

EXECUTIVE SUMMARY DSO REVIEW

TARIFFS FOR THE TRANSITION

REMUNERATION AND TARIFF DESIGN FOR
ELECTRICITY DISTRIBUTION IN LATIN AMERICA





DSO Review No. 10 - Series: Regulation and Markets

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KEYWORDS

Distribution remuneration; Tariff design; Incentive regulation; Energy Transition; Tariff structure: Non-conventional Assets; Social Subsidies; Investment Recognition; Price signals; Latin America.

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July 2026

01

THE REMUNERATION OF DISTRIBUTION UNDER THE ENERGY TRANSITION

The remuneration model and the tariff scheme constitute the economic core of electricity distribution: they define how the costs of the service are recognized, how network investments are recovered and what price signals users receive. Their design determines the adequacy of revenues to sustain reliable infrastructure, the efficiency with which resources are allocated and the fairness with which the cost of the service is shared. Remuneration regulation is therefore not merely an accounting matter, but a structural element that conditions the sector's capacity to invest, modernize and respond to society's expectations.

For decades, the region's remuneration frameworks were built on an assumption that is now under review: that of a passive network, with unidirectional flows and predictable demand, whose function was to transport energy from the transmission system to the end user. On that basis, efficient reference utility schemes, price caps and multi-year tariff cycles took hold and, in their time, successfully streamlined investment and contained costs. The tariff was built largely on energy consumed —because consumption was a good proxy for network use—, the asset base was conceived around long-lived physical infrastructure, and the cycles assumed that cost, demand and technology conditions would remain stable between reviews.

The energy transition has eroded those premises in four ways. The first is the emergence of distributed energy resources, which have turned the network into a bidirectional system and, above all, have broken the correlation between the energy a user buys and the costs their connection imposes on the system: a household with solar panels can drastically reduce its billed consumption —and with it its contribution to network costs recovered through volumetric charges— while remaining fully dependent on the infrastructure to back up its supply. The second is the electrification of new uses, which not only raises demand but changes its shape, generating concentrated peaks whose accommodation depends less on total energy consumed than on the temporal coincidence of consumption. The third is digitalization: advanced metering, automation and data management are indispensable for operating the new complexity, but they involve non-conventional assets whose nature and useful life differ from the physical infrastructure for which the classic regulatory categories were designed. The fourth is the growing demand for resilience to extreme weather events, whose benefit current indicators do not always capture.

These factors converge in three tensions that current frameworks resolve only partially. The first is between revenue adequacy and tariff structure: if the bulk of revenue collection rests on volumetric charges while billed consumption stagnates owing to self-consumption and efficiency, the financial sustainability of the service is compromised. The second is between investment certainty and affordability: the distributor needs stable rules to recover growing investments, while society demands that costs be contained and vulnerable users protected. The third is between the sophistication of price signals and equity, since differentiated tariffs are more efficient but must not disproportionately penalize those with less capacity to respond. Underlying all of them is the persistent challenge of correctly targeting subsidies and shielding tariff design from political pressure.

In this context, the remuneration model ceases to be a second-order technical matter and becomes a first-order determinant of the success of the energy transition. Frameworks designed for a passive network will not disappear overnight, but they need to evolve toward schemes that value flexibility, resilience and dynamic efficiency. This study analyzes the remuneration models and tariff schemes of electricity distribution in Latin America with a threefold purpose: to characterize the regional landscape, to contrast it with international regulatory best practice and to provide concrete elements to guide the evolution of current frameworks. The analysis is based on the Benchmarking developed within ADELAT's Tariff Committee, complemented by original research on international regulatory approaches.



02

CONCEPTUAL FRAMEWORK: REMUNERATION MODELS AND TARIFF DESIGN

Electricity distribution constitutes a natural monopoly: duplicating networks would be uneconomic and, in the absence of competition, the price of the service cannot be determined in a market. The regulator's task is to approximate the outcome a competitive market would produce —efficient prices, adequate quality and sufficient investment— through rules that determine how much the distributor may receive and how that revenue is passed on to users.

