

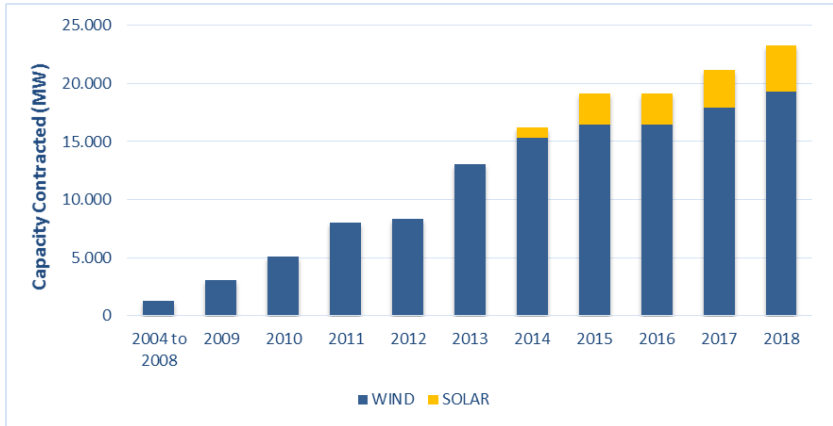


Requirements for technical acceptance of wind and solar projects for energy auctions in Brazil

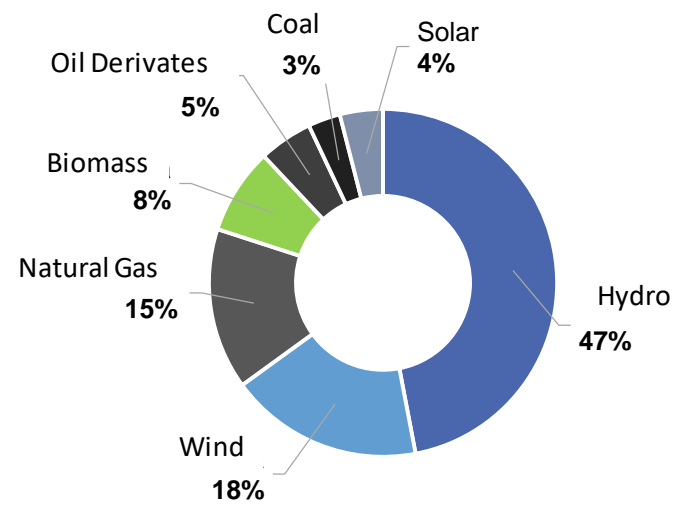


New Capacity Auctions: main results

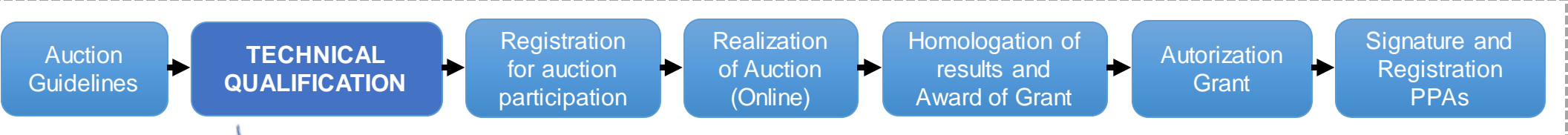
The expansion since 2005: ⚡ 1.229 projects ➔ 92.290 MW ➔ 57% of the eletrical matrix (1)



- ⚖️ **40 auctions**
- 25** New Energy Auctions
- 9** Reserve Auctions
- 3** Alternatives Sources Auctions
- 3** Structuring/Special Auctions



