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Beyond the Textbook: A Strong Regulatory Framework for an Effective Competitive Electricity Market in Developing Economies

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Chapter 1. Introduction

The critical importance of electricity to modern economies has resulted in a high level of government involvement in the development and operation of the electricity supply industry (ESI). The ESI had the characteristics of a natural monopoly, and most economies have sought to encourage its development through a state-owned utility.

The inefficiency of a vertically integrated monopoly, whether state owned or shareholder owned, has led governments to seek reforms. While South Africa is now beginning its transition to electricity markets, governments around the world have been introducing market reforms to their ESIs since the 1980s to create competition in the production and supply of electricity. If well implemented, with robust structural changes to enhance competition, effective competition can bring a constant downward pressure on electricity costs.

The standard textbook approach to ESI reform required three principal conditions. First, the law needed to be amended to allow for the creation of electricity markets, both wholesale and retail. Second, a structural reform of the ESI itself needed to be undertaken, unbundling the existing monopoly into several shareholder-owned generation businesses and separating transmission and distribution businesses. Third, the regulation of the ESI needed to be reformed, empowering an independent electricity regulator to protect consumers by ensuring that the markets delivered a reliable supply at affordable and competitive prices.

ESI reforms in various governments have not, however, followed the standard textbook approach, particularly in developing economies, where state-owned enterprises (SOEs) continue to dominate

in generation, transmission and, often, distribution of electricity. This has had consequences for both the effectiveness of competition and, indeed, the effectiveness of regulation. Competition is weakened as private investors can be deterred by an unlevel playing field that favours state-owned incumbents. Regulation, particularly tariff setting, has proven to be less effective in jurisdictions where state ownership continues to prevail.

Continued ownership of generation, transmission and distribution by SOEs means that regulatory oversight of the sector needs to be stronger and broader. A strong electricity regulator will have the power to set tariffs in an open and transparent manner and assure nondiscriminatory access to the markets. It will have oversight of planning and procurement of new investment, and it will be responsible for overseeing the quality of service.

Stronger sector regulation needs to be complemented by effective oversight of SOEs by the responsible government ministries. This stronger oversight needs to encompass the corporate governance of the state-owned companies and their financial objectives (which are often different from a shareholder-owned firm) but also, in some instances, control of their ability to exercise significant market power.

The aim of this report is to take the lessons learned from ESI market reforms elsewhere to provide guidance on the necessary attributes and capabilities of a strong regulatory framework for an effective competitive market where continued state ownership of the ESI prevails. It will include considerations of regulatory scope, governance and organization and identify the competencies required.

Chapter 2 of the report provides an overview of the regulatory frameworks that were created as a consequence of introducing electricity market reforms in developing economies and highlights some of the key challenges. Chapter 3 spells out

the features required for a strong, regulatory framework to ensure an effective, competitive electricity market. Chapter 4 presents conclusions and recommendations to address the challenges.

Chapter 2. Electricity Regulation and Power Markets in Developing Economies

Electricity market reform and the need for regulation

The current market and regulatory frameworks we see in the electricity supply industry (ESI) are the result of decades of market reform experience. There are now over four decades of experience with electricity markets, with Chile the earliest example dating from 1982. Most advanced economies initiated market reforms in the 1980s and 1990s, and these reforms have continued to evolve to this day.

The main goals of these reforms were to apply market discipline to electricity costs through wholesale and retail competition. Early experience with electricity market reform put heavy emphasis on creating competition amongst generators for the wholesale supply of electricity. Many early reformers were also keen on allowing end consumers to choose their supplier and therefore pursued policies that would encourage a competitive retail electricity market.

Privatization was integral to market reforms in many economies. In most economies, the ESI was a state-owned, vertically integrated monopoly. Separating the utility into distinct businesses for generation, transmission and distribution (known as unbundling) was a prelude to selling these businesses to private shareholders. Even where privatization was not a short-term objective, the restructuring of the system was designed with this in mind.

The introduction of markets would, one might have believed, reduce the need for electricity regulation. In fact, the opposite occurred: there

are far more electricity regulators with much larger responsibilities today than in the late 1980s when market reforms began in earnest. Today, nearly every advanced economy and over 70%¹ of developing economies have an independent electricity regulator at national level.

The main reason for this proliferation of electricity regulators is simple — a new type of regulatory governance was needed to replace the direct control governments had had over the sector. In many jurisdictions, the electricity supply had been the responsibility of a single government-owned utility with an obligation to serve. The rates to be charged, the income to be earned, the planning and investments to be made and the borrowing to be done were all decisions made by the utility and subject, at least in principle, to government oversight. State-owned electric utilities often set their own rates without a regulator and had other technical regulatory responsibilities, for example, for quality of service.

The first point that the textbooks would emphasize is that with the breakup of the state-owned utilities, these regulatory tasks had to be allocated elsewhere. With the advent of markets and the restructuring of the ESI, a new regulatory structure was required to ensure that traditional price and reliability protections for consumers were maintained by an institution that was not itself a market participant. In addition — and to make the markets operate fairly and effectively — electricity

¹ Foster, V., & Rana, A. (2020). *Rethinking power sector reform in the developing world*, p. 174. Sustainable Infrastructure Series. World Bank. <https://doi.org/10.1596/978-1-4648-1442-6>.

regulators were created (or, in some cases, their mandates expanded) to oversee these markets and to ensure that the remaining wires monopolies (transmission and distribution) provided open access to use their systems, charged just and reasonable rates and provided good service quality.

The second point that the textbooks would emphasize is that the scope of regulation is increased when you introduce electricity markets.

The creation of wholesale and retail markets requires rules and thus regulatory oversight of the compliance with these rules. Transmission and distribution activities, formerly integrated into the state-owned monopoly, were themselves distinct monopolies that needed oversight to set rates and to ensure nondiscriminatory access to their networks.