The remuneration model defines the basic rule linking the costs of the service to recognized revenue, and the archetypes are distinguished by the variable the regulator controls and by how risk is shared. Rate of return regulation recognizes prudent operating costs plus a return on invested capital: it secures the recovery of investment, but offers weak efficiency incentives and may induce over-investment. Price cap regulation sets a maximum price —or a unit value such as the Distribution Value Added (VAD), the regulated distribution margin— over a multi-year period, adjusted for inflation and an efficiency factor: it creates a powerful incentive to reduce costs, but transfers more risk to the distributor. Revenue cap regulation limits total revenue rather than the unit price, decoupling it from the volume of energy sold, which is particularly pertinent in contexts of self-consumption and distributed generation. In practice, the boundary between these archetypes has blurred with hybrid performance-based regulation schemes.



Fig. 1. Regulatory approaches to the remuneration of distribution companies.

Whatever the model, the regulator must determine what level of costs it recognizes as the basis of the tariff. The efficient reference utility approach —known in the region as the *empresa modelo*, or model company— constructs a notional company that would provide the service at the lowest possible cost, and it is the costs of that ideal company, not those of the actual distributor, that enter the tariff: it creates a strong efficiency incentive, but faces the complexity of modeling correctly and the risk of drifting away from real operating conditions. The actual cost approach recognizes expenditure actually incurred, subject to a prudence test, with greater certainty but less efficiency pressure. Between the two lie mixed schemes, combining modeled costs with actual or market costs, or using benchmarking among distributors to set targets.

Regulated revenue consists essentially of the return on invested capital, its recovery through depreciation and the coverage of operating costs. The centerpiece is the Regulatory Asset Base (RAB), whose value is determined by historical cost or by replacement cost —through the New Replacement Value (VNR), the equivalent of depreciated replacement cost— and to which the rate of return and depreciation are applied. Costs are classified into capital (CAPEX), which is incorporated into the RAB and remunerated over time, and operation (OPEX), recognized in the period in which it is incurred. The distinction is not neutral: because CAPEX is remunerated with a return over its entire useful life while OPEX is only recovered within the period, the design biases the company toward investment in physical assets even where an operational solution would be more efficient, the phenomenon known as capex bias. To correct it, the TOTEX approach has gained ground, recognizing total expenditure in an integrated way. The return applied to the RAB is determined through the weighted average cost of capital (WACC), which must be consistent with effective regulatory risk.

While the remuneration model determines how much the distributor receives, the tariff structure defines how that revenue is collected from users. Its basic components are the fixed charge, the variable or volumetric charge and, in many designs, the capacity or maximum demand charge, conceptually relevant because much of the network's cost is determined by the capacity that must be available at times of maximum demand and not by total energy consumed. Added to this is the temporal differentiation of prices —time-of-use, hourly and, in their most advanced form, dynamic tariffs— which seeks to induce more efficient use of the network and harness demand flexibility, although its deployment depends on the existence of advanced metering.

Finally, modern frameworks incorporate explicit incentives geared to quality, loss reduction, efficiency and, increasingly, resilience. The decisive distinction is whether they are symmetric —rewarding good performance and penalizing poor performance— or asymmetric —punishing non-compliance only—, because on this depends whether quality becomes a profitable investment or merely a threshold to be avoided. These incentives operate within multi-year tariff cycles, usually of four or five years, whose duration involves a trade-off between the efficiency incentive and the risk of obsolescence, mitigated through mid-period reviews and indexation mechanisms. The model, cost determination, revenue components, tariff structure and incentives operate as an interdependent system whose balance defines the adequacy and sustainability of the scheme.

03

REGIONAL LANDSCAPE OF REMUNERATION MODELS AND TARIFF SCHEMES

3.1. REMUNERATION MODELS

The Benchmarking reveals a landscape that, at first sight, suggests uniformity: most distributors report operating under a price cap scheme built around the VAD. That coincidence, however, conceals differences in the rule by which revenue is set and, with it, in the sharing of risk. On that criterion, the landscape falls into three categories along a single continuum. The first, and the most widespread, is the price cap: the regulator sets maximum multi-year revenue calculated on efficient reference costs rather than on those of the actual distributor. Chile is its purest expression; Guatemala and Peru operate under the same rule, building that standard from a notional reference utility, while Brazil shares the incentive-based price cap logic but derives its efficient cost from benchmarking among real distributors. El Salvador and Bolivia also belong here. At some distance lies the revenue cap, whose exponent is Colombia, where the regulator sets a cap on total revenue anchored in the assets actually installed and in an investment plan approved under Resolution CREG 015 of 2018. At the opposite end is cost-of-service regulation –Costa Rica, Ecuador and Paraguay– where revenue closely follows the costs actually incurred and the risk falls on the user or the State.