New Capacity Auctions: Scheme



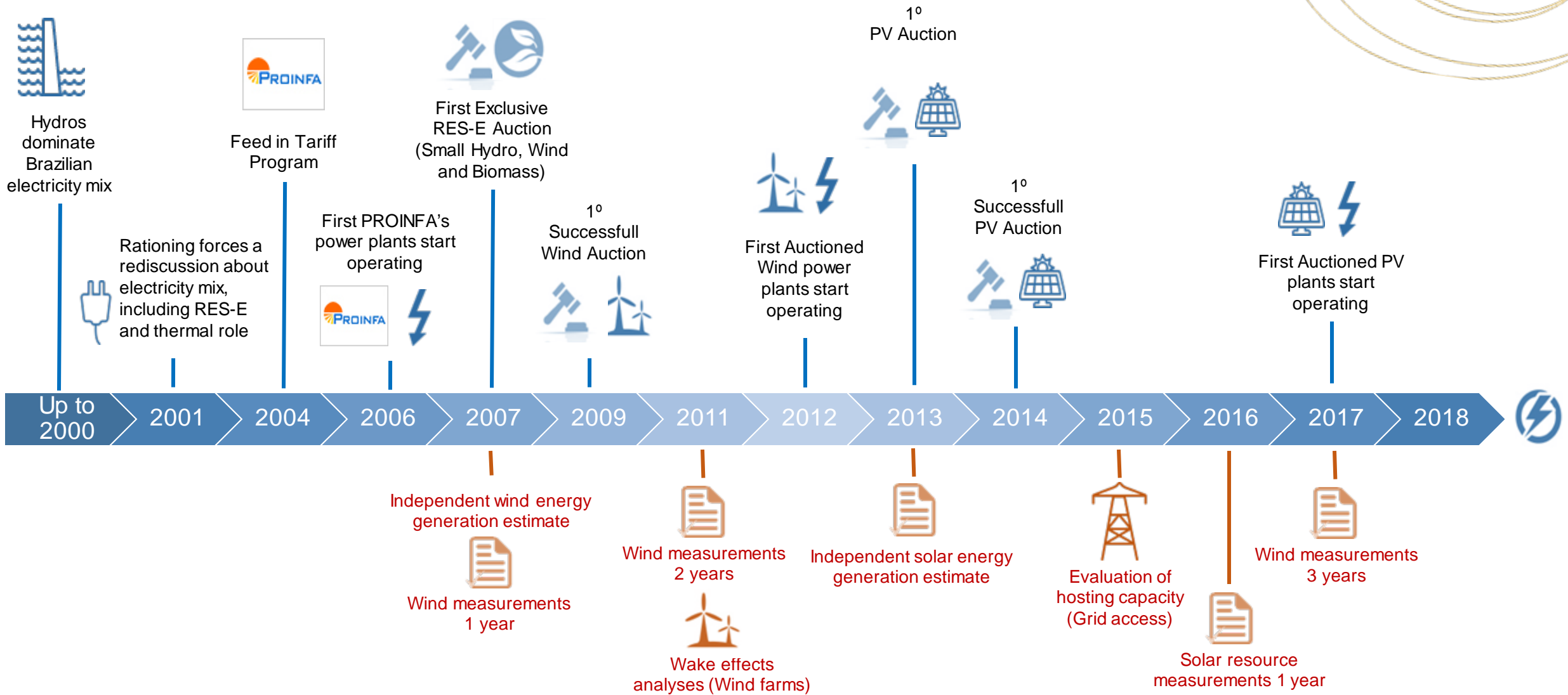
- Technical Analysis
- Documentary analysis
- Project's Datasheet

Other institutions involved:

(1) Canceled projects not counted.
Source: CCEE (september/2018)

The evolution of the renewables in Brazil

Wind and Solar Projects Requirements



Technical Qualification

Why?

- Necessity for objective rules and criteria for the public process of purchase of electric energy
→ **Transparency and fair competition**
- Purchase for the lowest price
→ **Minimum quality requirements**

Pitfalls:



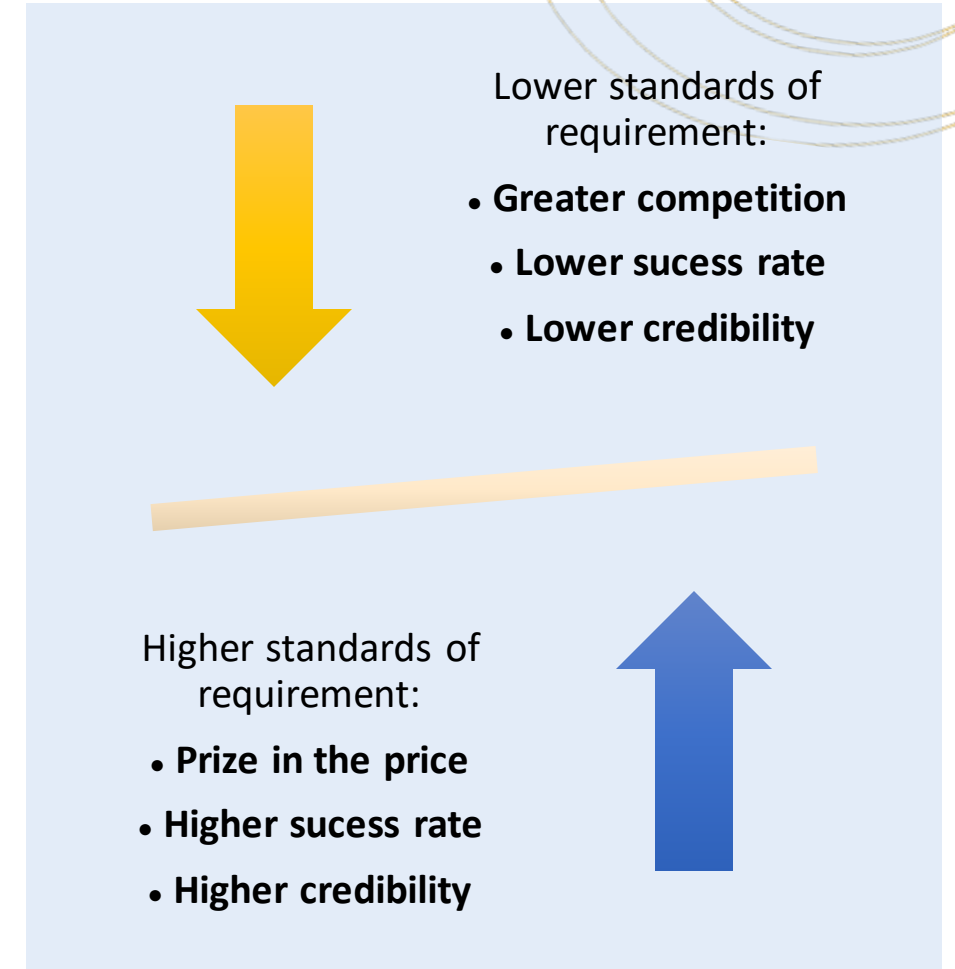
Construction and non-completion rates:

- Delay rate = approx. 27%
- Non-completion rate = 10%

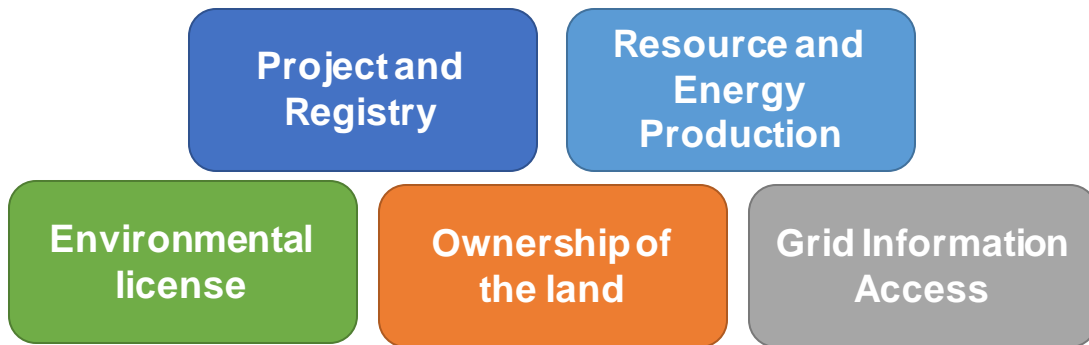


Generation and transmission mis-match:

Power plants completed before transmission lines **cost consumers approx. \$1 billion USD.**



Technical Qualification



More than 600 wind measurement stations and more than 100 solar radiation stations fulfilled EPE requirements, **improving the knowledge on the available resource in the territory.**

In the beginning, EPE discovered some projects, from different developers, in the same place. In other projects, the wind turbines were out of the land. Thus, some requirements were introduced regarding the right of using the land.

