

Case study n°2

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

Country: Brazil

Level: National

SDG Addressed: SDG7 – Affordable and Clean Energy



Summary

The objective of this case study is to demonstrate how standards – in particular, those based on IEC international standards - were used to improve the system of energy auctions. The implementation of the revised standards-based instructions must be followed by auction participants. This allowed a substantial increase in the number of compliant projects submitted and a better management of submission, analysis and approvals by the Energy Planning Authority of Brazil. This directly supports the achievement of Goal 7b “expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all”.

Background

Electricity auctions for the regulated market in Brazil are held 3 to 6 years before the energy delivery. This anticipation, associated with long-term Power Purchase Agreements, ensures the bankability of projects. On the other hand, the uncertainty associated with the construction of new power plants, requires a qualification stage, in order to guarantee that candidate projects accomplish the necessary requirements. For this qualification, the Energy Planning Authority of Brazil set the requirements, aiming an offer of feasible projects, contributing to increase the share of renewables in energy matrix.

Strategy

Instructions for project developers were published addressing technical requirements that must be followed for acceptance of projects for energy auctions. The requirements are frequently revised due to technological evolution, aiming the critical points for the success of new power plants. Eventually, the developers are consulted to improve the instructions. For example, there is no clear definition for power capacity of photovoltaics inverters, as it depends on the local temperature (for solar panels, for instance, international standards sets the conditions to measure its parameters). Due to the lack of proper standards for inverters, the Energy Planning Authority made a public consultation and, with the technical contributions received, set a consensus. Regarding the on-site measurements (solar and wind resource), the instructions also specify the requirements such as maximum distance from measurement station to project site, campaign duration, necessary instruments, quality of sensors and minimum height, considering the international standards (e.g. IEC 61400, ISO/IEC 17025 and ISO/IEC Guide 98-3). The standardized parameters help the developers when installing the stations and allow for the comparison of measured data.

Results and Impact

The standardization of requirements for qualifying wind and solar projects result in an increasing

number of accepted projects and contracted power plants. Some of the impacts achieved include:

- Since 2009, the percentage of approved projects was between 55 percent and 65 percent, demonstrating the importance of technical qualification.
- In 2017, auction registered more than 900 wind projects and 600 photovoltaic projects, representing more than 46 GW in proposals from renewable sources.
- This process resulted in the contraction of more than 500 (12 GW) wind and 140 (3.8 GW) PV power plants in last years.
- More than 600 wind measurement stations and more than 100 solar radiation stations fulfilled the requirements, reducing uncertainty in available primary resource and energy production estimation. This also contributed to improving the knowledge on the available resources in the territory.
- The qualification process is valid for energy auctions on the regulated market, but nowadays, even free market uses it: some independent companies ask the developer for the technical approval by the Energy Planning Authority before buying energy from new projects.
- Banks also require Energy Planning Authority's technical approval when financing new projects, aiming more confidence on its feasibility.

Challenges and Lessons Learned

The main purpose of these requirements is to avoid future problems with new power plants, which could expose electricity consumers to risks. When writing the requirements, the Energy Planning Authority tries to identify the potential risks, aiming to enhance security in energy supply. At the same time, it is important to keep in mind that strict requirements can lead to more expensive projects. For example, wind measurements must be carried out for at least 3 years, using high-quality instruments, which takes time and investment. Complicated rules can also reduce a number of candidate projects, reducing the competition for lower energy prices.

Since 2007, many improvements have been introduced to its instructions, of the Energy Planning

Authority considering the lessons learned during the period. The main lessons learned include:

- Some projects from different developers were discovered in the same place that would result in problems if both sell in the auction. Thus, some additional requirements were introduced regarding the right of using the land.
- With development of wind energy, some projects were very close to each other, especially in regions with good wind, what would result in turbulence and wake effects, reducing the energy production. To face this problem, a geodatabase was developed to analyse "shadowing" between wind farms and determined that energy production reports should consider the effect of all neighbour projects, even those from other developers, despite its phase (planned, in construction or operating).
- Due to a big number of candidate projects, a system of managements of submission, analysis and approval was developed. This web-based system is accessed by developers, who fill in the project datasheet, and analysts from the Energy Planning Authority, who check the registered projects and ask for documents and extra data without personal identification.

Potential for Replication

Among the available mechanisms to buy energy, auctions have been considered by many countries, as it encourages competition for lower energy prices and can be used with existing and new power plants. The Energy Planning Authority published a series of Instructions to be followed by project developers in auctions. The similar process and requirements can be used in others countries that wish to buy energy through the auctions.

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