Approach	Logic	Cost base	Countries
Price cap on efficient costs	Revenue set ex ante against a standard, rather than on actual expenditure	Notional reference utility or benchmarking among real distributors	Chile, Guatemala, Peru, Brazil, El Salvador, Bolivia
Revenue cap	Cap on total revenue anchored in the actual physical network, with investment plans	Mixed scheme: actual installed assets (CAPEX) plus efficiency benchmarking (OPEX)	Colombia
Cost of service	Revenue follows the actual costs incurred to guarantee the service	Actual accounting costs incurred by the company, subject to prudence criteria	Costa Rica, Ecuador, Paraguay

Table 1. Remuneration models applied in the region.

The construction of the recognized cost shows three mechanisms of differing technical sophistication. The most demanding is the efficient reference utility, which fully reconstructs the company that would provide the service at minimum cost through an engineering study; Chile, Guatemala and Peru share it, although they differ in who values the costs and who settles disputes: Peru concentrates both functions in the regulator, while Chile and Guatemala assign them to independent bodies –the Panel of Experts and an Expert Commission. The mixed scheme forgoes modeling the entire company: Colombia values assets with construction units at standard prices and estimates efficient operating expenditure through stochastic frontier models, while Bolivia and Brazil separate manageable costs from non-manageable ones, such as energy purchases. The third, the recognition of actual costs, resembles an audit of effective expenditure, as Costa Rica illustrates.

Practically the whole region recognizes CAPEX and OPEX separately, without integrating them into a single pool of expenditure: this is the sharpest difference from the TOTEX approach consolidated elsewhere, a contrast that distributors in Chile, Colombia and Brazil themselves make explicit. When the regulator —or the reference utility model— determines in advance what proportion corresponds to investment and what to operation, the distributor loses the freedom to substitute one for the other, and the design ends up tilting the balance toward the physical asset. The consequence goes beyond accounting: in a context where many of the transition's solutions —flexibility, demand management, contracted services— are operational rather than physical, a framework that rewards the asset over the operation discourages precisely the most efficient responses.

In the valuation of the asset base the region has opted almost unanimously for replacement cost: Chile, Guatemala, Peru and El Salvador value assets at New Replacement Value; Colombia reaches the same result through construction units at standard prices; and in Brazil the criterion operates through ANEEL's tariff methodology. Even more decisive is the frequency of updating: while in most frameworks the RAB is fully revalued only at each tariff process —every four or five years— Colombia updates it annually, incorporating the investments actually executed. It is here that valuation ceases to be a technical matter and becomes an economic one: a base frozen for the whole cycle forces new investment to wait until the following review before it begins to be remunerated.

The timing of recognition follows the same logic. In reference utility schemes it is essentially *ex ante*: what is remunerated is the efficient network the model projects, so that a real investment not anticipated finds no recognition until the next tariff process. In cost-of-service systems an *ex post* recognition operates, and between the two lies the Colombian mixed scheme, which sets *ex ante* the recognizable investments and their maximum amounts and subsequently incorporates *ex post* the assets actually executed, with an adjustment correcting deviations. The difference centers on rigidity: in the most rigid *ex ante* schemes, investment made mid-cycle goes unremunerated until the following review and by then it has lost value, a cost distributors sum up as the loss of the time value of money that deferred recognition fails to compensate for.

The problem is compounded with non-conventional assets —smart meters, automation, sensors, software— whose recognition tests frameworks conceived for physical infrastructure. In reference utility schemes the constraint is structural: the model incorporates a technology only once it has become the most efficient alternative, so the framework rewards those who adopt the technology when it is already common and penalizes those who introduce it first. Where a point of entry exists it tends to be narrow and case-by-case: Colombia opened one through special construction units and technological renewal investments, in a procedure distributors describe as slow and uncertain, and Peru allows innovation and smart metering projects to be incorporated into the VAD, but still without clear valuation rules. The underlying pattern is common: most frameworks value an asset by its category and not by the outcome it delivers, and genuinely new assets, by definition, do not fit.

