Brazilian Regulatory Framework

Analyst Update Meeting

June 2017

Agenda

1. The Brazilian Electricity Sector | Sectorial Context
2. Distribution | Sectorial Context
3. Regulatory vs. Real | Current situation
4. Enel Rio | New Concession Agreement
5. Power Purchase | Overcontracting of energy
6. Generation | Sectorial Context
7. Enel Cachoeira
8. Enel Generation Fortaleza

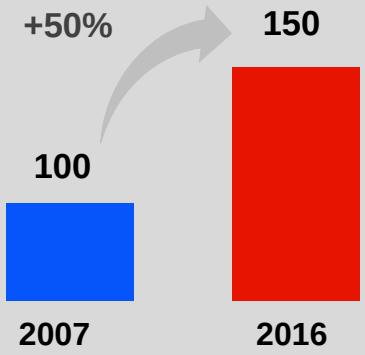
The Brazilian Electricity Sector

The Brazilian Electricity Sector | Sectorial Context

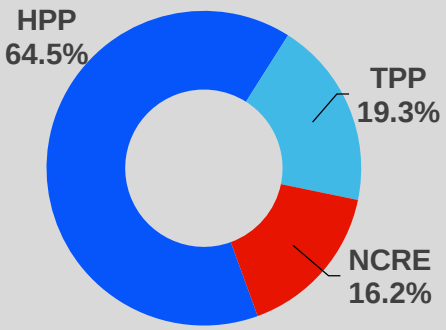
Key data of 2016

Generation

Installed capacity
GW

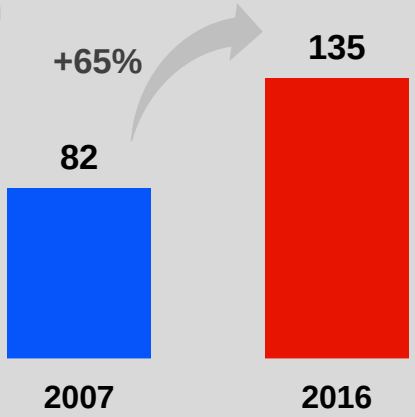


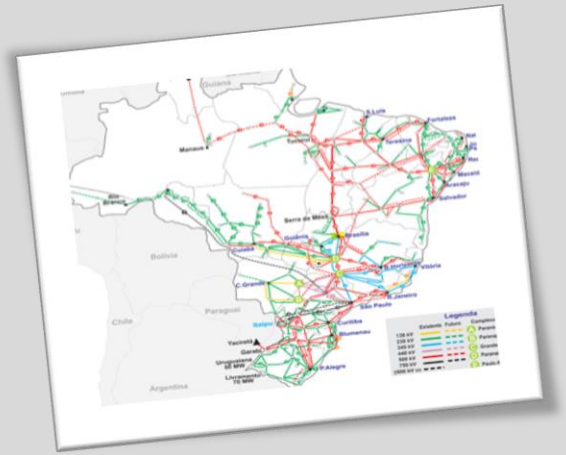
Installed capacity by technology %



Transmission

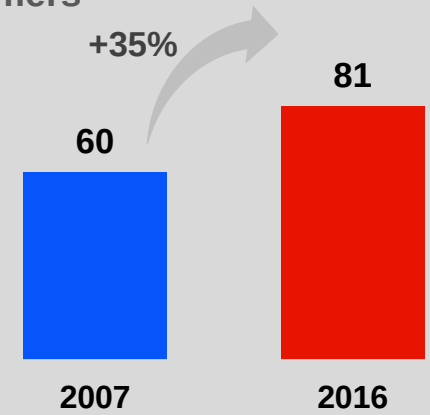
Transmission
Millions km





Distribution

Customers
Millions

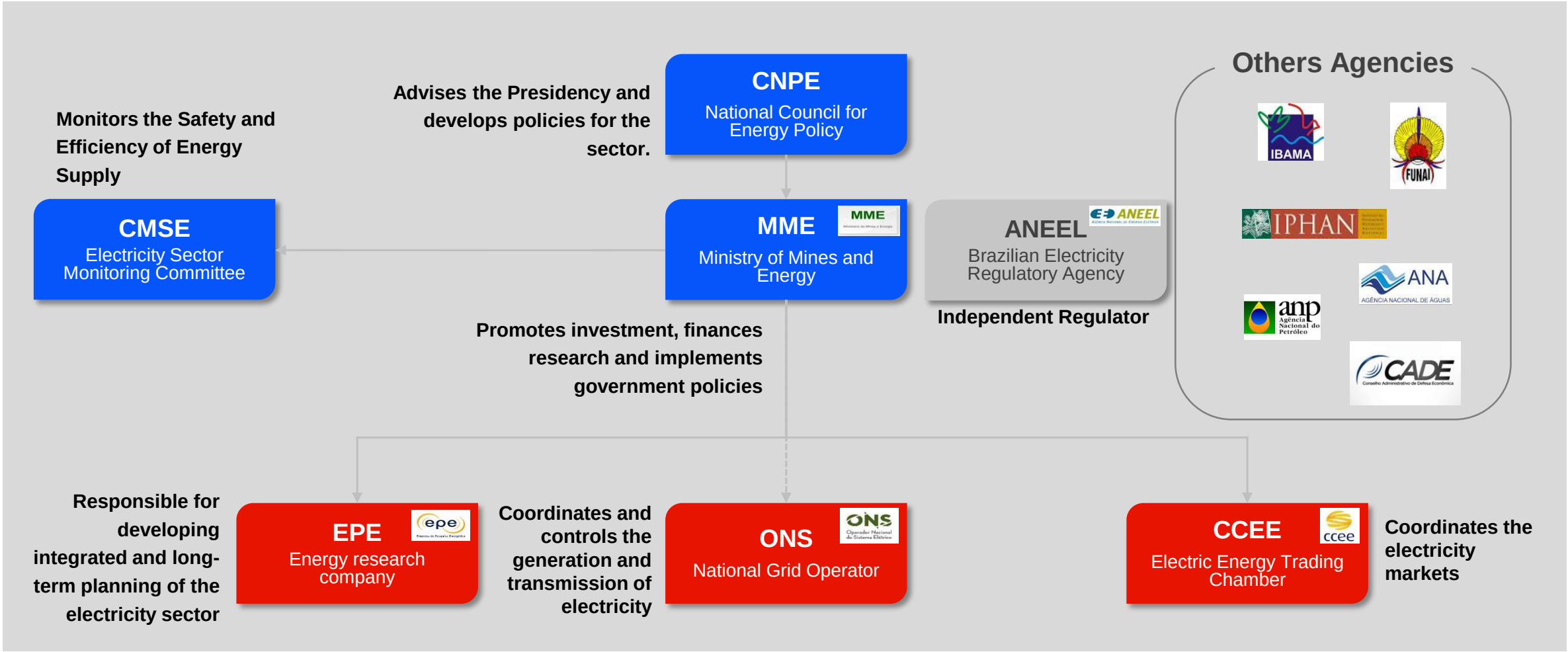


Distributors
64
+
38 Cooperatives / Special authorizations

Source: Aneel – data of 2016

The Brazilian Electricity Sector | Sectorial Context

Governance



Distribution

Sectorial Context | Dx Market

Dx competition in 2016

Main Players

1/ CPFL ENERGIA

2/ edp

ELEKTRO

AES

enel

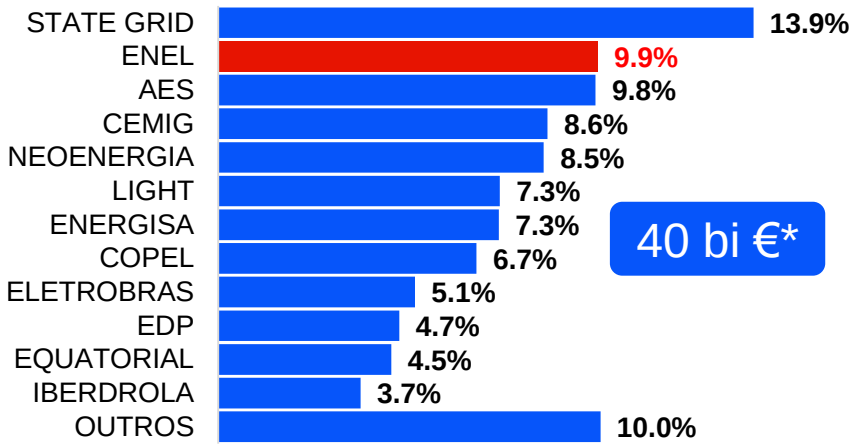
IBERDROLA

GRUPO energisa

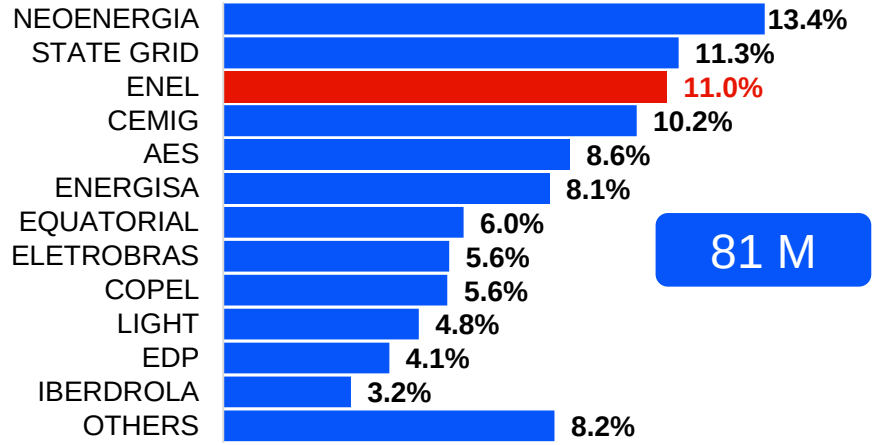
CEMIG

1/ State Grid
2/ Three Gorges

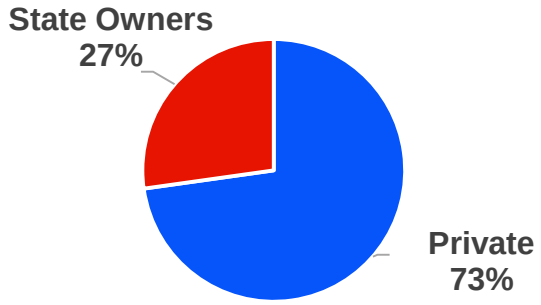
Distribution: Market share (Revenue)



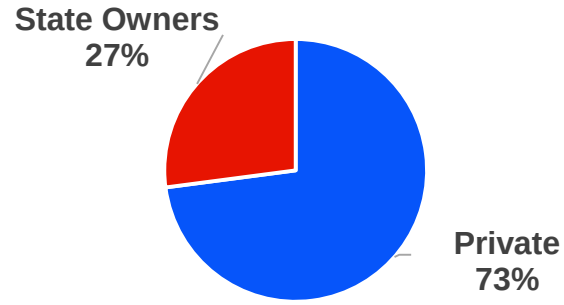
Distribution: Market share (Customers)



Distribution: Market share (Revenue)



Distribution: Market share (Customers)



*Exchange rate: 3,46 BRL/€

Sectorial Context | Dx Tariff Structure

The tariff is divided into two parts, Components A and B

- **The Brazilian model is Price-Cap, costs divided between manageable and non-manageable by the Dx**

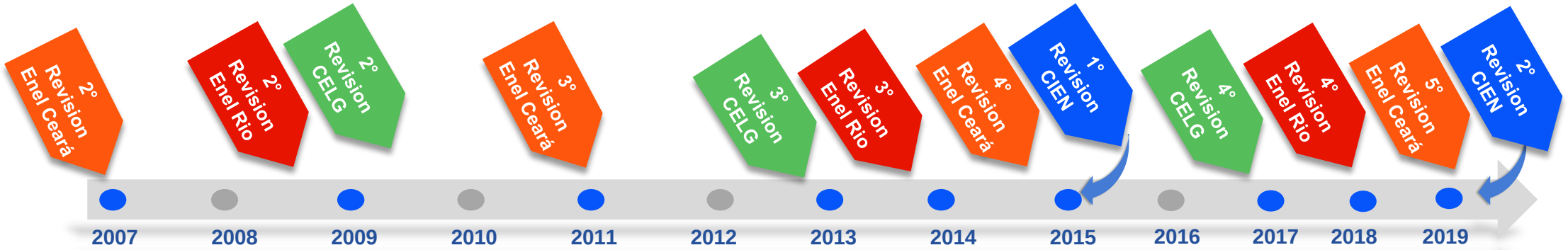
Sectorial Context | The Tariff review process

The Revision and Tariff readjustments

Concession Agreement for the distribution of electricity.

- Terms of Service
- **Term of Concession: 30 years**
- The Grid Expansion commitments
- **Applicable Service Fees**
  - **Tariffs: Maximum Price**
  - **Tariff update Rules**
- Penalties

Tariff Revision	▪ Ensure the economic and financial balance of the concession. ▪ Performed every 4/5 years.
Tariff Adjustment	▪ Seeks to preserve the economic and financial balance of the concession established in the tariff revision. ▪ Performed annually
Extraordinary Tariff Revision	▪ Applied when something extraordinary unbalances the concession contract. ▪ Does not have a defined frequency



Sectorial Context | The Tariff review process

The Tariff review process

COMPONENT A

- **Pass-through to Tariff** (In Readjustments and Revisions)
- **Imbalances between costs are transferred to the Tariffs in the next Readjustment / Revision**

+

COMPONENT B

- **Tariff Adjustment :** Updated by the market variation and inflation discounted of the Productivity Factor (factor X)
- **Tariff Revision:** The parcel B is recalculated

CVA

Variations costs in COMPONENT A	12 quotas indexed to SELIC interest rate

New Component B

Operational Costs	Benchmarking Analysis
