

REGULATORY CHALLENGES AND IMPROVEMENTS

FOR ELECTRIC DISTRIBUTION IN THE LATIN AMERICAN ENERGY TRANSITION

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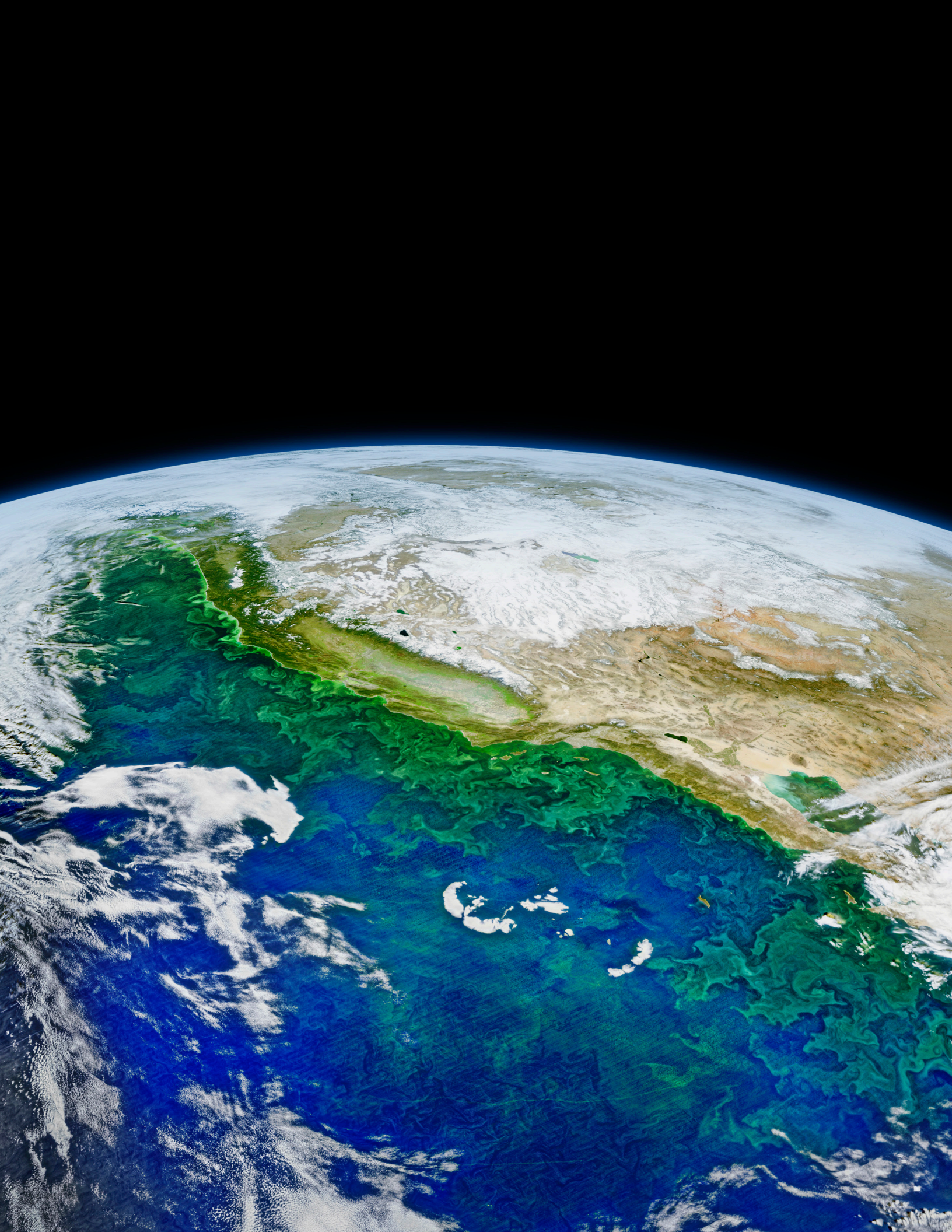
Regulatory Challenges and Improvements for Electric Distribution in the Latin American Energy Transition

All over the world, we are currently facing the challenges of limiting and adapting to climate change. In Latin America, we have taken important steps in the use of our natural resources, which allows us to develop an increasingly cleaner power grid. In the same way, the energy transformation process is implying significant changes in consumption, expressed in terms of energy efficiency and electrification, gradually replacing fossil fuels with electricity.