The rate of return is where the risk the model allocates ultimately gets paid for, and the region sets it through three mechanisms. A first group uses the capital asset pricing model (CAPM) and updates it regularly, so that it follows market conditions and country risk: Brazil recalculates it annually, and Argentina, Chile and Colombia at each review. The Argentine case illustrates the principle of consistency between rate and risk: the rate was reduced in January 2025 to 6.22% real post-tax following the fall in sovereign risk; in 2019 Chile re-

placed the historical fixed rate of 10% real with a band of between 6% and 8% determined by CAPM. A second group retains rates set by law —Peru maintains the 12% real pre-tax of 1992, El Salvador the 10% of 1996 and Guatemala has kept the legal floor of 7% for over a decade— with high predictability but a risk of becoming misaligned with the real cost of capital. A third group, that of public or cooperative systems, dispenses with a commercial WACC.

On incentives, the overall picture is telling: the region incentivizes above all by punishing. The quality incentive, built around the SAIDI and SAIFI indicators, operates asymmetrically in most frameworks, with sanctions or compensation to users for non-compliance but without equivalent reward for superior performance. Colombia is the clearest exception, adjusting the operator's revenue upward or downward according to its performance against average quality targets, and Brazil integrates a quality and satisfaction dimension into its X Factor. Losses receive a two-sided treatment —they are a recognized component of revenue and, at the same time, an incentive, since whoever reduces them below the standard retains the difference. Operational efficiency is rarely rewarded explicitly because the model itself embeds it, and resilience and digitalization almost entirely lack an economic signal.

Finally, cycles almost always extend between four and five years. Differences appear in the updating within the period —Colombia updates its base annually and Costa Rica adjusts its tariffs each year— and in the robustness of indexation: from Colombia, whose remuneration is adjusted almost exclusively by the producer price index, to Argentina, which, driven by inflation, moved to monthly adjustment and incorporated a deferral scheme. Duration and indexation operate as a single device: the longer the cycle, the more decisive the robustness of the adjustment becomes, and on their combination depends how much risk of erosion of real revenue the distributor bears between reviews.

3.2. TARIFF SCHEMES AND PRICE SIGNALS

Having determined how much the distributor receives, there remains the other half of the equation: how that revenue is collected from users. The great majority of the sample uses a basic structure of a fixed charge plus a variable charge, with the exception of Colombia and, in the residential segment, Brazil, where the fixed component exists only for high-voltage consumers and a proposal to replace the current minimum-consumption arrangement with a fixed monthly charge is under public consultation. Where substantive differences do appear is in the unbundling of components: Colombia and Costa Rica present the most complete and explicit breakdown on the bill, whereas for the small user in Chile, Guatemala or Argentina the cost of the network is integrated and practically invisible.

The capacity signal is almost non-existent in the residential segment. Only Chile passes the cost of capacity on to households, and it does so indirectly through load factors applied to consumption; Colombia maintains a single-part energy tariff and Peru incorporates a coincident peak demand charge within the energy formula, not visible to the user. Most countries reserve the capacity or demand charge for medium and large consumers, with contracted capacity schemes and penalties for exceeding the contracted level.

Something similar occurs with time differentiation. Brazil —with the White Tariff (*tarifa branca*), currently voluntary but under discussion for automatic application to certain segments through ANEEL's Public Consultation 46/2025—, Peru, Costa Rica and Paraguay are the only countries with hourly tariffs available to residential consumers; Chile and El Salvador offer

them as an option in medium and low voltage, Guatemala structures them by blocks, Argentina and Bolivia reserve them for large demands and Colombia maintains a flat tariff for the regulated user. The transparency of the distribution charge follows the same uneven pattern: it is explicit and regulated in Brazil, Colombia, Costa Rica and El Salvador, partial in Peru, and integrated and invisible to the regulated user in Argentina, Bolivia, Chile and Guatemala.