Investment remuneration	Net Remuneration Base x WACC
Depreciation	Remuneration Basis x % of depreciation
Losses and default rate	Technical Losses based on actual Non Technical Losses and default rate based on socioeconomic model and benchmarking

Sectorial Context | The 4° Cycle of Tariff Revision

Main changes in the methodology of Review for Dx

	1° Cycle	2° Cycle	3° Cycle	4° Cycle
WACC Real Before Taxes WACC Real After Taxes	**17,06%** **11,26%**	**15,05%** **9,95%**	**11,36%** **7,50%**	**12,26%** **8,09%**
OPEX	**Reference Company** (Standard costs in processes and activities**)**	**Reference Company** (Standard costs in processes and activities**)**	**Benchmarking** (Comparison between Dx base on Network extension, consumers, market, wage differences between regions)	**Benchmarking** (The same as in the third cycle **including in the benchmarking the non technical losses and quality indicator**)
Remuneration Basis	Construction of the first remuneration base	Revaluation of investments recorded in books	The same, with greater control and rigor in the accounting records.	The same, with **Recognition of Special Obligations**
Non Technical Losses	Dx historical average level of losses	**Benchmarking + Qualitative analysis** (Comparison between Dx base on social and economic Complexity of the concession area - % Families low income,% precarious housing,% homicide)	**Benchmarking** (The same as in the second cycle With small changes in the variables used and w/o Qualitative analysis)	**Benchmarking** (The same as in the third cycle With small changes in the variables used)

Sectorial Context | The 4° Cycle of Tariff Revision

Main changes in the methodology of Review for Dx

	1° Cycle	2° Cycle	3° Cycle	4° Cycle
Bad Debt	Defining one level of bad debt for all DX	**Benchmarking based on social and economic Complexity** (Classification of Dx in 3 cluster according with the social complexity. Bad Debt considered - unpaid invoices between 18-24 months)	**Benchmarking based on social and economic Complexity** (The same as in the second cycle **but with the definition of individual limits for each class of consumption**)	**Benchmarking based on social and economic Complexity** (The same as in the third cycle but without the separation of Dx in clusters. **Bad Debt considered - unpaid invoices between 49-60 months**)
Q Factor (quality)	**There was not**	**There was not**	DEC / FEC variations above +/- 5% will impact in increases or reductions in Tariff in the annual readjustments.	The same as in the third cycle **including indicators of commercial quality**
X Factor (productivity)	Discounted cash flow and consideration of customer satisfaction	Discounted Cash Flow with Investment Projection	Productivity average in the sector. Does not consider the individual investment plan of the Dx	Productivity average in the sector. Does not consider the individual investment plan of the Dx
Remuneration Basis	Construction of the first remuneration base	Revaluation of investments recorded in books	The same, with greater control and rigor in the accounting records.	The same, with **Recognition of Special Obligations**

