A Opportunities

- Market for projects by independent developers





Thank You!

谢谢



BRAZILIAN MARKET OPERATOR

CCEE – CÂMARA DE COMERCIALIZAÇÃO DE ENERGIA ELÉTRICA

Roberto Castro
Administration Board



Download our APP

April 22, 2018



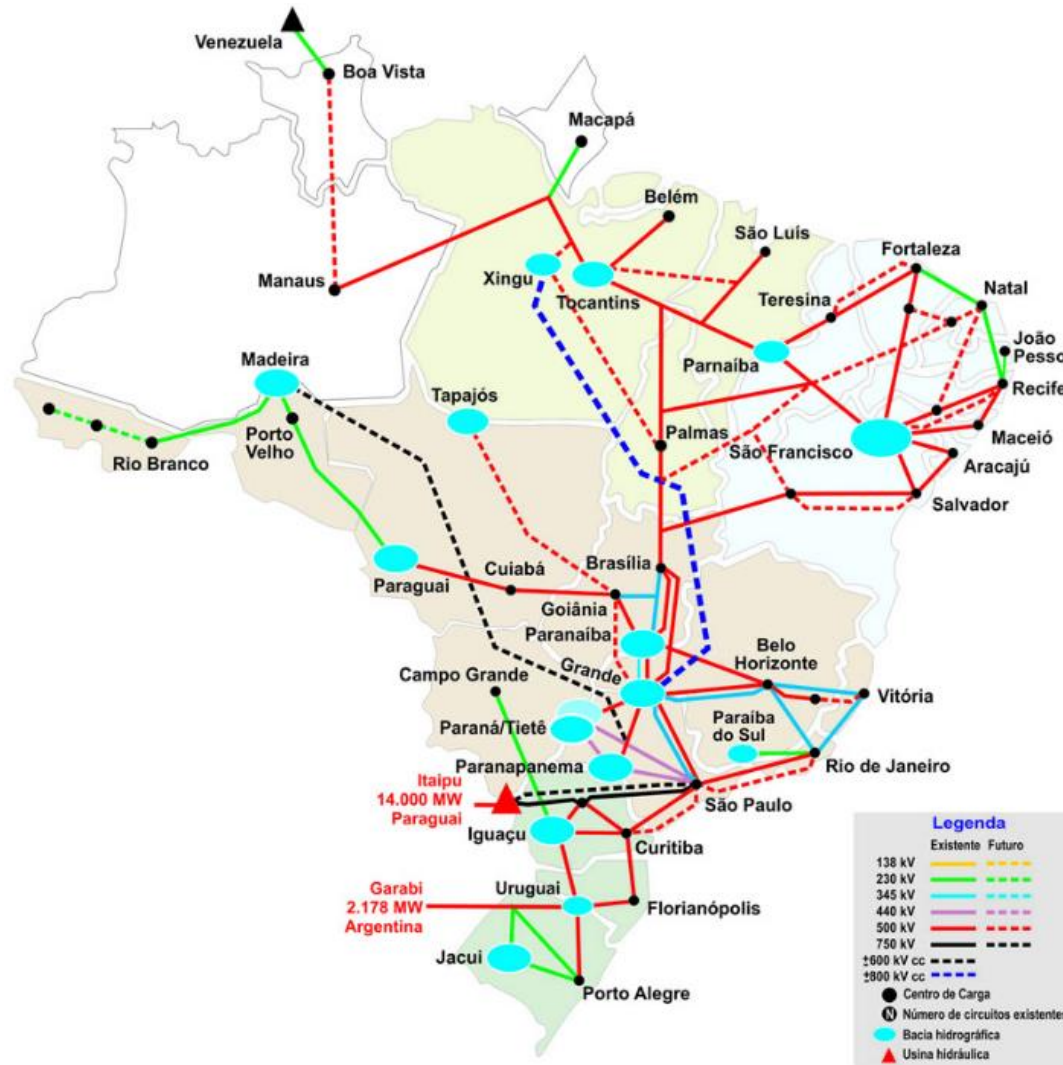
Centralized System and Market Operation

System operator

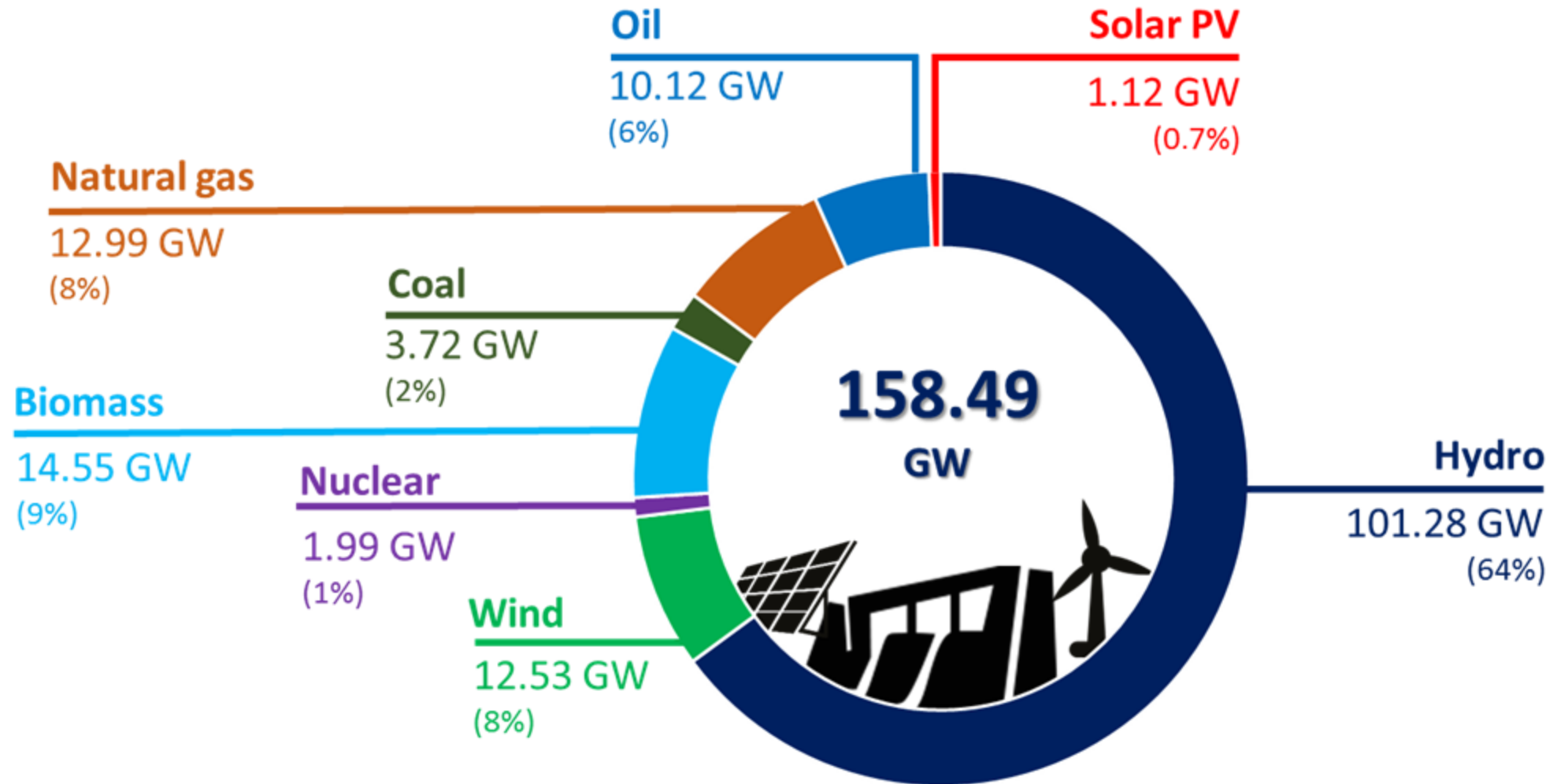
- Centralized dispatch of power plants and Transmission System