Country	Residential (BT) Low Voltage	Small demand (BT) Low Voltage	Medium demand (MT) Medium Voltage	Large demand (AT/MT) High/Medium Voltage	Type of time-of-use tariff	Relevant observations
Argentina	○	○	○	●	-	Applies only to Large Demands (>50 kW). Not available for residential customers.
Bolivia	○	○	○	●	3 blocks	Only Large Demands. Blocks: high / medium / low.
Brazil	●	●	●	●	White / Green / Blue Tariff	White Tariff for BT (residential). Green (A3–A4) and Blue (A3) in MT/AT.
Chile	○	○	○	●	On-peak / Off-peak	TOU optional for customers >10 kW in BT and MT. Defined by period.
Colombia	○	○	○	○	– (limited option)	Not available for most regulated residential customers. Only aggregators or special options.
Costa Rica	○	○	●	●	On-peak / Mid-peak / Off-peak	TOU for BT >50 kW and MT (mandatory) for some clients. Three daily periods.
Ecuador	○	○	○	●	On-peak / Off-peak	Applies to MT (≥13.8 kV) and large consumers. Two daily periods.
El Salvador	○	○	●	●	On-peak / Mid-peak / Off-peak	Optional for BT (residential). Mandatory for MT and large demands.
Guatemala	○	○	○	●	On-peak / Off-peak	TOU for clients >11 kW and public electric vehicle charging stations.
Paraguay	○	○	○	●	On-peak / Mid-peak / Off-peak	Optional in MT (≥23 kV) and mandatory in AT. Three daily periods.
Peru	○	●	●	●	On-peak / Off-peak	Residential with advanced meter (BTSD). On-peak: 18:00–23:00.

LEGEND

- Available / Mandatory
- Available / Optional
- Not available

BT = Low Voltage
MT = Medium Voltage
AT = High Voltage

TYPES OF TIME-OF-USE TARIFFS

- On-Peak**
Hours of highest system demand (highest price).
- Mid-Peak**
Intermediate hours of demand.
- Off-Peak**
Hours of lowest demand (lowest price).

Fig. 2. Time differentiation and time-of-use tariffs in the region.

All countries have subsidy mechanisms, but they finance them through four archetypes. The first is the cross-subsidy, where users themselves pay: Peru applies it through the FOSE for consumption of up to 140 kWh per month and Bolivia through a 25% discount for consumption of up to 70 kWh, while in Chile subsidies tend to be temporary and dependent on registration processes, which limits their continuity. The second is the Colombian mixed model, structured by socioeconomic strata, with discounts for strata 1, 2 and 3 limited to the basic lifeline allowance and financed by a 20% contribution from higher strata, commerce and industry, plus the deficit borne by the National Government. The third is the Brazilian sectoral fund—the Energy Development Account (CDE), paid by all consumers and representing close to 20% of the residential tariff. The fourth is the subsidy charged to the public budget, present in Argentina, El Salvador and Guatemala. The weakness is shared: allocation is based on the property's stratum or the level of consumption rather than on the household's real socioeconomic condition, which generates inclusion and exclusion errors and, when state reimbursements are delayed, transfers collection risk to the distributor.

Prepayment has a regulatory basis in most of the countries analyzed, but its adoption is marginal owing to economic barriers—the cost of meters, low attractiveness for the company and operational issues—and, in some cases, to design limitations, as in Colombia, where certain additional costs cannot be passed through the prepayment system. Protection for medically dependent customers shows a clear gap: only Chile and Argentina have frameworks combining economic benefit with a guarantee of service, while Colombia and Peru limit themselves to protection against disconnection for formally recognized users, Costa Rica serves them through its preferential social tariff, and Bolivia, El Salvador, Guatemala and Paraguay lack specific regulation.

On quality and loss incentives, all countries have indicators or targets, but the predominant model is asymmetric and punitive. Only Brazil and Colombia adopt symmetric mechanisms allowing the distributor to increase or reduce its revenues according to performance: Brazil through the DEC and FEC indicators, with automatic compensation to the user for any individual breach and loss targets defined by benchmarking; Colombia through SAIDI and SAIFI in the Local Distribution System, with a treatment of losses combining recognition for efficient companies and progressive incentives.