Regulatory vs. Real

Current situation

Regulatory vs. Real

Current situation - 2016

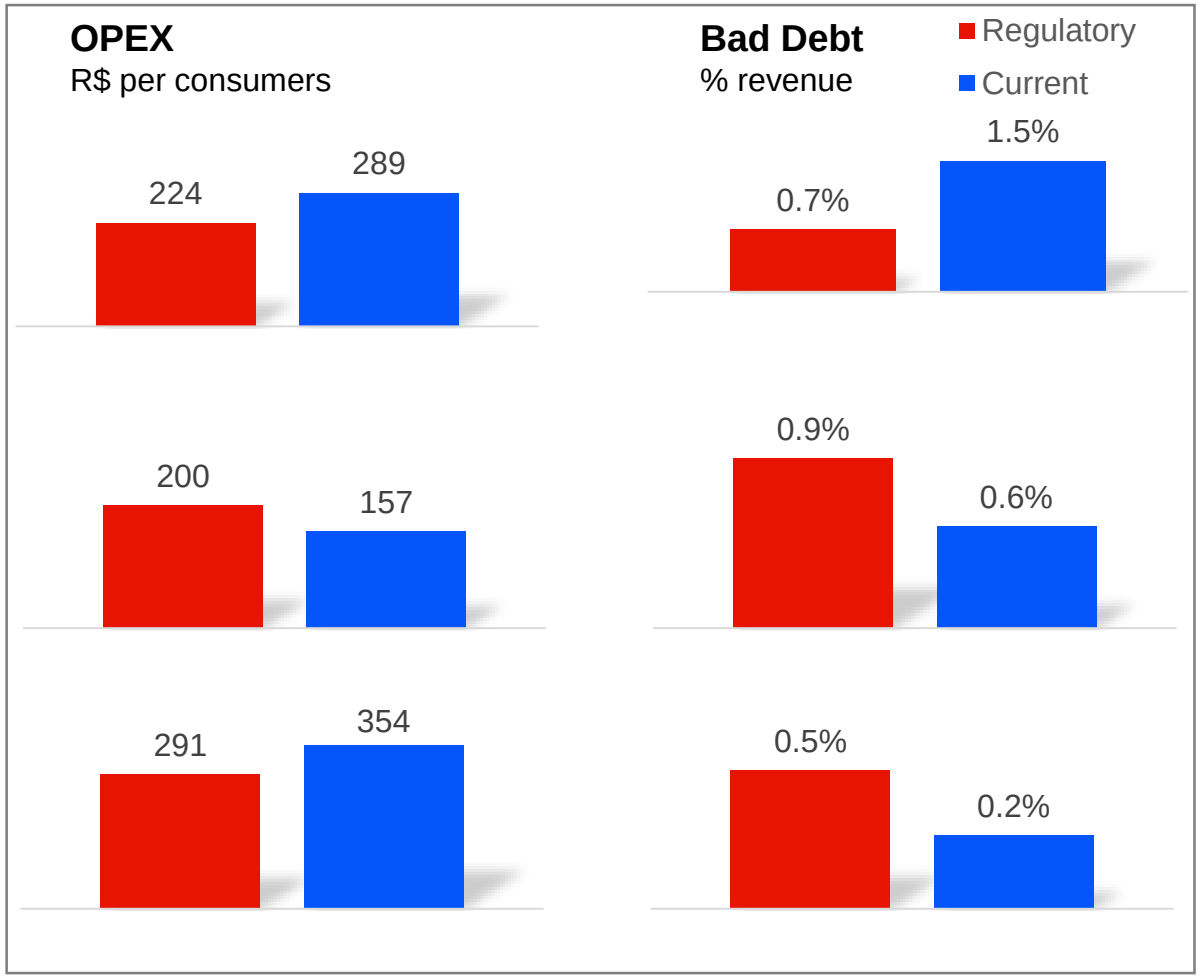
Key issues

- **Enel Rio:** The great challenges remain the non-technical losses and the adequacy of the quality indicators the company's service to the regulatory standards
- **Enel Ceará**: The Company is in a better position than the defined regulatory parameters. Losses remain a regulatory challenge
- **CELG**: The main challenge is to adapt the quality of service indicators to the regulatory standards