Market operator

- Centralized Spot price calculation and contractual position settlement
- Auctions for Generation Expansion



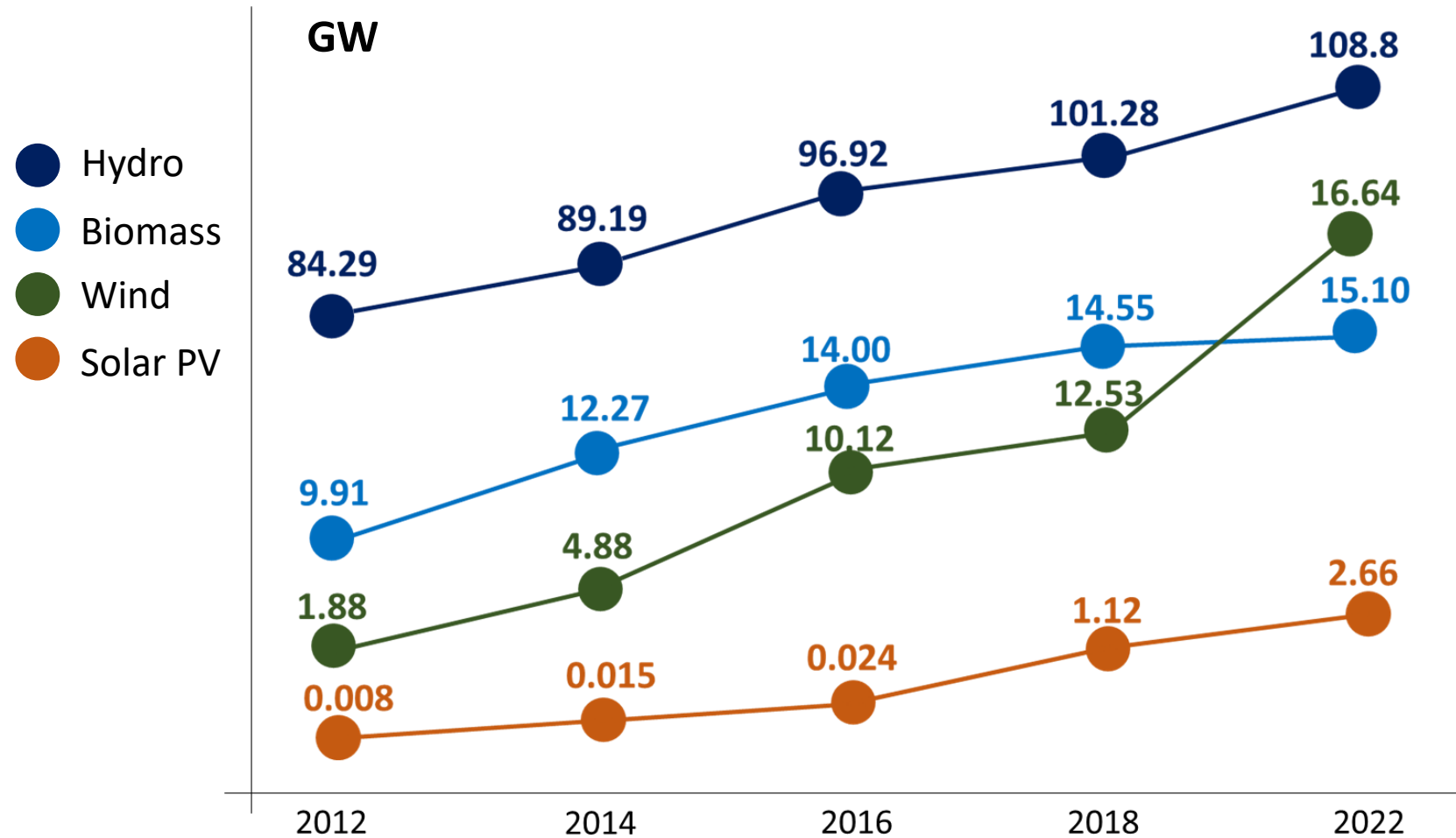
Installed Capacity



Source: ANEEL (as in Apr/18)

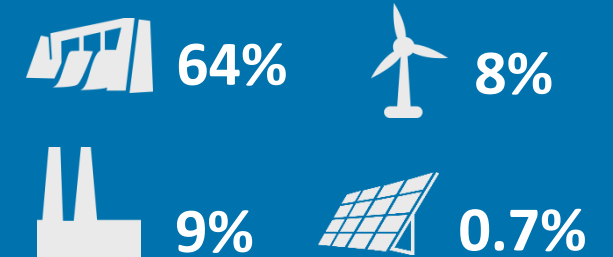
Renewable is about 80% of the Brazilian electricity matrix

Renewables Energy (Installed Capacity)



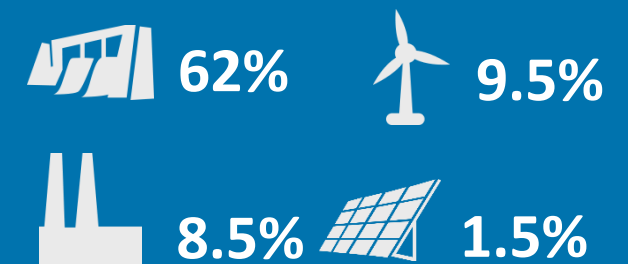
158.49 GW (total)

2018



174.27 GW (total)

2022



Source: MME, EPE and Aneel

Generation – 62,141 MWavg (2017)

