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International experience on disaggregating distribution from retail trading functions in electricity markets: Implications for South Africa

Prepared by the Regulatory Assistance Project (RAP)
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Overview

This report summarises findings from the Regulatory Assistance Project (RAP) study for the Public Affairs Research Institute (PARI) on international experience related to disaggregating distribution functions from trading functions in electricity markets for South Africa to consider when transitioning to a liberalised electricity market. The report aims to support decision-making by stakeholders engaged in South Africa's electricity market reform. The primary audience includes policymakers, the National Energy Regulator of South Africa (NERSA), energy department officials, and local governments.

The report covers relevant background and examples from international markets that have similarities to South Africa and have gone through a comparable process of electricity market reforms.

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Acronyms and abbreviations

Abbreviation	Definition
ACL	Ambiente de Contratação Livre (competitive retail electricity market in Brazil)
ACR	Ambiente de Contratação Regulada (regulated electricity market in Brazil)
AMI	Advanced Metering Infrastructure
ANEEL	Agência Nacional de Energia Elétrica (Brazilian Electricity Regulatory Agency)
BNDES	Brazilian Development Bank
CAIDI	Customer Average Interruption Duration Index
CCEE	Câmara de Comercialização de Energia Elétrica (Brazil’s Electricity Trading Chamber)
CERC	Central Electricity Regulatory Commission (India)
DBT	Direct Benefit Transfer (India)
DER	Distributed Energy Resource
DISCOM	Distribution Company
DPE	Department of Public Enterprises (South Africa)
DU	Distribution Utility
EC	Electric Co-operative
ECOS	Embedded Cost-of-Service
EPE	Empresa de Pesquisa Energética (Energy Research Company)
EPIRA	Electric Power Industry Reform Act
ERC	Energy Regulatory Commission (Philippines)
EPM	Empresas Públicas de Medellín
EV	Electric Vehicles
FAER	Rural Electrification Fund (Colombia)
FAZNI	Fund for the Electrification of Non-interconnected Zones (Colombia)
IPP	Independent Power Producer
ISO	Independent System Operator
MW	Megawatt
NEA	National Electrification Administration (Philippines)
NERSA	National Energy Regulator of South Africa
NY PSC	New York Public Service Commission

Abbreviation	Definition
O&M	Operations and Maintenance
ONS	Operador Nacional do Sistema Elétrico (National System Operator)
PARI	Public Affairs Research Institute
POLR	Provider of Last Resort
PPA	Power Purchase Agreement
PRONE	Program for Network Normalization (Colombia)
RAP	Regulatory Assistance Project
RDSS	Revamped Distribution Sector Scheme (India)
RSA	Republic of South Africa
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
TSO	Transmission System Operator
UPME	Unidad de Planeación Minero Energética (Colombia's Mining and Energy Planning Unit)

Relevant definitions and functions for a disaggregated distribution sector

Term	Definition	Key functions or details
Consumer or customer	The end user of electricity (residential, commercial, industrial). They can sometimes choose their retailer but not their wires company. 'Captive or ineligible' consumers don't have choice.	▪ Right to reliable supply and clear billing ▪ Decides on usage patterns and energy efficiency ▪ Can opt in to dynamic tariffs and demand response ▪ Can also generate electricity on site
Disaggregated (aka unbundled distribution utility)	Distribution utility that has separate responsibilities for: 1. **Distribution**: Low voltage infrastructure including operations, maintenance and accounting 2. **Retail**: Purchasing and selling electricity to consumers	▪ Distribution wires companies usually have a natural monopoly over the wires, which often results in a separately regulated company (typically state-owned, but sometimes privately owned) from the private retail company.
Distribution licensee (wires company, distributor or distribution company	A regulated entity that holds a licence from a governmental or regulatory authority to operate and maintain the distribution power system within a defined geographic service territory. The licensee is responsible for safely delivering electricity from the transmission system to end-use customers (residential, commercial and industrial). Depending on the regulatory framework, the distribution licensee may own the distribution infrastructure or may operate and maintain assets owned by another party.	▪ Investing in infrastructure and operations and maintenance (O&M) for the grid ▪ Metering and theft control ▪ Connecting and disconnecting customers
Distribution power system	The network of medium-voltage and low-voltage electrical infrastructure that delivers electricity from high-voltage transmission substations to individual end-use customers (i.e., the 'last mile' of the electric grid, representing the physical connection between the transmission system and end users).	Operates: ▪ Distribution substations (stepping down transmission voltage) ▪ Primary distribution lines (medium voltage, typically overhead or underground) ▪ Distribution transformers (further reducing voltage) ▪ Secondary distribution lines (low voltage to customers) ▪ Service connections and metering equipment ▪ Associated switchgear, protective devices and monitoring systems
Electricity rates (tariffs in some countries)	Regulated rate that a licensed monopoly utility is allowed to charge for supplying electricity	▪ Electricity rates or tariffs require regulatory approval ▪ Cost-recovery mechanism that is usually transparent with standardised calculation method ▪ Excludes surcharge, tax, levy or duty

Electricity trader	Typically, a licensed entity who purchases electricity from generators in bulk (or the wholesale market) and resells it to retailers or large consumers. In many wholesale markets, they can be players who don't own assets, and whose participation improves liquidity and competition in short-term markets.	▪ Portfolio optimization and contract negotiation/hedging ▪ Risk management aligned with price incentives ▪ Participation in forward, day-ahead and real-time markets
Price	A charge for electricity to an end user or customer based on a competitive or negotiated market transaction.	▪ Typically used in liberalised market segments such as the wholesale and, sometimes, retail markets ▪ May include surcharge, tax, levy or duty
Provider of last resort (POLR)	A regulatory mechanism that ensures customers continue to receive electricity service in the event of a retail supplier's bankruptcy or failure to serve. It defines rules for how customers of a failed supplier will continue to be served, either by the incumbent distribution utility, another retail supplier or a designated supplier of last resort.	▪ Customer protection during retail supplier failure
Retail market	The environment in which multiple retailers compete to sell electricity to end customers. (Usually it needs unbundled metering, transparent distribution and transmission tariffs, and open access to the grid.)	▪ Consumer protection and dispute resolution ▪ Supports customer switching and regulating information flows
Retailer/ supplier	Typically, an independent entity from the distribution licensee/wires company, licensed to buy electricity and sell it to final end-use customers. Often privately owned with competition from other retailers.	▪ Selling electricity, customer billing/management, price and rate design and demand forecasting ▪ Buying electricity from wholesale markets, spot markets and sometimes long-term contracts
Transmission system operator (TSO)	The licensee responsible for operating the high-voltage transmission system. The system operator can also be the owner, but higher degrees of unbundling often have separate ownership.	▪ Grid stability and reliability ▪ Coordinates bulk electricity transfer and interconnection with generators and distribution grids
Wheeling	An arrangement that allows an end-use customer or trader to buy electricity from generators (e.g., independent power producers, or IPPs), and to transport it through the existing grid infrastructure while paying associated use-of-system charges to the grid owner(s).	▪ Enables traders, retailers and customers to use existing transmission and distribution infrastructure they don't own
Wholesale market	Centralised platform or system with generators, traders, retailers and sometimes large customers that buy and sell electricity (often includes day-ahead and real-time markets).	▪ Price discovery ▪ Matching supply and demand ▪ Ancillary services procurement

Sources: SEA. (2025). *Electricity reform and market basics*; Foster, V., & Rana, A. (2020). *Rethinking power sector reform in the developing world.*

Executive summary

The electricity distribution sector plays one of the most critical roles in the power system value chain, yet it is also where some of the toughest challenges converge, especially for developing economies, creating both obstacles and opportunities for reforms. Effective distribution sector reforms require careful consideration to predict and manage how both the distribution and retail activities will perform as the electricity market evolves. At the same time, broader power sector reforms place an increasing emphasis on improving distribution operations, as the creditworthiness of distribution utilities heavily influences the flow of investment across the sector.

Since the distribution sector is the primary interface with consumers, it is responsible for core functions that underpin the financial viability of the entire system, including metering, billing, collecting revenues and preventing theft. The rapid growth in distributed energy resources (DERs) further increases the operational complexity, introducing two-way power flows that must be efficiently managed and optimised. This reinforces the need for robust distribution reforms integrated with measures like disaggregation to effectively manage this complexity.

This document focuses on key issues related to the disaggregation of the distribution sector (also known as unbundling) and other enabling distribution sector reforms, within the context of larger electricity market reforms (e.g., wholesale markets and regulatory frameworks). Disaggregation refers to the unbundling of distribution utility operations into a distribution 'wires company' that's responsible for operations and maintenance (O&M) of low voltage infrastructure, and a 'retail company' that primarily purchases and sells electricity to consumers. Disaggregation is often used in conjunction with other reforms (e.g., governance reforms and retail competition) to address recurring distribution sector challenges (see Table 2). This report takes an in-depth look at common disaggregation steps, while highlighting relevant examples and lessons learned for South Africa as it reforms its electricity market and distribution sector, through analysis of four detailed case studies: Brazil, the Philippines, Colombia and India.

The case studies reveal consistent patterns within successful distribution reforms:

- **Strong independent regulatory institutions:** Brazil's Agência Nacional de Energia Elétrica (ANEEL) and Colombia's Comisión de Regulación de Energía y Gas (CREG) demonstrated that financial independence (funded through industry levies rather than government budgets) protects regulators from political interference and enables consistent decision-making. Brazil's transparent regulation attracts significant private investment without government guarantees, and distribution utilities now receive investment-grade credit ratings.

- **Privatisation is an effective tool**: Countries successfully used privatisation to improve efficiency and reduce the need for government ownership and support.

- **Clear institutional role separation**: Countries that created distinct agencies for regulation, planning, system operation and market operation achieved better coordination and reduced conflicts of interest compared to countries with consolidated functions.

- **Phased retail competition**: The four countries profiled each started with large customers only (typically ≥ 1 MW demand) and gradually lowered thresholds over time. This gradual approach allowed markets to mature, regulators to build capacity and unforeseen problems to be addressed before expanding to smaller customers.

- **Flexible distribution models**: The Philippines' dual system (unbundled urban distribution utilities versus bundled rural electric co-operatives) and Colombia's mix of public and private distribution utilities demonstrated that different contexts require different solutions. One-size-fits-all mandates are uncommon.

- **Technology combined with governance**: Brazil reduced distribution losses from 34% to 6.6%, while India's Revamped Distribution Sector Scheme (RDSS) programme significantly cut theft when smart metering and grid technology were combined with governance improvements, results-based financing, and strict enforcement. Technology alone is often insufficient.

- **Targeted individual subsidies**: India's Direct Benefit Transfer (DBT) pilot programme, which provides subsidies directly to individuals' bank accounts as deductions on monthly bills, improves transparency compared to cross-subsidies embedded in tariff structures.

The case studies also reveal common challenges that South Africa must actively work to overcome:

- **Political interference in tariff setting**: India's state-owned distribution companies (DISCOMs) operate at around 180 billion rand (around US$11 billion) in annual losses largely due to political pressure preventing cost-reflective tariffs, despite 2003 legislation that aimed to prevent this. The Philippines experienced similar challenges, demonstrating that even well-intentioned laws can fail without genuine regulatory independence.

- **Problematic cross-subsidies**: Colombia's geographic (neighbourhood-based) cross-subsidies created an unsustainable dynamic as subsidized areas grew faster than areas paying surcharges, requiring continuous government supplementation through special funds. Cross-subsidies proved politically easy to introduce but difficult to reform or properly target.

- **Implementation gaps**: India's comprehensive 2003 Electricity Act remained poorly implemented even 11 years later according to a 2014 World Bank review as operational and financial shortcomings at the distribution level have led to multiple government bailouts. Good legislation proved insufficient without implementation capacity and sustained political commitment, even at the distribution level.

- **Delayed distribution reform**: Colombia's postponement of distribution privatisation to 2000 extended financial difficulties for years. India's limited unbundling (stopping at functional/legal separation) perpetuated DISCOM losses for decades. Partial or delayed reforms prevented benefits from upstream changes (e.g., at generation or transmission) from fully materializing.

- **Initial reform challenges:** Brazil's reforms in the 1990s faced challenges early on due initially to a lack of proper institutional coordination, unclear regulatory rules and a lack of investment confidence that contributed to its 2001 energy crisis. This demonstrates that partial or poorly designed reforms can have significant consequences.

A well-functioning distribution sector can take many different forms, and local context and market dynamics determine which reforms to prioritise. Tailored solutions can effectively address local problems, so there is no universal design or single path to follow during the reform process for the distribution sector. However, international experience reveals important principles that South Africa can consider to increase the likelihood of successful reform outcomes.

- ***Institutional foundations first***
    - **Strengthen NERSA**: Ensure NERSA has genuine financial autonomy (e.g., is funded through industry levies rather than government budgets), enforcement capacity, including authority to revoke licences, and protection from political interference at national, provincial and municipal levels. Without this foundation, even well-designed market structures can fail.
    - **Consider multiple specialised agencies**: Assess whether additional specialised agencies beyond NERSA are needed for market operation, system planning and oversight as the wholesale market develops. Clear separation of these functions reduces institutional confusion and improves accountability.
    - **Invest in implementation capacity**: The gap between legislation and outcomes depends largely on implementation quality. South Africa would benefit from investing significantly in implementation capacity (i.e., training, systems, monitoring and enforcement). Regular independent assessments can measure achievement of outcome objectives — such as reliability, cost recovery and loss reduction — in addition to compliance with procedures.
- ***Sequencing and phasing strategy***
    - **Differentiate by municipal capacity**: Large metros like Johannesburg, Cape Town, eThekwini and Tshwane have vastly different capacities than smaller rural municipalities. Prioritise unbundling and potential retail competition for larger, more capacitated metros while maintaining bundled operations with account unbundling initially for smaller municipalities.
    - **Start retail competition with large customers**: Begin with high-demand threshold (for example ≥ 1 MW) and plan for incremental reductions as market infrastructure, regulatory capacity and competitive dynamics mature.
    - **Rehabilitate before privatising**: Brazil's Eletrobras rehabilitation project made six 'unbankable' utilities attractive to private investors in six months through systematic improvements: smart metering, customer database cleaning, illegal connection regularization, governance reforms and project management procedures. South Africa's financially distressed municipal distributors may require similar systematic rehabilitation before attracting private capital.
- ***Financial sustainability mechanisms***
    - **Implement targeted individual subsidies**: Establish transparent, individual-targeted subsidy mechanisms (similar to India's on-bill subsidies) as cross-subsidies are phased-out, funded explicitly through government budgets with clear

eligibility criteria. Avoid embedding cross-subsidies in distribution tariffs that become challenging to reform later.

- **Enable cost-reflective tariffs**: Ensure NERSA can make tariff decisions independently using objective methodologies with regular review cycles, and use targeted subsidies to still enable affordability. Colombia's periodic tariff reviews with clear methodologies improved utility viability and need to be protected from political pressure.

- **Address legacy contract obligations**: Manage Eskom power purchase agreements (PPAs) and municipal power purchase obligations carefully during transition. India's expensive long-term PPAs (86% of supply) restricted DISCOM finances even after reforms. South Africa needs to thoughtfully address contractual legacy issues with decarbonisation goals in mind.

- ***Technology and governance integration***

  - **Combine technology with institutional reform**: Invest in metering technology, billing systems and grid infrastructure alongside simultaneous governance improvements, capacity-building and enforcement mechanisms. Technology deployment without addressing underlying institutional weaknesses will not deliver expected benefits.

  - **Develop loss reduction strategies**: Brazil's dramatic loss reduction and India's theft mitigation both required combining smart technology with strong governance, performance-based incentives and legal enforcement. Neither technology nor governance alone proved sufficient.

- ***Managing risks and expectations***

  - **Set realistic timelines**: Full implementation of reforms can take many years, as Brazil's and India's experiences show. But there is also opportunity for quick wins. South Africa can still set realistic expectations and maintain reform consistency across multiple political cycles, while reaping the benefits of quick wins that create momentum with investment in execution capacity.