Enel Rio

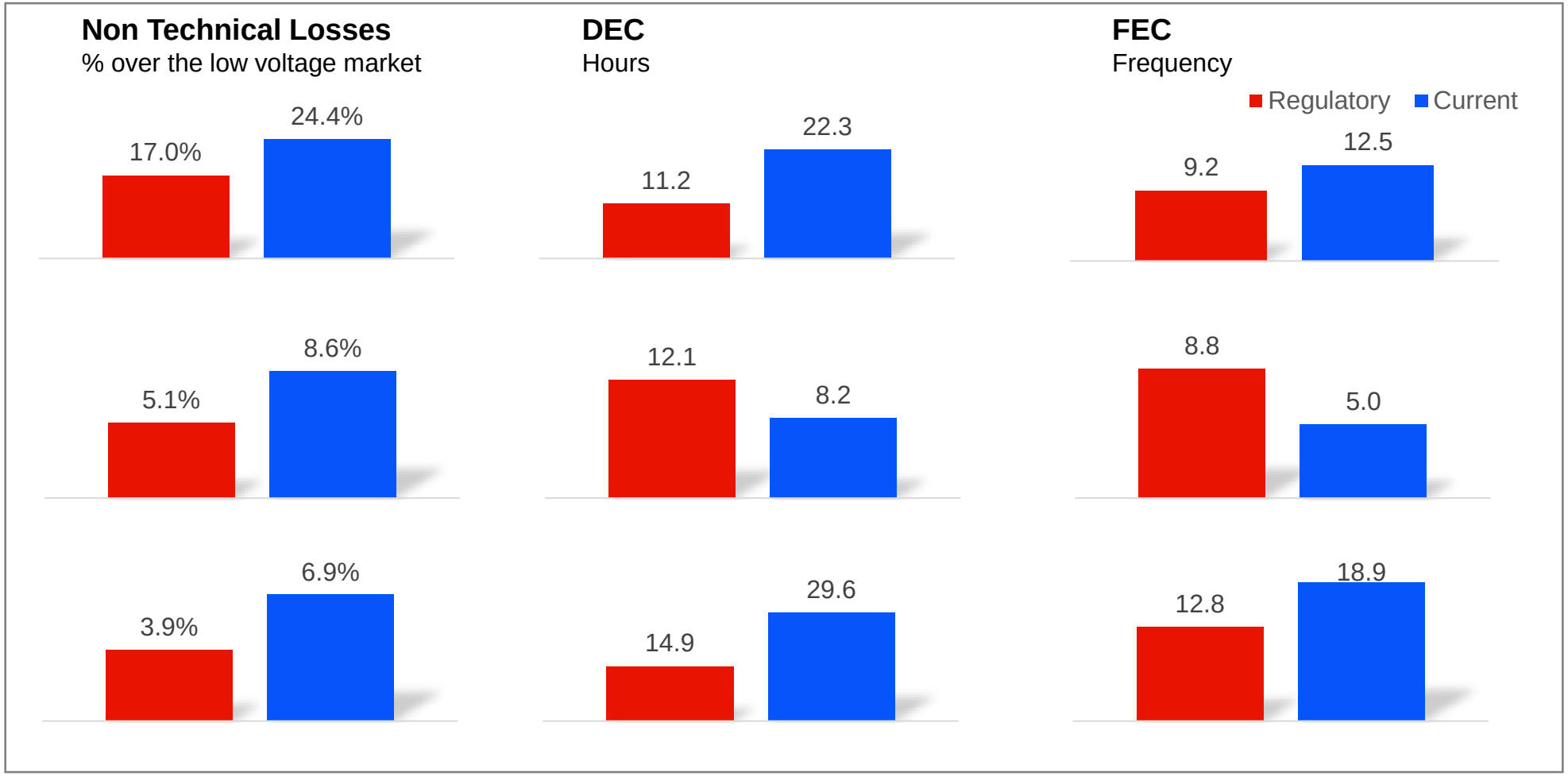
Enel Ceará

CELG



Regulatory vs. Real

Current situation



Enel Distribuição Rio

New contract

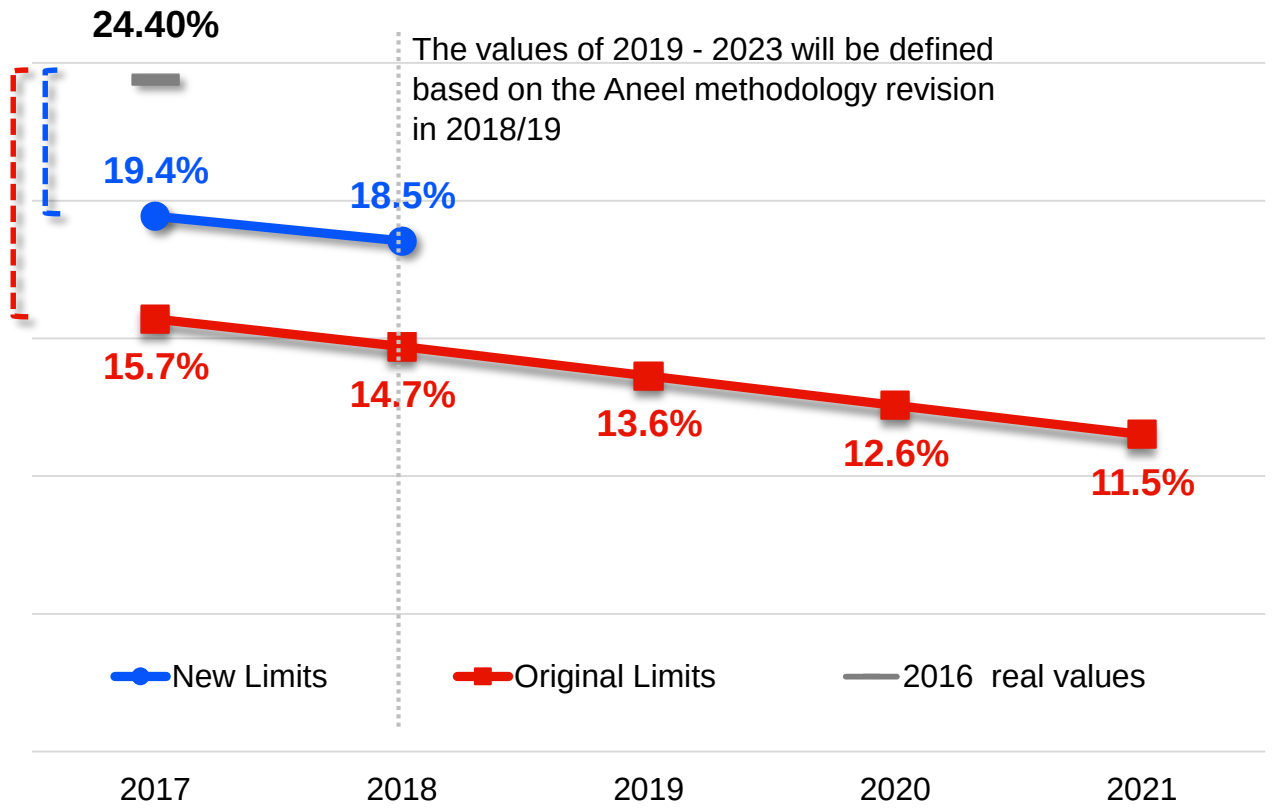
Enel Distribuição Rio | New contract

Key changes

- **Enel Río Tariff Review anticipation for 2018 (Previous was 2019)**
- **Regulatory non-technical losses review:** new limits for 2017 and 2018, with partial recognition of losses in areas with high criminal levels as an exception of socio-economic model
- **Regulatory Bad Debt:** annual adjustment based on the regulatory revenue requirement established in the tariff readjustment process
- **Components A costs neutrality:** Calculated for energy, transmission, bad debt and other financial costs.

New limits of non-technical losses

% over low tension market

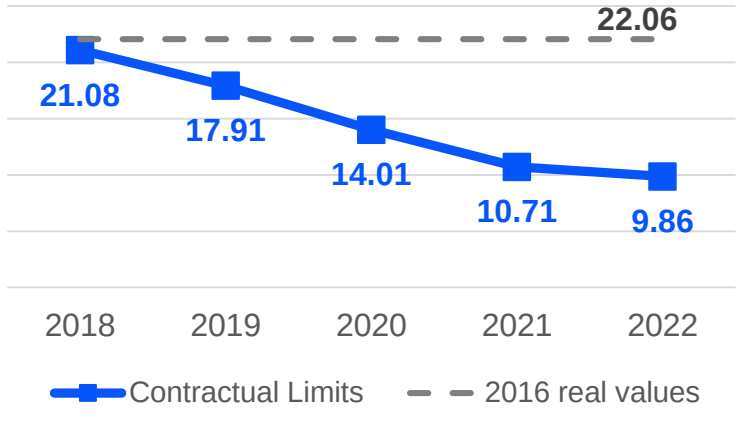


Enel Distribuição Rio | New contract

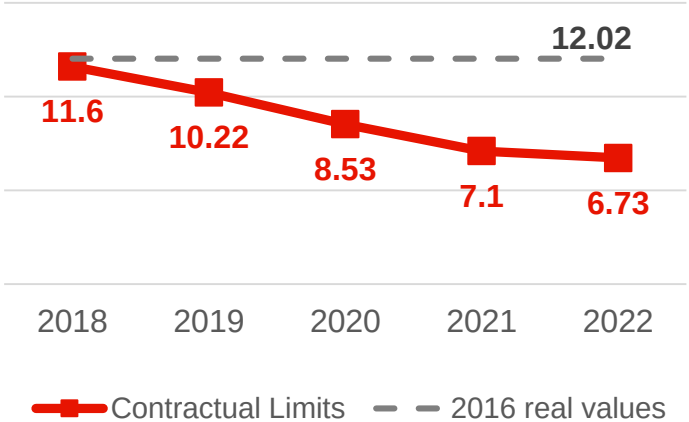
New contractual Commitments

- **Adequacy of quality indicators:** Definition of a path to adapt the DECi / FECi indicators to regulatory limits from 2018 to 2022
- **Efficiency in economic and financial management:** The establishment of new objectives for economic and financial management
- **The non-compliance for 2 consecutive years or in 2022 of the new quality and economic and financial management objectives, will trigger a process for the termination of the concession**

DECi Limits
Hours



FECi Limits
frequency



New objectives for economic and financial management

2019	EBITDA ≥ Zero
2020	EBITDA – Regulatory Depreciation (QRR) ≥ zero
2021	EBITDA – QRR – (80% Selic x Net Debt) ≥ zero
2022	EBITDA – QRR – (110% Selic x Net Debt) ≥ zero