In this new scenario, Distribution System Operators ("DSOs") have a key role to play, since in order to advance in the energy transition it is essential to have a safe and reliable power supply; to transfer greater benefits to the consumer; and to enable and promote the massive entry of distributed energy resources ("DERs").

The distribution infrastructure must be the digital platform that helps the energy transformation process to be an integral part of the economic, climate, social, service quality and coverage changes that the inhabitants of our region are facing. To advance on this path, we have identified **tthree macro-challenges for the regulation and modernization of electric distribution:**

1) **Achieving higher levels of service quality and increasing resilience in distribution systems:** the quality of service is key to the energy transition, ensuring the continuity and reliability of supply, which allows the efficiency and feasibility of energy consumption´s electrification. To improve quality, it is necessary to digitalize and automate the network; expand the meshing to increase the possibilities of available substitutes for a fortuitous event; substantially increase the number of tele-controlled and autonomously operating equipment at the different voltage levels of the network; ensure the coordination of the new elements that are incorporated into the network, whether they are owned by utilities or third parties; and especially, make maximum use of the available flexibility. An example of these improvements and their benefits are the systems that allow recovering in a few minutes or seconds, automatically, up to 90% of the service after an interruption, redistributing the affected customers to alternative lines (substitutions) by means of tele-controlled equipment and with its own logic of action, in case of unexpected events. The concept of resilience should also be introduced in distribution systems, referring to the ability to limit the scope, severity and duration



of system degradation after the occurrence of an extreme event, considering that as a result of climate change, what used to be exceptional events such as snowstorms, storms, floods, tornadoes or forest fires, among others, are now increasingly recurrent events or are happening in regions where they are not normally expected to occur (such as snowstorms in tropical areas and strong winds in areas traditionally exempted from them).

2) **To sustainably transform the grid as a platform for connecting, disposing, exchanging and enabling a new set of uses, exchange models and actors associated with the energy transition:** the energy transition will bring changes in the way users interact with technology and thus modify their consumption habits, which will be accompanied by new technologies, services and business models. In this new scenario, the DSO must be an "orchestrator" of the system, interacting instantaneously with the various participants, through robust information systems – with hight cybersecurity standards- that ensure the quality and interoperability of the new assets to be introduced into the grid, whether these are its own or from third parties; that allows the simultaneous operation of microgrids, distributed generation, storage systems, electric vehicle charging, among other DERs, guaranteeing a coordinated, safe, reliable that, also maximize the flexibility as a key factor in optimizing power system costs. Additionally, the DSO (Distribution System Operator) must promote innovation through the implementation of regulatory sandboxes, seeking to make this entire grid transformation in a sustainable way.

3) **Promote economic efficiency of the entire electricity system, matching supply and demand:** it is important to encourage the development of demand response programs through the implementation of incentive mechanisms which, together with the hourly or time-of-use tariffs, will bring lower operating costs and better price conditions for consumers. This requires the efficient incorporation of advanced metering technologies, which must be an inherent part of the distribution systems, for which it is important that customers can internalize the benefits of migrating to Smart Metering Systems.

> Understanding the balance between costs and reliability is fundamental, as a higher level of reliability may require greater investments in the network which, in any case, will generate economic benefits for consumers.

> New role of distribution infrastructure as a platform and enabler of the energy transition.

Addressing the macro-challenges of distribution **will require an unprecedented investment plan, which makes it essential to have a regulation that adequately locates incentives and recognizes investments ex-ante, in a timely manner, and that are equitably remunerated by consumers and new actors in the use of the grid,** which also requires a regulator with strong technical and independent capacity, whom promotes stable rules that maintain investor confidence in the long term.

In general, **the traditional regulatory approach of minimizing distribution costs subject to a certain level of service quality is incompatible with this new scenario, and we must move to a focus on maximizing the benefits, for society,** of investments in distribution, which allows improving quality, increasing resilience and flexibility, as well as promoting innovation, economic efficiency, the massive entry of DERs and new business models with attention to sustainability issues.