  - **Plan for universal service obligations**: All four case studies show persistent challenges serving low-density, remote areas. Market mechanisms alone won't serve all areas profitably. South Africa would benefit from dedicated programs with explicit government financing for rural/remote distribution infrastructure and operations.

  - **Build political commitment beyond electoral cycles**: Given that reforms sometimes take many years, success depends on maintaining consistency beyond single political administrations. The EDI roadmap could include binding milestones with consequences for missing targets to achieve goals.

  - **Learn from both successes and failures**: Brazil proved that well-designed regulatory frameworks can attract private investment without government guarantees — but only after learning from its 2001 crisis. India shows what happens when implementation lags behind legislation. South Africa has the advantage of learning from both.

Setting clear local market objectives is an important first step to enable a healthy distribution sector and to drive the reform process, since objectives directly influence the outcomes. The objectives often reflect local socio-economic priorities and guide reforms with clarity. For example, Colombia and the Philippines built their distribution sector reforms on policy objectives such as reliability and cost recovery to help guide many of its reform decisions. Common objectives for a well-functioning distribution sector include:

- Sufficient revenue collection to cover O&M, costs of service and new infrastructure
- Cost minimisation, reducing energy losses, and limiting monopolistic control where feasible
- Non-discriminatory and universal access to electricity services
- Higher reliability and investment in modern grids as a foundational strategy

While international experience can offer valuable insights, the relevance of reforms depends on how well they reflect local objectives, and how to best implement them considering the local contexts. For example, the Philippines and Colombia implemented tailored reforms aligned with local political and operational realities to successfully reform the distribution sector. Table 1 summarises some relevant key lessons for South Africa based on distribution unbundling and related reforms that took place in other countries researched for this paper.

Table 1. Key lessons for South Africa to consider in implementing distribution unbundling reforms

Reform learning	Description	Case study examples
1. Tailor reforms to country context and political economy.	Reforms work best when adapted to each country's institutional capacity, system size and development goals.	The Philippines phased in retail competition in a controlled way only for larger urban distributors (DUs initially, while rural ECs remained bundled). Rather than adopting full retail privatisation from day one, the phased approach reduced reform risk and matched local market context along with local capacity for overseeing competition.
2. Strengthen regulator and planning that supports market adaptability.	Countries need adaptive regulatory frameworks that improve reliability, account for new technological trends (e.g., DERs) and anticipate the market's future needs.	Brazil strengthened the role of its regulator and created new institutions such as a planning agency (EPE) and independent operators (i.e., system operator and market operator) to clarify roles and adapt with both short- and longer-term planning needs. This lowered risk for investors and resulted in bankable distribution utilities.
3. Ensure independence, financial viability and good governance of distribution utilities.	Governance reform and loss reduction leveraging performance incentives is a key step, even before unbundling, as competition cannot solve all distribution sector challenges.	Improving transparency and financial viability of DUs — such as through performance incentives — was a goal for most of the countries profiled (e.g., Colombia incentivises utilities with tariffs tied to loss-reduction targets) and often a prerequisite for retail competition.

Reform learning	Description	Case study examples
4. Enable competition in distribution retail supply where necessary preconditions are met.	To reduce potential risks, ensure preconditions such as sufficient cost recovery, data transparency, an empowered regulator, unbundled tariffs and political support are in place to unlock private investment.	The Philippines introduced retail competition primarily for urban DUs that met eligibility criteria but not for smaller and more remote ECs. The sequenced introduction of competition reduced reform risk.
5. Develop targeted reforms for goals like universal access and decarbonisation.	Electricity sector reforms still require focused instruments to achieve government goals like universal energy access, decarbonisation and energy efficiency.	In addition to distribution sector reforms, India developed rural electrification and clean energy access programs (e.g., Green Open Access) to help meet its decarbonisation and universal access goals.
6. Implement an effective and transparent subsidy scheme to balance cost reflectivity with affordability.	An effective subsidy framework improves efficiency by helping remove energy cross-subsidies and moving towards cost-reflective tariffs, while ensuring low-income customers still benefit from fair, transparent and targeted subsidies.	India's experience shows how using targeted subsidies (Direct Benefit Transfer deductions on monthly bills) for some customers can be an effective tool to help phase out tariff cross-subsidies. Targeted subsidies create fewer market distortions and are more compatible with retail competition than cross-subsidies.
7. Establish clear market rules early on in process.	Establish clear market rules from the start that clarify stakeholder roles and responsibilities to mitigate risk with reforms.	In all of the case studies, the countries drafted market rules (supplementing other rules) to govern both the local wholesale market and inform distribution sector operations, as well as set clear stakeholder responsibilities.
8. Establish clear distribution sector objectives prior to unbundling.	Setting local market objectives is an important first step to enable a healthy distribution sector and drive the reform process since objectives directly influence outcomes with effective implementation (e.g., cost recovery, affordability, reliability and limiting monopoly control).	Colombia and the Philippines built their distribution sector reforms on policy objectives such as reliability and cost recovery to help guide many of their reform decisions.
9. Introduce retail choice in phases to reduce risks.	Consider setting an initial size threshold for customers that can choose their electricity supplier (e.g., ≥ 1 MW demand). Adjust the size threshold over time to increase customers that are eligible for retail choice.	All of the studied countries initially limited competition to a subset of customers (typically larger customers first) while gradually expanding eligibility requirements over time. This iterative approach reduced risks and allowed the market to adjust before opening up to more customers.
10. Implement customer education and data protection rules with increased competition.	Clarify rules on data protection and sharing for an unbundled distribution sector. Educate customers to make informed choices about retail options and implement regulations that enable pass-through of efficiency savings to customers.	New York State's unbundling policy established data-driven procedures to separate competitive and monopoly utility costs to support retail competition and enable transparent utility cost recovery. The UK uses yardstick competition to benchmark distributors and encourage efficient operations and customer benefits.

Case studies from other countries further highlight that there is no one-size-fits-all design or transition process, and that the approach in South Africa can be customised to align with its existing and planned power sector dynamics, political realities and developmental priorities. Comparative international experience also offers a rich source of insight into both successes and failures, including what has worked elsewhere, challenges faced and enabling conditions. For example, enabling conditions for disaggregation with retail competition varies to some extent with each case study, but, in general, preconditions such as sufficient cost recovery, data transparency, an empowered regulator, unbundled tariffs and political support were in place before introducing competition. Trade-offs exist with every variation of the electricity market structure, from vertically integrated monopolies (e.g., inefficiencies and investment risk) to fully unbundled and competitive operations (e.g., lack of subsidies). Potential shortcomings or market challenges such as lack of investment and insufficient competition need to be managed before, during and after the reform process with clear market rules and regulations that empower regulators and capacitate government agencies to maintain ongoing oversight of unbundling and privatisation efforts.

Market rules are a key tool to clarify stakeholder responsibilities and participation criteria to manage potential challenges from the start. These market rules establish important criteria and terms related to who is eligible to participate in the wholesale market and how transactions will take place in both the short-term and long-term to ensure ongoing system reliability and fair competition. Potential shortcomings of these systemic market reforms can also be managed with a sequenced approach to phase in reforms over time with, for example, evolving eligibility rules for customers. For example, Brazil and Colombia initially limited retail competition to just large power users by setting a high demand threshold for eligible customers with retail choice, which was reduced over time to increase the number of eligible customers. Consistent stakeholder feedback loops (e.g., stakeholder committees) throughout the process also help to identify what's working and where adjustments need to be made. Table 2 lists key tools that can be used to address common deficiencies and challenges before, during and after distribution sector reforms.

Table 2. Toolkit for overcoming common distribution sector deficiencies and challenges

Reform learning	Description	Case study examples
Improve governance and operational performance of utilities	Effective corporate governance (e.g., private-sector governance principles) improves performance, cost recovery and distribution efficiency for both bundled and unbundled distributors. Regulatory oversight and stakeholder feedback loops ensure lasting reform.	India's Electricity Act of 2003 mandates performance standards, transparency, open access, tariff cost recovery and accountability. Colombia's state-owned utility (EPM) showed strong results using private-sector governance principles.
Discourage political interference	Reducing political influence in tariff-setting often improves financial stability and performance. Independent regulators increase accountability.	Brazil's regulator, ANEEL, is financially independent, regulates tariffs objectively, and can revoke licences, which helps it to maintain checks and balances

Reform learning	Description	Case study examples
Theft and loss mitigation tools	Tools like smart meters, strict enforcement and performance-based incentives can help utilities ensure financial health and reliability.	India's distribution scheme (RDSS) supports utilities with results-based financing and smart meters to curb theft. Likewise, Colombia incentivises utilities with tariffs tied to loss-reduction targets.
Affordability and cost-minimisation strategies	Benchmarking key performance metrics with other utilities, price caps and reducing investment risk help lower costs and electricity rates for customers.	The UK uses yardstick competition to benchmark distributors, Chile applies hypothetical 'model firm' costs to develop price caps and Brazil reduced financing risk with help from development banks and supports local supply chain manufacturing.
Tariff and subsidy tools	Replace broad cross-subsidies with targeted support. Subsidy frameworks keep subsidies targeted to improve affordability and effectiveness.	Colombia's cross-subsidy programme faced many challenges with its broad geographic focus and funding shortfalls, requiring additional government funds.
Regulation and privatisation strategies	Independent regulation and privatisation are key market tools that can help meet local goals (e.g., energy reliability, efficiency and affordability). Competitive retail markets can improve customer experience and DER integration (e.g., time-of-use and EV tariffs or demand flexibility).	The Philippines and Colombia both have a mix of distributors that remain bundled along with those that have unbundled wires from competitive retail activities. They also established independent agencies for planning.

This report underscores the importance of an intentional and tailored approach to distribution sector reforms. South Africa has the advantage of learning from countries that have already navigated this transition, including by studying their failures. Brazil demonstrates that transformation from crisis to investment-grade creditworthiness is possible, but it required a decade of sustained effort after learning from initial failures. The Philippines shows that flexible models can work when matched to local capacity. Colombia proves that public utilities can perform excellently with proper governance. India provides a cautionary tale of what happens when political interference undermines sound legislation.

By learning from both international successes and failures, and adapting lessons to local conditions, South Africa can create a more transparent, efficient and financially sustainable distribution system that supports broader electricity sector reform goals while contributing to economic development for the country. However, this requires realistic expectations about timelines, unwavering commitment to regulatory independence, massive investment in implementation capacity and political consistency across multiple administrations. The Electricity Regulation Amendment (ERA) Act provides an excellent legal foundation, but South Africa's success will ultimately depend on the quality and consistency of implementation in the years ahead.

1. Introduction

This report profiles international experience with disaggregating electricity distribution from trading functions to provide insights into South Africa's own electricity market reforms. In-depth case studies on Brazil, the Philippines, Colombia and India were chosen based on their development stage, market size, and relevance for South Africa. These case studies examine both what worked well and what didn't in each country's reform experience, providing balanced lessons that highlight not only best practices but also critical challenges to address. In addition, a few examples from more liberalised electricity markets (the United Kingdom, the United States and the European Union) were referenced along with relevant reports from the World Bank and international organisations for additional context.

It can be challenging to discuss the distribution sector reforms in isolation since they are directly dependent on the larger electricity market ecosystem, including upstream generation and transmission operations. For example, changes to other market segments — like setting up a wholesale market for generation and trading — has downstream impacts on the distribution sector. This document focuses on pivotal issues for distribution sector reforms contextualised within the larger framework of electricity market liberalisation. Specifically, it highlights relevant examples and considerations for South Africa as it transitions to a more liberalised electricity sector.

Cost-reflective tariffs and affordability

An important finding from this report is that cost-reflective electricity tariffs improve the viability of distribution utilities especially when introducing retail choice. Likewise, political interference in tariff setting has led to negative consequences for distribution utilities in some of the case studies profiled. However, the reality in many developing countries, including South Africa, is that cost-reflective tariffs are often unaffordable for a large portion of the population and undermine other government goals, such as the attainment of universal access to electricity as a key facilitation of growth and development. This raises the question how to resolve these apparent contradictions. Replacing cross-subsidies with a subsidy framework that uses targeted subsidies (typically funded with a ring-fenced government budget rather than distribution utility balance sheets) for low-income customers to enable affordable access to electricity has worked in other markets and still protects the integrity of independent rules-based tariff setting. This approach separates tariff setting and the subsidies necessary to ensure universal access, so the subsidy is delivered via a mechanism separate from the tariff setting process.

Local market objectives are a key enabler of a healthy distribution sector and help drive the reform process, as they can directly influence outcomes and impacts with effective implementation. Using these objectives to help drive reforms has also proven more effective than relying solely on process-oriented reforms in many developing markets. According to a

2020 World Bank report on power sector reform that looked at global trends from developing countries since the 1990s, only a handful of countries had implemented the textbook full liberalisation recipe which included creation of an autonomous regulator, utility restructuring (corporatisation with vertical and horizontal unbundling), private sector participation in distribution (primarily retail) and generation, and establishment of competitive markets.

Process-led reforms often focus more on structural changes like unbundling alone without setting goals for desired results. In many countries, targeted policy objectives implemented with power sector reforms helped to more effectively achieve desired outcomes, as seen in Colombia and the Philippines, which built reforms on policy objectives (e.g., reliability and cost recovery) established in electricity sector reform Acts (World Bank, 2020). Likewise, an energy supply crisis in Brazil in 2001 catalysed its reform process, which led to a new law that set objectives and empowered new institutions such as the national regulator and planning agencies to implement reforms. However, as the case studies demonstrate, setting objectives and creating institutions, while necessary, are insufficient without sustained implementation capacity, enforcement mechanisms and political commitment that extends beyond a single electoral cycle.

Examples of some objectives for a well-functioning distribution sector include:

- Sufficient revenue collection to cover efficient levels of operations and maintenance (O&M), costs of service and new infrastructure
- Minimising costs, reducing energy losses and limiting monopolistic control where feasible
- Universal access to electricity services
- A reliable service, according to standards set by the policymakers
- Achievement of decarbonisation targets

Disaggregation of the distribution sector is one tool that can help with goals like affordability and minimising electricity costs for customers. As a first step, account unbundling helps regulators and utilities have a better understanding of costs and track key performance metrics to identify where it makes sense to potentially introduce competition (e.g., retail competition), which can help further improve efficiency and drive down costs for customers. International experience shows that disaggregation delivers the greatest benefits when paired with other reforms, including governance improvements, regulatory strengthening and performance-based incentives.

2. South African context on electricity distribution sector and related reforms

Historically, Eskom has operated as a monopoly with vertically integrated control over South Africa's generation and transmission, and some of the distribution assets. Eskom also operates alongside about 167 local municipal distributors with clearly delineated areas of supply that prevent competition between Eskom and municipal distribution. Up until recently, there hasn't been the regulatory possibility for disaggregating distribution functions or allowing for competition with distribution, as municipal distributors were responsible for both the wires and retail functions within their geographic territory while primarily on-selling electricity supplied from Eskom.

Discussions and draft plans for changes to South Africa's electricity sector have been ongoing since the 1998 white paper on energy policy. In 2019, South Africa's Department of Public Enterprises (DPE) published a roadmap for reforming Eskom and unbundling its monopoly. In 2020, South Africa's Presidency and National Treasury also launched Operation Vulindlela targeting reforms in five key sectors:[1] energy, logistics, telecommunications, water and the visa system. Phase II of the plan identified five priority reforms for the electricity sector, including:

1. Complete restructuring of Eskom.
2. Establish a wholesale market for generation.
3. Streamline the regulatory framework.
4. Reform the electricity distribution industry (EDI).
5. Strengthen and expand transmission infrastructure (RSA Presidency, 2025).

To help address the financial challenges the EDI was facing, the government committed to developing an EDI reform roadmap guiding the creation of financially sustainable distribution utilities. The EDI roadmap draft has yet to be finalised or made public.

The Electricity Regulation Amendment (ERA) Act 38 was passed in March 2024 by the National Assembly and signed into law in August 2024, paving the way for the implementation of a new market structure that unbundles generation, transmission and distribution operations, and objective decision-making. These amendments, along with Operation Vulindlela Phase II, help lay the groundwork for distribution unbundling and associated reforms in South Africa. Table 3 summarises other key reforms from the ERA Amendment.