83% Renewable

Hydro

71%

43,937 MWavg

Wind

7.5%

4,618 MWavg

Solar PV

0.1%

44.5 MWavg

Thermal

22%

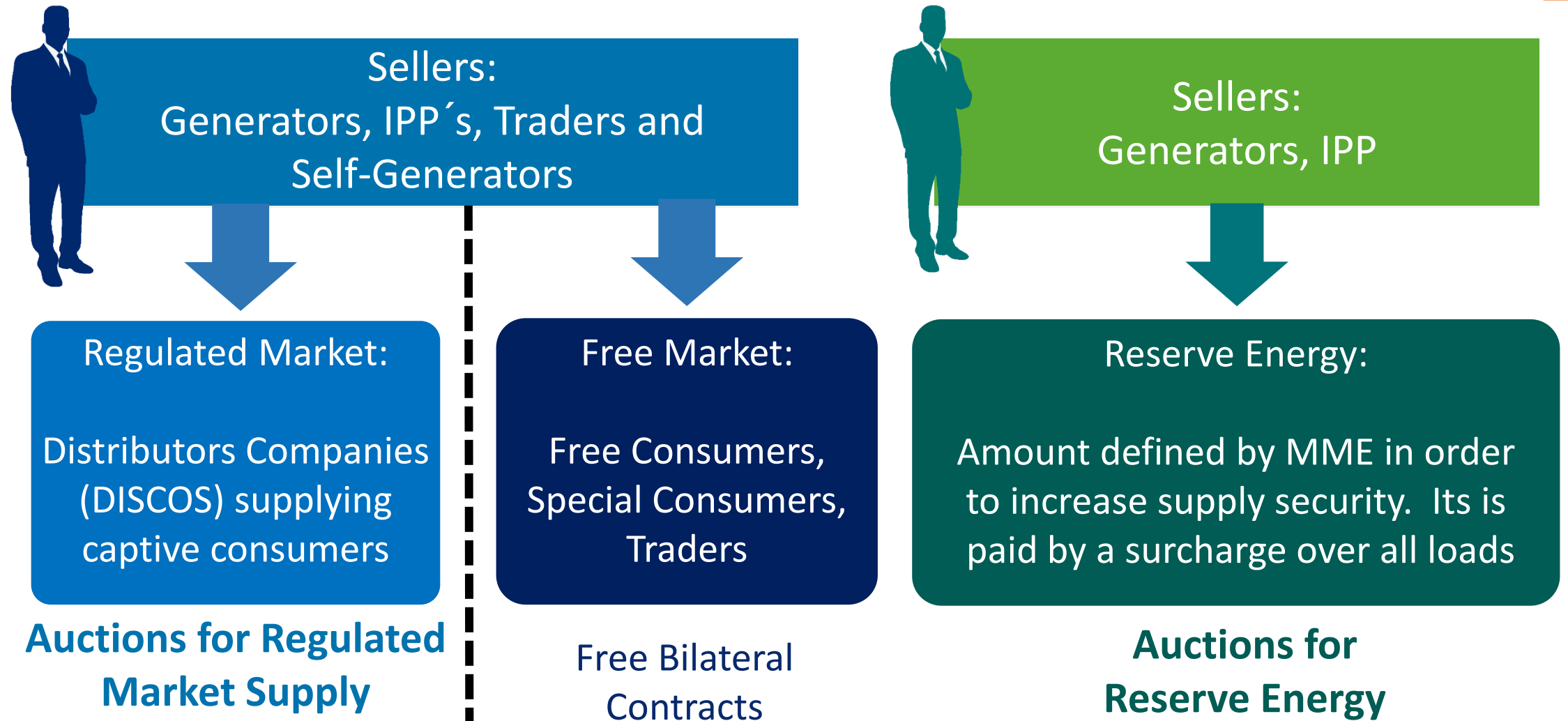
13,540 MWavg

4.5%

Biomass: 2,908 MWavg



Current Brazilian Market Design - Main Figures



Energy Auctions

73 auctions held

USD 525 billions* traded

USD 38.4 billions* investment

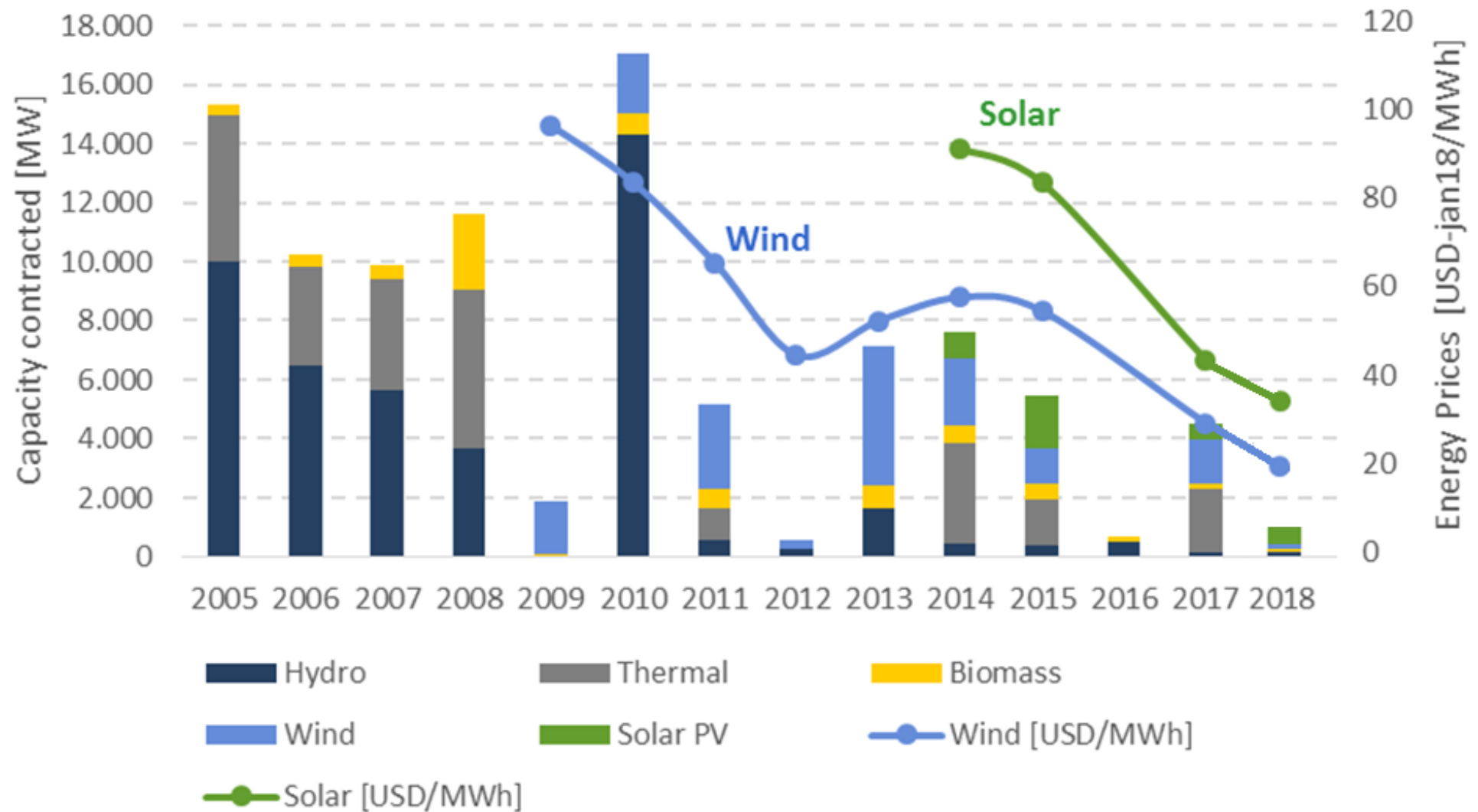
9.3 TWh contracted

*1 USD = 3.3138995 BRL / Currency in Apr 03, 2018

Source: Central Bank of Brazil



Prices by technology (auction)