Finally, regulatory experimentation is almost non-existent. Brazil is the country that has made most use of this tool, with nine sandbox projects under way piloting flexible tariffs, demand response, locational time-of-use and seasonal tariffs, dynamic schemes, prepayment and fixed billing with social incentives. Building on that experience, disseminated within ADE-LAT, Salta became the first Argentine province to institutionalize the mechanism through ENRESP Resolution No. 2965/25, with pilot projects aimed at regularizing low-income neighborhoods. Colombia is undergoing public consultation to establish a formal framework through draft Resolution CREG 705 012/2026, while Chile and Guatemala allow innovation at the distributor's own risk and cost, and Bolivia, El Salvador and Peru lack regulation or experience.

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The remuneration model defines the basic rule linking service costs to the revenue the distributor is entitled to receive



04

INTERNATIONAL REGULATORY APPROACHES AND BEST PRACTICES

The most profound transformation in the regulation of distribution over the past two decades has been the shift from cost-of-service regulation toward performance-based regulation. The change is conceptual: whereas traditional regulation controls inputs, performance-based regulation shifts the focus to the outcomes the distributor delivers to users and to the system. Its most mature expression is the RIIO framework of the British regulator, whose acronym summarizes the formula: revenues result from the combination of incentives, innovation and outputs. It operates through a multi-year revenue control that provides a planning horizon, a set of measurable outputs rewarded or penalized with financial and reputational incentives, a total expenditure baseline that lets the company choose the most efficient combination of investment and operation, a sharing factor for savings and overspends, and uncertainty mechanisms that prevent the multi-year nature of the control from translating into rigidity. Its calibration combines a rate of return consistent with the effective risk of the business with an ongoing efficiency challenge of the order of 1% per year. The approach is not exclusive to the United Kingdom: numerous jurisdictions in the United States have expanded the use of performance incentive mechanisms.

In the recognition of investment and innovation, four lines of good practice can be identified. The first is the adoption of the TOTEX approach which, by removing the accounting advantage of the physical asset, allows digital and flexibility solutions to compete on equal terms; Italy offers a gradual variant —the ROSS approach— combining forward-looking expenditure targets with fixed shares between operation and capital. The second is to value non-network solutions —flexibility and storage— as alternatives to be assessed against physical expansion, enabling the contracting of flexibility services. The third is to give innovation a financing space of its own, with a risk profile distinct from that of ordinary investment, because subjected to the same criteria of ex post prudence it simply does not happen. The fourth is to shift the axis of recognition from the category of the asset to the outcome it produces, remunerating digital investment for its contribution to quality, resilience or the integration of distributed resources, as New York's REV model has advanced.

In tariff design, international practice has moved toward signals that more faithfully reflect the cost each user imposes on the system. Time-differentiated tariffs span a growing spectrum of sophistication, from time-of-use tariffs to critical peak and dynamic pricing. The evidence is robust: France's Tempo tariff has reduced the national peak by around 4% and Hydro-Québec's trials showed reductions of close to 6% in critical peak events. At the same time, research warns that time-of-use tariffs capture only around 10% of the efficiency gains real-time pricing would achieve, but stresses that most of the benefit is already obtained with a simple two-block scheme. A central lesson is that the mode of adoption conditions the outcome as much as the design of the price: voluntary schemes achieve low participation with self-selection bias, whereas default schemes achieve far greater coverage, provided they are accompanied by safeguards for users with less capacity to respond. On capacity charges, Australia is the most developed reference point in the residential segment. Underlying all of this is an inescapable enabling condition: none of these signals is viable without advanced metering, hence the recommended sequence of first consolidating metering infrastructure, then introducing hourly tariffs by default with transition protections, in-

corporating capacity charges where the capacity signal proves most valuable, and reserving dynamic and locational designs for a later phase.

On subsidies, international experience converges on one idea: separating social protection from tariff design. The first lesson is that targeting requires measurement, and the most advanced jurisdictions first built an operational definition of energy vulnerability —the United Kingdom evolved from a simple threshold toward an indicator weighting energy expenditure, the distance of income from the poverty line and the energy efficiency of the dwelling. The second, and the most cross-cutting, is to decouple the subsidy from the tariff through transfers or vouchers directed to the household, drawing on social programs and pre-existing registries: its virtue is twofold, because it leaves the price signal intact and shifts financing to the targeted public budget. The third comes from concrete instruments with differing degrees of decoupling: Spain's social bonus, with graduated categories of vulnerability; France's *chèque énergie*, which replaced social tariffs with a voucher allocated on the basis of tax information; and the United Kingdom's Warm Home Discount, targeted through means-tested benefits. The fourth is that protection goes beyond price and extends to continuity of supply.