To advance along this path, we have proposed three regulatory improvements that should be present in all countries, following international best practices. It should be noted that several of these recommendations have already been incorporated in some countries in the region and that several of them can be addressed by the regulator, without necessarily requiring legal changes. These three regulatory improvements are:

1) **Mechanism to promote continuous improvement in the quality of service and to increase the resilience of distribution systems:** Regulatory schemes have prioritized minimum cost while meeting a defined quality standard, which has not generated the necessary - or sufficient - incentives for companies to focus on service quality, as is what has happened decades ago in the United States and Europe, regions where annual interruptions are measured in minutes, while in Latin America they are measured in hours. In parallel, it is essential to increase resilience, which is the grid's ability to prevent collapse and recover operation after an extreme event.

   Reconciling quality, resilience, efficiency and fair prices is a great challenge, not only because users value quality differently, but also because, in general, the form of remuneration over several years and without ex ante recognition of investment efforts means that companies tend to shift their improvement plans to the end of the period in order to make their financing viable. Moreover, in some countries, remuneration is not based on the actual companies but on estimated costs of a hypothetical company considered as a "best practice" benchmark; on other occasions, remuneration methodologies do not explicitly recognize investments for technological improvements. Based on international experience, **the first proposal is to incorporate symmetrical incentives to improve service quality and increase network resilience, at an efficient cost.** These incentives must be based on compliance with Investment Plans and should seek economic efficiency and technological neutrality, avoiding predefined biases towards CAPEX-only or OPEX-only solutions.

> It must be ensured that DSOs have adaptability and incentives to make the necessary investments and expenditures to improve the quality of service and increase the resilience of their systems.

> DSO must be an "orchestrator" of the system, interacting instantaneously with the various participants, through robust information systems that ensure the quality and interoperability of the new assets to be introduced into the grid.

2) **Incentives for remuneration of actual costs associated with distribution service asset base:** Once the technological and economic neutrality of the regulatory incentives have been assured, the tariff calculation methodology must also guarantee the recognition of a Regulatory Asset Base, for which it is recommended to move towards a mechanism based on real costs, as used in Colombia or Brazil. In these markets, the DSO is generally assured that their infrastructure and investments will be remunerated, with the benefit for the consumer of a low cost of capital. To avoid overinvestment, regulations should control the volume of investments, establishing incentives for savings in addition to verifying prices, approving investment plans and applying audits.

The state-of-the-art and modern regulations show that a good remuneration scheme considers both the recognition of real costs and efficiency incentive schemes. Consequently, **it is recommended that Latin American countries move towards a scheme based on real costs, together with a package of incentives to ensure efficiency and the continuous improvement of performance indicators.**

3) **Timely and adequate remuneration of investments consistent with the needs and priorities of the energy transition:** We have already reviewed the importance of including incentives for quality and efficiency in the remuneration, in addition to using the real asset base. In this section we will address the convenience of including in the tariff calculation the investments foreseen in the tariff cycle. There is a temporary mismatch in many countries in the region between the remunerated asset base and the existing one, so that new assets might not be fully compensated, creating an unbalanced incentive to use the infrastructure to the maximum, until the end of its useful life and postpone investments. in the context of the energy transition, which requires large investments in infrastructure and digitalization, failure to consider the planned investments may compromise quality and generate long-term economic inefficiency.

Therefore, following the European and Colombian experience, **it is recommended that the regulation of the distribution activity in Latin America includes the remuneration of the**

assets foreseen in investment plans for the tariff cycle, with timely follow-up, linked to the expected objectives, including the development of new technologies, such as the deployment of AMI, the digitalization of the network and the inclusion of DERs, linked to the results of quality objectives and other innovation and sustainability objectives, as well as those set by the regulation..

This energy transformation in distribution will generate great social benefits, such as improved supply quality, greater grid resilience, lower losses, increased capacity for the integration of distributed renewable generation, as well as the electrification of mobility and buildings, among others, which will result in **lower energy costs for users,** by replacing the use of fossil fuels.

For this to happen, the energy transition will require a modern, digital, automated, secure, resilient, flexible and sustainable distribution network that allows for the incorporation of new business models and DERs. For which, the traditional distributor must have to cease to be just the operator of distribution networks and become the operator of the distribution system (DSO) capable of incorporating new business models and DERs on a robust, bidirectional and smart system.




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