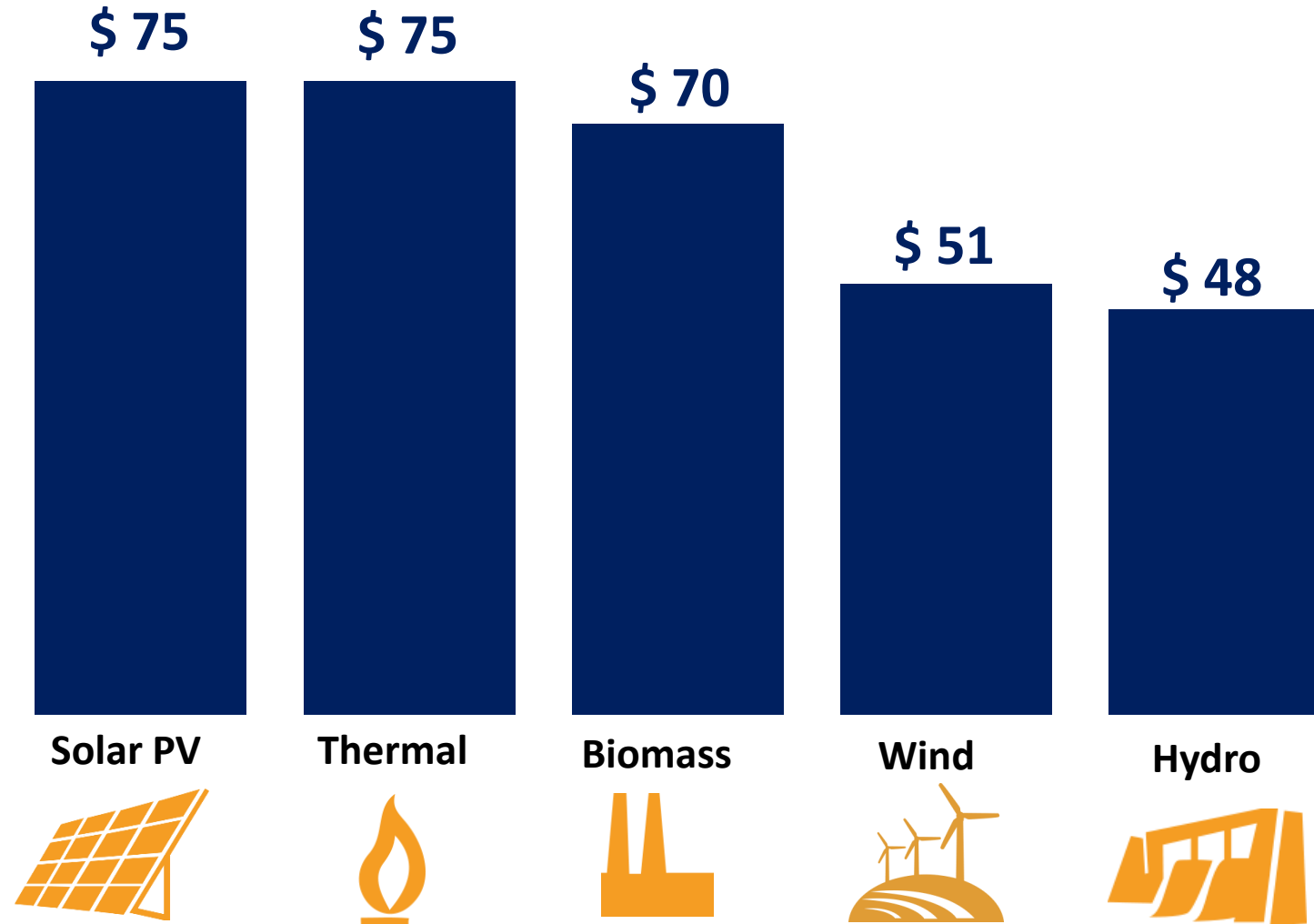
Prices by technology (auctions)

(USD/MWh) *

*1 USD = 3.31 BRL R\$

Exchange rate as in Apr 03, 2018

Source: Brazilian Central Bank



Conclusion

- ❑ Attractive Environment for Investors







Our organization

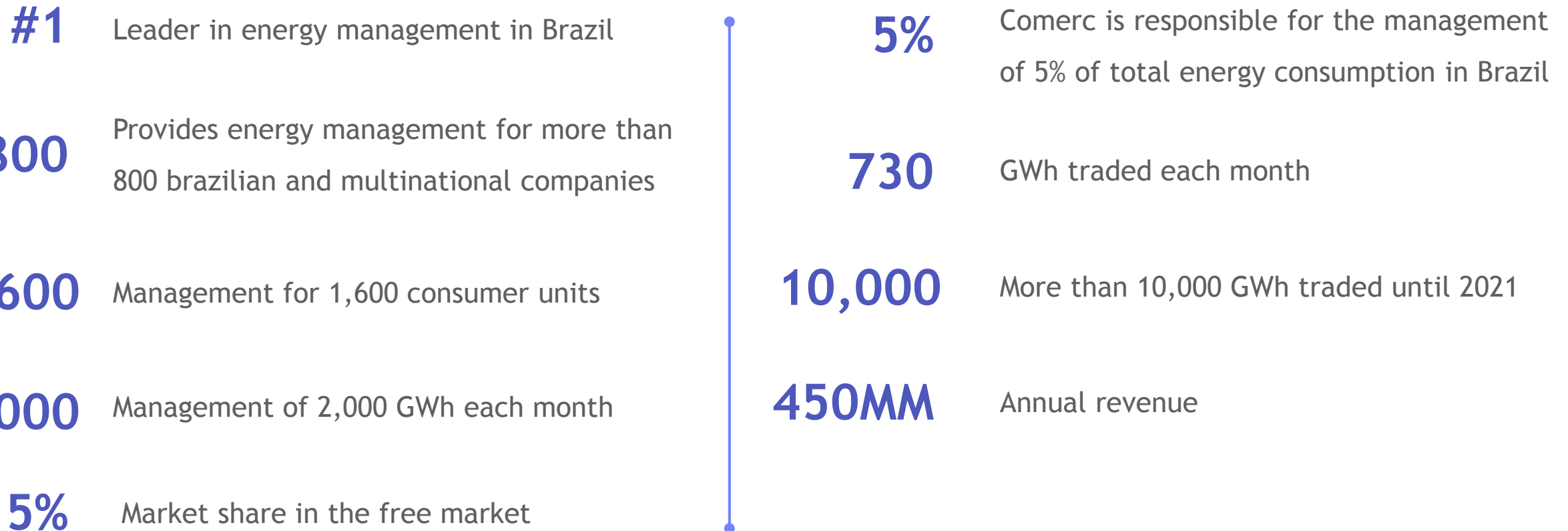
Brazil

We are present
nation-wide

+250 Experts



COMERC ENERGIA



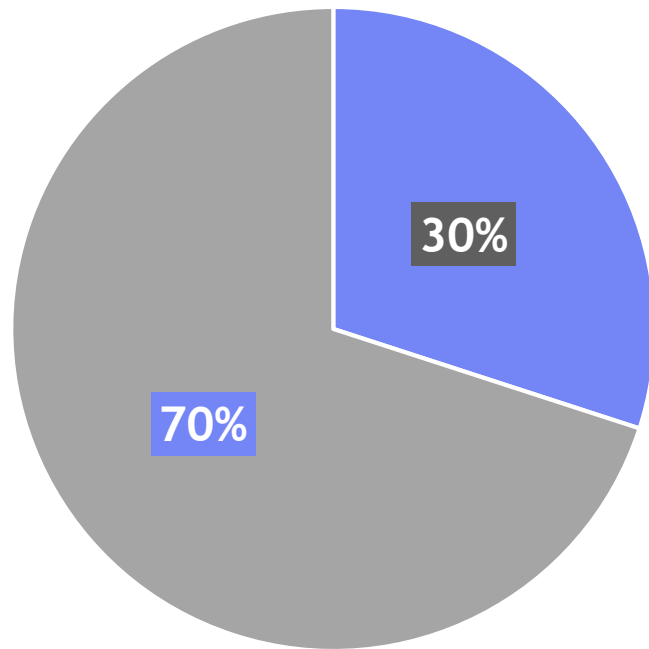
Regulated vs. Free Market



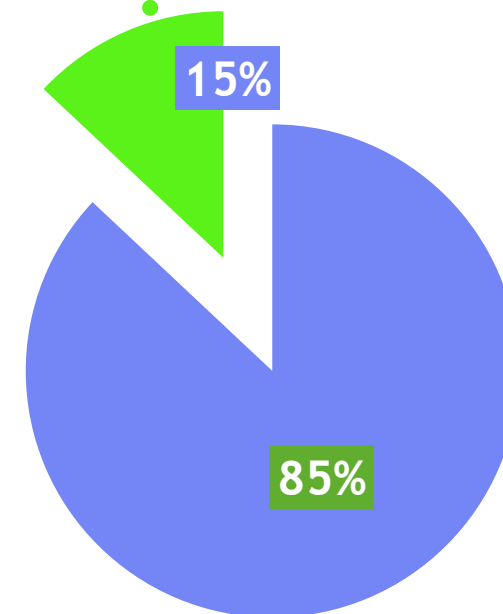
COMERC GESTÃO The free energy market in Brazil