Power Purchase

Overcontracting of energy

Brazil Distribution Overview

Contracted capacity

Current situation

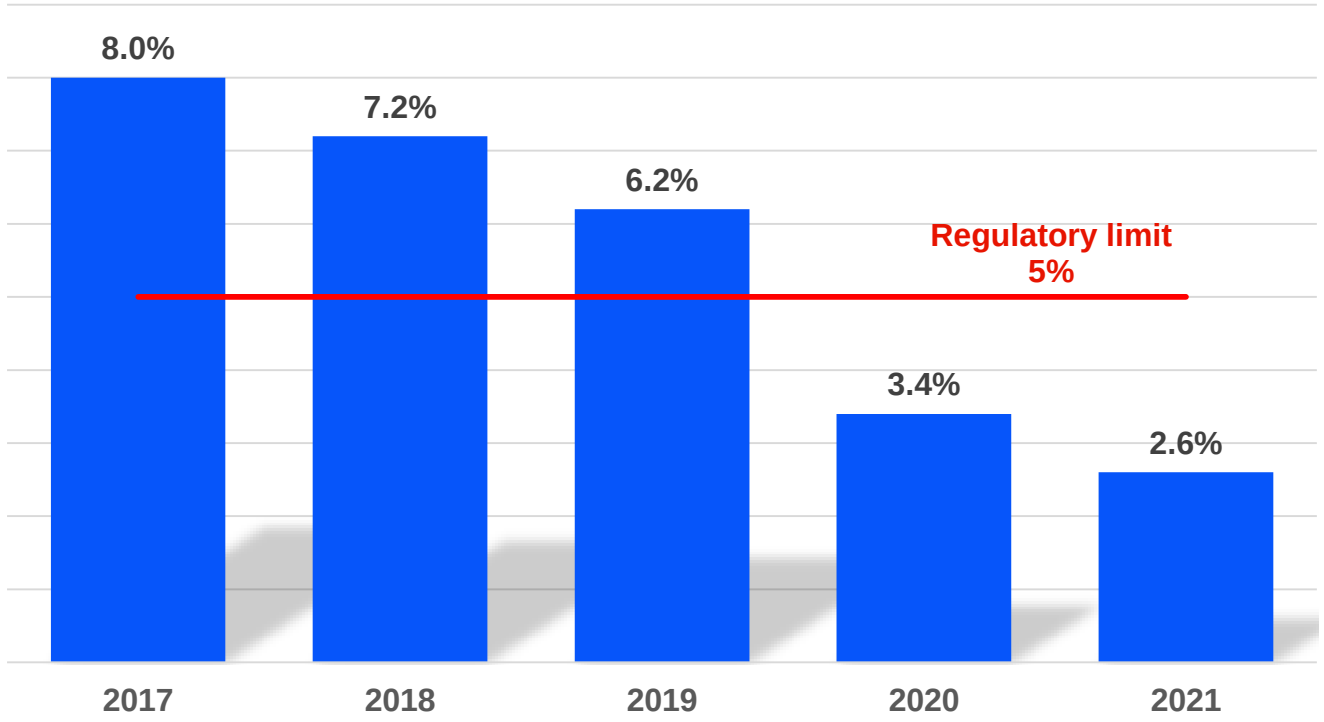
- **Brazilian Dx are over contracted** due to the Brazilian economic crisis and the market reduction in the years 2015-16
- Part of the problem is that Dx have to contract its energy demand five years in advance

The key issue

- **The energy costs transfer to the Tariff of is limited to 105% of the amounts of energy required, i.e. discos are exposed to price risk for energy above 105% of their demand**

Total Dx energy contracting situation in Brazil

% surplus over energy required



Enel Distribution Overview

Contracted capacity

Action Plan

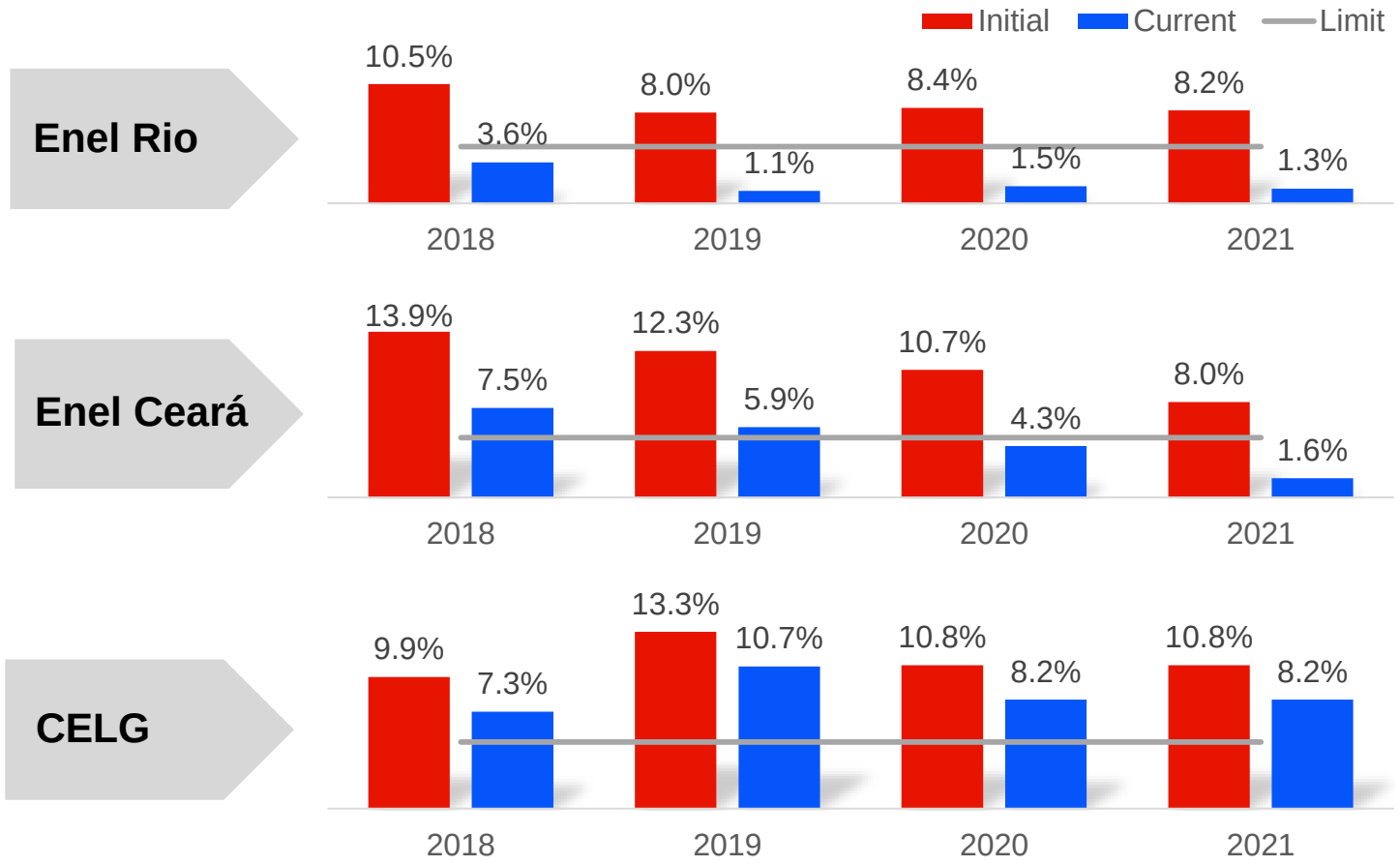
- **Reduction of contracts with the Enel plants** ✓
- **Participation in the mechanisms of contract exchanges** (from 2018) ✓
- **Reduction of existing energy contracts** ✓

Actions in progress

- **Bilateral agreements with generators**
- **Participation in surplus auctions (sale to free consumers)**