The third point is that effective regulation requires an autonomous and accountable electricity regulator.

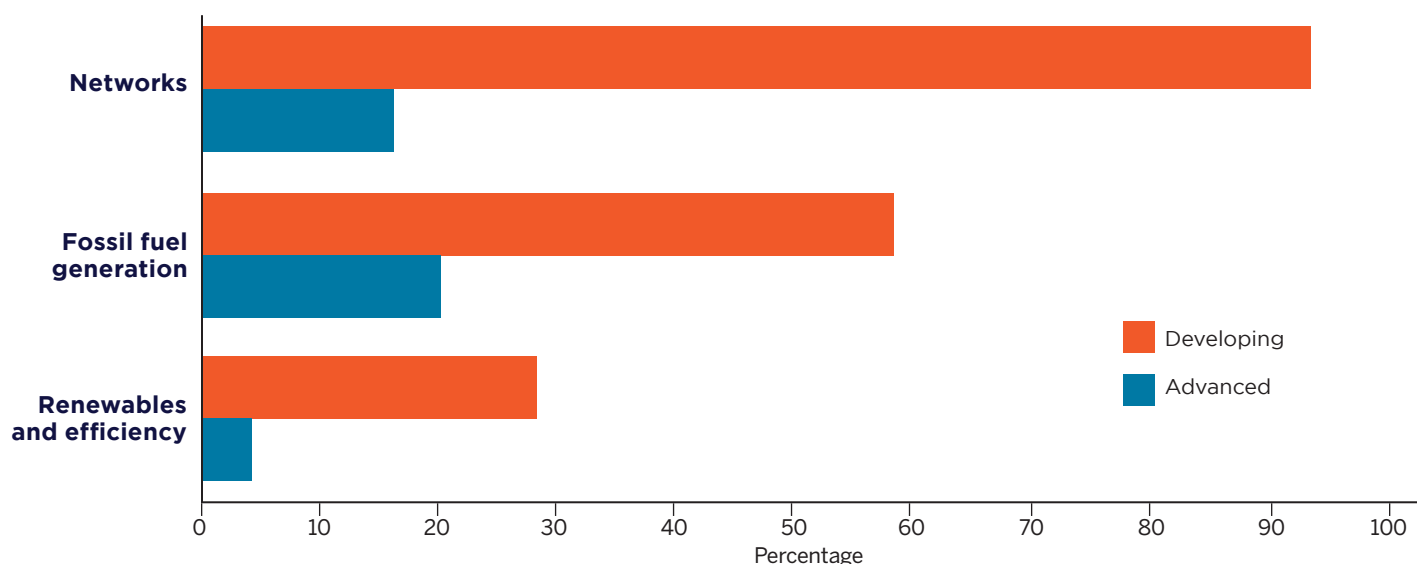
A regulator able to carry out the critical role of approving the rates charged by the remaining wires monopolies, overseeing nondiscriminatory access to those networks by market participants and monitoring market

behaviour while remaining at arm's length from the day-to-day pressures of government would, in turn, increase the confidence of current and potential investors in the ESI. In other words, in the textbook design, the independent regulator would help attract capital to the ESI to sustain it.

But that raises another point that one will not find in the textbook prescriptions. Those textbooks tended to assume that the transition would include the unbundling of the state-owned utility and its eventual privatization. The unbundled companies could be regulated as profit-seeking firms, with regulation aiming to ensure that the regulated activities would be carried out as efficiently as possible and that consumers would reap some of the benefits of these efficiency gains.

But it is often the case, particularly in developing economies, that the ESI remains largely state owned. Figure 1, taken from an International Energy Agency World Energy Investment report,² shows how fundamentally different electricity investment is in developing economies versus advanced economies.

Figure 1. Percentage share of electricity investments made by SOEs in advanced and developing economies, 2019



Source: IEA. (2020). *World Energy Investment 2020*

The figure shows over 90% of the investment in electricity networks and over half of the investment in fossil fuel generation in developing economies is by state-owned companies. Even for investment for renewables and efficiency, where the private sector is dominant, the participation of state-owned enterprises is much larger in developing economies than in advanced economies.

Experience of electricity market reform in developing economies

While the experience of electricity market reform in advanced economies has been widely studied,^{3,4} the assessment of electricity market reforms in developing economies has been less extensive. The most comprehensive analysis was published in 2022 by the World Bank, entitled “Rethinking Power Market Reform in the Developing World.”⁵ One of the main observations of the report is that power market reform in developing economies did not follow the textbook model described above.

First, very few jurisdictions restructured their ESI⁶ to allow for multiple competing generating companies, so-called horizontal unbundling. Less structural change means in turn that the conditions of effective competition and its benefits in terms of reducing system costs will be more difficult to achieve.

Second, even after reforms, state-owned firms continued to dominate the ESI. While there are numerous examples in advanced economies where a state-owned company remained dominant after power market reforms were implemented, this is far more common in developing economies.

Third, the limited structural reforms and continued state ownership pose a challenge for effective regulation. This continued existence of powerful state-owned utility creates major challenges for effective regulatory oversight in a competitive electricity market. Even, as is often the case, the legal framework allows for effective regulation, in practice this has proven difficult to achieve. Three of the major tasks of regulatory oversight are: setting tariffs, regulating quality of service and overseeing market entry (licensing of new entrants but also planning and procuring new generation resources). The World Bank report⁷ identifies challenges with each of these:

- **Tariff setting can be ineffective.** A stable tariff setting framework is crucial for a reformed ESI. Regulated tariff setting is an opportunity for regulatory authorities to ensure that customers are not paying excessive rates for their electricity and that those rates are allocated equitably among different customer groups, while ensuring a fair return on investment by the well-managed regulated company that in turn is able to attract continued investment in the sector. While the World Bank report observes this has generally worked well when regulated utilities are privatized, rate setting has proven far more problematic when tariffs are being set for state-owned utilities. Governments often intervene to set rates below the rate the regulator recommends (and finance ongoing operations of the state-owned utility), and fiscal discipline is not a sufficient incentive without the hard budget constraint that a shareholder-owned utility would face.