Table 3. Key reforms from the Electricity Regulation Amendment Act 38 of 2024

Notable amendment	Section of act	Implication
The term 'reticulation' is now defined as excluding 'trading' at or below 11 kV	Section 1(p)	Separates physical distribution (wires) from retail electricity sales (retail), enabling disaggregation
'Trader' is defined as a person licensed to buy and sell electricity	Section 1(t)	Creates a trading licence allowing for further disaggregation
Defines 'distribution power system' as operating between 11 kV and 132 kV	Section 1(e)	Clarifies operational boundaries between municipal, distribution and transmission grids

[1] Vulindlela translates to 'open the gates' or 'make way' in Xhosa and Zulu.

Notable amendment	Section of act	Implication
Defines 'vesting contracts' between distribution licensees and Eskom or the National Transmission Company	Section 1(zB)	Allows transitional contracts to facilitate unbundling
Ensures non-discriminatory access to grids for all participants	Section 9(4)(e)	Prevents incumbents from blocking competition; opens access for new entrants
Authority of a market operator to develop the market code and enabling rules	Section 4(a)(i)(dd); Section 1	Enables clear market rules and objective decision-making to encourage competition
Regulator has authority to issue, amend, withdraw, suspend and revoke licences and determine the registration	Section 3(2)	Increases regulatory authority and oversight
Licensee can subcontract the maintenance and operation of generation, transmission or distribution facilities	Section 14(e)(tA)	Supports flexible operating models and potential future market entrants

Source: RSA Government. (2024). *Act No. 38 of 2024: Electricity Regulation Amendment Act*.

Municipalities have authority over electricity reticulation according to the South African constitution (RSA Government, 1996), but a clear definition for reticulation was missing from the constitution. That has now been further clarified with the ERA Act, however, the threshold voltage level for reticulation still needs to be formalised. In addition, the National Energy Regulator of South Africa (NERSA) now has the authority to give or revoke the licence for municipalities to supply electricity, which further promotes unbundling of South Africa's distribution system in order to unbundle the distribution licensee (wires company) from the retailer. The 1998 policy white paper on electricity sector reforms also sets a goal to provide more consumer choice with retail electricity providers.

The path to open the electricity market to traders in South Africa has been slow,[2] initially enabled by the ERA of 2006 and the first trading licence granted to PowerX in 2009. It took another twelve years for the second licence to be granted by the regulator, and as of August 2025, there were over ten companies with a trading licence. The trading licences initially allowed for bulk purchasing of electricity from independent power producers (IPPs) and the use of a wheeling arrangement to on-sell electricity primarily to high voltage customers. Electricity trading has been limited to date and the market rules for traders have yet to be defined, resulting in legal challenges from Eskom as to their validity in the absence of these market rules (Creamer, 2025).

[2] In South Africa, the term 'trader' has historically referred to the ability to buy electricity from generators (e.g., IPPs) and on-sell it to customers via a wheeling agreement that uses the grid and pays associated use-of-system charges to the grid owner (e.g., Eskom and/or distribution companies).

South Africa's National Treasury has also come up with strategies to improve municipal electricity performance, including:

- **Organisational structure:** Establish a fit-for-purpose structure with management autonomy and accountability to provide electricity services.
- **Management and technical capability:** Secure skilled leadership, engineering and technical staff to operate effectively.
- **Financial viability and performance:** Improve metering, billing, collections and tariff-setting to ensure the service generates sustainable revenue and financial transparency.
- **Customer service, responsiveness and communications:** Prioritise customer experience by improving call centre operations and setting service resolution standards.
- **Technical performance metrics:** Monitor reliability (e.g., SAIDI, SAIFI and CAIDI), reduce losses and invest in infrastructure and smart technologies.
- **Strategies to mitigate losses, electricity theft and vandalism:** Implement anti-theft technologies, asset protection and community engagement to reduce non-technical losses.
- **Comprehensive planning and management for electricity supply:** Adopt integrated planning to ensure reliable medium- and long-term electricity supply through coordinated stakeholder efforts.
- **Build resilience in the electricity and energy system:** Use risk-based and scenario planning to prepare for future shocks, supply constraints and climate change impacts (RSA National Treasury, 2024).

In summary, South Africa's EDI roadmap and broader distribution sector reforms remain a work in progress, with many key design details still under discussion. For example, the rules around whom traders can buy and sell to are evolving topics, which need to be further clarified in the final electricity market rules (van der Poel & Bracher, 2025). Recent steps highlight the government's commitment to create a more transparent and financially sustainable distribution system that supports broader electricity sector reform goals.

International experience from countries like India and Colombia, however, demonstrate that policy commitments and legislative frameworks, while essential, are insufficient without sustained implementation capacity, enforcement mechanisms, regulatory independence and political consistency across multiple administrations. South Africa's success will depend heavily on how effectively these reforms are implemented over the coming years, taking as a benchmark the timeline that similar reforms have required in other countries.

3. International trends with disaggregation and distribution sector reforms

3.1 Challenges and drivers

The electricity distribution sector is a vital component of the power system value chain, and challenges with distribution can impact both customers and the entire power system. Distribution utilities, regulators and energy system planners (including national, regional and system operator planners) often need to work together to address existing and potential future challenges with the distribution sector. For example, operational inefficiencies or the inability to adequately maintain distribution infrastructure may require governance and regulatory reforms to mitigate. Likewise, making broader electricity market changes that move away from a traditional utility monopoly requires clear rules for how distribution utilities fit into a changing market structure. A few common challenges and drivers for disaggregation and distribution sector reforms in South Africa and broader global markets include:

- Insufficient cost recovery from customers jeopardising investment and operations.
- Rising costs and the need for affordable electricity that supports economic development.
- Low electricity reliability (e.g., insufficient operations and maintenance of infrastructure).
- Governance challenges and limited internal capacity (e.g., irregular cost of supply studies).
- High losses (technical and commercial) and inefficiencies resulting in rising tariffs.
- Universal electricity access requirements and illegal connections.
- Lack of investment in new and existing infrastructure.

These challenges and their level of importance can vary in each local electricity market. Increasing tariffs for customers can hinder economic activity, particularly in markets where small businesses rely on affordable electricity or in high-poverty contexts where the increase in electricity costs has a higher impact on discretionary spending, contributing to lower living standards. It's also politically unpopular to increase tariffs and sometimes postponed to the next administration by democratically elected governments if they have too much influence over the tariff-setting process. Preferably, an objective and capacitated regulator can make these tariffs decisions based on a regular utility tariff application process, but that's not always the case in every market. India's experience demonstrates the severe consequences when political interference prevents cost-reflective tariffs. The state-owned distribution companies accumulated 180 billion rupees in annual losses despite sound 2003 legislation, requiring repeated government bailouts that did not address the underlying need for objective tariff decisions.

In addition, tailored solutions are often developed to address local problems, so there is no one-size-fits-all design for the distribution sector. There is also no single path to follow during the transition process to a more liberalised market, and simply replicating another country's model without adapting it to local realities often results in misaligned outcomes. While international experience can offer valuable insights, its relevance still depends on how well it is adapted to local context. For example, experiences in the Philippines and Colombia demonstrate how tailored reforms that were based on political and operational realities led to better outcomes. The Philippines' dual-track approach (allowing unbundled distribution utilities, or DUs, in urban areas while maintaining bundled electric co-operatives, or ECs, in rural areas) recognised that different contexts require different solutions, a pragmatic flexibility that proved effective.

Disaggregation (aka unbundling) of distribution sector functions is an important step and primarily carried out in conjunction with other reforms (e.g., retail privatisation) to help address recurring distribution sector challenges. For example, disaggregating distribution into a distribution wires company to manage the O&M of distribution infrastructure and making competitive retailers responsible for the sale of electricity to customers can lower risk for investors while driving efficiency, transparency and more customer-centric services. Figure 1 shows the different degrees of unbundling, including separate ownership options. Unbundling requires careful implementation, however, along with other reforms and alignment with policy goals to bring tangible benefits. Structural unbundling alone, without simultaneous improvements in governance, regulatory capacity and enforcement mechanisms, has often failed to deliver expected benefits, as seen in India, where functional and legal unbundling proceeded without full implementation of supporting reforms.

Fortunately, solutions and tools exist to address common challenges and manage risks for distribution utilities, as discussed in Section 7. The case studies examined in this report provide evidence-based guidance on which tools have worked under different conditions and, critically, which approaches have failed and why, enabling South Africa to learn from both successes and challenges experienced elsewhere.

3.2 Different degrees of disaggregation

The degree of unbundling often falls on a spectrum, with account unbundling as the most basic and ownership unbundling as the highest degree of independent decision-making for the distribution network operator. Various degrees exist in between, such as functional and legal unbundling, which allow for more independent decision-making between wires and retail activities of a distribution utility. Legal unbundling also has risks since the entity may still be owned by the previously vertically integrated firm through a holding company, which can result in favouritism for the parent firm (e.g., preferential grid access) over other market participants. Ownership unbundling ultimately helps resolve this risk of discriminatory network access that may also still exist under an independent system operator (ISO) scenario (FSR, 2020).

Figure 1. Degrees of disaggregation/unbundling for distribution utilities

Account	Most basic form of unbundling with separate bookkeeping for various activities while highlighting the costs and revenues derived from each. Enhances transparency while helping regulators evaluate tariff adequacy and potential cross-subsidies.
Functional	Reorganise internal structure with separate responsibility for wires and retail activities into different units that can make independent decisions. Introduction of an information barrier between those units.
Legal	Prevents discriminatory practices with a separate legal entity tasked with network activities and independent management decision-making. May still be owned by a previously vertically integrated firm through a holding company, but this can still lead to conflicts of interest if favouritism is shown.
ISO	Independent system operator (ISO) operates grid infrastructure and expansion planning, which are independent from previous vertically integrated utility. Integrated firm may still own network assets.
Ownership	Highest level of unbundling with completely independent operation and ownership of grid network from other market participants. The company that owns and operates a network cannot participate in, own or sell its shares to other businesses in competitive market segments.

Source: Based on FSR. (2020). *Unbundling in the European electricity and gas sectors*

Brazil's distribution utilities are primarily legally unbundled, and they've introduced retail competition initially for large and medium-sized customers who also have the option to buy renewable energy with discounted network charges as an incentive. Most customers (primarily residential), however, still don't have retail choice. Many of the distribution utilities in the Philippines and in Colombia are either functionally or legally unbundled with some retail competition allowed for large contestable customers in both countries. Like in Brazil, residential customers in the Philippines don't have retail choice. In Colombia, low-consumption customers are legally able to choose their retailer, provided they install a metering system that allows remote reading. Various examples of higher degrees of distribution-level unbundling exist in more advanced electricity markets in the UK, Europe and the United States. Many residential customers in some of these markets have retail choice, which has contributed to higher levels of distributed energy resource (DER) integration in some markets, with pricing incentives for customers aligned with value-add for the grid.

Of the case studies profiled in this report, India has the least amount of unbundling (primarily functional and legal) and limited retail competition. Many of its state-owned DISCOMs have still been operating at a loss in recent years. The Electricity (Amendment) Bill, 2022, sought to further reform the distribution sector by improving governance and increasing the level of retail competition by allowing multiple DISCOMs to operate within the same area using a shared network, effectively separating wires from retail. This proposed legislation would also aim to 'delicense' distribution utilities for trading and require them to meet eligibility requirements (viable business plans, financial and technical experience, and qualified staff) to compete with other retailers. Section 4.4 provides more detail on the mixed success of some distribution utilities in India (Mookherjee et al., 2024).

Exemptions for disaggregation often exist in many markets for smaller or less capacitated distribution utilities. For example, the Philippines distinguishes between two types of distributors:

- Electric co-operatives (ECs) tend to be small non-profits in rural areas supervised by a government entity that provides bundled distribution services to customers.
- Distribution utilities (DUs) have separate 'wires' services under regulated tariff rules and retail activities that are subject to pricing competition for large contestable customers.

Likewise, in Europe, smaller distribution utilities serving less than 100,000 connections are exempt from both legal and functional unbundling required by the EU's unbundling regime. However, account unbundling for grid network activities is still required for all distribution utilities in the EU regardless of size (European Commission, 2010). More recent reforms in the EU for unbundling exemptions linked to performance-based regulations incentivise more operational transparency from distribution utilities and encourage them to unbundle despite smaller size.

This flexibility in international practice, allowing different unbundling requirements based on utility size, capacity and context, suggests that South Africa could benefit from a similarly differentiated approach based on local municipality context. The Philippines' experience shows that well-supervised bundled co-operatives serving rural areas can coexist with unbundled utilities in metros, provided proper performance monitoring and support mechanisms are in place.

3.3 Trading and distribution utility interactions with wholesale market

While the term 'traders' in the electricity sector often refers to entities that buy and sell electricity, two common types of trade transactions exist in many locations with a wholesale market:

- Trading (wholesale): The bulk buying and selling of electricity between generators, market operators, aggregators (aka 'traders' in South Africa), utilities and retail energy providers.
- Trading (retail): The direct sale of electricity to end-users such as homes and businesses through pricing plans and associated customer service.

In some wholesale markets, traders aren't obligated to own or represent assets in the market, so they can also be purely financial players (e.g., buying on day-ahead markets and selling in real time, while speculating on price movements) to enable virtual trading that improves liquidity and competition in short-term markets.

Distribution utilities interact with wholesale electricity markets in various ways depending on the market design. They usually do not engage in direct wholesale market trading for speculative purposes, but may procure power for their regulated customer base or facilitate market participation on behalf of other stakeholders. Legally unbundled distributors or system operators (wires businesses) typically do not participate in trading electricity, as this function is usually performed by the retailers. In addition, regulators usually provide licences for traders to participate in the wholesale market and sell to customers if they meet certain eligibility criteria.

Brazil has a dual retail market structure: One is the regulated retail market (ACR) and the other the competitive retail electricity market (ACL). In Brazil's regulated market, distribution utilities secure electricity through government-organised auctions on behalf of their captive customers, so they don't directly engage in open wholesale trading. The competitive market gives large customers the option to directly negotiate with retailers and generators. Brazil recently proposed a new bill to increase customers with retail choice to include all low-voltage residential customers, which, if approved, would be phased in over a few years (Mirow & Co, 2023). There are about 105 distribution companies in Brazil as of 2024 with legal or functional unbundling requirements consisting of a nearly 50/50 split between 'concessionaires' (mainly privately owned) and 'permissionaires' (mainly member-owned co-operatives in rural areas) (Yanasse, Salzano et al., 2025). As of 2025, there were about 515 wholesale trading companies registered with Brazil's electricity trading chamber (CCEE), with about 50% considered active (sales greater than 10MW per month on average) (Thunders, 2025).

The privately owned DUs in the Philippines can procure electricity from the wholesale electricity spot market and through bilateral contracts with generators. DUs were initially mandated by law to procure at least 10% of their electricity from the wholesale market during its initial five years of establishment. These DUs also participate in retail competition and facilitate market participation at the wholesale level for larger end users (IEMOP, 2025). As of 2025, there were about 59 retail electricity suppliers (RES), 15 of which were considered local, that could buy in the wholesale market and sell to customers (PEMC, 2025).

There are about 29 distribution companies in Colombia that serve distinct geographic areas, with a mix of public and private ownership. Many of the distribution companies have unbundled with regulated distribution licensees and competitive retailers operating in the same geographic area who can trade in the wholesale market. Colombia also provides retail choice for large and small customers, and there are about 93 licensed companies or retail traders that can purchase electricity through the wholesale market and sell to end users (Roy, 2017).

While a functional wholesale market in India exists that allows DISCOMs to participate, most DISCOMs still primarily procure from generators through long-term PPAs. As of 2023, about 86% of the energy dispatched in the country still took place via long-term PPAs, including many expensive coal plants (CERC, 2023). These legacy contracts have created a structural financial burden for many DISCOMs, demonstrating that South Africa must carefully manage its transition of existing Eskom and municipal power purchase agreements; simply unbundling distribution while maintaining expensive long-term obligations can perpetuate rather than solve financial challenges. In addition, there were 68 licensed inter-state electricity traders authorised to buy/sell in the wholesale market according to CERC's list of trading licensees as of March 2025 (CERC, 2025). Table 4 provides a summary of key disaggregation and trading features in each of the case studies profiled.