Total Dx energy contracting situation in Brazil

% surplus over energy required

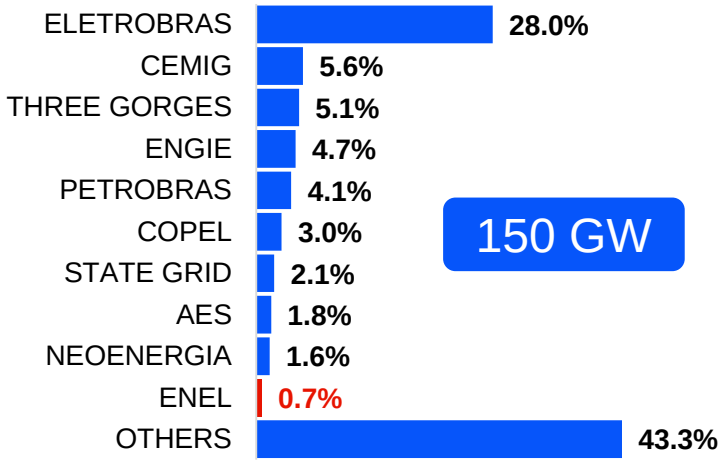


Regulatory Generation

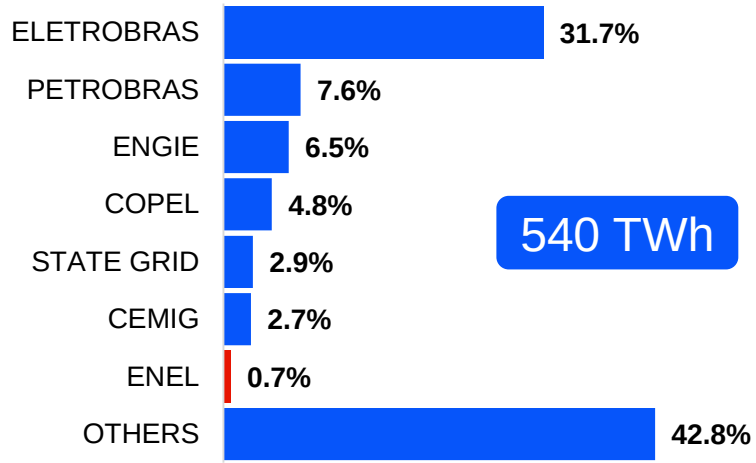
Sectorial Context | Gx Market

Gx competition in 2016

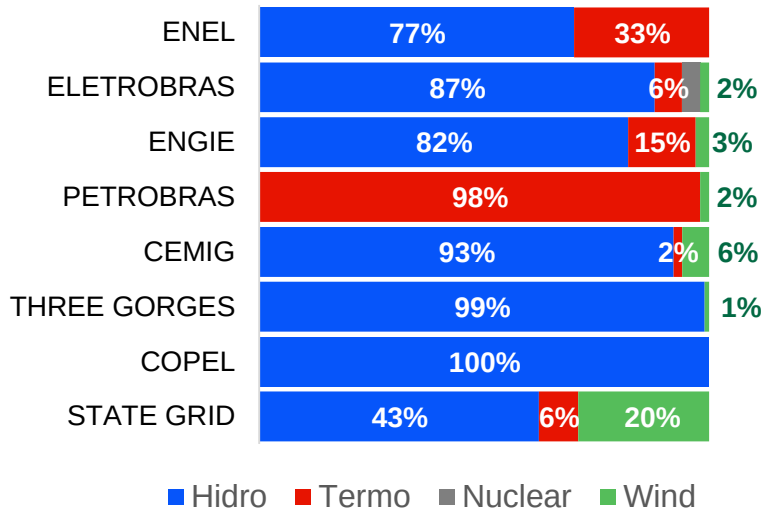
Generation: Market share (Installed Capacity)



Generation : Market share (Energy generated)



Companies fleet breakdown



Main Players

COPEL, AES, enel, IBERDROLA, CPFL ENERGIA 1/, edp 2/, CEMIG, ENGIE

- Due to its large size (150 GW), energy generation market in Brazil is not concentrated, presenting only one major player, Eletrobras, a state owned company, with a market share above 10%.
- Hydro power is the most important generation technology in the Brazilian market, being responsible for nearly 65% of the country installed capacity and more than 75% of its energy generation.

1/ State Grid
2/ Three Gorges

Sector context | Energy commercialization

Decree 5.163/2004 defines Regulated market and Free market

REGULATED MARKET

FREE MARKET*

Sellers

Generators

Traders

Self-producers

Offer MWh for the lowest price

The offer is free

Buyers

Distributors → **Regulated Consumer**

Free Consumers

Long-term contracts, resulting from auctions for new energy

Medium and short term contracts for existing energy

- Ministry of Mines and Energy promotes regulated auctions

Freely traded contracts

- Distributors and regulated consumers can not buy / sell free energy, but the Distributors are allowed to sell their energy surplus (those that exceed their market)

***The free market participates in 26% of energy (Brazil consumption of 573 TWh/aa)**

Short Term
Settlement Market

Monthly settlement of the difference between generation and contracts at Spot Price (PLD)

Large consumers (> = 3 MW) or consortium of consumers (> = 0.5 MW) have the option to buy energy in any environment, but must notify the distributor 5 years before the return to the ACR, special consumers (0.5-3 MW can buy renewable energy only in the free market)

Sector Context | Regulated Auction

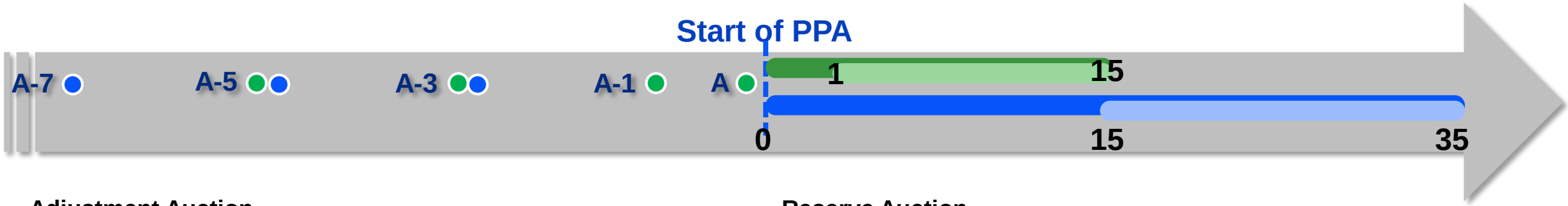
Promoted by MME to guarantee energy supply

Existing energy

- Delivery started in the same year (A) or up to the 5th year (A-5)
- Supply between 1-15 years (contracting CCEAR)

New Energy

- Delivery started in 3rd year (A-3) or up to 7th year (A-7)
- Supply between 15-35 years (contracting CCEAR)



Adjustment Auction

- Up to 5% of the Dx load with supply up to 2 years (contracting CCEAR).

Reserve Auction

- Need for contracting depends on the MME – objective of guaranteeing energy security
- Recruitment costs are prorated among all free and regulated consumers via charges

Types of contracts (PPA)

By availability

- Fixed: for remuneration of assets and payment of fixed costs
- Variable: declared cost in auction x MWh generation
- Typically for thermal plants

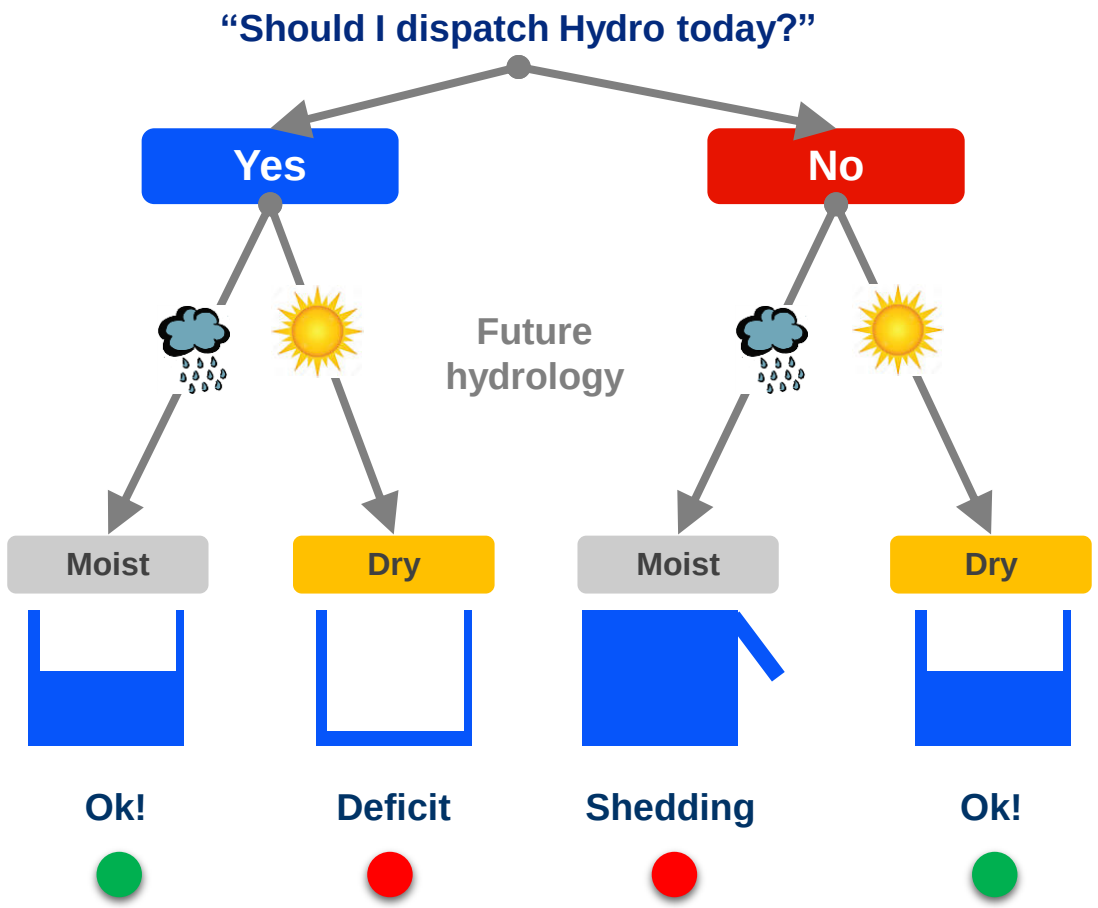
By quantity

- Amounts and prices (auction) – independent of effective generation
- Typical for renewable sources, including large hydro

Operation and formation of the “Spot Price”

Centralized Dispatch (ONS): “Should I use water now or in the future?”