3 OECD (Organisation for Economic Co-operation and Development). (1997). *The OECD report on regulatory reform: Synthesis report*. <https://doi.org/10.1787/9789264189751-en>

4 IEA. (2001). *Regulatory institutions in liberalised electricity markets*. Energy Market Reform, OECD. <https://doi.org/10.1787/9789264189317-en>

5 Foster & Rana, 2020.

6 Foster, V., Witte, S., Banerjee, S. G., & Moreno, A. (2017). *Charting the diffusion of power sector reforms across the developing world*. Policy Research Working Paper 8235. World Bank. <https://hdl.handle.net/10986/28853>

7 Foster & Rana, 2020.

- **Service quality and reliability is not well enforced.** Improving service quality and reliability, along with low rates, is a top priority of electricity consumers. These improvements can be made, whether through better operating practices, additional investment or both, if the service quality performance is monitored. According to the report, despite many regulators having clear legal mandates to establish and enforce quality-of-service frameworks, there is a large gap between the legal requirements and actual performance. Factors responsible for this gap include a lack of published standards, limited reporting (perhaps the result of a lack of data available or of data analysis by the regulator) or simply standards that are not realistically achievable.
- **Regulatory oversight of electricity planning and procurement has been limited.** Electricity planning often remains in the hands of the state-owned utilities after reforms. While a formal oversight role may be assigned to an independent electricity regulator, in practice the oversight exercised by regulators in many jurisdictions is limited. This is particularly a concern when new resources, particularly renewable resources, are

being procured as new entrants have faced a variety of roadblocks to develop their projects, such as getting approval to use a particular site, obtaining a timely assessment from the (often state-owned) network utility and finally the limited oversight of the terms of the power purchase agreements.

In addition to these challenges affecting the electricity regulator, the World Bank report also noted deficiencies in the other main aspect of the regulatory framework — corporate governance of the state-owned utilities — compared to shareholder-owned counterparts. It notes that strong corporate governance, regardless of ownership, is strongly correlated with good utility performance.

The result of these and other shortcomings in power market reform noted in the World Bank report is that the reality of regulatory oversight has, in many economies, fallen short of the strong regulatory framework required for an effective competitive electricity market. We turn to the requirements for a strong regulatory framework in the next chapter.

Chapter 3. A Strong Regulatory Framework for an Effective Competitive Electricity Market

Textbook approach to electricity regulation in electricity markets

As alluded to in the World Bank report, there are textbook prescriptions for creating strong regulatory frameworks for an effective, competitive electricity market. Early reforms tended to follow these prescriptions carefully, taking into account the best practices highlighted by various international agencies and other practitioners, and indeed, this is the subject of more than one textbook.⁸ This chapter examines the textbook approaches on regulatory scope and governance and how one must go beyond the textbook to develop an effective regulatory framework in electricity markets where state ownership still predominates.

Key regulatory responsibilities

The simplest way to compare the impact of the move to market with significant state ownership is to compare how different aspects would be regulated against five key regulatory tasks: (1) rate regulation, (2) investment and security of supply, (3) quality of electricity service, (4) regulation of market participants' conduct and (5) financial soundness of the ESI. These are summarized in Table 1 and addressed in more detail below.

Rate regulation. Setting electricity rates is a core function of an electricity regulatory framework. While a state-owned monopoly might set its own rates in consultation with the government, in the transition to markets, more transparent regulatory

oversight is required. In practice, two types of rates need to be approved by a regulator in the market context: the rates charged by electricity transmission and distribution companies, which remain monopolies even in an open electricity market, and default retail electricity rates for smaller consumers. Unlike some other fields such as telecommunications, where customer choice has been embraced by customers, most small electricity customers have not opted to choose another electricity supplier, or retail competition is not even on offer. These customers are best served by a regulated default rate option that assures the great majority of small customers continue to see just and reasonable rates.

State ownership complicates matters further as it provides a new channel by which rates can be subsidized — both directly on the government budget and indirectly through foregone profits of the state-owned electricity company. Subsidies can be directed to all consumers, particular consumer groups (e.g., residential) or subsets of those groups (e.g., low income). Instead of providing subsidies, governments can also intervene by directing that rate increases be deferred with the foregone revenue to be recovered from consumers later. This practice was extensive during the pandemic.

8 Hunt, S. (2002). *Making competition work in electricity*. John Wiley & Sons, Inc.; IEA. (2000). *Electricity market reform: An IEA handbook*. Energy Market Reform, OECD. <https://doi.org/10.1787/9789264180987-en>; and Brown, A. C., Stern, J., Tenenbaum, B., & Gencer, D. (2006). *Handbook for evaluating infrastructure regulatory systems*. World Bank. <https://hdl.handle.net/10986/7030>

Table 1. Key regulatory tasks under state monopoly and an electricity market with significant state ownership