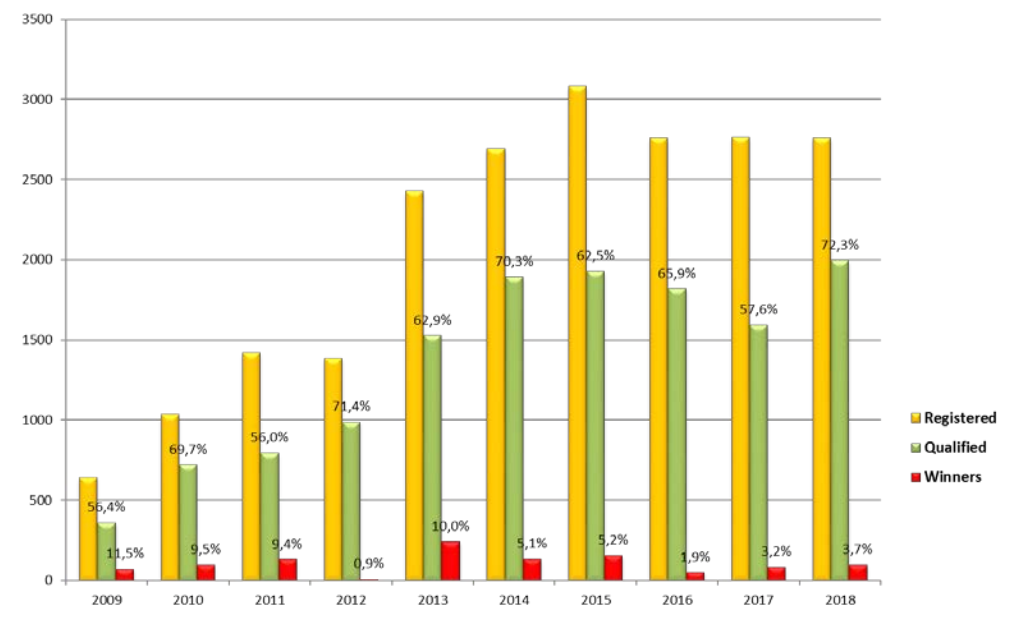
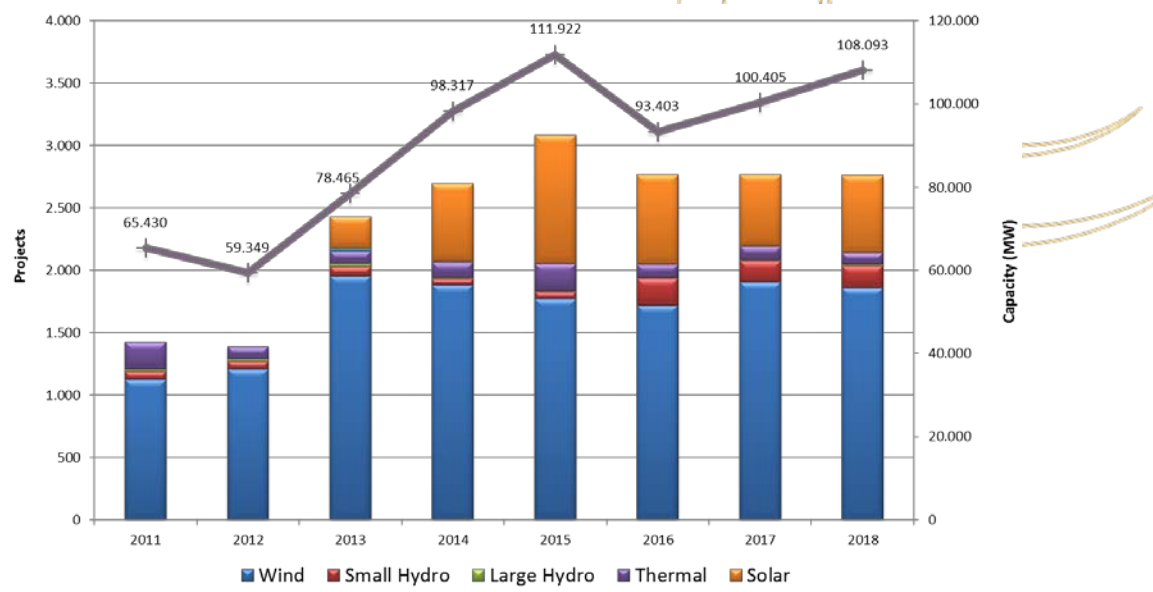
The percentage of qualified projects was between 55% and 65% in the last auctions, **demonstrating the importance of the technical qualification and standards.**