The free market accounts for 30% of the Brazilian energy consumption

■ Free market ■ Regulated market

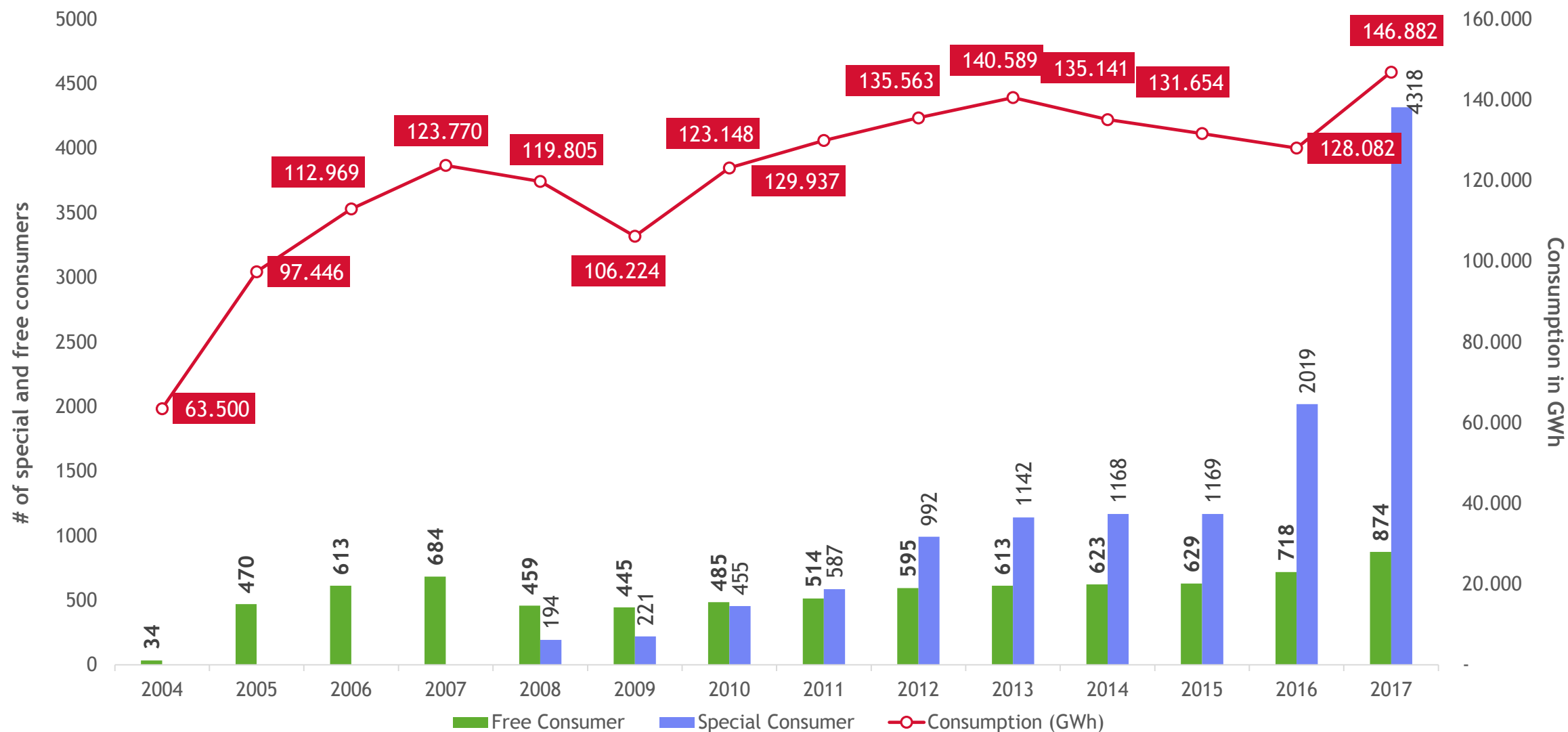


COMERC gestão Market share in the free market

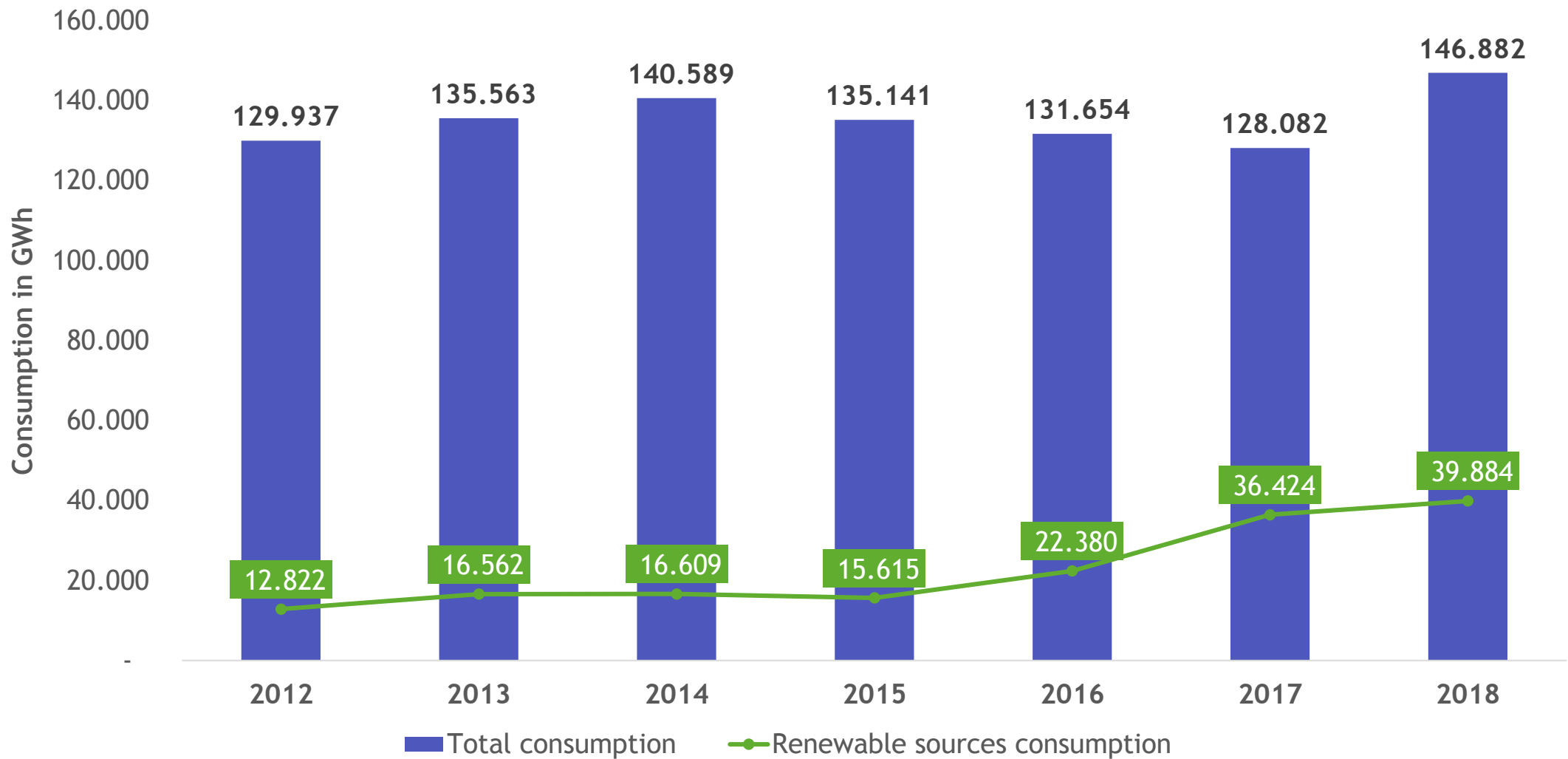


Comerc leads in number of clients, with 15% market share.