Table 4. Distribution disaggregation summary from country case studies

Country	No. of distribution companies	Unbundling	Traders (wholesale)	Customer choice
Brazil	~105 with 50/50 split between: ▪ concessionaires (privately owned) ▪ permissionaires (co-ops in rural areas)	Functional and legal unbundling requirements for all distribution companies	~515 wholesale trading companies registered with Brazil's electricity trading chamber, with about 50% considered active (sales greater than 10 MW per month on average)	Choice for large/medium customers (connected at high/medium voltage) who can bilaterally negotiate prices with traders in free market, which are generally lower than the tariffs from long-term auctions for captive customers
The Philippines	~140: ▪ 120 electric co-ops ▪ ~20 distribution utilities	Functional unbundling with retail competition for distribution utilities, while electric co-ops are limited to account unbundling	~59 retail electricity suppliers (15 considered local) that can buy in the wholesale market and sell to end users	Choice for large customers initially (≥ 1 MW); plans to include smaller C&I scale (> 100 kW peak demand by 2028)
Colombia	~29 distribution companies with mix of public and private ownership	Legal unbundling with retail competition for many, while some remain bundled with retail, including successful utility example in Medellin (EPM)	~93 licensed companies or traders (retailers) that can purchase electricity through the wholesale market and sell to end users	Choice for large customers initially (≥ 0.5 MW) that can freely negotiate supply contracts with generators, traders or retailers in the wholesale market
India	~55 distribution companies, most of which were state-owned	Functional unbundling, but limited retail competition to date	~68 licensed inter-state electricity traders authorised to buy/sell in the wholesale market	Choice for large customers initially (≥ 1 MW); green tariffs give small captive consumers (> 100 kW in demand) the choice to buy green power

3.4 Key steps and considerations during the disaggregation process

Key steps need to occur during the disaggregation process to improve transparency (e.g., cost of supply, data sharing and data ownership) and enable future reforms like retail competition. International experience, particularly from Brazil and New York State, demonstrates that these steps require careful planning and detailed regulatory procedures. Superficial unbundling without proper cost allocation, consumer protection and data governance frameworks can lead to disputes, delays and failed implementation. These steps include:

1. **Unbundle costs of service and supply (aka account unbundling):** Activities that can potentially be performed by a competitive retailer — such as providing supplies, metering, meter reading, billing, collection and customer service, which are currently embedded in distribution utility costs — need to be separated. This increases transparency and helps ensure customers don't pay twice for the same service when competitive retailers enter the market. Regulators must also decide how potential lost revenues for the distribution utility will be calculated and addressed.
2. **Establish consumer protections:** Distribution utilities provide certain consumer protections consistent with applicable laws and good utility practices (e.g., when a customer's service can be terminated and protocol for late payments). Regulators usually specify which ones would be applicable to the retail supplier or the distribution network utility based on the unbundling status and whether any new protections must also be considered (e.g., prevention of false advertising or poorly structured customer contracts).
3. **Determine business rules for retail suppliers:**[3] Develop rules for retail suppliers during unbundling that detail how retail suppliers will be licensed and monitored, what functions they perform (e.g., procurement from wholesale market and/or traders), their creditworthiness and the relationship that will govern their interactions with customers (e.g., consumer protections, protocols for interaction with distribution utilities).
4. **Set provider of last resort (POLR) price:** Rules in the event of bankruptcy of the retail supplier are needed to clarify how customers of that supplier will continue to be served by the incumbent distribution utility, another retail supplier or a supplier of last resort. The price of the POLR is very important as it helps create a yardstick to inform competitive and planning decisions made by retail suppliers. For example, an artificially low POLR price will discourage competition and retail planning for a POLR scenario.
5. **Educate consumers:**[4] As consumers have more choice, tools to facilitate consumer understanding become even more important (e.g., understanding retail supplier options, costs and associated services) to ensure consumers benefit from disaggregation reforms. For retail competition to be fair and to flourish, consumers need to be aware of their options and make informed decisions.
6. **Establish regulatory oversight:** Regulations and effective oversight are required during and after the unbundling process. For example, the wires company is still a monopoly, so its tariffs and operations still need regulatory approval, and new competitive retail participants will require oversight to ensure fair conduct. While new retailers may be

[3] See, for example, New York State Public Service Commission business rules for retail suppliers: https://dps.ny.gov/uniform-business-practices

[4] See a detailed example for consumer information from New York: https://dps.ny.gov/energy-competition-information-consumers

'lightly' regulated and allowed to set their own prices based on 'willing seller, willing buyer' rules, monitoring is still needed to ensure fair pricing practices (i.e., no price gouging), avoid potential false advertising and manage customer complaints and interactions fairly. The Philippines' regulator struggled with limited enforcement powers, demonstrating that creating oversight responsibilities without adequate enforcement authority undermines consumer protection and market integrity.

7. **Clarify data ownership and privacy:** Rules for who owns the data and who may share the data — such as customer data, metering data and system loading data — is also an important aspect to clarify early in the process when planning to unbundle the distribution sector. In New York, distribution utilities are the custodians of customer metering data and provide access to third parties (energy service companies and DER providers) under a data access framework and standardised data security agreement, which requires opt-in customer consent. Bulk system and market data is regularly published by the NYISO while adhering to confidentiality requirements (e.g., anonymized historical bid data) (New York Public Service Commission, 2021).

3.4.1 Unbundling in New York State

The state of New York went through an unbundling process from 2000 to 2004 culminating in an unbundling policy to remove barriers to retail competition. The policy established cost-based rates for electricity and natural gas services and required distribution utilities to initially conduct embedded cost-of-service (ECOS) studies that split utility costs between competitive and monopoly functions. The policy outlined the following framework:

- **Cost allocation principles**: Apply cost causation approach, which assigns expenses to the services responsible while factoring in market and consumer interests. The New York Public Service Commission rejected the generalised allocation method to broadly estimate retail overheads in favour of function-based allocations (aka utility retailer method or hybrid allocations).

- **Cost categories and treatment**: Key costs like credit and collection, customer care, IT systems and promotional expenses are explicitly separated into competitive and non-competitive services. For example, credit and collection costs were allocated by revenues, while IT system costs were split 50/50 between commodity and delivery units.

- **Lost revenue recovery**: Utilities may recover revenue losses from customer migration (net of avoided costs) through mechanisms tied to either revenues or earnings from all its customers.

- **Rate design for unbundled services**: Competitive service rates should be cost-based and may incorporate fixed and variable charges. Gradualism, customer impact and market stability are guiding principles to help reduce price uncertainty.

- **Procedural elements:** Utilities are required to file comprehensive embedded cost studies with rate filings, including competitive rate proposals and lost revenue recovery mechanisms with justification.

- **Implementation and oversight:** The unbundling policy encourages compliance using comprehensive filings, review and ongoing stakeholder input with discretion to tailor approaches as the market evolved (New York Public Service Commission, 2004).

New York's unbundling framework established data-driven procedures to separate competitive and monopoly utility costs, to support retail competition and to enable transparent utility cost recovery. To further protect customers and ensure fair regulatory oversight, New York also created an Office of Consumer Services agency to assist customers when their utility cannot resolve their issues, while closely monitoring the number and types of complaints received by all utilities (including competitive entities) operating in the state (New York Deptartment of Public Service, 2025).

South Africa has an opportunity to invest the time early on to develop comprehensive cost-allocation methodologies before proceeding with unbundling, as attempting to retrofit these later has proven problematic in other markets.

3.5 Guiding principles

The interdependent nature of the electricity market as a whole makes it challenging to discuss the distribution sector in isolation. Changes in other segments, such as unbundling the distribution sector and establishing a wholesale market for generation and trading, impact other aspects of the market. International examples can still provide context for common principles that energy policymakers and regulators may consider when planning for distribution power sector reforms within the larger framework of electricity market liberalisation. However, as is emphasised throughout this report, these principles represent necessary but insufficient conditions on their own since their effectiveness depends heavily on implementation quality, enforcement capacity and sustained political commitment. Table 5 summarises a list of guiding principles that have worked well in other markets dealing with distribution sector reforms such as disaggregation.

Table 5. Guiding principles for distribution disaggregation and power sector reform

Guiding principles	Summary	Example
1. Tailor reforms to country context and political economy.	Reforms work best when adapted to each country's institutional capacity, system size and development goals. Successful reforms set clear market rules and responsibilities to create an enabling environment for the market that accounts for stakeholder capacity, the regulatory regime and political risks. Monitoring the political economy and supporting 'reform champions' can help prevent resistance and policy reversal.	The Philippines unbundled and phased-in retail competition in a controlled way with an evolving minimum size for contestable customers. The size threshold matched local market context and regulatory capacity for managing competition over time.

Guiding principles	Summary	Example
2. Strengthen regulator and planning to support market adaptability while improving reliability and energy security.	Countries need adaptive regulatory frameworks and capacity for integrated planning of generation, transmission and distribution that can improve reliability, ensure energy security, account for new technology trends (e.g., distributed energy resources, or DERs) and help anticipate future needs of the system as the market evolves. Complying with licence conditions and enforcing accountability are key.	Brazil strengthened the role of its regulator and created new institutions, such as a planning agency (EPE) and independent operators (i.e., system operator and market operator), to clarify roles and adapt with both short- and longer-term planning needs. This lowered risk for investors and resulted in bankable distribution utilities.
3. Ensure independence, financial viability and good governance of distribution utilities.	Governance reform is critical, as disaggregation and market liberalisation cannot solve all challenges. Structural changes like disaggregation add the most value when paired with data transparency, strong financial management and institutional accountability. Privatisation of some segments (e.g., retail competition or distribution operation) can incentivise good governance, as can adopting private-sector principles for state-owned utilities, such as clear targets, financial discipline, performance-based regulation and depoliticised leadership. Enabling other utility models via public-private partnerships and alternative ownership can also improve service delivery.	Improving transparency and financial viability of distribution utilities was a goal for most of the countries profiled and often a prerequisite for privatisation. Colombia's experience with a publicly owned distribution utility (EPM) in its second largest city (Medellin) shows that corporatisation and governance improvements can also work even without privatisation for some well-capacitated distribution utilities.
4. Enable competition in distribution retail supply where necessary preconditions are met.	Ensure preconditions such as cost recovery, data transparency, strong independent regulator, unbundled tariffs and political support are in place to unlock private investment. Provisions for both regulated tariffs and negotiated pricing for eligible customers help to phase in competition over time.	The Philippines introduced retail competition primarily for urban distribution utilities but not for smaller and more remote electric co-operatives. The higher operational performance of the distribution utilities shows that disaggregation paired with retail competition has been more effective than just account unbundling for the electric co-ops. The sequenced introduction of competition reduced reform risk.
5. Develop targeted reforms for goals like universal access and decarbonisation.	Electricity sector reforms still require instruments to achieve government goals like universal energy access, energy efficiency and decarbonisation. Purpose-built reforms and programmes to enable new business models (e.g., distributed mini-grids), technologies (DERs) and policies (renewable portfolio standards and loading order prioritising efficiency and clean energy) can be used to realise goals.	In addition to distribution disaggregation and sector reforms, India developed rural electrification and clean energy access programs (Green Open Access) to help meet its decarbonisation and universal access goals.

Guiding principles	Summary	Example
6. Implement an effective and transparent subsidy scheme to balance cost reflectivity with affordability.	A transparent scheme to subsidise low-income households, along with distribution and retail competition, can ensure that subsidies reach low-income households instead of covering inefficient operations of the utilities. Cross-subsidies aren't viable once competition is introduced. Well-defined subsidy frameworks can benefit public finance and build social buy-in for distribution reforms. Unbundling network cost components (e.g., charges for use-of system, energy losses, service and admin) help to accurately develop cost-reflective tariffs and prices.	Colombia's electricity tariff cross-subsidies created inefficiencies (e.g., economic distortions, lower service quality, strain on government funds and energy efficiency disincentive) and lacked a mechanism to remain targeted and transparent for individuals or phase them out over time. India's experience shows how using targeted subsidies (i.e., Direct Benefit Transfer deductions on monthly bills) for some customers can be an effective tool to help phase out tariff cross-subsidies.

Sources: ESMAP. (2024). *From ambition to action: Practical insights on energy subsidy reforms*; Foster & Rana, 2020.

3.6 Common market shortcomings and potential deficiencies

Different countries and jurisdictions have organised their power sector in different ways, including vertically integrated utilities in one extreme, and fully liberalised sectors on the other, with intermediate levels of competition in the retail side. Each of these models requires regulatory intervention to provide the right incentives for the operators to perform and deliver the outcomes that society expects from the power sector. Each of these models also has trade-offs and may result in deficiencies if they are not properly implemented. Critically, these case studies demonstrate that market structure alone does not determine outcomes. For example, India's functional unbundling with insufficient regulatory implementation produced suboptimal results, whereas Colombia's partially bundled system succeeded with the help of a strengthened regulator, showing that regulatory quality matters in addition to structural reform.

Table 6. Potential regulatory deficiencies under different market structures

Guiding principles	Summary	Example
Vertically integrated	Regional monopoly controlling the distribution grid along with electricity procurement and on-selling to regional customers.	▪ Natural monopoly with lack of accountability ▪ Investment shortfall if not financially stable ▪ Inefficient upgrades and supply shortages ▪ Poor performance and service delivery
Partially unbundled and competitive	Separate regulated distribution company responsible for wires and grid assets. Competition amongst retailers for buying and selling electricity to at least a fraction of the consumers, with regulation for electricity procurement for default retailers.	▪ Lack of cost ring-fencing ▪ Inaccurate use-of-system charges for distribution ▪ Insufficient competition due to lack of companies ▪ Lack of oversight to protect customers and manage subsidies
Fully unbundled and competitive	Privatised distribution company responsible for wires in addition to competition amongst retailers.	▪ Weak regulation to ensure market efficiency ▪ Insufficient competition due to lack of companies ▪ Lack of oversight to protect customers and manage subsidies

Source: Foster & Rana, 2020.

Managing potential deficiencies and risks with electricity distribution sector reform begins by strengthening regulation to enhance transparency and cost discipline, whether the utility is publicly owned and bundled or privatised. Independent regulators play a key role in defining acceptable operating costs, setting tariffs to enable cost recovery and insulating service providers from short-term political interference. Unbundling helps regulators to more accurately identify inefficiencies, apply benchmarking tools and introduce competition in retail services where feasible. In addition, clear market rules are an important tool to clarify stakeholder responsibilities and participation criteria in order to effectively manage potential deficiencies from the start. As India's experience demonstrates, however, even clear rules and regulations can have suboptimal results if they lack enforcement authority and protection from political interference. Institutional design benefits from both agency independence and practical enforcement capacity.

Another way to manage common shortcomings involves adopting a culture of incentive-based regulation where penalties associated with non-compliance with licence conditions (accompanied by strict enforcement of such penalties) provide an automatic incentive to follow rules. For example, if a distribution utility fails to submit a cost-of-supply study, then it would have to pay penalties on par with conducting the study, creating an environment where it becomes cheaper to comply than run the risk of paying fees for non-compliance. Brazil's

ANEEL has successfully applied this approach, including revoking or threatening to revoke licences for persistent non-compliance, demonstrating that enforcement credibility helps to maintain regulatory effectiveness.

Maintaining ongoing oversight of disaggregation and privatisation efforts by both the regulator and government throughout the unbundling process further helps to avoid unexpected issues. These reforms often benefit from an iterative approach to phase in reforms over time. For example, all four case study countries adopted an evolving definition for eligibility rules for customers that can choose their retail supplier (e.g., those above a certain demand size). Consistent stakeholder feedback loops throughout the process help to identify what's working and where adjustments need to be made.

4. Case studies on distribution sector reforms and disaggregation

This report considers examples from other countries that have gone through electricity sector reforms and disaggregation of their distribution systems. This section provides summaries of the electricity sectors from four countries: Brazil, Colombia, the Philippines and India. These countries were selected based on their development stage, market size and relevance for South Africa to provide valuable lessons learned. Not all of the case studies profiled are considered success stories, as lessons can still be learned from the challenges experienced in markets like India's, which had less initial success with unbundling than the others.