Regulatory Task	State Monopoly	Market with State-Owned Utilities
<p>Rate regulation Review and approve tariffs and tariff design</p>	<p>Utility proposes rate changes. Regulator (if in place) reviews. Utility/government makes final decision.</p>	<p>Utility proposes rate changes. Regulator reviews and sets binding rates for monopolies (transmission and distribution) and default retail rates for smaller customers. Government may provide subsidies for all customers or directed at particular customer groups (e.g., low income).</p>
<p>Investment and security of supply Electricity infrastructure planning. Promotion of specific generation technologies (e.g., renewables) and ensuring adequate supply (resource adequacy) and operability of the supply mix.</p>	<p>Utility has obligation to serve and plans the system to ensure resource adequacy and operability. Plan or individual projects arising may be subject to government (environmental) review.</p>	<p>Government (energy ministry) provides overall guidance on resource mix (e.g., share of renewables). Specialized planning body/energy ministry/utility prepares integrated resource plan in compliance with government direction. Regulator reviews and approves plan with respect to government-established goals (e.g., for renewables or efficiency) and oversees procurement of new generation. Regulator separately approves investment plans of transmission and distribution monopolies and monitors resource adequacy. SOEs may be asked to develop particular resources (nuclear, large hydro, coal).</p>
<p>Quality of service Standards for frequency and duration of supply interruptions and power quality.</p>	<p>Utility is responsible using standards it sets itself as it has the necessary technical expertise.</p>	<p>Government standards with reporting by utility to electricity regulator. Regulator enforces noncompliance with standards.</p>
<p>Regulating market entry/ conduct of market participants Licensing for all market participants (generation, transmission, distribution). Develop and enforce rules and codes. Wholesale and retail market oversight and assessment.</p>	<p>Conduct not applicable. Government may permit independent power producers to sell to utility with utility setting the terms.</p>	<p>Regulator responsible for licensing, compliance and enforcement of licence requirements, rules and codes. Regulator (or national competition authority) responsible for wholesale market. Regulator also responsible for consumer protection with respect to retail market.</p>
<p>Financial soundness of monopolies Allowed rates of return and capital structure of monopolies.</p>	<p>Government (usually finance ministry) sets targets.</p>	<p>Regulator fair return standard (shareholder companies) and approves capital structure. Government (finance ministry) sets SOE targets.</p>

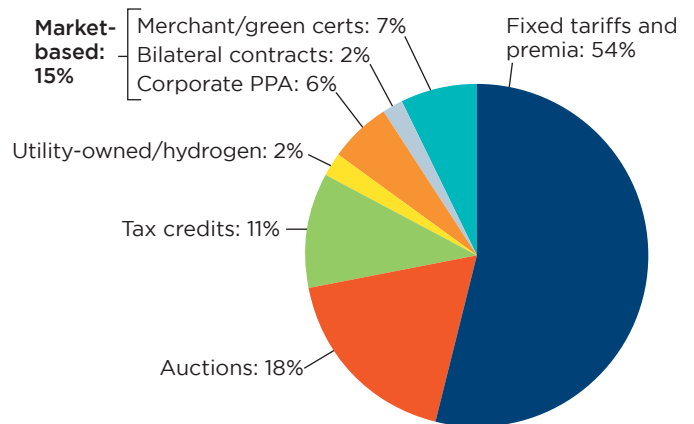
Investment and security of supply. A central premise of the textbook reform emphasized the role of the wholesale market in attracting investment in generation and networks to assure a reliable supply of electricity. It assumed that the electricity market design, relying mainly on the wholesale market price, would be allowed to bring forward an efficient level of generation investment to assure adequate supply. Well-designed incentives would bring forward an efficient level of transmission investment to support the generation. These assumptions carried with it a certain political risk.⁹ While a well-designed electricity market may indeed achieve these goals, any supply shortfalls or sudden price increases will not be blamed on the market design but on the government that approved that market design.

Even as electricity market designs have been further refined, it is government policies and procurements that have been responsible for the bulk of global electricity capacity now being added. This is principally due to favourable policies and procurements related to renewable energy, which now account for over 80% of generating capacity being added globally. This is expected to continue, with market-driven investments expected to account for only 15% of the utility-scale renewable capacity to be built by 2030, as seen in Figure 2.¹⁰ The majority of the rest will come from fixed feed-in tariffs, auctions or tax credits; only 2% of added renewables capacity is expected to come from utilities.

In contrast with generation, transmission and distribution investment remains overseen by regulators, as part of the rate approval process.

The investment picture is further complicated by the role of state-owned utilities. Such utilities have

Figure 2. Forecast percent shares of global utility-scale renewable electricity capacity by financing type (2024-2030)



Source: IEA. (2024). *Renewables 2024: Analysis and Forecasts to 2030*.

been used by governments in both advanced and developing economies to deepen their involvement in generation resource acquisition. They have played the leading role in investments in nuclear power¹¹ and large hydro generation,¹² justified in part by the difficulties of privately owned generators of obtaining competitive financing for these resources. Continued state ownership of coal-fired generation is also common in jurisdictions where coal plays a major role. And in developing economies, the transmission networks have remained in public hands. These complications merely underscore the importance of regulatory oversight of these investments.

The large investments in renewables have raised concerns about the operability of the changing power system. While the additional generation capacity can be seen as beneficial to supply security, integrating these increasingly large shares of new variable renewable resources into the

9 IEA. (2003). *Power generation investment in electricity markets*. OECD. <https://doi.org/10.1787/9789264105577-en>

10 IEA. (2024). *Renewables 2024: Analysis and forecasts to 2030*. <https://www.iea.org/reports/renewables-2024>

11 Government of Ontario. (2023). *Ontario building more small modular*

reactors to power province's growth [Press release]. Ontario Newsroom. <https://news.ontario.ca/en/release/1003248/ontario-building-more-small-modular-reactors-to-power-provinces-growth>

12 Power Technology. (2024). *Power plant profile: Belo Monte, Brazil*. Data Insights. <https://www.power-technology.com/data-insights/power-plant-profile-belo-monte-brazil>

system remains a significant technical challenge.¹³ Operability is further affected as the new inflexible resources (wind and solar) may encourage the early retirement of existing flexible generation that would remain useful to ensure a reliable supply.¹⁴ Therefore, oversight and transparency about system planning and resource adequacy and operability remain important components of the regulatory framework even in open electricity markets.