Free energy market growth 2004 - 2017



Total consumption vs. renewable energy consumption in the free market 2012 - 2018

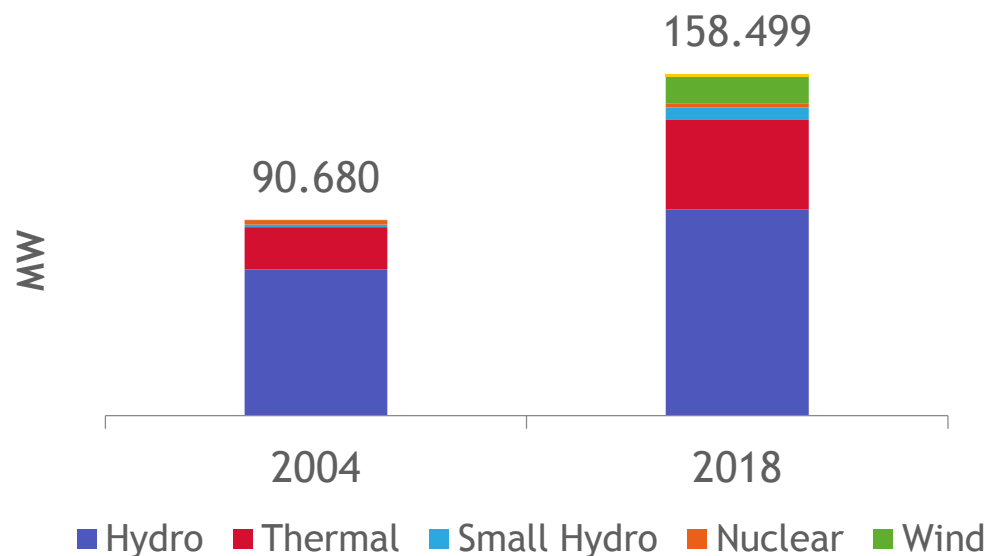


Generation Capacity Expansion



Installed Capacity by Source

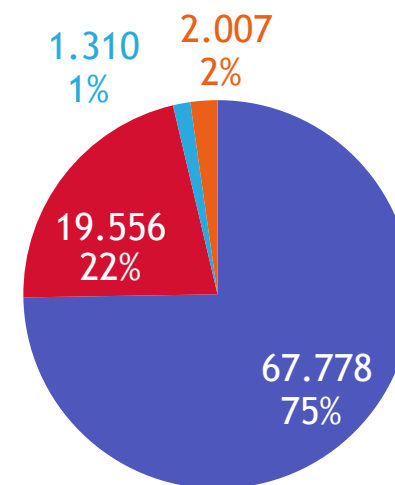
Evolution of installed capacity
2004 x 2018



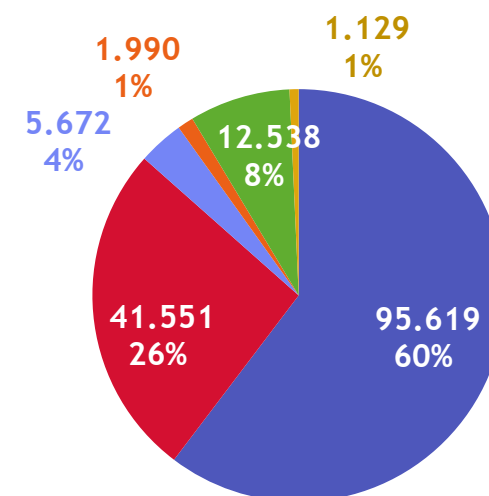
MW	2004	2018
Hydro	67.778	95.619
Thermal	19.556	41.551
Small Hydro	1.310	5.672
Nuclear	2.007	1.990
Wind	29	12.538
Photovoltaic	0	1.129

■ Hydro ■ Thermal ■ Small Hydro
■ Nuclear ■ Wind ■ Photovoltaic

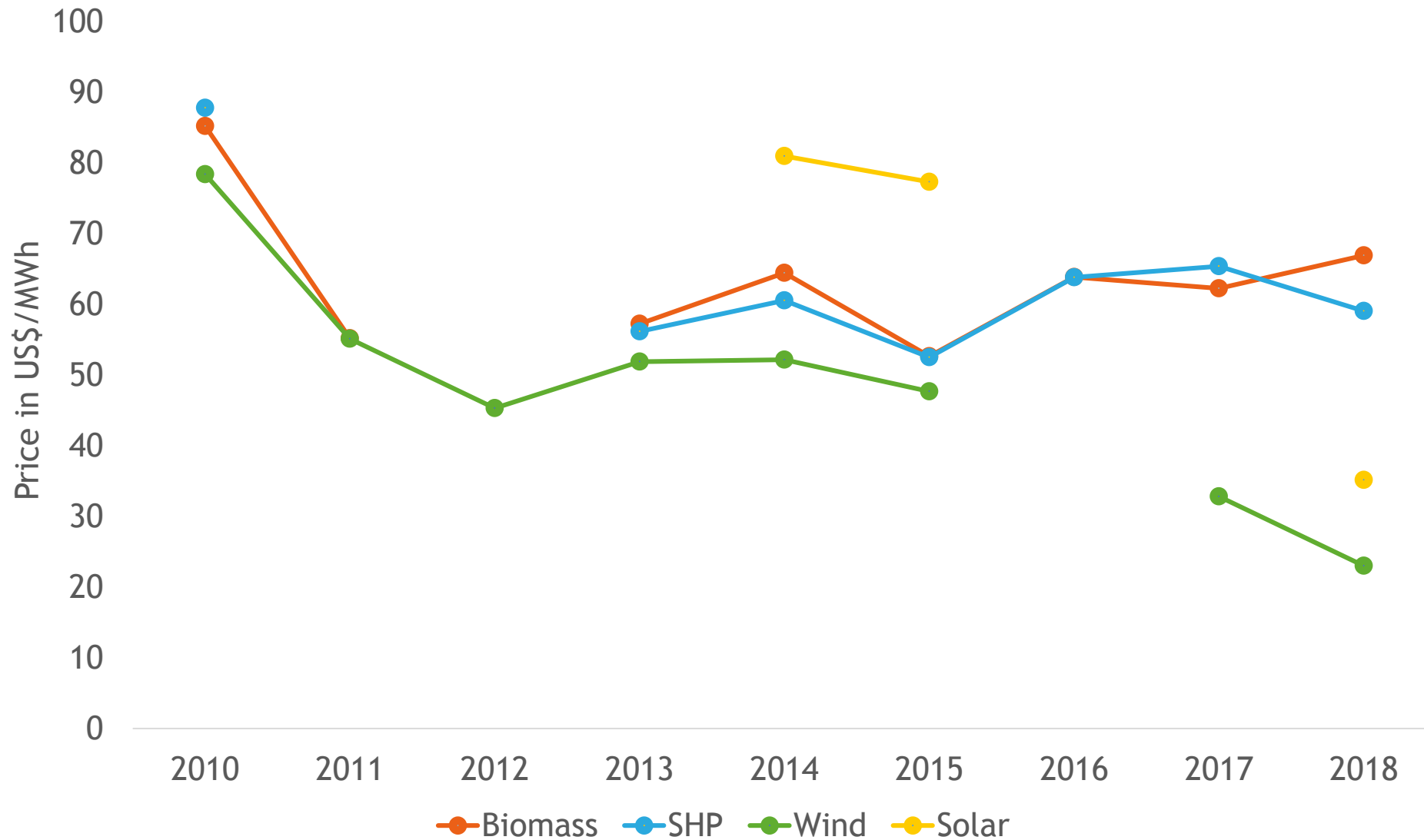
2004



2018



Renewable Energy Regulated Market Auction Prices



Current prices for Solar (PV) and Wind Power are at the lowest levels since the beginning of the Auctions

Biomass and SHP prices are stable

Brazilian Wind Power Potential

In 2001, the estimated Brazilian wind power potential was 143 GW, assuming average wind speed of 7 m/s and 50-meter towers.