Table 7 below provides a summary of key distribution unbundling features and findings from the case studies. All of these countries began their electricity sector reforms by the early 2000s and took several years to implement and iterate, resulting in varying degrees of distribution sector unbundling. Licensing regimes, likewise, also vary in each of the countries profiled, but in general there is a clear separation of wires and retail tariffs to avoid cross-subsidies, as well as different levels of oversight for regulated and private entities. In general, reforms helped to improve distribution revenue collection in the countries profiled due to a combination of efforts, including updated metering, billing, targeted subsidies, collections and energy efficiency programs, along with retail privatisation for some distribution utilities.

Table 7. Country case study summary

Country	No. of distribution companies	Degree of distribution unbundling	Customer choice	Key finding
Brazil	~105 with 50/50 split between: ▪ concessionaires (privately owned) ▪ permissionaires (co-ops in rural areas)	Functional and legal unbundling implemented for all distribution companies	Choice for large/medium customers (connected at high/medium voltage) who can bilaterally negotiate prices with traders in free market, which are generally lower than the tariffs from long-term auctions for captive customers	Reforms enabled bankable distributors and private investment in grid infrastructure, even without government guarantees. They initially lacked regulations ensuring efficiency gains from privatisation were passed through to customer prices.
The Philippines	~140: ▪ 120 electric co-ops ▪ ~20 distribution utilities	Functional unbundling with retail competition for distribution utilities, while electric co-ops are limited to account unbundling	Choice for large customers initially (≥ 1 MW); plans to include smaller C&I scale (> 100 kW peak demand by 2028)	Two types of distribution entities in the same market demonstrate successful options, with the distribution utilities generally performing better than electric co-ops in cost recovery and technical operations. In some cases, electric co-ops offer competitive residential tariffs but still benefit from government subsidies.
Colombia	~29 distribution companies with mix of public and private ownership	Legal unbundling with retail competition for many, while some remain bundled with retail (e.g., EPM in Medellin)	Choice for large customers initially (> 0.5 MW or 270 MWh/month), currently > 0.1 MW or 55 MWh/month that can freely negotiate supply contracts with generators, traders or retailers in the wholesale market	Empowered regulator, planning bodies and oversight institutions were created with clear mandates to improve governance and transparency.

Country	No. of distribution companies	Degree of distribution unbundling	Customer choice	Key finding
India	~55 distribution companies, most of which were state-owned	Functional unbundling, but limited retail competition to date	Choice for large customers initially (≥ 1 MW); green tariffs give small captive consumers (> 100 kW in demand) the choice to buy green power	More reforms needed, as many state-owned distribution companies still operate at a loss due to insufficient revenue collection, expensive long-term power purchase agreements with coal plants and inadequate investment. Distribution privatisation pilots have had some success with draft policy to fully separate wires and retail.

A disaggregated (aka unbundled) distribution sector in these case studies refers to the separation of responsibilities for operating and maintaining the low-voltage infrastructure (‘distribution wires company’) from the purchasing and selling of the electricity to consumers (‘retail company’). While retail companies are often private entities in these case studies, distribution wires companies still have a natural monopoly over the infrastructure, which typically results in a separate regulated company, often state-owned but sometimes privately owned, that manages and passes on system costs to retail companies.

4.1 Attracting private investment: Brazil’s experience

4.1.1 Context and reform evolution

Brazil’s electricity sector used to be dominated by vertically integrated state-owned utilities (federal and state), coordinated around Eletrobras as a federal holding company. Eletrobras experienced a debt crisis in the late 1980s, which led to comprehensive reforms in the mid-1990s that liberalised electricity generation and opened the sector to private and foreign investment (Instituto E+ Transicao Energética, 2020). The initial market design failed to ensure sufficient investment, however, resulting in the 2001 energy crisis.[5] The crisis began with a severe drought in an already highly hydro-dependent system, amplified by delays in new generation investment and weaknesses in the initial market design and planning arrangements. The initial market design suffered from limited institutional coordination, unclear regulatory rules and a lack of confidence in contract enforcement that further discouraged investment from both distributors and generators to expand supply. Poor

[5] Brazil’s 2001 energy crisis stemmed from a high dependence on large hydropower combined with a water shortage and incomplete market structure reforms that effectively enabled investment in new supply options. This led to rationing of electricity and customer penalties from overuse. Ambiguities in market regulations led to several lawsuits from various stakeholders, causing disruptions in the electricity market. For nearly a year, electricity usage in Brazil was reduced by approximately 20% on average (Hunt, Stilpen, & Vaconcelos de Freitas, 2018).

communication of sector risks and energy contracts that lacked adequate physical backing worsened the crisis (Kelman, 2001).

In response to the crisis, a second wave of reforms was implemented in 2004. Law 10,848/2004 was meant to correct distortions and restore market confidence by creating a more predictable investment environment, backed by enforceable contracts and clearly defined institutional roles. The new law also formalised the dual-market model (regulated and free markets) and introduced centralised long-term energy auctions for the regulated market (ACR), which became the main instrument to secure new investments. In particular, the reforms aimed to:

1. **Enable disaggregation, clarify roles and attract investment**
    - Mandated legal and accounting unbundling between generation, transmission and distribution, and restricted certain forms of cross-ownership and non-core activities, to improve transparency, accountability and investor confidence.
    - Required distribution utilities to focus solely on distribution services, to reduce cross-ownership and non-core activities.
    - Enabled investment and privatisation, which provides a strong incentive for efficiency.
2. **Strengthen institutional framework and coordination**
    - Consolidated the role of regulator (ANEEL) as an independent regulator.
    - Created a planning agency (EPE) with a strong focus on electricity expansion planning, including ten-year and long-term plans.
3. **Create independent operators and increase transparency**
    - Strengthened the role of the system operator (ONS) responsible for coordinating and controlling the operation of generation and transmission facilities.
    - Introduced the electricity trading chamber (CCEE, the market operator) to oversee energy transactions in both the regulated and free market. CCEE became responsible for registering PPAs on the market, accounting and clearing all energy trades.
    - Introduced long-term energy auctions aimed at ensuring the procurement of sufficient electricity to meet future demand.
4. **Promote universal access and renewable energy**
    - Put forward measures to promote universal electricity access ("Luz para Todos"[6]) and expand the electricity grid to underserved areas to ensure all regions of Brazil had reliable access to energy.

[6] The universal access programme translates to 'Light for All.' More details on the flagship programme can be found here: https://www.raponline.org/knowledge-center/roadmap-for-electricity-access-in-the-legal-amazon/

- Emphasised sustainability, encouraging investments in hydro, wind, solar and biomass to diversify the energy mix through several policies (e.g., a renewable energy incentive programme called PROINFA), and centralised auctions and Brazilian Development Bank funding (Chambers & Partners, 2024).

4.1.2 Implementation results

Brazil's reforms have allowed for significant investment from the private sector in generation and grid infrastructure (around US$32 billion or 570 billion rand over 16 years)[7] even without direct government guarantees. As of 2024, there were about 105 distribution companies in Brazil with legal/functional unbundling requirements consisting of:

- 53 concessionaires: mainly privately owned with long-term rights (typically 30 years) over a geographic region and some state and municipal control for a few.
- 52 permissionaires: mainly member-owned co-operatives in rural areas (Yanasse, Salzano et al., 2025). Permissionaires are small, typically rural co-operatives with simplified regulatory obligations compared to concessionaires.

Distribution concessionaires operate as regulated distribution companies and sell electricity as retailers, passing on their operational costs as wires companies to captive customers through a regulated tariff. It's important to note that Brazil did not structurally unbundle retail from distribution for captive customers initially, and distribution concessionaires continue to act as default retailers under regulated tariffs.

To encourage long-term investment in infrastructure, the government coordinates the expansion of generation capacity for this regulated market (ACR) through new energy auctions and PPAs with terms of up to 30 years. Distribution companies are the off-takers with the largest share of these projects. The average technical and non-technical losses (primarily from low bill collection, electricity theft and inadequate infrastructure) before and immediately after the 2004 reforms averaged around 34% for electricity distribution (World Bank Group, 2019) compared to 6.6% in 2024 (ANEEL, 2025). These distribution companies are now considered creditworthy off-takers of electricity by agencies like S&P and Fitch that regularly evaluate Brazil's distribution utilities. These agencies recently gave four of Brazil's major distribution utilities AAA(bra) ratings, highlighting that Brazil's transparent and stable utility regulation is working to encourage private investment even without government guarantees (FitchRatings, 2024).

As of 2025, there were about 500 wholesale trading companies registered with CCEE, Brazil's electricity trading chamber, with about 50% considered active (sales greater than 10 MW per month on average) (Thunders, 2025).

[7] From 2007 to 2022, about 86,000 kilometres of power lines and 223,000 MVA have been auctioned to the private sector, resulting in 185 billion reals or 570 billion rand in investment (assumes 3 rand per real and 18 rand per US dollar) (Perez, 2024).

4.1.3 Distribution rehabilitation framework

The Eletrobras distribution rehabilitation project in Brazil also shows how reforms can succeed in improving operations for struggling distribution companies to facilitate private investment. The private sector wasn't initially interested in buying six distribution companies (Amazonas, Acre, Roraima, Rondônia, Piauí and Alagoas), until a series of rehabilitation reforms were implemented. These utilities were located in challenging regions with high non-technical losses and limited payment capacity, resulting in chronic underinvestment. Eletrobras temporarily assumed control, implemented a rehabilitation programme and, supported by regulatory adjustments and federal measures, was then able to privatise them. The distribution rehabilitation reforms included:

1. Installation of smart-grid network equipment (e.g., reclosers and capacitors).
2. Grid extension, including unconnected customers.
3. Regularisation of customers with illegal connections.
4. Replacement of obsolete meters.
5. Implementation of advanced metering technology with telemetering capabilities.
6. Updating the customer database.
7. Establishment of proper project management procedures.
8. Updating social and environmental procedures.
9. Development of a communications programme (World Bank Group, 2019).

4.1.4 Competitive market development

A competitive electricity market (ACL) is also growing in Brazil. It was initially for large and medium-sized customers who can choose their electricity retailer, including the option to buy renewable energy with discounted network charges as an incentive. In the competitive market, prices are privately negotiated bilaterally and generally lower than the regulated market but limited to durations of three to five years. As a result, short-term ACL contracts are often complementary to long-term ACR revenues for capital intensive projects. While about 40% of the electricity is sold through this free market as of 2023, Brazil has been making progress to increase competition by progressively lowering eligibility thresholds (measured in contracted demand) for customers that can choose their retailer from large customers to medium-sized customers. Recent legislation foresees a path towards full retail liberalisation by the early 2030s (Perez, 2024). The dual-market framework in Brazil shows how competition can be phased into a regulated market over time, while maintaining the bankability of the distribution sector.

4.1.5 Key findings from Brazil's case study

Table 8. Summary of outcomes from Brazil's case study

What worked well
1. **Successful privatisation:** Extensive privatisation of distribution utilities, combined with improved regulation, created strong incentives for efficiency and reduced dependence on direct government support.
2. **Strong independent institutions:** ANEEL's financial independence (funded through levies, not budgets) and clear division of roles between specialised agencies (i.e., ANEEL as regulator, EPE as planning agency, ONS as system operator and CCEE as electricity trading chamber) enabled clear accountability.
3. **Private investment without guarantees:** Privatisation and transparent regulation attracted around US$32 billion over 16 years; distribution utilities now receive investment-grade ratings from credit agencies.
4. **Dramatic loss reduction:** Distribution losses fell from 34% to 6.6% through combined governance improvements, smart technology and regulatory oversight.
5. **Phased competition rollout:** Gradual expansion from large to medium customers reduced risks while maintaining system stability. Brazil's model deliberately prioritised financial stability of distribution utilities and long-term investment signals with its reforms.
6. **Utility rehabilitation framework:** Nine-point rehabilitation programme made six 'unbankable' utilities attractive to private investors within six months.
7. **Dual-market structure:** Parallel regulated (ACR) and competitive (ACL) markets balanced investment stability with price competition by enabling long-term planning, with auctions in ACR, progressive development of competition in ACL and preservation of a stable revenue base for distributors.
Challenges
1. **Initial reform failure (1990s to 2001):** Incomplete institutional frameworks and unclear rules caused a major energy crisis requiring electricity rationing for nearly a year — demonstrating that partial reforms can be worse than no reform at all.
2. **Limited consumer benefit from efficiency gains:** Early privatisation lacked mechanisms to pass efficiency savings to customers through lower prices.
3. **Restricted retail competition:** After more than 20 years, most residential customers still lack retail choice; only 40% of electricity flows through competitive markets.
4. **Extended implementation timeline:** Achieving stable, creditworthy utilities took many years, requiring sustained political commitment.
5. **Ongoing enforcement needs:** Even mature systems require vigilance. The 2024 Enel São Paulo case, which involved a 500 million Rand fine and licence revocation proceedings, shows that continuous regulatory oversight remains essential.

Table 9. Summary of lessons for South Africa based on Brazil's experience

Lessons for South Africa
1. **Avoid partial reforms:** Ensure complete institutional frameworks, market rules and coordination mechanisms are in place before major structural changes. Brazil's 2001 crisis shows the cost of incomplete reform. 2. **Build institutional capacity first:** Strengthen NERSA's independence and resources before unbundling; ensure financial autonomy through industry levies, not government budgets. 3. **Rehabilitate struggling utilities:** Invest in systematic rehabilitation (e.g., metering, databases, governance and theft reduction) before privatisation. Brazil made six 'unbankable' utilities attractive to investors in six months. 4. **Phase competition gradually:** Start with large customers only; lower thresholds incrementally over many years to build market capacity and address problems before expanding. 5. **Consider dual-market structure:** Maintain regulated tariffs for captive customers while allowing eligible customers competitive access. This reduces risk while enabling competition. 6. **Set realistic timelines:** Full implementation requires realistic timelines and consideration of political cycles. 7. **Combine technology with governance:** Loss reduction requires both smart technology and strong governance and enforcement; technology alone is insufficient. 8. **Ensure enforcement capability:** NERSA needs legal authority and practical capacity to impose penalties and revoke licences for non-compliance. 9. **Enable private investment without government guarantees:** Private investment without explicit sovereign guarantees is possible when the regulatory framework credibly ensures cost recovery through tariffs and provides stable, enforceable long-term contracts.

4.2 Disaggregation with diverse distribution models: The Philippines' experience

4.2.1 Context and reform evolution

Major reforms to the Philippines' power sector began back in 2001 with the aim of increasing supply, reducing costs and establishing competitive wholesale and retail markets. The 2001 Electric Power Industry Reform Act (EPIRA) unbundled the state utility monopoly and created an independent Energy Regulatory Commission (ERC). The key objectives and outcomes of the act are summarised in Table 10.

Table 10. The Philippines' Electric Power Industry Reform Act objectives and outcomes

Policy objective set in 2001	Outcomes
Universal electricity access: Accelerate full electrification across the country.	Electrification increased from 76% in 2001 to 91% by 2015 and around 96% by 2022. Subsidised tariffs helped expand access, and off-grid solutions helped with challenging island locations.
Reliable and affordable supply: Ensure a reliable, secure, high-quality and affordable electricity supply.	Power outages declined and real electricity prices fell slightly over time, but small grids in isolated systems remain expensive due to limited economies of scale.
Competitive and transparent pricing:[8] Promote transparency, fair competition and public accountability in pricing to boost economic efficiency and global competitiveness.	The wholesale spot market was established to facilitate transparent price formation, although challenges remain due to limited competition and market power in some areas.
Private sector investment and ownership diversification: Attract private investment and expand ownership in generation, transmission and distribution sectors.	Many of the incumbent utility assets were privatised, and private distribution utilities now serve major urban centres.
Fair and non-discriminatory access: Guarantee fair and non-discriminatory treatment of public and private sector players during sector restructuring.	Retail competition was introduced in 2012, requiring contestable customers to choose their supplier, but legal challenges delayed rollout and the policy became voluntary.
Consumer protection: Protect consumer interests in terms of utility rates and service quality.	Lifeline rates supported affordability for low-income customers, but implementation by distribution utilities has been challenging, with many instances of ineligible households receiving the subsidy and limited enforcement by the regulator.
Environmentally compatible energy systems: Support the development of energy systems and infrastructure that are socially and environmentally responsible.	Policy intent was present, but fossil fuels still dominate the mix, with over 75% of electricity primarily from coal, so clean energy (primarily hydro and geothermal) growth has been slow.
Indigenous and renewable energy promotion: Encourage the use of local land renewable energy sources to reduce reliance on energy imports.	Inflexible and incentivised baseload plants (mainly coal) still supply most of the electricity, while supply shortages and high spot market prices continue since these plants have been unable to address peak demand.
Transparent reforms of incumbent utility assets: Enable an orderly and transparent privatisation of the utility's assets and liabilities.	Generation and transmission assets were privatised with oversight from the Joint Congressional Power Commission, which was created by EPIRA and tasked with overseeing implementation of the law.