The ONS dilemma



Optimization process (variables in account)

- Hydrology (flows).
- Storage of reservoirs.
- Transmission capacity.
- Thermal (indices of availability and variable costs etc).
- Central Hydro (availability)
- Wind and solar (not simulated).
- Demand for landing.
- Entry of new plants.

Dispatch by economic optimization

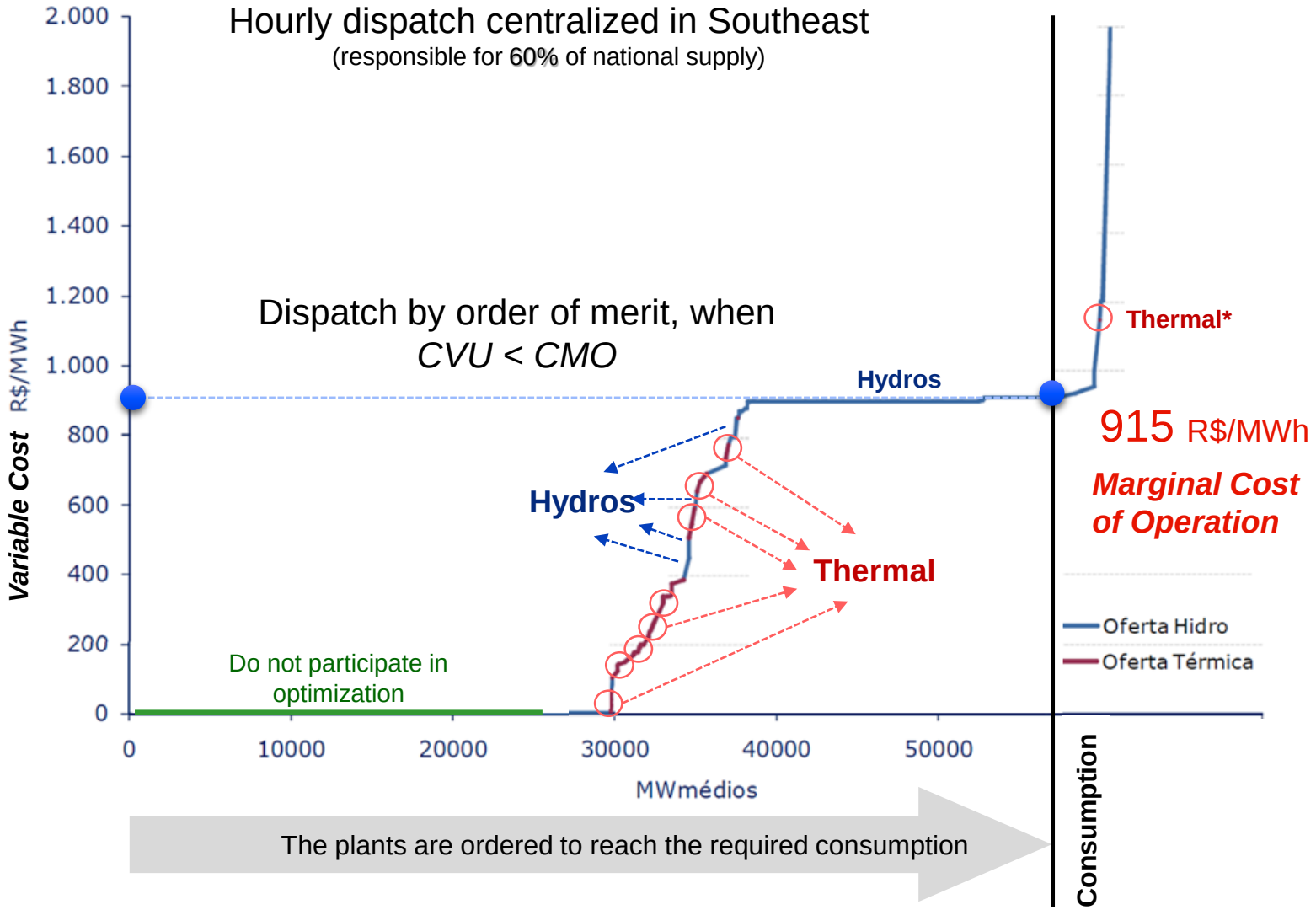
PLD

Basin Configuration

Parnaíba: basin where ir EGP Cachoeira

Economic Dispatch illustration

On a weekly basis, the ONS optimizes the use of resources



- The plants that operate at the Base do not participate in the optimization process: wind, solar, nuclear and the inflexible part of the thermal power plants.
- The Brazilian water characteristic is responsible for marking the marginal cost of the system.
- **The central problem is in the assessment of the future cost of water, which for this example, there are hydros with water cost higher than the variable of some thermals.**

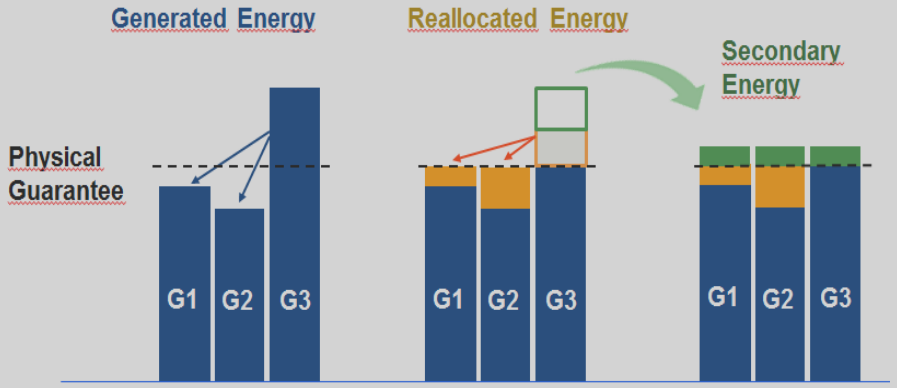
MRE

Mechanism of energy allocation between hydroelectric

What has motivated the creation of the MRE?

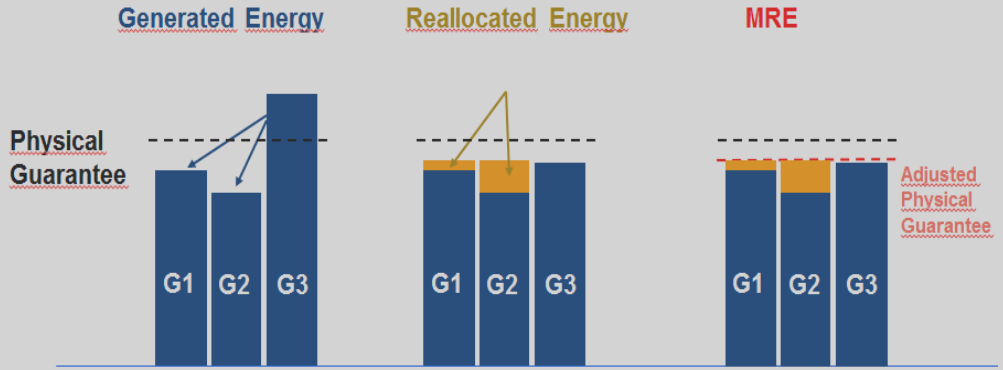
Centralized dispatch **Mitigation of individual risk** **Several plants in cascade**

Case Energy SURPLUS (GSF>1):
Generation Hydro > Physical guarantee Hydro:



- In this example there was a SURPLUS of generation of the Hydros, characterizing secondary energy existence in the MRE.