Regulatory experimentation mechanisms are the international response to the dilemma of innovating without destabilizing the framework. The United Kingdom was a pioneer with Ofgem's Innovation Link and Energy Regulation Sandbox, which allow trials in a live environment through bespoke guidance and time-limited derogations; the Netherlands enabled residents' associations and cooperatives to organize peer-to-peer supply and set their own tariffs within the controlled environment. The literature has distilled four principles: clear delimitation of scope, with safeguards for consumers; capacity for regulatory learning, through monitoring and feedback into the rule-making process; a cross-sectoral character; and adaptation to the context of each jurisdiction rather than transplanting models from mature markets.

Finally, all the technical dimensions of remuneration design produce the expected results only if they rest on a credible and stable institutional framework. Tariff regulation operates as an implicit long-term contract, and when that trust is eroded regulatory risk is incorporated directly as a premium in the cost of capital. The OECD has systematized the principles of governance around five dimensions that determine a regulator's effective independence —clarity of role, transparency and accountability, financial independence, independence of leadership and a culture of independence among its staff— and it is no coincidence that in its member countries 87% of energy regulators have independent status. The European model offers the most demanding normative expression by requiring a distinct legal entity, budgetary autonomy and independence from government and market instructions. Added to this are mechanisms that lend credibility to the regulatory commitment when confronting the time inconsistency problem: a protected asset base with predictable methodologies functions as a long-term contract, and independent appeal bodies —such as the right to appeal Ofgem's decisions to the British competition authority (the Competition and Markets Authority)— subject decisions to rule-based technical scrutiny that limits discretion. International assessments document that it is precisely in this dimension that developing countries display their greatest gaps.

05

CONCLUSIONS AND RECOMMENDATIONS

Beneath the diversity of labels, the region shares one underlying question: who bears the risk that actual costs diverge from those recognized. The price cap built around the VAD, calculated on an efficient reference utility and with assets valued at replacement cost, is clearly the predominant paradigm, with Colombia shifted toward the revenue cap and public-company systems toward cost-of-service regulation. This convergence means that the challenges also tend to be common and that solutions piloted in one country are, with due adaptation, relevant to the others.

The second conclusion, and the most consequential for the transition, is that current frameworks recognize investments late, partially and with bias: the strict separation between CAPEX and OPEX tilts the balance toward the physical asset, investment not anticipated by the model waits until the following review, and non-conventional assets find only narrow, case-by-case accommodation. Colombia's annual updating of the base shows that the problem of deferred recognition has a solution within the region's own paradigm. The third is that, predominantly, regulation punishes but does not incentivize: quality and loss schemes are largely asymmetric, and only Colombia and Brazil apply symmetric schemes, while resilience and digitalization almost entirely lack an economic signal.

The fourth conclusion concerns tariff design: price signals are weak and poorly differentiated, with a strong volumetric predominance, a practically non-existent residential capacity charge and marginal time differentiation, so that the tariff rarely communicates to the user the real cost their consumption imposes on the network. The fifth is that subsidies are poorly targeted and are channeled through the tariff, with allocation based on stratum or level of consumption rather than on the household's real condition. The sixth identifies protection and innovation gaps: protection for medically dependent customers is robust only in Chile and Argentina, prepayment has a broad regulatory basis but marginal adoption, and regulatory experimentation is almost non-existent outside Brazil and Salta.

The seventh conclusion is cross-cutting: the adequacy of remuneration depends less on the level of the rate of return than on the stability and predictability of the rules, because a well-set rate is diluted if investments are recognized late, if tariffs are frozen for political reasons or if methodologies change unexpectedly. And a final, propositional conclusion: Brazil emerges consistently as the regional benchmark for tariff innovation —the only country combining residential hourly tariffs, operating sandboxes, symmetric quality incentives and explicit regulatory unbundling of components— which suggests that several of the practices the region is debating already have a testing ground within Latin America.