Recent studies with new technologies and 100-meter towers estimate the Brazilian wind power potential as 522 GW.

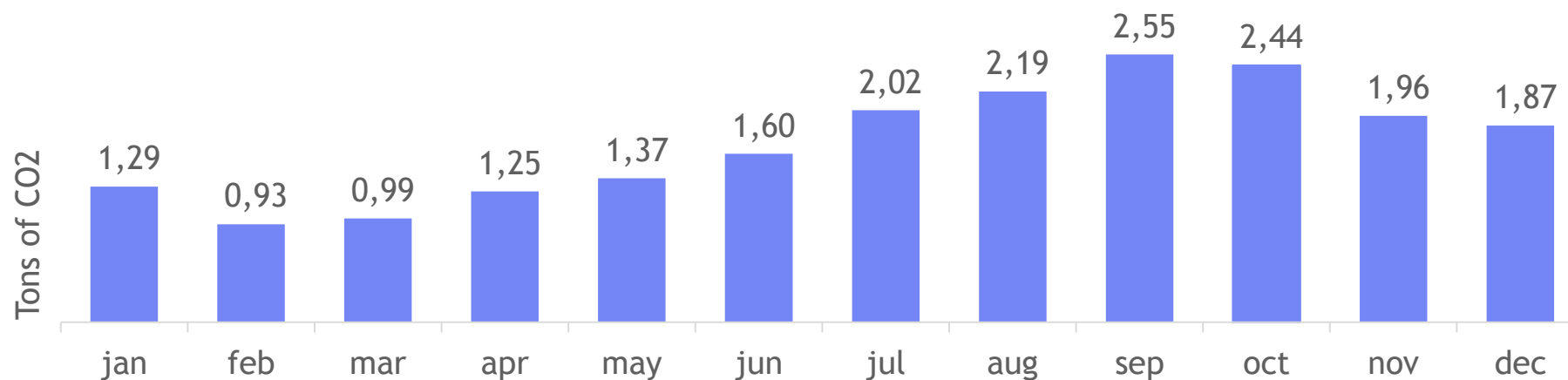


Wind Power in the Northeast of Brazil

Drivers:

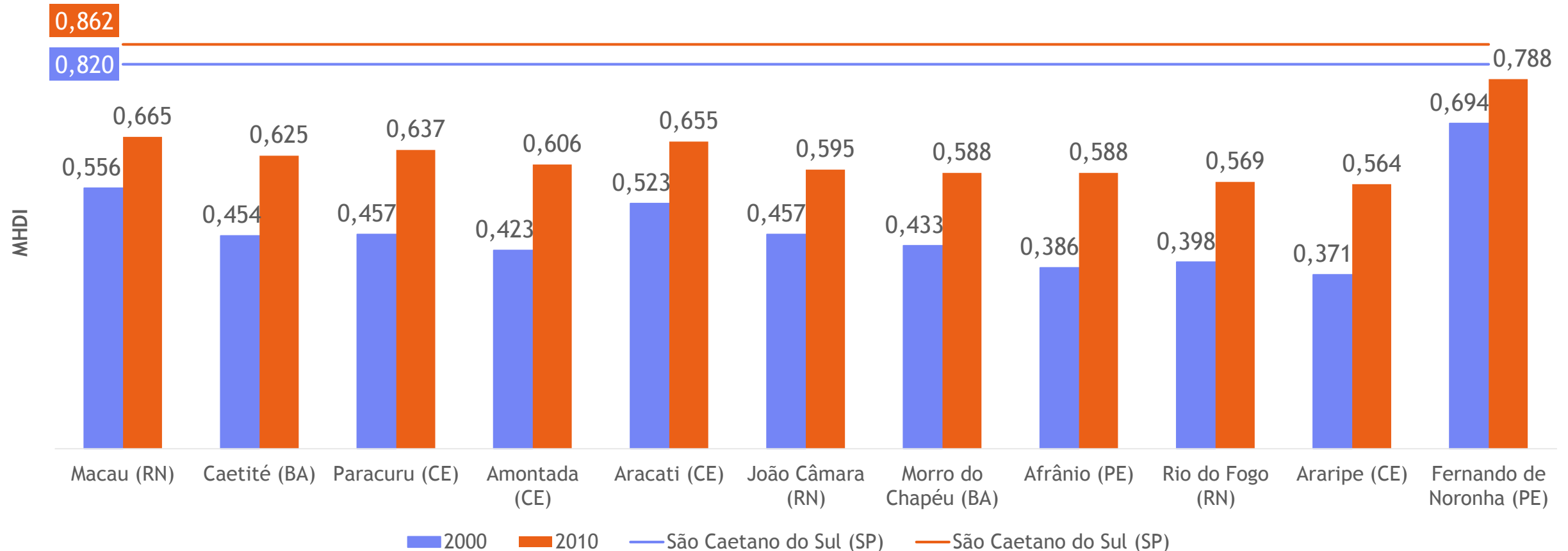
- Land leases generate extra household income for families in poor regions
- New Jobs
 - ABEEólica estimates 15 new Jobs/new megawatt installed
- More than 150,000 new Jobs in 2016
- Avoided CO2 emissions in 2017 equivalent to the annual emission of more than 13 million cars