[8] While competition, ownership diversification and private investment were identified as objectives for the Philippines' policy reforms, they are more appropriately categorised as instruments to achieve objectives such as efficiency and reliability.

Policy objective set in 2001	Outcomes
Independent regulation: Establish a strong, independent regulatory body to protect consumers and support a competitive electricity market.	The Philippines established an independent regulator, but instances of political interference to limit tariff increases by government have been documented. The ERC's limited enforcement powers have also reduced effectiveness (e.g., consumer protection).
Efficiency and demand-side management: Promote efficient energy use and demand-side management practices.	Generation and grid efficiency improved, with significant declines in transmission and distribution losses. Adoption of demand-side management, including dynamic pricing, has been slow.

Sources: Philippines Government. (2001). *Republic Act No. 9136;* Brucal A., & Ancheta, J. (2018). *The Philippine electric power industry under EPIRA*; Rudnick, H., & Velasquez, C. (2019). *Learning from developing country power market experience: The case of the Philippines;* AGORA, NewClimate Institute, ERI. (2024). *Electricity market designs in Southeast Asia.*

4.2.2 Implementation of retail competition

EPIRA planned for a phased rollout of retail competition and open access after other liberalisation reforms had been implemented (e.g., wholesale spot market, unbundling wheeling charges and cross-subsidy reforms) and required that contestable customers choose a new supplier. The initial implementation of contestable customer requirements was as follows:

- Average monthly peak demand of at least 1 MW over the preceding 12 months.
- Two years thereafter the threshold reduced to 750 kW.
- Annual review by regulator to lower threshold until it reaches household demand levels (Philippines Government, 2001).

As of 2024, the contestable customer threshold had only been lowered to a monthly peak demand of ≥ 500 kW, but the regulator is considering lowering it to 100 kW by 2028 (Talavera, 2024).

4.2.3 Dual distribution model

Two types of distributors operate in the Philippines — DUs and ECs — as shown in Table 11 below. DUs provide regulated 'wires' services under regulated tariff rules, while retail activity is subject to competition for contestable customers. ECs tend to be small non-profits in rural areas supervised by a government entity called the National Electrification Administration (NEA).

Table 11. Characteristics of distribution utilities electric co-operatives in the Philippines

Category	Distribution utilities	Electric co-operatives
Count	~20	~120
Ownership and governance	Privately owned and managed by corporate boards/shareholders	Member-owned community-based co-operatives, supervised by NEA and governed by elected members
Regulatory oversight	Regulated by ERC for tariffs, service standards and market rules	Regulated by ERC with financial/operational oversight by NEA
Geographic coverage	Urban and industrial areas	Predominantly rural and remote regions
Capital access and financing	Access to private capital, long-term debt and equity	Relies on NEA funding, government subsidies and internal capital, with limited access to private capital
System performance	Generally stronger service reliability, system efficiency and financial health	Varies widely with high system losses and low collection rates in some areas
Retail competition	Participating in retail competition	None, as they act as the default supplier in their franchised location
Privatisation status	Commercial private ownership	Not privatised (publicly supported entities)
Unbundling	Subject to wires–retail disaggregation for contestable customers	Maintain bundled service for all customers

Source: Agora Energiewende, NewClimate Institute, & ERI, 2024.

The two types of distribution entities in the Philippines demonstrate how different approaches for disaggregating municipalities and introducing retail competition can be used to match the needs and readiness of various distributors. The ECs were tasked with providing access to affordable power in both remote islands of the country and in some locations connected to the national grid (e.g., Tablas Island EC and Romblon EC). The NEA Act in 2013 and subsequent NEA support was developed to directly encourage the technical capability and financial viability of the ECs. Performance results for ECs have been mixed historically (Brucal & Ancheta, 2018), but most ECs have done well on key performance indicators (KPIs) in recent years.

4.2.4 Performance monitoring framework

The NEA tracks the following KPIs:

- Technical: system loss, power factor, system average interruption duration index (SAIDI) and system average interruption frequency index (SAIFI).
- Financial: average collection period, profitability, debt service cover and liquidity ratios.
- Institutional: performance ratings of the board of directors and general manager, employee-customer ratio, and customer service variables.
- Reportorial: timely submission of NEA-required reports.

NEA performance reports from 2024 showed most of the ECs were performing well, with over 70% achieving a AAA rating, which is the highest score, while about 6% were classified as 'ailing,' with a D as the lowest score (NEA, 2025).

In general, DUs tend to have higher technical and reliability performance relative to the ECs due to economies of scale, which is one of the benefits of disaggregating distribution activities and allowing for retail competition for entities that have the capacity and scale to manage it. That said, DUs are unlikely to invest in some remote areas with low demand, so universal access objectives still require a mix of ECs and DUs in the market. In 2024, about 74% of the ECs achieved more affordable electricity rates for residential customers than one of the more expensive DUs (Meralco) highlighting that ECs' rates can also be competitive with DUs despite their smaller size. The tax exemptions and subsidies provided to ECs from the government make it challenging to directly compare their rates to the unsubsidised electricity rates of DUs, however (Power Philippines, 2025).

The 2001 EPIRA required all ECs to unbundle their tariffs, with separate accounting for wire charges and retail related charges, and has generally led to positive results for ECs, especially in recent years. The higher technical and reliability performance of DUs shows there are still benefits to DUs and private sector participation — in creating market-driven incentives for efficient distribution operations in the Philippines — that don't require government subsidies.

4.2.5 Key findings from the Philippines' case study

Table 12. Summary of outcomes from the Philippines' case study

What worked well
1. **Flexible dual-track model:** Creating separate frameworks for urban distribution utilities (unbundled with retail competition) and rural electric co-operatives (bundled non-profits) matched reform applicability to local capacity and context. 2. **Significant electrification progress:** Access increased from 76% (2001) to 96% (2022), showing reforms can expand service while improving quality. 3. **DU performance gains:** Urban DUs achieved higher technical performance, reliability and financial health through unbundling and competitive incentives without government subsidies. 4. **Comprehensive KPI framework:** Multi-dimensional performance tracking (technical, financial, institutional and reportorial) enabled evidence-based management and accountability. 5. **EC performance improvement:** Recent data shows 70% of ECs achieving AAA ratings, demonstrating that even bundled co-operatives can improve with proper oversight and support. 6. **Competitive pricing for some ECs:** 74% of ECs offer lower residential rates than major DUs (though they are subsidised), showing small entities can remain affordable with government support.
Challenges
1. **Legal challenges stalled competition:** Mandatory customer switching (2012) faced legal opposition, forcing a shift to voluntary participation and significantly delaying competitive market development. 2. **Slow eligibility expansion:** Despite a 2001 regulatory goal for annual review by the regulator to lower the size threshold for customer choice until it reaches household demand levels, the contestable threshold only lowered from ≥ 1 MW to ≥ 500 kW as of 2024, with 100 kW planned by 2028 — suggesting resistance to broader competition. 3. **Performance gap between models:** DUs consistently outperform ECs in cost recovery and technical operations, highlighting efficiency trade-offs with universal service obligations. 4. **Subsidy targeting failures:** There were challenges with lifeline rates implementation, with some leakage to ineligible households and limited regulatory enforcement. 5. **Limited ERC enforcement authority:** Political interference in tariff decisions and insufficient regulator enforcement powers to protect consumers undermine effectiveness. 6. **Slow clean energy and demand management adoption:** Coal remains dominant (over 75%); dynamic pricing and demand-side management adoption have been slow despite policy objectives. 7. **Persistent supply reliability issues**: Inflexible baseload plants were unable to address peak demand, causing ongoing shortages and high spot prices.

Table 13. Summary of lessons for South Africa based on the Philippines' experience

Lessons for South Africa
1. **Differentiated models for different contexts:** Consider allowing larger, more capacitated metros to unbundle with retail competition first, while smaller/rural municipalities pursue account unbundling initially.
2. **Make retail competition voluntary initially:** Mandatory customer switching can lead to resistance, and voluntary participation can reduce implementation risk.
3. **Set realistic eligibility timelines:** Plan for gradual threshold reductions and build capacity for ongoing monitoring and future reforms.
4. **Invest in performance monitoring systems:** Implement comprehensive KPI frameworks before unbundling to establish baselines and track reforms objectively.
5. **Strengthen regulator enforcement powers:** Ensure NERSA has legal authority and practical capacity to enforce decisions.
6. **Keep subsidies targeted:** Design transparent, individual-based subsidy mechanisms up front rather than relying on geographic or customer-class cross-subsidies that often leak to ineligible recipients.
7. **Sequence reforms where practical:** Establish wholesale markets, unbundle tariffs and reform cross-subsidies before expanding on existing retail competition.
8. **Don't assume structural reform drives policy goals**: Market restructuring alone won't achieve decarbonisation, demand management or affordability objectives, as they often require dedicated instruments.

4.3 Incentivising financially stable distribution utilities: Colombia's experience

4.3.1 Context and reform evolution

Reforms to Colombia's electricity sector began back in the 1990s to address major challenges to its power sector and its vertically integrated utility, including demand rationing, mismanagement and poor financial viability that discouraged investment in new infrastructure. In 1994, the government passed a couple of laws (Law 142 and Law 143) to begin major reforms, including unbundling of the power sector, the creation of an independent regulator (CREG) and the introduction of competition. Competition was first introduced to the generation sector, while unbundling and privatisation of the distribution sector experienced delays and took longer than initially planned. Colombia's policy objectives from its 1994 reforms are listed in Table 14, along with a summary of outcomes.

Table 14. Colombia's electric power industry reform objectives and outcomes

Policy objective set in 1994	Summary outcomes
A **unified legal and regulatory regime** for all businesses, regardless of the property nature	A single, coherent legal framework was created, applying uniformly to all companies regardless of ownership. This facilitated a predictable environment for private participation and investment.
A **rate system based on economic efficiency**, which requires the correct use of resources in a way that guarantees the provision of the service at the lowest economic cost, financial sufficiency and social solidarity	Tariff methodology from regulator improved cost recovery with periodic reviews and more cost-reflective pricing helped financial viability of distribution utilities, though affordability challenges remain for some customers.
A unique and **sustainable system of cross-subsidies**, applicable to customers of all companies, regardless of their nature and ownership	A national cross-subsidy system was implemented to support lower-income consumers, which improved affordability, but challenges persist with economic distortions and reaching remote areas cost-effectively.
Vertical disintegration of the electricity supply chain	Generation, transmission and distribution were unbundled, with separate ownership and management structures for each, reducing monopolistic inefficiencies. Unbundling took longer for distribution.
Separation of monopolistic activities (transmission and distribution) from the ones where competition was desirable (generation and commercialisation)	Competition exists for generation and retail, while transmission and distribution remain regulated. Surveillance authorities (e.g., SIC and SSPD) were empowered to enforce competition rules.
Suppression of electricity supply monopolies seeking free access to transmission and distribution networks	Market liberalisation policies enabled non-discriminatory access to transmission and distribution networks, encouraging competition amongst generators and retailers.
Creation of **specialised state agencies** according to functions: policy, regulation, monitoring and control	Independent regulators (CREG), planning bodies (UPME) and oversight institutions (SSPD and SIC) were created with clear mandates, improving governance and transparency.
Contractual freedom for consumers whose consumption levels exceed the thresholds established by the regulator	Large consumers (e.g., industrial users) were first allowed to contract directly with generation or trading companies. This has promoted competition in the wholesale market and increased consumer choice.
Indicative **planning** for the generation activity and freedom of investment in generation assets; mandatory planning for the transmission activity	The government agency (UPME) is responsible for formulating indicative generation expansion plans and mandatory transmission expansion plans. Transmission planning is particularly robust, contributing to Colombia's high score in international planning benchmarks.
Creation of a **wholesale electricity market** with the participation of generators, traders and large electricity consumers	A functioning wholesale market was established, with market-based dispatch, competitive bidding and settlements. Generators, traders and eligible consumers actively participate, contributing to a relatively liquid and transparent market.

Source: Rudnick, H., & Velásquez, C. (2021). *Learning from power sector reform experiences: The case of Colombia*.

4.3.2 Implementation results

Reforms in Colombia sought to reduce supply deficiencies while improving efficiency and financial viability of the sector, and they have been successful in many aspects. These reforms also helped to attract more investment in power generation and improve average service quality.

Some of the reform challenges include the initial delays to unbundling of distribution, the limited adoption of non-hydro renewable energy sources, affordability challenges that persist for some customers and subpar performance by several distribution utilities. The privatisation of distribution utilities was delayed in 2000, which extended the financial difficulties and low performance for some utilities. Maintaining financial stability, basic efficiency and quality of service remain significant challenges for several distribution companies, highlighting that common challenges can continue even after distribution sector reform.

There are about 29 distribution companies in the country (as of 2017) that serve distinct geographic areas with a mix of public and private ownership. Many of the distribution companies have unbundled with regulated distribution licensees and competitive retailers, while some remain integrated. The metropolitan distributors have generally performed well in terms of high reliability and reduced losses. Rural distributors in non-interconnected zones face more challenges with higher outages and costs, largely due to their dependence on diesel. There are also about 93 licensed companies or traders that can purchase electricity through the wholesale market and sell to end users (Roy, 2017).

Consumer choice — and therefore retail competition — has also been introduced initially for large customers (≥ 0.5 MW or 270 MWh)[9] as non-regulated customers to freely negotiate supply contracts with generators, traders or retailers in the wholesale market.

4.3.3 Anti-monopoly framework

To discourage monopoly during the unbundling process, the regulator (CREG) introduced resolutions to limit the market share and consolidation between companies, and set shareholding limits:

- No company may have more than 25% of effective installed capacity in generation.
- No company may have more than 25% of total commercialisation.
- No company may have more than 25% of distribution activity, but that limit is not currently binding.
- No generation company may have shares, quotas or parts on social interest that exceed 25% of a distribution company social capital (Rudnick & Velásquez, 2021).

[9] See Alejandría - Resolución 131 de 1998 from CREG: https://gestornormativo.creg.gov.co/gestor/entorno/docs/resolucion_creg_0131_1998.htm

4.3.4 Cross-subsidy system

Colombia's reform policies helped create a national cross-subsidy system to help low-income consumers afford electricity costs. While cross-subsidies improved affordability for some customers, they did create challenges and inefficiencies (e.g., economic distortions, lower service quality, strain on government budgets and energy efficiency disincentive) since their implementation targets neighbourhoods rather than individuals and lacks a mechanism to phase them out for individuals over time as income levels potentially improve. Section 7.5 provides more details on Colombia's experience with cross-subsidies.

4.3.5 Public utility success: EPM Medellín

Experience with Colombia's publicly owned distribution utility in Medellín, one of the larger metros, shows that corporatisation and governance improvements can work even without privatisation for some well-capacitated distribution utilities. Empresas Públicas de Medellín (EPM) consistently ranks amongst Latin America's top-performing utilities with investment-grade stability, high operational standards, lower fixed costs per household and strong governance. EPM's structure didn't change directly with these reforms, but competition did increase for supply from the wholesale market. Wealthier municipalities like EPM have also shown that cross-subsidies are easier to finance compared to smaller regions without supplementary government funding (Rudnick & Velásquez, 2021).