Quality of electricity service. Improving service quality and reliability, along with low rates, is a top priority of electricity consumers. Standard approaches to reliability look at the frequency and duration of interruptions, as well as quality of electricity supplied (e.g., the stability of the voltage level). The unbundling of the utility into separate generation, transmission and distribution units has the risk of dispersed or diminished accountability for service quality and reliability that was formerly the responsibility of the state-owned monopoly. A strong regulatory framework to support improved reliability will be an indicator of the success of market reforms.

Regulating the conduct of market participants.

With the introduction of markets, the establishment of nondiscriminatory access to those markets means that the regulator must make rules to ensure such access and scrutinize the conduct of the regulated entities to police the conduct of all market participants. Grid codes are used to set out requirements for the network companies with respect to providing access to their networks and quality of service. More challenging is oversight of the wholesale electricity markets, which requires in-depth monitoring to ensure that a generating

company with a dominant position does not abuse its market power. Retail market oversight is a different challenge: it requires regulatory action to listen, investigate and act on customer complaints about the behaviour of retailers.

In the case of wholesale markets, the presence of state-owned companies can result in a major distortion of competition, particularly if the state-owned company (or companies) have a dominant position in the market or state-owned companies are dominant in both generation and transmission. Shareholder-owned competitors will be concerned that the state-owned companies will use their position to protect their dominant position, by, for example, offering lower prices in the market, or a transmitter disclosing information to a state-owned generator. Contracting can be used to mitigate market power, along with market monitoring, to ensure that state-owned companies are complying with the contracts as well as other potential market distortions.

Financial soundness. A key element of rate setting is establishing a return on investment of capital for the regulated monopolies to ensure that a well-run regulated entity can earn a sufficient return to continue to attract capital and maintain vital infrastructure. This process is straightforward to establish in the case of shareholder-owned utilities, where a fair return can be assessed by the electricity regulator against other shareholder companies of a similar risk profile. Likewise, the regulator will provide guidance on the appropriate capital structure of the regulated entity (such the debt ratio).¹⁵ However, if the regulated monopolies remain state owned, they may be subject to different and often lower financial targets set by

13 Kuwahata, R., Copier, J. J., & Hevia-Koch, P. (2024). *Integrating solar and wind: Global experience and emerging challenges*. IEA. <https://iea.blob.core.windows.net/assets/4e495603-7d8b-4f8b-8b60-896a5936a31d/IntegratingSolarandWind.pdf>

14 NERC (North American Electric Reliability Corporation). (2023). *2023 Long-term reliability assessment*. <https://www.nerc.com/pa/>

[RAPA/ra/Pages/default.aspx](https://www.nerc.com/pa/RAPA/ra/Pages/default.aspx)

15 NARUC (National Association of Regulatory Utility Commissioners). (2019). *Cost of capital and capital markets: A primer for utility regulators*. USAID. <https://pubs.naruc.org/pub.cfm?id=CAD801A0-155D-0A36-316A-B9E8C935EE4D>

the government than a shareholder-owned utility would expect. While a shareholder-owned utility will expect to be able to earn a reasonable profit commensurate with the risk in investment in return for good performance, utilities in state ownership need not do so. The government itself may set lower return requirements and/or allow for a higher proportion of the company to be funded by (often government-backed) debt to keep electricity rates down. Recovery of capital costs could be at a level sufficient to financially sustain the utility, rather than the full cost of capital.

Regulatory governance

As noted above, the textbook reforms call for an independent electricity regulator. Indeed, this has been one of most common reforms observed in both advanced and developing country reforms. While governments have been enthusiastic about creating electricity regulators, they have found it difficult to confront the dualism of the “yang” of regulatory independence with the “yin” of regulatory accountability. Both aspects are necessary for an effective regulatory governance, but finding the correct balance is difficult.

Regulatory independence

There are three key characteristics a regulatory institution should have to be considered autonomous or independent.

Autonomy in decision-making. The first and most important point is that the independent electricity regulator can make binding decisions over matters that it regulates. This is particularly important with respect to the level of tariffs but also other key regulations, such as those setting standards for the quality of electricity service. To carry this out, the electricity regulator needs to be independent of the government with respect to such decisions. This means providing the decision-makers security

of tenure: once appointed, they can only be removed before the end of their term for cause.

Independent of the sector it regulates. Equally important, the regulator must be independent of stakeholders in the sector. This is primarily a question of personnel. Decision-makers and senior staff in the regulatory organization must not be able to move easily between regulated entity and regulator, that is, no revolving door. This also includes separate oversight of potential conflict of interest by senior staff: they should not be able to hold securities in the companies that they regulate.

Financial autonomy. The third element to creating an autonomous regulator is to give it control over how it finances its activities. It is common for regulators to recover the cost of its activities from the sector they regulate. Conversely, decisions about allocation of its budget need to be in the control of the regulator itself rather than the government.

Regulatory accountability

Regulatory accountability is the other side of the coin of regulatory independence. Electricity regulators exist in the context of the broader government policy for the ESI. Therefore, while electricity regulators need autonomy from the government to operate effectively, they also require guidance on the policy context in which the regulator is making decisions.