Case Energy DEFICIT (GSF<1):
Generation Hydro < Physical guarantee Hydro

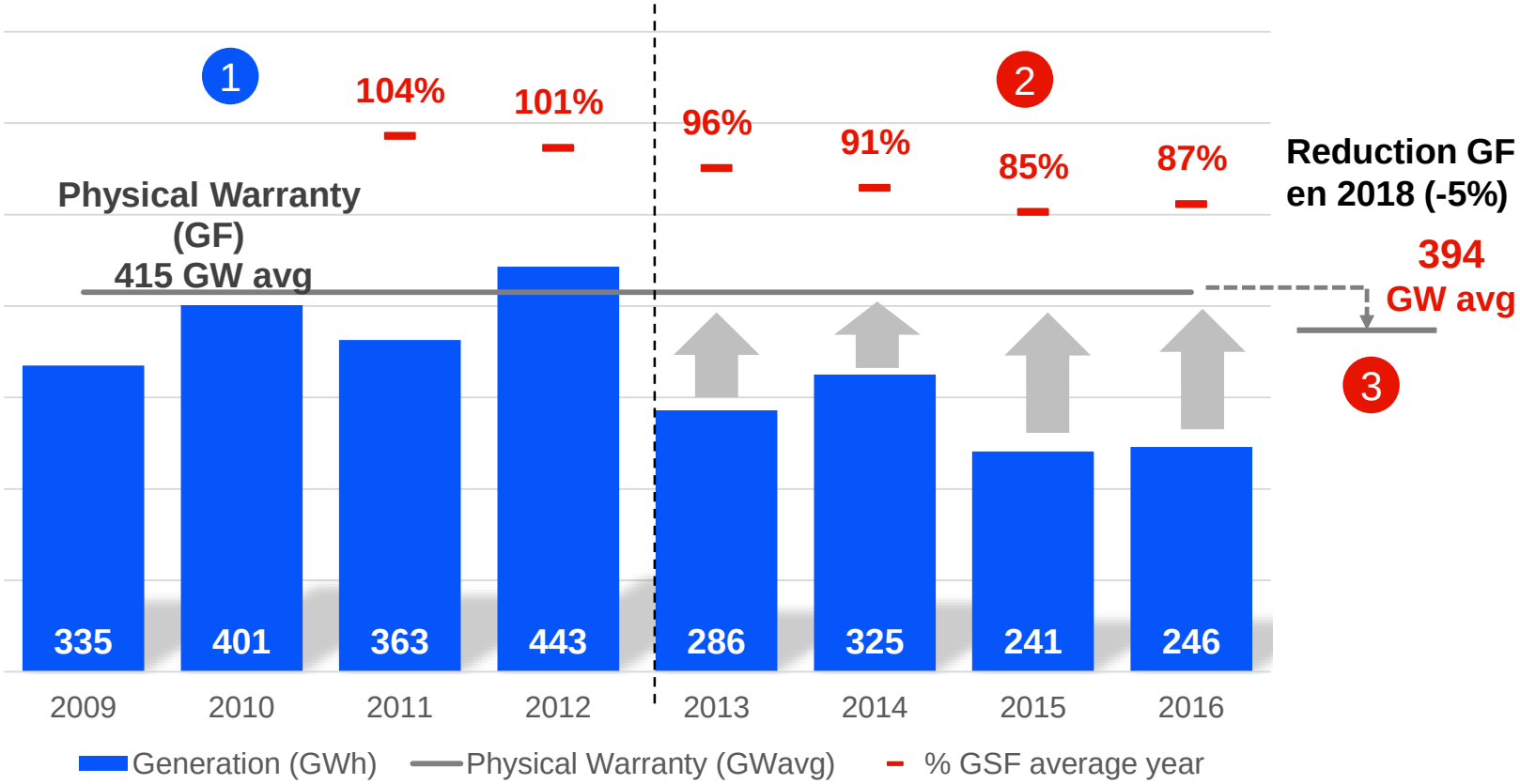


- In this example there was DEFICIT of generation of the Hydros, characterizing insufficiency of physical guarantee coverage in the MRE.

- **The individual generation of each hydro is not so relevant. The important thing is the total generation of hydros!**

Enel Cachoeira

Historic individual generation Enel Cachoeira



1. **Until 2012, GSF> 1** - so that in addition to recomposing the individual generation of Cachoeira up to its Physical Guarantee, there were leftovers (secondary energy)

2. **However, from 2013, the GSF <1** - So, MRE has allowed Cachoeira mitigate their individual risk of generation deficit

3. **From 2018**, the physical guarantee of Cachoeira will be reduced for the first time by 5% (According to the current regulations, a total reduction of up to 10% is allowed for the entire contract)

Cachoeira Dourada was privatized in 90's and its concession contract ends in 2027

Enel Generation Fortaleza

Contracts via Thermoelectric Priority Program

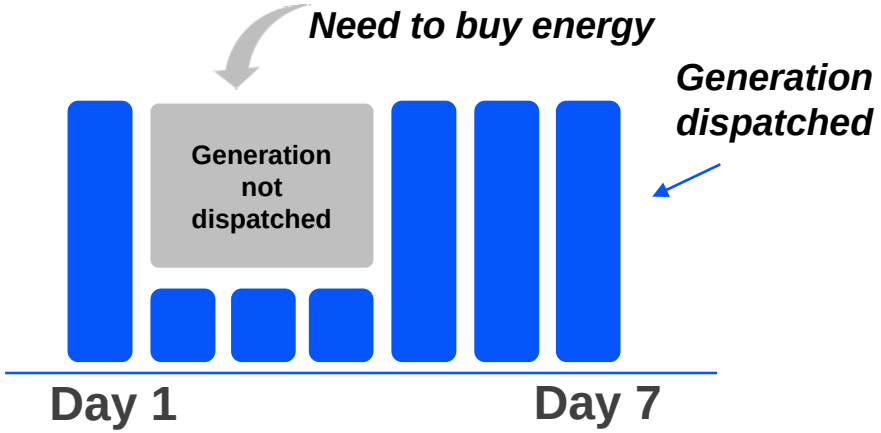
Energy contract with Enel Distribuição Ceará (Coelce)

Thermoelectric Priority Program (PPT)

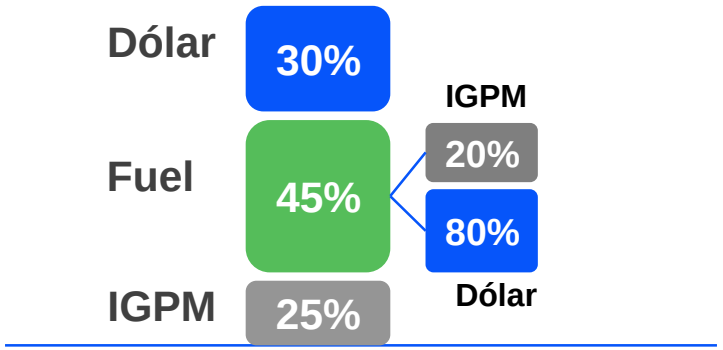
Program created in 2000 (Decree 3371/00) for the implementation of thermal power plants, under funding incentives and gas supply guarantee for 20 years, in order to avoid a short-term energy crisis (there were no restrictions on self-dealing at that time). Enel Geração Fortaleza contract expires in 2023, and has no renewal clause.

- Income: Fixed independent of the generation. PPA with Enel Distribuição Ceará 2,690 GWh / year. Enel Enel Distribuição Ceará counterpart.
- Costs: Gas contract with Petrobras, take-or-pay 70% annual and ship-or-pay 95% annual.
- PPA Price: 382 R$/MWh. Index for Brazilian inflation, Exchange Rate and Fuel (annual indexation).
- Variable Cost (used by the ONS for the purposes of the optimization process): 139.88 R$/MWh (revised annually)

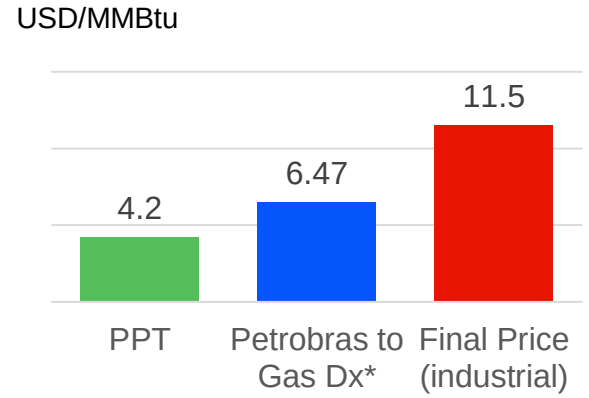
Operation example



Indexation Price PPA



Gas price in Brazilian market



Source: Reportgas MME Jan17

** Note: lack of transportation and distribution*

End