4.3.6 Key findings from Colombia's case study

Reforms to Colombia's distribution sector have improved performance through stronger governance and high-quality regulation. Experience shows that corporatisation, unbundling and privatisation in Colombia still face challenges with implementation like delays and keeping cross-subsidies targeted/temporary, but the effects have been long-lasting.

Table 15. Summary of outcomes from Colombia's case study

What worked well
1. **Comprehensive institutional framework:** Creating multiple specialised agencies (CREG for regulation, UPME for planning, and SSPD and SIC for oversight) with distinct responsibilities improved coordination. 2. **Successful public utility model (EPM Medellín):** EPM demonstrated that public ownership with corporate governance principles can match or exceed private utility performance (e.g., EPM achieved investment-grade ratings without privatisation). 3. **Proactive anti-monopoly provisions:** 25% market share caps across generation and commercialisation prevented emergence of new monopolies after unbundling. 4. **Improved cost-recovery framework:** Regular tariff reviews with clear methodologies created predictable revenue streams and improved financial viability for most distributors.

5. **Functioning wholesale market:** Fairly liquid and transparent market with competitive bidding enabled effective price discovery and generator/trader participation.

Challenges

1. **Delayed distribution unbundling:** Distribution privatisation postponed to 2000, extending financial difficulties and poor performance for affected utilities.
2. **Problematic geographic cross-subsidies:** Neighbourhood-based subsidies created economic distortions and energy efficiency disincentives, and became increasingly expensive as subsidised areas grew faster than contributor areas. Cross-subsidies work in wealthy metros like Medellín, but not in all areas.
3. **Cross-subsidy funding crisis:** Reforms required continuous government supplementation through multiple special funds, as the subsidy system proved unsustainable in some regions.
4. **Persistent performance disparities:** Despite reforms, a number of distribution companies still struggle with financial stability and service quality, particularly rural distributors and distributors servicing challenging areas, both being more dependent on government subsidies.

Table 16. Summary of lessons for South Africa based on Colombia's experience

Lessons for South Africa

1. **Multiple specialised agencies can improve coordination:** Separate planning (UPME), regulation (CREG) and oversight (SSPD for service regulation surveillance and SIC for competition topics only) functions prevent institutional role confusion; South Africa can assess whether additional specialised agencies are needed.
2. **Public ownership can work with the right governance:** EPM Medellín proves corporatisation with private-sector governance principles can succeed without privatisation if proper governance is implemented.
3. **Implement anti-monopoly safeguards early:** Set market concentration limits before unbundling to prevent dominant players from emerging (e.g., Colombia's 25% caps).
4. **Avoid geographic cross-subsidies:** Colombia's neighbourhood-based subsidies created unsustainable funding pressures and economic distortions, so individual-targeted mechanisms, based on income more than location, may be more effective.
5. **Plan for cross-subsidy replacement:** Phasing out cross-subsidies requires government support especially in low-income areas, so planning for explicit government funding can help ensure distribution reforms don't compromise affordability.
6. **Expect diverse performance outcomes:** Not all distributors will perform equally post-reform, as geography, customer demographics and local capacity create persistent disparities requiring tailored support.

4.4 Reducing losses and improving reliability: India's experience

4.4.1 Context and reform evolution

India's liberalisation process began back in 1991 with policies to open up the electricity sector and amend regulations to allow for private sector involvement. India has since successfully implemented a national wholesale market (with private sector IPPs that account for more than 50% of the generation capacity) and a well-integrated transmission grid. A large majority of electricity (86% as of 2023) is still purchased via long-term PPAs, however, including from many expensive coal plants, and a number of challenges still exist at the distribution level, such as high financial losses and unreliable supply.

India's Electricity Act of 2003 had several key provisions relevant for distribution sector reforms, including:

- Mandating efficient, coordinated and economic distribution systems.
- Fostering competition through 'open access' and progressively allowing more consumers to choose suppliers.
- Ensuring non-discriminatory wheeling and allowing third-party access to the grid.
- Enabling surcharge mechanisms to protect cross-subsidy structures and move to cost reflectivity over time.
- Adopting tariff principles that reward efficiency, promote competition and ensure cost recovery while safeguarding consumer interests.
- Encouraging distributors to adopt commercial principles to improve financial viability and attract investment.
- Permitting other businesses by distribution licensees for better asset utilisation.
- Establishing supply codes (e.g., billing, metering, disconnections, theft control and grievance) and service obligations to ensure transparency and consumer protection.

4.4.2 Implementation challenges and gaps

While many of the changes after the Electricity Act of 2003 worked well, the implementation of some provisions fell short of their goals. For example, the phase-out of cross-subsidies to move towards cost-reflective tariffs over time did not happen, and supply codes on their own did not ensure sufficient cost recovery for most distribution utilities. A 2014 World Bank study reviewed the impacts of India's Electricity Act of 2003 and made the following recommendations, which highlight the importance of effective implementation in electricity market reform:

- Fully implement act mandates on competition, distribution, tariffs, open access and performance standards.
- Ensure regulatory autonomy, effectiveness and accountability for utilities and regulators.
- Protect utilities from state government interference (Pargal & Banerjee, 2014).

Most of India's distribution companies are still state-owned, and many operate at a loss (nearly 180 billion rand or around US$11 billion for 2021[10]) due to insufficient revenue collection, expensive long-term PPAs with coal plants and inadequate infrastructure and operations. Likewise, political interference preventing tariff increases and adoption of cost-reflective tariffs have contributed to high financial losses for some distribution companies, resulting in high utility debt and multiple government bailouts. Despite sufficient transmission grid capacity and electricity supply, a significant rural electricity access gap remains.

4.4.3 Successful privatisation examples

To address these challenges, some distribution companies have been privatised, resulting in positive outcomes for revenue collection and reliability for those markets. Privatised distribution companies in India showed it's possible to improve financial performance with better revenue collection and, in some cases, more targeted subsidies. Targeted subsidies, like the Direct Benefit Transfer (DBT) initiative, show that it's possible to implement alternatives to cross-subsidies and improve transparency with direct transfer of subsidies to a citizen's account as a deduction on their monthly bill. These companies leveraged cost-reflective charges and automatic adjustment mechanisms to improve the financial health of the distribution sector (Pargal & Banerjee, 2014).

4.4.4 Open access and green energy initiatives

Open access is allowed in India for large consumers (> 1 MW in demand) who can choose which generator to buy from through a direct purchase arrangement or through a trader or power-exchange platform. The Green Open Access Rules of 2022 also gave consumers with > 100 kW demand the choice to buy green power from their local power distribution company in exchange for green certificates (Ministry of Power India, 2022).

India's experience highlights the importance of effective implementation of distribution reforms and how distribution privatisation can lead to improved electricity reliability, which brings socioeconomic benefits (e.g., for small and medium enterprises, agriculture, education and health), making it easier for customers to afford electricity and thus boosting local economic activity (EY, 2023).

[10] Converted from 90,000 crore in rupees as of 2021 using 17 rand per US dollar and 5 rupees per rand.

4.4.5 Ongoing reform efforts

Of the case studies profiled in this report, India has the least amount of unbundling (primarily functional and legal) and limited retail competition, which has contributed to ongoing challenges experienced by its DISCOMs (Dubash et al., 2018). Many of its DISCOMs have still been operating at a loss in recent years, leading to multiple rounds of electricity (amendment) bills that have yet to successfully pass. A recent bill included measures like improved governance and an increase in the level of retail competition by allowing multiple DISCOMs to operate within the same area using a shared network, effectively separating wires from retail. This proposed legislation would also aim to 'delicense' distribution utilities for trading and obligate them to meet eligibility requirements (viable business plans, financial and technical experience, and qualified staff) to compete with other retailers (Mookherjee et al., 2024).

4.4.6 Key findings from India's case study

Table 17. Summary of outcomes from India case study

What worked well
1. **Successful upstream reforms:** Established functioning national wholesale market and well-integrated transmission grid with more than 50% private generation capacity, demonstrating that upstream progress is possible despite delays with distribution reforms. 2. **Privatisation success stories:** When implemented with proper frameworks, privatised DISCOMs saw improvement in revenue collection, reliability and financial performance. 3. **Innovative Direct Benefit Transfer pilot program:** Individual-targeted subsidies through direct bank transfers were able to reduce leakage and improve transparency to replace cross-subsidies. 4. **Technology-enabled theft reduction:** Distribution programme combining AMI deployment, results-based financing and strict enforcement significantly reduced electricity theft even in contexts with cultural acceptance of illegal connections. 5. **Green open access innovation:** The 2022 rules enabling consumers above 100 kW load to access renewable energy created a pathway for clean energy adoption without full retail competition. 6. **Sound legislative framework:** The 2003 Electricity Act provided a legal foundation with provisions for competition, open access, performance standards and consumer protection.
Challenges
1. **Persistent DISCOM losses:** Many state-owned DISCOMs continue operating at a loss due to insufficient revenue collection and require government bailouts. 2. **Political capture of tariff-setting:** State government interference preventing cost-reflective tariffs undermined financial sustainability of DISCOMs. 3. **Minimal unbundling progress:** Primarily seen functional and legal unbundling to date with some recent examples of retail competition.

4. **Implementation gap:** There has been slow progress to implement key regulatory provisions such as phasing out cross-subsidies, promoting competition and establishing supply codes to address consumer challenges.
5. **Continuing rural electrification gap:** Despite adequate generation/transmission capacity, distribution problems prevented universal access.
6. **Legacy contract burden:** 86% of energy is still through expensive long-term PPAs (primarily coal), undermining DISCOM financial viability.
7. **Multiple bailouts:** Repeated government bailouts without addressing root causes perpetuated inefficiencies.

Table 18. Summary of lessons for South Africa based on India's experience

Lessons for South Africa
1. **Legislation ≠ implementation:** India's comprehensive 2003 act remained partially implemented more than 20 years later, highlighting the need for implementation capacity, enforcement and political will with legal frameworks. 2. **Ensure political independence of regulator:** State interference in tariff-setting restricted DISCOM financial viability. 3. **Don't stop at functional unbundling:** India's limited unbundling (functional/legal only) resulted in inefficient operations and limited benefits of reforms. 4. **Targeted individual subsidies can replace cross-subsidies:** The DBT pilot programme shows alternatives to cross-subsidies can be implemented, such as individual-based direct transfers, without compromising affordability. 5. **Privatisation requires complete framework:** Privatisation requires cost-reflective tariffs, enforcement capacity and regulatory independence. 6. **Technology needs governance and enforcement:** AMI and smart meters reduced theft only when combined with strong governance, financing mechanisms and legal enforcement. 7. **Address legacy contracts proactively:** Long-term expensive PPAs (86% of supply) crippled DISCOM finances, so South Africa needs to closely manage Eskom PPAs and municipal power purchase obligations. 8. **Bailouts without reform perpetuate problems:** Repeated government bailouts created inefficiencies without concrete performance incentives and governance reforms. 9. **Upstream success doesn't guarantee downstream results:** Successful generation/transmission reforms didn't fix distribution challenges. 10. **Implementation timelines need to be managed:** India's ongoing challenges more than 20 years after liberalisation began show distribution reform consistency across multiple political cycles is necessary to maximise benefits. 11. **Green energy access requires dedicated mechanisms:** Green open access rules demonstrate that clean energy goals benefit from purpose-built instruments beyond market structure reform.

5. Conclusion

The disaggregation of distribution functions from trading functions paves the way for retail choice for customers and, if well implemented, leads to a more efficient, reliable and financially sustainable power system. This report examined international experience with distribution sector reforms across Brazil, the Philippines, Colombia and India to identify practical lessons for South Africa as it embarks on its own electricity market transformation.

Disaggregation of the distribution sector is one tool that can help with goals like improving affordability and minimising electricity costs for customers. As a first step, account unbundling helps regulators and utilities have a better understanding of costs and track key performance metrics to identify where it makes sense to introduce competition (e.g., retail competition), which further improves efficiency and drives down costs for customers. Table 19 summarises experiences and lessons learned from international markets that have already implemented similar reforms, such as the importance of tailored approaches, an empowered and independent regulator, ongoing oversight/planning and ongoing adaptations to stakeholder feedback.

Table 19. Key lessons for South Africa to consider in implementing distribution unbundling reforms

Guiding principles	Summary	Example
1. Tailor reforms to country context and political economy.	Reforms work best when adapted to each country's institutional capacity, system size and development goals.	The Philippines phased in retail competition in a controlled way only for larger urban distributors initially, while rural electric co-operatives remained bundled. The limitations matched local market context and local capacity for overseeing competition.
2. Strengthen regulator and planning to support market adaptability.	Countries need adaptive regulatory frameworks that improve reliability, account for new technological trends (e.g., DERs) and anticipate future needs of the market.	Brazil strengthened the role of its regulator and created new institutions like a planning agency (EPE) and independent operators (i.e., system operator and market operator) to clarify roles and adapt with both short- and longer-term planning needs.
3. Ensure independence, financial viability and good governance of distribution utilities.	Enact governance reform and loss reduction by leveraging performance incentives – which is a key step even before unbundling – as competition cannot solve all distribution sector challenges.	Improving transparency and financial viability of distribution utilities — for example, with performance incentives — was a goal for most of the countries profiled (e.g., Colombia incentivises utilities with tariffs tied to loss-reduction targets) and often a prerequisite for retail competition.

4. Enable competition in distribution retail supply where necessary preconditions are met.	To reduce potential risks, ensure preconditions such as sufficient cost recovery, data transparency, an empowered regulator, unbundled tariffs and political support are in place to unlock private investment.	The Philippines introduced retail competition primarily for urban distribution utilities that met eligibility criteria but not for smaller and more remote electric co-operatives.
5. Develop targeted reforms for goals like universal access and decarbonisation.	Electricity sector reforms still require focused instruments to achieve government goals like universal energy access, decarbonisation and energy efficiency.	In addition to distribution sector reforms, India developed rural electrification and clean energy access programs (Green Open Access) to help meet its decarbonisation and universal access goals.
6. Implement an effective and transparent subsidy scheme to balance cost reflectivity with affordability.	An effective subsidy framework improves efficiency by helping remove energy cross-subsidies and moving towards cost-reflective tariffs, while ensuring low-income customers still benefit from fair and targeted subsidies.	India's experience shows how using targeted subsidies (Direct Benefit Transfer deductions on monthly bills) for some customers can be an effective tool to help phase out inefficient tariff cross-subsidies.
7. Establish clear market rules early on in the process.	Establishing clear market rules from the start that clarify stakeholder roles and responsibilities helps to mitigate risk with reforms.	In all of the case studies, the countries drafted market rules to govern the local wholesale market that also inform distribution sector operation and stakeholder responsibilities.
8. Establish clear distribution sector objectives prior to disaggregation.	Setting local market objectives is an important first step to enable a healthy distribution sector and drive the reform process since objectives directly influence the outcomes with effective implementation (e.g., cost recovery, affordability, reliability and limiting monopoly control).	Colombia and the Philippines built their distribution sector reforms on policy objectives such as reliability and cost recovery to help guide many reform decisions.
9. Introduce retail choice in phases to reduce risks.	Consider setting an initial size threshold for customers that can choose their electricity supplier (e.g., ≥ 1 MW demand). Adjust the size threshold over time to increase customers that are eligible for retail choice.	All of the countries studied initially limited competition to a subset of customers while gradually expanding eligibility requirements over time. This iterative approach reduced risks and allowed the market to adjust before opening up to more customers.
10. Implement customer education and data protection rules with increased competition.	Clarify rules on data protection and sharing for an unbundled distribution sector. Educate customers to make informed choices about retail options, and implement regulations that enable pass through of efficiency savings to customers.	New York State's unbundling policy established data-driven procedures to separate competitive and monopoly utility costs, to support retail competition and enable transparent utility cost recovery. The UK uses yardstick competition to benchmark distributors and encourage efficient operations and customer benefits.