Furthermore, regulatory accountability extends beyond government to the sector itself and the customers it serves. This requires that the regulator be transparent both in the way it performs its duties but also in regulatory decision-making. There are several aspects of regulatory accountability that are required:

- **Clear communication from the government to the electricity regulator on government policy priorities.** While general goals and objectives

for an electricity regulator may be set out in legislation, a clear communication from the government is necessary about its priorities and its expectations on what the regulator is expected to achieve in the coming year. Establishing such clarity provides useful guidance for regulatory policy work that the regulator might undertake and context for regulatory decision-makers when considering their decisions. One example from Canada is known as the “Mandate Letter” — a communication from the Minister of Natural Resources sets out the government’s policy views and expectations about issues that the regulator will need to address in the coming year. Other instruments can be used to the same end, for example, a ministerial approval required for the business plan of the regulator or, where permitted by legislation, a policy direction from the government to the regulator requiring it to develop particular policies, such as policies in support of a government goal for renewable energy.

- **Clear and transparent reporting from the regulator to the government.** The regulator needs to be held to account by the government for achieving the goals and objectives it has set in regulatory mandates and stated government priorities. The regulator needs to be able to explain both how the sector it oversees is functioning compared to the objectives set out for the sector in legislation and, more specifically, how effectively the regulator is carrying out its duties. This will require a regular (annual) report to the government on sector and regulator performance backed by suitable quantitative metrics.
- **Controls on regulator spending.** While a regulator must be sufficiently resourced, it must also be expected to manage its expenditures well. If a regulatory agency is inside a ministry, existing financial oversight mechanisms may well suffice. If the regulator is established as an independent

agency, with revenues raised directly by charges to regulated entities, oversight is needed to manage increases in costs of regulation. Furthermore, outside financial scrutiny (through audits, such as through the parliament’s auditor general) must ensure that the revenues collected are well managed.

- **Transparency in the regulator’s dealings with the regulated industry and the public.** The regulator can be accountable to those it regulates and to the public it serves by being transparent in setting out the processes it will use and consulting with industry stakeholders and members of the public and in setting out its own strategic priorities. Moreover, it can become the key agency in evaluating industry performance, publishing on an annual basis how the industry is doing against key performance indicators, such as rates, financial soundness, reliability and quality of service. Most important of all, transparent regulators need to publish their decisions along with the reasons for those decisions. Depending on the legislative context, these decisions can be subject to judicial review, providing a further independent level of oversight.

Regulatory governance in a market dominated by state-owned companies

This balance between regulatory independence and regulatory accountability is further complicated when the ESI remains dominated by state-owned utilities. In this case the government itself remains a major regulator of the industry even where an independent electricity regulator has been created. Government, often through the finance ministry, can exert a great deal of control over the sector, both in intervening in rate setting (by the provision of direct electricity subsidies), its different (and commonly lower) fiscal objectives for the state-owned electricity companies (in order

to lower rates) or its use of state-owned companies (often through the energy ministry) to invest in particular supply technologies (e.g., investment in large hydroelectric or nuclear power plants). In the market context, investors wishing to connect their shareholder-owned generators to the state-owned networks will be concerned about whether they will have access on nondiscriminatory terms, particularly when they are competing against state-owned generators.

While the electricity regulator can try to provide as level a playing field as feasible with state-owned and privately owned companies, it is the government that needs to act to ensure that competition can continue under these circumstances. First, a certain transparency is required; for example, the target rate of return for the SOEs and the investment goals for SOEs investing in particular technologies (e.g., nuclear power) needs to be disclosed publicly

More important is for the government to ensure that SOEs have a high standard of corporate governance. One of the observations of the World Bank report is that electricity companies, including state-owned enterprises, have better corporate performance in terms of efficiency and cost recovery when they have strong corporate governance. The report notes that indicators — including publication of accounts consistent with international financial reporting standards, the explicit definition of public service obligations, the ability to fire employees for nonperformance, the use of transparent hiring processes and the ability of the board of directors to appoint and remove the chief executive officer — are most strongly associated with efficient utility performance.¹⁶ Corporate governance reforms and establishing open accountability measures, similar to those used for independent regulators, can make the activities of state-owned companies more transparent.

The *G20/OECD Guidelines on Corporate Governance of State-Owned Enterprises*¹⁷ sets out useful principles to guide government oversight of state-owned companies. One of the key principles is that the government should ensure that the governance of SOEs is carried out in a transparent and accountable manner with a high degree of professionalism and effectiveness. These guidelines propose that relevant public bodies, including state audit institutions, oversee SOEs and that monitoring and reporting systems to measure SOE performance and their compliance with corporate governance standards be established.

Human resource reforms are a key reform to modernize the state-owned companies and improve their performance. In most countries, ESI workers are organized in trade unions often with very substantial job security. Market reforms and the expectation that the electricity supply mix may change profoundly in the coming years may result in changes that could have significant impacts on the existing workforce. Many reforms of state-owned companies relied on bringing the workers on board through representation on boards of directors, the negotiation of generous exit packages for older workers and commitments to retrain existing staff.

The existence of multiple loci of regulatory oversight necessitates the need for coordination. Nowhere is this need for coordination clearer than in electricity system planning. This aspect tended to be inadequately supported in the textbook approaches to reform as price signals aimed to replace central planning. In practice, most new resources are either procured through a government policy (such as a feed-in tariff or competitive auction) or through government-supported investments by state-owned generators.

¹⁶ Foster & Rana, 2020, p. 12.

¹⁷ OECD (2023), *G20/OECD Principles of Corporate Governance 2023*, OECD Publishing, Paris. <https://doi.org/10.1787/ed750b30-en>

While the planning function may reside within a system operator or a specialized government agency, the electricity planning process becomes a tool to engage the government, the customers, the ESI and the broader regulatory framework on the future of the electricity system.

Competencies

Carrying out the key regulatory tasks set out in Table 1 above requires regulatory staff that possess a broad range of competencies. The first competency, common to all, is that the staff be individuals of high integrity. Furthermore, it is vital that those holding senior positions in the organization be subject to strict conflict-of-interest requirements to ensure that they are not beholden to those that they regulate. Even a regulator with strong technical capabilities will be ineffective if it is perceived to lack integrity.