Avoided CO2 emissions in 2017



MHDI improves in Cities with Wind Power

Municipal Human Development Index (MHDI) - Cities with wind power

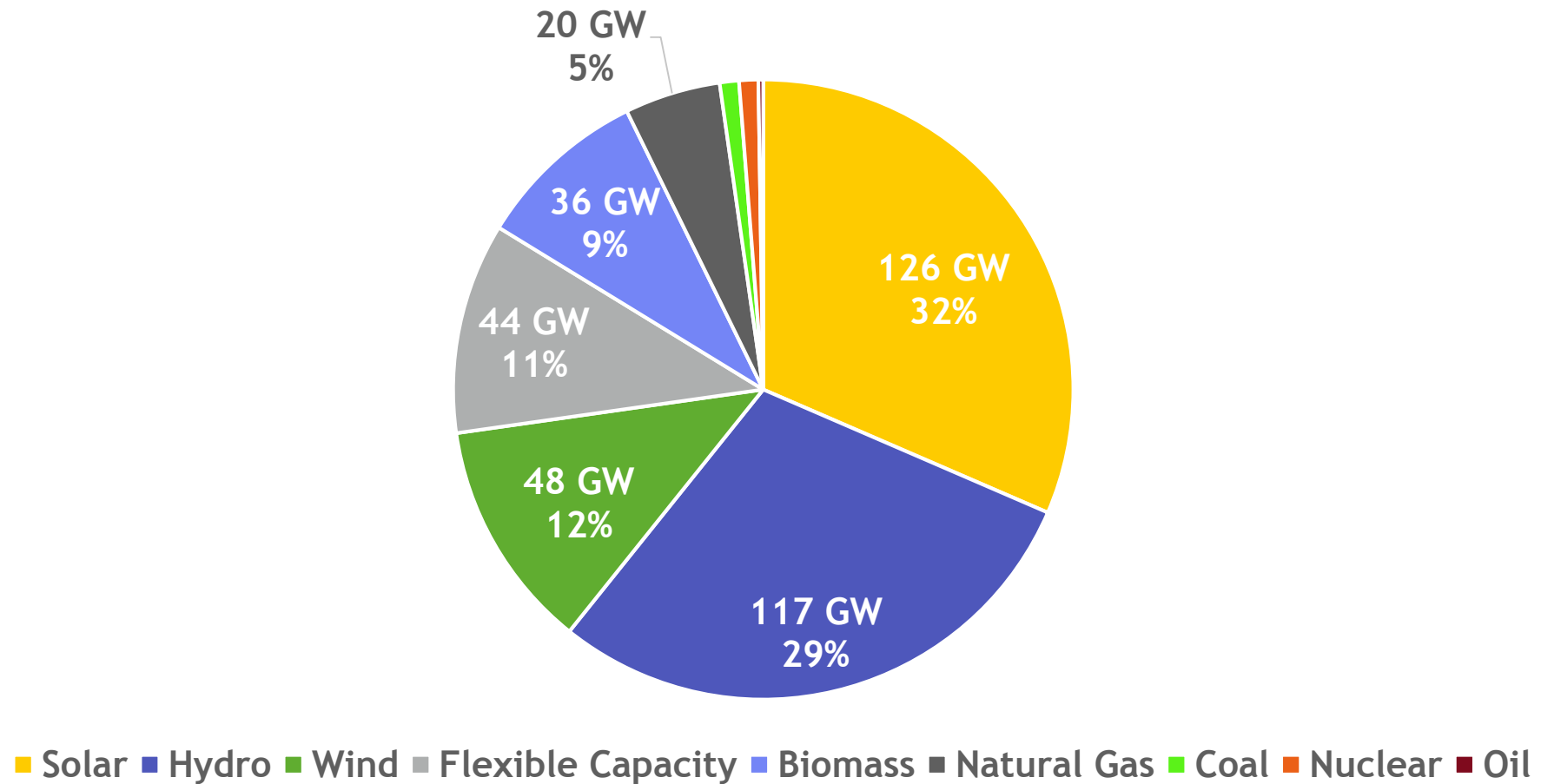


***São Caetano do Sul (SP) - City with the highest MHDI in Brazil**

	Macau (RN)	Caetité (BA)	Paracuru (CE)	Amontada (CE)	Aracati (CE)	J. Câmara (RN)	M. do Chapéu (BA)	Afrânio (PE)	R. do Fogo (RN)	Araripe (CE)	F. de Noronha (PE)
%(2010/2000)	20%	38%	39%	43%	25%	30%	36%	52%	43%	52%	14%

Solar Power Forecast in Brazil

Brazilian Matrix in 2040 - BNEF Forecast



Source: BNEF 2016.



In 2011 we created the Comerc-Sinerconsult Renewable Energy Certificate for the amount of greenhouse gases avoided through the use of renewable energy from small hydro plants (PCH), thermal plants burning sugarcane biomass, wind farms or solar power plants.

All calculations used are fully compliant with the requirements defined in the GHG Protocol Corporate Standard.

"GHG Protocol" is the methodology most widely used by governments and corporations to quantify and manage greenhouse gas emissions. The "Comerc Sinerconsult Renewable Energy Certificate" itself does not generate carbon credits.

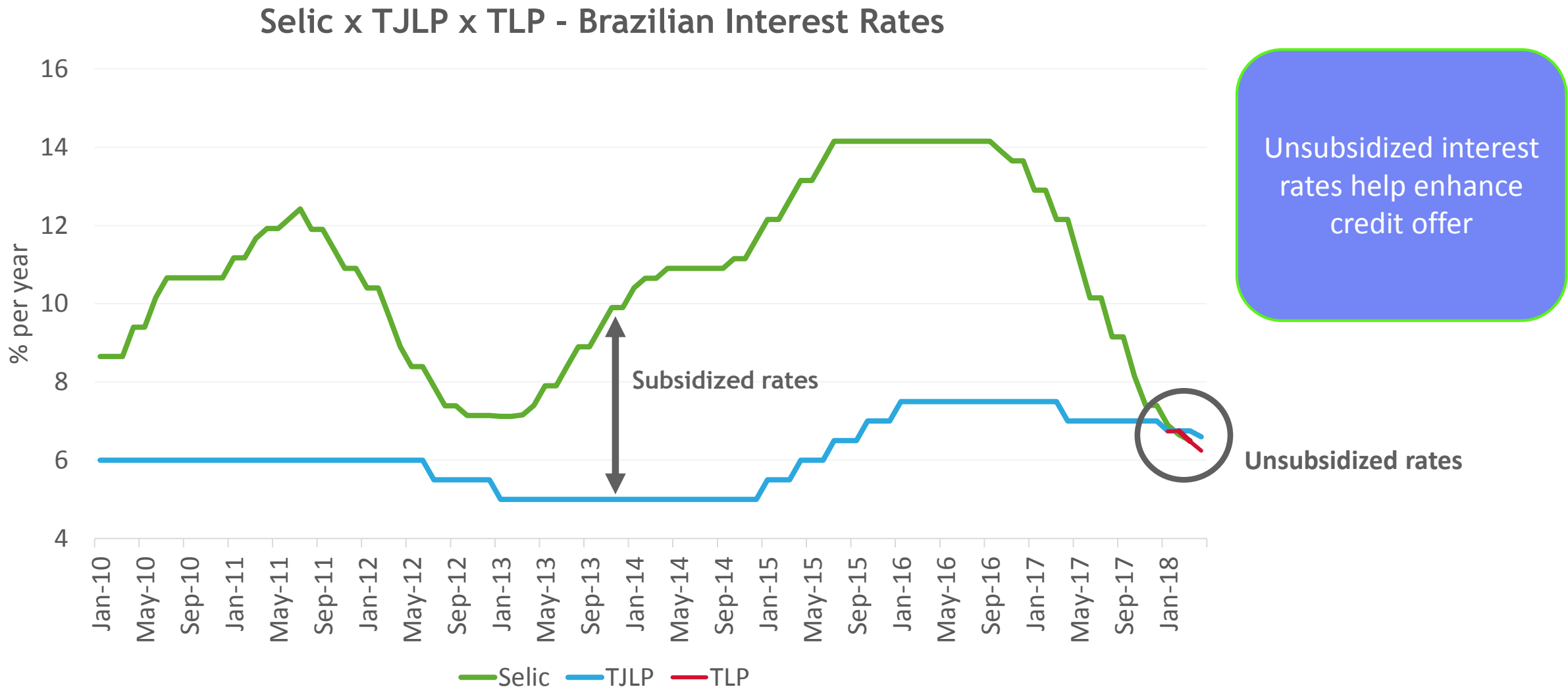
Financing Power Generation



PPA for Regulated and Free Market in Brazil - How has it worked until now?

	REGULATED 70% of the Electrical Market	FREE MARKET 30% of the Electrical Market
PPA Term	15 to 30 years Accounts receivable serve as collateral for bank loans	5 to 6 years PPA term not long enough for financing
PPA Price Index	IPCA	IPCA or IGP-M
Main Lender	BNDES	- Subsidized rate
Loan Interest Rate	TJLP (subsidized rate)	-
Enables Generation Expansion?	Yes	No

Interest Rates on Loans



PPA for Regulated and Free Markets in Brazil - How should it work in the future?

	REGULATED 70% of the Electrical Market	FREE MARKET 30% of the Electrical Market
PPA Term	15 to 30 years <div>Accounts receivable serve as collateral for bank loans</div>	5 to 6 years 10 years <div>Accounts receivable serve as collateral for bank loans</div>
PPA Price Index	IPCA	IPCA or IGP-M 70% USD / 30% IPCA
Main Lender	BNDES	BNDES (and other banks) <div>BNDES assumes R\$ 90/MWh as the minimum price for electrical energy</div> TLP International Credit Lines
Loan Interest Rate	TLP	International Interest Rates
Enables Generation Expansion?	Yes	Yes

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