While South Africa's ERA Act creates an excellent legal foundation for electricity market reforms, there is still a need to invest in implementation capacity before and during unbundling. This includes training programs for NERSA staff, capacity-building for municipal utilities, development of detailed implementation procedures and creation of monitoring systems to track progress. In summary:

- **Sequencing matters**: Institutional capacity-building, regulatory strengthening and governance reforms need to accompany (or potentially precede) structural unbundling.
- **Affordability remains a priority:** Establishing transparent, ideally individual-targeted subsidy mechanisms (similar to India's Direct Benefit Transfer) from the outset can help address many customer concerns. These can be funded explicitly through government budgets with clear eligibility criteria.
- **There is no one-size-fits-all design**: Large metros like Johannesburg, Cape Town, eThekwini and Tshwane have different capacities and contexts than smaller rural municipalities. The framework can enable different models for different contexts and timelines.
- **Implementation is key**: The gap between legislation and outcomes depends entirely on implementation quality. South Africa has an opportunity to invest in implementation capacity from the start (e.g., training, systems, monitoring and enforcement). Regular independent assessments can track compliance and measurable outcomes — such as reliability, cost recovery and loss reduction.
- **Political commitment needs to survive electoral cycles**: Given the sometimes long timelines required, reform success depends on maintaining consistency beyond a single political administration. Building broad stakeholder consensus, establishing independent oversight mechanisms and creating institutional buffers against political reversals are essential.

For South Africa, building on these lessons and tailoring reforms for local conditions will be crucial to address the unique challenges faced by its electricity sector. These case studies show that success is possible: Brazil transformed its sector from crisis to investment-grade creditworthiness, Colombia improved performance through better governance and the Philippines expanded access while differentiating models. Lasting success requires sustained commitment to both structural reform and implementation capacity-building.

Effective implementation of these distribution sector reforms, grounded in international experience and adapted to South African realities, can support both the broader electricity sector goals and the overall economic development of the country. The path forwards requires building on lessons from both successes and failures in other markets to chart a course suited to South Africa's institutional capacity, political economy and development priorities.

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7. Annex: Sample toolkit for overcoming common distribution sector challenges

Table 20 and Table 2 summarise the key tools that can be used to address common deficiencies and challenges with distribution sector reforms, which are each discussed in more detail in this section.

Table 20. Toolkit for overcoming common distribution sector deficiencies and challenges

Tool	Description	Case study examples
Improve governance and operational performance of utilities	Reforms work best when adapted to each country's institutional capacity, system size and development goals.	The Philippines phased in retail competition in a controlled way only for larger urban distributors initially, while rural electric co-operatives remained bundled. The limitations matched local market context and local capacity for overseeing competition.
Discourage political interference	Reducing political influence in tariff-setting often improves financial stability and performance. Independent regulators increase accountability.	Brazil's regulator, ANEEL, is financially independent, regulates tariffs objectively, and can revoke licences, which helps it to maintain checks and balances
Theft and loss mitigation tools	Tools like smart meters, strict enforcement and performance-based incentives can help utilities ensure financial health and reliability.	India's distribution scheme (RDSS) supports utilities with results-based financing and smart meters to curb theft. Likewise, Colombia incentivises utilities with tariffs tied to loss-reduction targets.
Affordability and cost-minimisation strategies	Benchmarking key performance metrics with other utilities, price caps and reducing investment risk help lower costs and electricity rates for customers.	The UK uses yardstick competition to benchmark distributors, Chile applies hypothetical 'model firm' costs to develop price caps and Brazil reduced financing risk with help from development banks and supports local supply chain manufacturing.
Tariff and subsidy tools	Replace broad cross-subsidies with targeted support. Subsidy frameworks keep subsidies targeted to improve affordability and effectiveness.	Colombia's cross-subsidy programme faced many challenges with its broad geographic focus and funding shortfalls, requiring additional government funds.

Tool	Description	Case study examples
Regulation and privatisation strategies	Independent regulation and privatisation are key market tools that can help meet local goals (e.g., energy reliability, efficiency and affordability). Competitive retail markets can improve customer experience and DER integration (e.g., time-of-use and EV tariffs or demand flexibility).	The Philippines and Colombia both have a mix of distributors that remain bundled along with those that have unbundled wires from competitive retail activities. They also established independent agencies for planning.

7.1 Improve governance and operational performance of utilities

Governance reforms are critical, as disaggregation and market liberalisation on their own won't solve all the distribution utilities' challenges. Effective corporate governance is closely linked to better utility performance in cost recovery and distribution efficiency for both public and privately owned distribution utilities. State-owned utilities, like EPM in Colombia's second most populated city, Medellín, have demonstrated they can perform effectively when governed with private-sector principles such as clear targets, financial discipline and depoliticised leadership. Many distribution utilities have also found success with the privatisation approach, which creates both a profit and competitive incentive to improve operational efficiency.

Opportunity exists to learn from governance and operational frameworks from countries such as India, with its Electricity Act of 2003. In addition to the key elements outlined in Table 21, complementary measures such as structured stakeholder engagement and ongoing feedback loops with sector stakeholders like private financiers help ensure that market reforms last and lead to sustained investment. Similarly, financial ring-fencing of distribution activities helps control cross-subsidisation by increasing transparency and operational self-sufficiency.

Table 21. Operational provisions from India's Electricity Act 2003

Provision	Description
Standards of performance and consumer protection	Mandates performance standards, benchmarks and fair service practices set by the appropriate commission for licensees. Disputes are handled with oversight from the commission, and licensees failing to meet standards must compensate affected parties.
Monitoring and transparency	Licensees must report on their performance and compensation paid. The reports are published annually by the commission.

Provision	Description
Open access and non-discrimination	Distribution licensees are obligated to act as neutral carriers, facilitating third-party access to their networks to promote competition.
Regulatory oversight	State and central commissions are empowered to issue licences, set tariffs, enforce standards and adjudicate disputes.
Market behaviour and competition	Commissions can intervene against licensees or generators abusing market dominance or engaging in anti-competitive practices.
Utility autonomy and accountability	Commissions may revoke licences for non-compliance, mismanagement or poor financial standing.
Tariff principles and cost recovery	Progressively move towards cost-reflective tariffs and incentivise efficiency while reducing cross-subsidies.

7.2 Discourage political interference

In many countries, state-owned electric utilities face challenges stemming from insufficient separation between operational decision-making and political influence. Democratically elected governments often face pressure to keep electricity tariffs artificially low, leading to revenue shortfalls and underinvestment. Privatisation is one tool that offers a degree of protection from these pressures by introducing independent operators with financial stakes and performance obligations.

The creation of an empowered and independent regulatory entity with its own source of finance and the authority to make decisions about licences also helps avoid government influence over the electricity sector while encouraging accountability amongst licensees. Increasing electricity tariffs is often not politically popular, so ensure regulators make these decisions independently, typically using an objective tariff methodology, to improve the reliability and financial stability of the power sector for all customers. Likewise, the regulator's authority to issue or revoke a licence for a distribution utility provides an incentive for more transparency, better performance and accountability in order to keep the licence.

In Brazil during 2013, political pressure resulted in a law to reduce electricity bills that impacted credit ratings for some local market participants. Fortunately, the regulatory framework in Brazil allowed the regulator (ANEEL) to maintain its autonomy and ultimately make an objective decision about tariffs. Key aspects of Brazil's regulatory framework that have helped it to discourage political influence include:

- **Regulatory independence:** The regulator operates as a technical agency, led by an experienced board with members whose fixed terms overlap, allowing for both continuity of criteria and gradual change.

- **Financial autonomy of regulator:** The regulator is funded through a levy on customer bills, rather than relying on annual state budgets, protecting ANEEL from discretionary budget cuts.

- **Authority to grant or revoke licences:** As the granting entity for distribution concessions and permissions, ANEEL can also revoke distribution concessions for non-compliance with legal, technical or regulatory obligations. This accountability mechanism helps ensure service quality and compliance.

- **Structured tariff regulation with cost recovery:** Tariff adjustments follow defined cycles and methodologies with inflation indexing and regulated cost pass-through. Distribution tariffs are adjusted annually for inflation and efficiency, while the accounting on assets and liabilities is updated every three to five years with a more thorough review.

- **Transparent governance and oversight:** Public deliberations about tariffs are held in meetings that are subject to audits.

- **Recognised regulatory credibility:** Credit rating agencies commend Brazil's regulatory framework for its consistency and independence (FitchRatings, 2024) (OECD, 2021).

The regulator in Brazil has the authority to fine licensees and revoke their distribution licences for poor performance. In October 2024, ANEEL launched a formal review and potential recommendation to revoke the distribution licence of a private electricity distribution company in Sao Paulo (Enel Distribuição São Paulo) after repeated failures in its emergency response efforts. After a November 2023 blackout, ANEEL imposed its largest-ever administrative fine on Enel (500 million rand),[11] which was later suspended by a court ruling (Bitencourt, 2024).

Privatisation, capacity-building and training, and enforcing transparent procedures for tariff-setting and dispute resolution are proven tools to discourage political interference — as well as strengthening the role of the regulator by giving it legislative authority to keep licensees accountable.

7.3 Theft and loss mitigation

In addition to losses from poor grid maintenance and operational inefficiencies, widespread electricity theft can put further stress on the financial viability of the distribution sector and, if widespread, the whole power system. A loss mitigation strategy usually involves the right governance structure for the distribution company and sufficient incentives to address losses. In addition, government support may also be required in certain areas if, for example, safety is a concern for the distribution company.

India also had to address 'kaatiyabaaz,' which refers to the local cultural acceptance of tapping electricity from the grid without paying. India's government implemented the Revamped Distribution Sector Scheme (RDSS) to provide results-based financing assistance and capacity-building to distribution companies to improve performance and reduce losses. Distribution companies with stronger internal governance and technical and procurement capabilities were

[11] 165 million reals converted to rand assuming three rand per real.

better positioned to take advantage of this programme to effectively implement advanced metering infrastructure (AMI) programmes and strict enforcement laws, which has led to a significant reduction in electricity theft (World Bank Group, 2018) (Reddy, 2022).

Similarly, Colombia's regulations incentivise loss reduction amongst distribution licensees with a tariff charge incentive tied to loss reduction targets, encouraging utilities to prioritise loss management measures (e.g., proper planning and network reinforcement) (Rudnick & Velásquez, 2021). Performance-based regulations (e.g., incentives and penalties) are also an effective tool to reduce losses and improve performance.

7.4 Affordability and cost-minimisation strategies

A number of strategies exist to incentivise lower costs for the distribution sector and result in more affordable electricity.

The regulator in the UK has been assessing benchmarks with 'yardstick competition' for decades, to set revenue caps for distribution companies by comparing historical costs of distribution network operators with peer performance. These benchmarks, supplemented with self-reported data, are a useful tool to compare efficiency levels, even if they don't operate on the same network (Cowan, 2001).

Likewise, Chile uses a benchmarking method that works for a multitude of municipal distributors: Its 'model firm' approach is where the regulator estimates what a hypothetical greenfield distribution company would likely spend to serve a given area with optimal efficiency. Estimates are made at the beginning of each control period (i.e., every four years) assuming replacement infrastructure costs and 10% cost of capital, which are used to develop price caps (Moreno et al., 2020). Reducing electricity rates for customers can also be achieved by lowering investment risk and financing costs in the electricity market. Providing government clarity around the institutional framework, market rules and reform implementation reduces risk for investors, typically leading to lower lending rates for projects. Similarly, Brazil reduced investment risk with the help of the Brazilian Development Bank (BNDES), which played an instrumental role by offering finance and risk mitigation to make new infrastructure projects (e.g., renewable energy and transmission) more attractive. BNDES has also provided catalytic investment in local supply chains in the country, such as wind turbine manufacturing.

7.5 Affordability and tariff subsidy tools

As seen in the case studies, using a targeted subsidy framework to deliver affordable electricity to society's most vulnerable populations has proven more effective than cross-subsidies built in to electricity tariffs. Targeted subsidies with a clear idea of where the money will come from

can lead to a more effective use of public funds, reduce persistent inequalities and challenge the perception that theft is an acceptable social norm. Colombia's experience with cross-subsidies highlights the challenges it faced when its energy reform policy led to a national cross-subsidy system intended to help lower-income consumers afford electricity. The electricity subsidy programme geographically classifies neighbourhoods into six categories, as shown in Table 22.

Table 22: Electricity cross-subsidy categories in Colombia

Tool	Description	Case study examples
Strata 1	50%–60% subsidised	Subsidy is provided for a capped consumption block, and then the regulated base price applies for additional demand
Strata 2	40%–50% subsidised	
Strata 3	15% subsidised	
Strata 4	0% subsidised	Pay base price
Strata 5 and 6	Pay extra at 120% of base price	Overpayment of 20% goes to subsidy programme, but relatively few households pay into the subsidy programme, primarily in the metros

Note: Colombia classifies housing into six categories, or strata, ranging from 1 (the lowest) to 6 (the highest). The physical and geographic characteristics of a neighbourhood's housing (e.g., construction materials, neighbourhood infrastructure and public services) and surroundings determines the strata category rather than wealth or income.[12]

Unfortunately, funding the cross-subsidy has been a challenge, as the growth in subsidised neighbourhoods (Strata 1–3) has outpaced growth in those paying for the subsidy. This has led to a need for more government subsidies to support rural electrification that are managed by the government's Ministry of Mines and Energy, including the Fund for the Electrification of Non-Interconnected Zones (FAZNI), Rural Electrification Fund (FAER) and Program for Network Normalization (PRONE) (McRae & Wolak, 2020).

In Colombia's larger metropolitan municipalities, like Medellín, cross-subsidy contributions typically cover subsidy costs, unlike in smaller regions where government funds make up the deficit. While cross-subsidies improve affordability for some customers, they do create challenges and inefficiencies (e.g., economic distortions, lower service quality, strain on government budgets and energy efficiency disincentives), especially when they're not targeted and temporary with a phase-out plan.

[12] McRae, S. D., & Wolak, F. A. (2020). *Retail pricing in Colombia to support the efficient deployment of generation and electric vehicles.*

7.6 Regulation and privatisation strategies

The process, timeline and key components of distribution sector reforms depend on local context.

As mentioned previously, distribution monopolies that are state-owned often lack a clear separation from political influence (e.g., tariff setting), so privatisation is one tool to provide more independent decision-making and competitive performance incentives. Regulated entities can also use performance-based regulations and benchmarks with other comparable utilities to encourage efficiency. Both private operators and distribution monopolies face risks that need to be managed with the help of independent regulation, which plays a critical balancing role, as a sound regulatory framework is essential to protect both consumers from monopoly abuse and private companies from political or administrative overreach. Private utilities can still fail if they underperform, but concession frameworks (e.g., provider of last resort guidance) allow for orderly transfer of assets to new operators. Independent regulators backed by judicial oversight who make decisions based on objective criteria, such as engineering, economic and public policy criteria, rather than political influence are a key tool for addressing common challenges.

Both Colombia and the Philippines created government agencies focused on overseeing and planning for the electricity market with their reform process but still allowed the market to operate independently. The Philippines and Colombia also both have a mix of distribution utilities that remain bundled, along with those in other parts of the country that have unbundled wires from competitive retail activities. Their experiences show that an independent and adaptable institutional and regulatory framework can be locally customised to improve efficiency and adapt to the needs of the evolving market.

Another successful example from the U.S. state of Texas shows how distribution sector reform can still work with a diverse mix of distribution entities, even in the same wholesale market. A mix of bundled and unbundled (aka disaggregated) distribution companies with retail competition — formed from the spin-off of wires business from the larger utilities — publicly owned rural co-operatives, and vertically integrated municipalities (e.g., the city of Austin, which can participate in the wholesale market) operate alongside each other in the state electricity market. About 80% of Texas is open to competition. The state has kept retail activities bundled in about 20% of the state due to inadequate competition in some regions with municipal-owned utilities and co-ops (Electric Choice, 2021).

7.6.1 Improved customer experience and DER integration

Competition in the retail segment can also create tangible value for both the distribution sector and customers they serve, while enabling DER integration. Competition usually incentivises retailers to improve customer experience and offer innovative products that align with customer needs (e.g., lower cost options with off-peak pricing and electric vehicle or heat pump tariffs). Retail competition has also shown it can improve DER integration under supportive regulatory frameworks that compensate for DER value-add and non-wires alternatives to large infrastructure investments, such as customer storage and demand flexibility.

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