There are several areas of responsibility that require specific technical competencies. For example, the competencies associated with reviewing rate applications: business and accounting competencies to assess the reasonableness of the rate request, technical competencies to judge the reasonableness of the investment plans, legal competency to ensure compliance with applicable laws, financial expertise to assess the allowed rate of return on capital and economic competencies to assess the proposed rate designs.

The second area of responsibility that requires a wide range of competencies relates to the regulation of conduct of wholesale and retail market participants, including generators (and storage providers), transmitters, distributors, traders and retailers. The required competencies include the necessary technical legal and financial skills to craft sets of rules that are enforceable. This also requires competencies related to the system's collection and analysis of data to monitor market

participant behaviour, an ability to scrutinize information when needed through financial or technical audits and skills related to compliance and enforcement of the rules to encourage compliance by others. A particularly specialized economics expertise is needed to oversee wholesale electricity markets and to determine if larger players are abusing their dominant position in the market. Conversely, misconduct by retailers against customers requires an in-depth knowledge of consumer protection laws, significant investment by the regulator in call centres and associated support to hear and investigate customer complaints and compliance and enforcement officials to prosecute retailer misconduct.

Regulators also require more specific expertise in other areas. For example, for investment and security of supply, it is important that the regulator possess technical expertise to be able to scrutinize the overall system plan and gauge progress against that plan. This is important not only for resource adequacy, but also to ensure that supporting investments in transmission and distribution can also be made. Another example is ensuring compliance with quality-of-service standards, which requires the requisite technical expertise to ensure that data being reported is accurate.

With most of the new investment likely to be in variable renewables, the regulatory framework needs to ensure that the necessary supporting investments are being made, whether it is in flexible resources (including customer resources) to balance new renewable supplies or expansion of transmission and distribution systems to accommodate larger generation capacity. Therefore, competence in electricity system planning is necessary.

A vital but sometimes neglected competency is the role of the regulator in communicating with electricity customers and the broader public. Regulators are often entrusted with setting default

retail electricity rates and need to communicate these — and changes in such rates — to customers. As regulatory organizations become more involved in policing the conduct of regulated entities, it will be important for them to understand the views of the customers that these entities are meant to serve. This has proven particularly pertinent when markets are opened to retail competition, that is, when customers are offered their choice of supplier.

The rise of customer-based generation in recent years means that, even without retail choice, more customers are becoming directly involved in investing in and supplying the power system. To protect customer interests, regulators need to understand their needs better. Hence, there is a need for skilled public communications professionals to help the regulator to listen to customers and provide them with objective information.

Such public communications can also serve a broader purpose: with the breakup of vertically integrated (and often government-owned) utilities, customers need a new source of reliable information about the power system that they may need to engage. The regulator, since it continues to oversee the entire sector, has the potential to become that new source of information. Making the regulator a reliable source of information for the sector will also make it more likely that governments in the future will entrust the regulator with greater responsibilities.

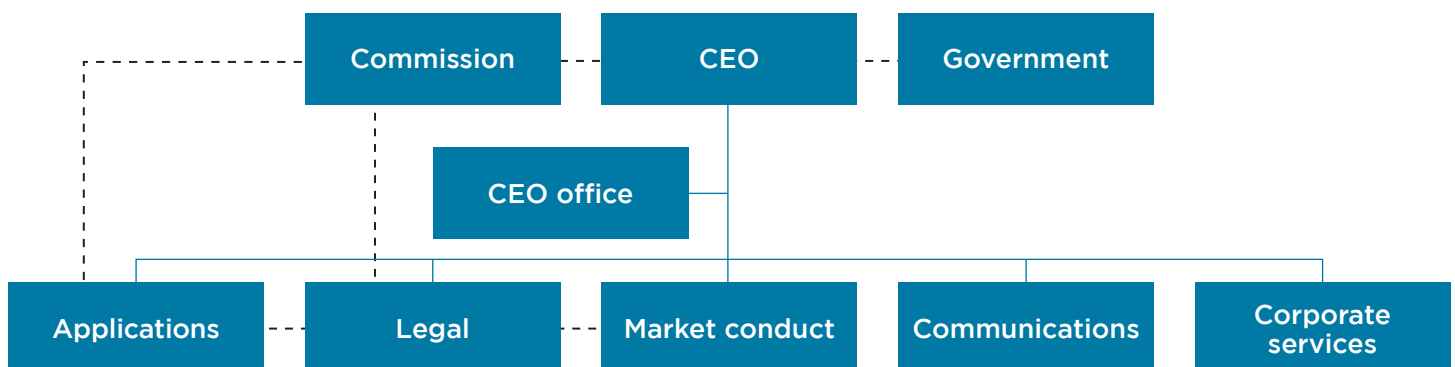
A final key competency demonstrated by all successful electricity regulators is an ability to evolve. The goals of electricity policy in both advanced and developing economies continue to evolve. A key competency of a robust regulatory framework is not just to manage the current responsibilities capably, but also to demonstrate its ability to evolve as the market and the policy context changes. In other words, the regulatory framework becomes a key instrument to assist the government and the ESI in managing this evolution.

Organization

While the regulatory framework may consist of several organizations involved in oversight, an independent electricity regulator is a key feature in many market reforms. Identifying a potential organizational structure for the electricity regulator can be helpful in elaborating what functions the regulator is expected to carry out and how these respective functions can be managed within one organization. When these responsibilities are allocated to several regulatory organizations, coordination and alignment of these regulators becomes an additional challenge.

Figure 3 (below) is a representative regulatory organization chart with the key functions identified.

Figure 3. Notional organization chart for an electricity regulator



Commission. The commissioners are the ones responsible for making decisions on rates and projects, supported by the applications and legal departments.