On the basis of this diagnosis, the study puts forward six regulatory recommendations. The first is to modernize the recognition of investments and neutralize the bias toward capital, moving gradually toward total expenditure logics or, at the very least, removing the penalization of operational and flexibility solutions; accelerating recognition through more frequent updates of the asset base and mixed ex ante/ex post schemes; and creating explicit routes for non-conventional and digital assets, recognizing them by the function they perform and not by their accounting category. The second is to move from asymmetric to symmetric, re-

sults-oriented incentives, taking as a reference the models of Colombia and Brazil in quality and loss management, and progressively incorporating economic signals for resilience and digitalization.

The third recommendation is to strengthen the price signals of tariff design through an ordered sequence: first consolidating advanced metering as a prerequisite, then introducing hourly tariffs —preferably by default and with transition protections—, incorporating capacity charges where electrification and distributed resources make the capacity signal more valuable, and reserving dynamic and locational designs for a later phase, while improving in parallel the transparency of the distribution charge on the bill. The fourth is to decouple subsidies from the tariff and target them by the household's real condition, replacing cross-subsidies with transfers or vouchers that preserve the price signal, drawing on social registries and securing timely reimbursement mechanisms that do not transfer collection risk to the distributor; this agenda also includes closing the protection gaps for medically dependent customers.

The fifth is to enable regulatory experimentation through sandboxes, adopting formal mechanisms that allow new tariff structures to be piloted in a bounded environment, with temporary derogations and systematic evaluation, before generalizing them; the sandboxes of Brazil and Salta offer a direct regional reference. And the sixth, as a cross-cutting condition, is to reinforce the stability and institutional independence of the regulatory framework, strengthening the regulator's financial and managerial autonomy, establishing fixed and staggered terms, reserving methodological competence to its technical remit, guaranteeing transparency as a counterweight and providing appeal or technical arbitration bodies that offer predictability.

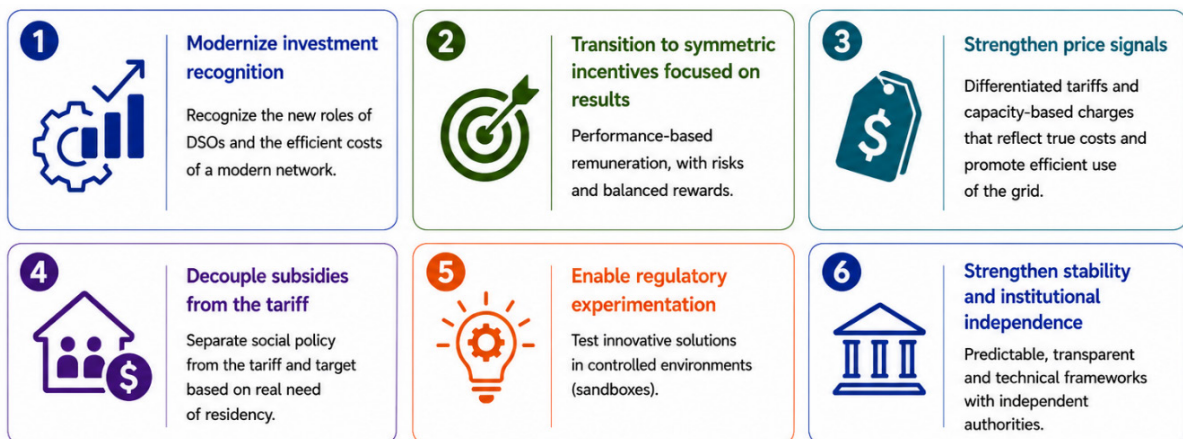


Fig. 3. Recommendations for regulators and policymakers.

These recommendations form an articulated agenda, not a list of independent measures. The remuneration model, the determination of costs, the treatment of capital and operation, incentives, tariff design, subsidies and the institutional framework are parts of a single system, and their reform must be approached with that overall perspective: there is little point in refining the price signal if the subsidy continues to distort it, or in recognizing investments better if the rate does not reflect risk or the rules are not stable. The energy transition has made remuneration and tariff design a first-order determinant of the future of electricity distribution in Latin America. The good news is that the region does not start from scratch: it has its own reference points, a shared diagnosis and a convergent reform agenda expressed by the distributors themselves. The challenge is to translate that consensus into concrete frameworks, adapted to each national reality, that support the transformation of the system.



