

The future of electricity distribution regulation in Brazil: insights from stakeholders

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Introduction

In the last decade, there has been a growing increase in the share of Distributed Energy Resources (DER), consolidating the decentralization and decarbonization of electricity generation. Meanwhile, smart grid technologies lead the digitalization of the sector, which now has an expanding layer of information and communication technologies, associated with increased control, monitoring and automation. Together, the so-called 3D's of the energy transition result in significant changes in the electricity sector, impacting, especially, distribution utilities. Not only the functions traditionally performed (planning, operation and maintenance of the grid) by these companies will be affected, but also their areas of operation and business model. The utility of the future business model is not yet defined and, in the spectrum of alternatives discussed in the literature, the extremes are represented by theoretical alternatives: on the one hand, the expanded monopoly model, in which the distributors hold all the new assets and services; on the other hand, the platform operator model, characterized by the utility's role as neutral asset integrator and host of competitive activities (Cross-Call et al., 2018). As a natural monopoly activity, the change of utilities' role raises the need for a broad regulatory framework restructuring (Ruester et al., 2014). The historical focus of regulation, translated into support for traditional, prudent, investments, must evolve to an approach focused on optimizing demands and opportunities, considering a broader pool of stakeholders, and compatible with the utility's role in promoting social and environmental goals (Cross-Call et al., 2018b). In this sense, the transition of the distribution network requires: the definition of the market structure, establishing roles, borders and responsibilities of utilities regarding new, and traditional, services, products and assets; and the modernization of distribution utilities economic regulation.

In Brazil, the power sector transition, led by the diffusion of Distributed Generation, tends to consolidate in the coming years. In this scenario, the regulation must advance in order to allow distribution companies to promote the integration of new resources and technologies into the system, based on ensuring flexibility, optimizing resources, and maximizing the value for consumers. Despite the recognition of regulation as a crucial dimension to enable the modernization of the utilities' business model and to ensure the sustainable diffusion of DER, the Brazilian Power Sector Regulatory Agency (ANEEL) actions to prepare the regulation for the evolution of distribution utilities' role are still incipient. In this context, the article aims to contribute to the advancement of this agenda through the following goals: (i) analyze how distribution utilities business model will evolve in the context of the transition of the Brazilian electric sector; (ii) identify the necessary regulatory adaptations in order to make this evolution viable.

Methods

This research is grounded on a literature review of the economic regulation and business model of distribution utilities, aiming to identify the main areas of market structure and economic regulation that must be revisited in order to pave the evolution of utilities business model and distribution network modernization in the context of DERs diffusion. Then, 28 virtual interviews were conducted, between May and June 2022, with stakeholders grouped in 7 categories: (i) distribution companies; (ii) specialists (consultants and academics); (iii) associations and companies from the generation, transmission, and retail segments; (iv) consumer representatives; (v) associations and companies of products and solutions for the electricity sector; (vi) agents focused on renewable sources; and (vii) policymakers.

The interviews had an average duration of 1 hour and the questionnaire were composed of five sessions. In the first one, the aim was to analyze the perception of the interviewees about the target model of the electricity utility of the future in Brazil. In the second session, the interviewees evaluated the utilities' level of actuation in new areas or services, such aggregation and microgrids operation. Next, they were questioned about flexibility procurement mechanisms at the distribution level, considering the services provided by DER and the distribution system's active management. Based on this panorama, Session 4 approached the main challenges related to Brazilian regulatory

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framework, questioning whether the current regulation could become an obstacle to the modernization of the sector. Finally, the interviewees pointed out the main obstacles to the evolution of the role of distribution utilities in Brazil and the regulatory changes that should be prioritized by the Regulatory Agency in the next eight years in order to support this transition.

Results

Regarding the future model of electric energy distributors in Brazil, 60% of interviewees believe that the utilities should evolve to the role of owner and operator of the distribution system, limited to providing the grid service (Model A). The interviewees that advocate for this model believe that the distributors' participation would be harmful to new markets development, since monopoly advantages would persist, imposing disadvantages over new entrants. Limiting the activities of distributors to network services would mitigate the risk of anti-competitive behavior and the transfer of undue costs to consumers. Moreover, maintaining the focus on network services would have a positive impact on the quality of system management.

The second model (Model B), chosen by 40% of the interviewees, presents an evolution to a more verticalized distributor, acting directly in the provision of new products and services, either in a competitive or a monopoly regime. This choice is based on the argument that the distributor could accelerate the insertion of new technologies, due to economies of scale and scope and the expertise of these companies. In addition, given that the utility represents a consolidated brand, its participation would encourage the competitiveness of new agents. As a result, consumers would have an expanded range of services and providers.

When it comes to flexibility procurement, regardless of the distributor model chosen, the need to advance coordination between distributors and the National Electric System Operator (ONS) was highlighted, as well as the development of mechanisms for the contracting of flexibility services by distributors. The analysis suggests that the topic is still incipient and, therefore, there is a need to expand the discussion about flexibility contracting mechanisms in the Brazilian electricity sector.

A topic with relative consensus was economic regulation, with 80% of the interviewees suggesting that it could be an obstacle to the modernization of distribution utilities. Two major groups of regulatory challenges were identified and summarized in the following sentences: (i) how to enable the redefinition of the distributors' business model while guaranteeing the economic balance of the distribution service; and (ii) how to enable the active management of the distribution system, supporting the use of DERs as operational resources.

In the first group, twelve actions were suggested, related to four major goals: promoting the neutrality of distribution utilities and isonomic access to metering data; modernizing tariff structure; supporting financial and economic sustainability of the grid service, mitigating market risk; and redefining the current revenue sharing rules, applied to complementary activities, since they inhibit the development of new services and products by the utilities. Regarding the second challenge, sixteen actions were proposed, associated to seven objectives: enabling the roll-out of smart meters, minimizing the short-term impact on tariffs; developing mechanisms to the flexibility procurement from DER by distributors; equalizing investments in traditional and new technologies, with reduced lifespan; providing economic signal through dynamic tariffs; ensuring the neutrality of distribution utilities between non-wire alternatives and traditional solutions, assuring the use of DER's flexibility as an operating resource; reviewing the benchmarking model based on backward looking; and adjusting the market design to a new decentralized context.

Conclusions

According to the 28 stakeholders consulted in the research, in Brazil the utilities role as distribution system operators will be crucial in the power sector transition. Although about 60% of the interviewees believe that in the future the distributors will have to focus on the operation of the system, tending to Model A, the competitive regime with the distributor's performance was elected by the majority as the most appropriate for the development of new activities, associated with DER. It is possible to note, therefore, the presence of a hybrid model, in which, although the distributor is focused on the operation of the network, its performance in new areas, competing with new players, is allowed. The creation of mechanisms for flexibility procurement at the distribution level was identified as crucial for DER to become, in fact, an alternative to traditional investments in the network. However, there are still several regulatory gaps to be filled, which indicates the need for a broader discussion on the subject. Besides that, the democratization of access to consumer data was pointed out as an essential feature to the virtuous development of the distribution sector. Finally, it is a consensus that the current economic regulation of distributors imposes a series of challenges that must be mitigated in order to support the modernization of the distribution system and the evolution of Brazilian distribution utilities' business model.

References

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