CEO and executive office. The chief executive officer is the individual responsible and accountable to the government for the regulatory organization. In addition to providing overall strategic direction to the organization and liaising with the government and others, the CEO is also responsible for the structure of the organization and for hiring senior executives to fulfil other roles.

Applications. Manage and support the work of the commissioners with respect to applications for changes to rates, approval of new projects (where the regulator has jurisdiction) and, where applicable, electricity plans requiring regulatory approval.

Legal. Supporting all legal needs of the organization. Providing legal advice on issues arising in applications and in enforcement of codes and rules as well as meeting internal legal needs.

Market conduct. This group comprises a series of functions to oversee the behaviour of market participants (generators, transmitters, distributors, traders and retailers). Included in the group are licensing of market participants, compliance and enforcement of the rules that apply to the licensees. Compliance and enforcement activities include the ability to investigate and audit the performance of licence holders and to initiate enforcement action (supported by the legal department) when a licensee is suspected of a breach of the rules. The market conduct group also monitors the financial reliability and quality-of-service performance of the regulated and licensed entities and issues regular reports of how the industry is performing against industry benchmarks. These include wholesale market surveillance, compliance and enforcement with licence conditions and rules, review of reported

data, audit of regulated entities and dispute resolution. The group also collects, analyses and publishes performance data about regulated entities.

Communications. The communication team has responsibility for all the public communications issued by the regulator. Major priorities include informing customers about changes in rates (particularly default electricity rates), customer rights regarding retail electricity contracts and the outcome of major commission decisions.

Corporate services. Responsible for all human resource, finance risk and corporate compliance functions.

Having identified the functions and competencies required for a strong regulatory framework, the question that arises is: How will the regulatory institution recruit and develop the technical and financial competencies that it will need to succeed? Lawyers, engineers, accountants, economists, auditors, enforcement and communications professionals are all required to fulfil various functions of the regulator.

In practice, the sector itself can attract more knowledgeable and experienced professionals. A few key senior hires can make a big difference: for example, a strong hire for the head legal position (general counsel) will attract a higher-quality legal team.

To attract this experienced talent to work for the regulator, compensation should reflect that industry than that typically paid to civil servants. It is therefore important to recognize that those working for the regulator, though working for a public body, will need to be subject to different compensation rules than for civil servants. As noted previously, senior positions will need to be subject to strict conflict-of-interest requirements to discourage a revolving door between the regulator and the regulated industry.

Chapter 4. Conclusions and Recommendations

Going beyond the textbook

Over three decades of experience with power market reform in both advanced and developing economies has underscored the importance of a strong regulatory framework to support an effective competitive electricity market.

The so-called textbook approach to power market reform recognizes that the scope of regulation needs to increase, as regulators take on responsibilities that were previously managed by the government or the utility, and regulatory oversight of the newly created wholesale and retail electricity markets is also required.

According to the textbook prescription, a strong regulator needs to be independent in its decision-making from both the government as well as the regulated industry itself. Effective regulation requires regulatory staff with a range of competencies. At the same time, the regulator itself needs to be accountable, to be aligned with government policy, to limit its increases in budget, and to be transparent to the industry and customers alike.

But the reality is that the textbook approach could fall short, particularly in developing economies where continued state ownership of the key players in the sector remains common. For example, setting rates that recover all costs including a return on investment has proven difficult under state ownership, and resource procurement processes have been less transparent.

Moving beyond the textbook requires the recognition that these common conditions — where state ownership of the ESI continues to predominate after market reforms are introduced — mean that, while a strong electricity regulator is a necessary condition of effective regulatory governance of the ESI, it is not sufficient. A strong electricity regulator needs to be complemented by effective government oversight of the electric SOEs.

Recommendations for improved regulatory governance

Establish a strong electricity regulator. This regulator must have the autonomy to make decisions about tariffs and the other regulatory tasks assigned to it, independent of government and of the sector it regulates. Requiring the regulator to carry out its duties in a transparent and efficient manner, with its decisions subject to independent reviews, will ensure its accountability. The regulator will need to have the necessary competencies to carry out its mandate, including finance, accounting, technical and legal expertise and an in-depth knowledge of the sector being regulated. In addition, the regulator will be overseeing wholesale and retail electricity markets, which will require specialized technical, economic and legal knowledge (in the case of wholesale and retail markets) and consumer protection skills (in the case of retail markets).

Ensure all key regulatory oversight tasks are allocated to a responsible body. The most important aspect of this recommendation is to ensure that all responsibilities are allocated and that none are neglected or left ambiguous. This has been a problem particularly with oversight of electricity planning and quality of service. The main oversight responsibilities — setting electricity rates, approving investment plans, overseeing procurements and the oversight of market participants — all need to be allocated to a regulatory institution. While many of these responsibilities might be allocated to an electricity regulator, certain responsibilities such as procurement could be managed separately through a specialized government agency. Monitoring and enforcement of competition law in the electricity sector could be the responsibility of the national competition authority.

Improve the corporate governance of the ESI state-owned enterprises. The need for this will vary by jurisdiction but could include:

- Reform corporate governance to ensure that boards of directors of the state-owned companies have independent members to review corporate performance.

- Reform hiring practices and compensation systems to ensure that the most highly qualified candidates are hired and retained.
- Improve working relationships with unions to make them partners in reforming SOEs.
- Set explicit financial targets (for rate of return, capital structure) for state-owned electricity companies (ESI SOEs).

The creation of a strong independent regulator and the allocation of regulatory responsibilities and improvements to their corporate governance of the electricity SOEs will allow jurisdictions introducing electricity market reforms to have a greater chance of succeeding in establishing an effective, competitive electricity market. Strong regulatory institutions will also become a key instrument to assist the government and the sector to manage future changes as the market and policy context evolves.



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