Qualification rules tends to lead to **higher success levels in the implementation of the projects.**

Independent companies ask the developers for EPE's technical approval before buying energy from new projects in free market

Balancing the level of requirements, ensuring that qualified projects are technically feasible and keeping the competition for lower energy prices

Registered Projects



Lessons learned

Technical Qualification

- Requirements: clear, objective and as simple as possible
- Diligences demand effort and time, but important for the competition
- Tradeoff: Track record requirements x Project quality requirements

Post-auction project changes

- After the auctions, Technical and economical optimization, deals with equipment suppliers, new technologies available, international financing, etc.
- But this doesn't mean the technical qualification was useless... Making changes is much less risky when a project has been consistently developed

Confidence in the process

- Rules should not be changing all the time, because demands time and investment for the participants
- Technical qualification is just one part. The financial arrangement after the auctions is also a significant challenge

Mixing different sources

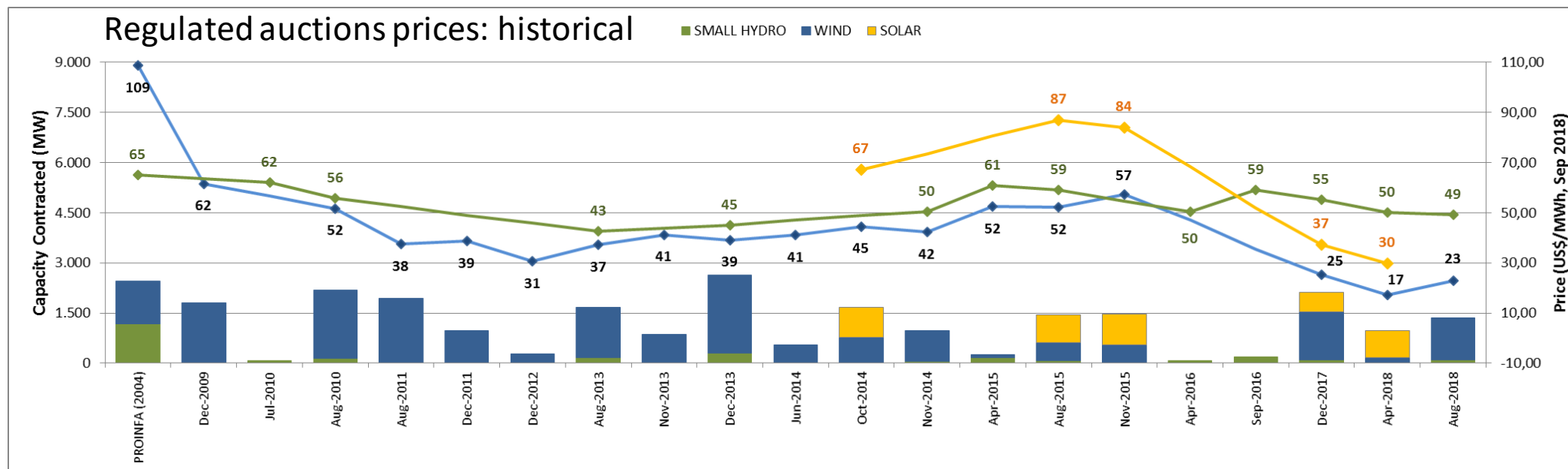
- Brazil has many energy resources and we have aimed to have a mixed matrix – it means you don't always buy the cheapest sources and you should adapt the auctions to have some demand met by different sources
- Consistent metrics to compare different energy sources is important

Cap price

- The cap price is just a piece of the attractiveness of the auction:
 - Risk evaluation is a key issue: currency, grid connection, environmental permitting, regulatory environment, financing, resource availability, etc.
 - Risk allocation is everything: setting the risk-adjusted return level, product design, FX risk, etc.

Grid access

- More recently, a new approach: transmission planned and contracted before the new capacity auctions and projects are qualified only if there's grid capacity
- This demands a transmission grid capacity evaluation, which can be a complex problem
- A new phase in the auction for competing for the available grid capacity



R\$/US\$ 3,95

Thank you!

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