

## Assessing the Electricity Sector Reform Paradigm



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### Definitions

Over two decades ago, electricity sector reform has been a central policy path in most developed and developing countries. The motivation for this reform in a previously state controlled/monopoly of the sector is to generate efficiency through the introduction of competition in the industry. Modelling from Chile's reform experience in the 1980s, many countries world over have implemented a number of electricity market reforms including restructuring, liberalization, privatization, corporatization, commercialization, independent regulatory agency, independent power producers, unbundling, and wholesale electricity markets (Jamasb et al. 2005; Zhang et al. 2008; Erdogdu 2014; Urpelainen and Yang 2019). According to the World Bank (1999, 2019), the term restructuring implies the reorganization of the roles of the market players in the electricity sector for greater efficiency; liberalization denotes the removing of restrictions on entry and exit into the electricity sector to make it more competitive and open to prospective private

investors; privatization is the selling of government-owned assets to private sectors to restore financial discipline and improve productive and cost-efficiency. In the same vein, corporatization refers to the transformation of state-owned assets into corporation in order to operate on commercial terms; commercialization is the concession of the management of the electricity sector to an enterprise principally for financial gain; independent regulatory agency involves creating and authorizing independent regulatory agencies to set electricity tariffs, issue licenses, and enforce regulatory policies; similarly, independent power producers involves the allowing of private investors to set up their own generation facilities even without comprehensive reform; unbundling means vertical and horizontal restructuring to separate generation and retail activities from the natural monopolistic segments, such as generation, transmission and distribution; and wholesale electricity market involves the creation of wholesale energy market to allow competitive suppliers and marketers to generate electricity, access to the grid, and facilitate trade among suppliers and between buyers and sellers.

### Introduction

Several factors such as technological, economic, and sector's inefficiency necessitated the need for electricity reforms (Pollitt 2012). More specifically, one argument for electricity market reform

is that public ownership is less efficient than private ownership (Chiara and Florio 2012). In a similar study, Jamasb et al. (2005) and Erdogdu (2014) identified the pull and push factors as responsible for motivating electricity sector reforms. The pull factors include the signaling effects of the revolutionary power sector reforms in Chile, Norway, and England during the 1980s and early 1990s; encouragement of reforms by IMF and World Bank as well as other international financial organizations; the advent of rapid technological development in the electricity generation and distribution value chain. On the other hand, the push factors include the underperformance that characterized the state controlled power sectors; unreliability of power supply; inadequate state funding and expansion of electricity assets; and the need to make the sector competitive and to remove electricity subsidies so as to channel public funds to critical areas of expenditure. However, emerging evidence suggests that there exist noticeable differences between reforms expectations and its actual outcomes. In many cases, technically sound principles do not translate well in practice, resulting in problems and chaos (Sioshansi 2006). This disparity may be a reflexive of differences in reform models as well as institutional and political commitment to reform. Countries with strong political commitment and strong institutional frameworks (i.e., Norway, Switzerland, Sweden, and Great Britain) are characterized with greater improvement in their power sectors. Others, especially from developing countries (i.e., Nepal, Namibia, Yemen, and Nigeria), have continued to struggle with reform due to weak institutional framework and lack of political commitment. As observed by Jamasb et al. (2017), a holistic review of the impact of power sector reforms on several key macroeconomic variables such as energy supply quality, economic growth, energy prices, utility performance, poverty reduction, and social welfare has produced mixed results. After more than two decades of electricity sector reforms, it is therefore crucial to revisit the reform process and models and draw out policy lessons given that successful implementation of electricity reforms could lead to improvement in electricity access

and reliability, enhance the efficiency of the sector, and increase in the sector's investment.

## Overview of Power Sector Reform Paradigm

Power sector reform paradigms are policy frameworks put in place to restructure the power sector away from continued government monopoly. In the early 1980s and following the reform of the power sector in Chile, the problem with state monopoly of the sector became clear, as state-owned vertically integrated monopolies displayed poor technical performance with financial crises. According to Urpelainen and Yang (2019), power sector reform paradigm can be categorized into two, namely, the hybrid reform model and the textbook or standard reform model. The hybrid model involves the coexistence of state-owned utilities and private investment. In this wise, the sector is not completely unbundled, privatized, nor fully competitive – the sector is not solely owned or operated as a monopoly, though, the major segments of the sector are still controlled by the state. The hybrid market arrangement marked the beginning of restructuring of the power sector, and it paved way for the introduction of textbook reform model. The textbook reform model started in the early 1980s, and it was first applied in Chile in 19982, UK in 1990, and Norway in 1991 (Newbery 2005; Joskow 2008). The elements of this reform model include introduction of independent power producers; establishing independent regulatory agencies; vertical unbundling of the sector into different segment – generation, transmission, and distribution; corporatization of state-owned enterprise; and the enactment of electricity acts for the sector's liberalization (Gratwick and Eberhard 2008; Sen 2014). These reform steps gave way for the eventual privatization of electric utilities, establishment of wholesale markets, and allowing customers to buy electricity from competitive retail suppliers. These changes are more fundamental than the hybrid reforms, as they gradually reduced state monopoly of the sector and allowed for more market-driven reforms.

Foster et al. (2017) categorized the 1990s power sector reform model into four structural reforms. The first reform step is regulation which involves the establishment of independent regulatory authority to hold utilities accountable for their operational and financial performance. The second is the restructuring of the sector by gradual implementation of vertical and horizontal unbundling of the incumbent state-owned monopoly. The third reform step involves the introduction of private sector participation in the sector to boost the capital requirement for the sectors expansion and operational efficiency. The fourth step is competition, which involves the creation of wholesale electricity market to allow competitive suppliers and marketers to generate electricity, access to the grid, and facilitate trade among suppliers and between buyers and sellers. Notably, the various elements of the 1990s power sector reform model were seen as mutually complementary (Bacon 2018). Although these reforms have not progressed without challenges, however, the general focus of public policy has increasingly supported reform in sectors that were previously dominated by state monopolies. According to Erdogdu (2013), market-driven reforms are still ongoing in many countries, while the reform process in the electricity sector is regarded as not only possible, but also inevitable. In many countries electricity sector reforms are incomplete with stalled progress, either moving forward slowly with considerable resistance or moving backward, despite the success of these reforms in the UK, EU, Nordic countries, New Zealand, Australia, etc. (Streimikiene and Siksnielyte 2016).

The World Bank (2019) observed that only about a dozen developing countries have been able to adopt the full reform package, while many others have barely got started. Reforms tended to advance much further in middle-income countries with larger power systems, particularly in Latin American and Eastern Europe. However, in the vast majority of developing countries, reforms were adopted rather selectively, resulting in a “hybrid model” where elements of market-orientation coexisted with continued state dominance of the sector. It is believed that adopting the standard or textbook reform model leads to

greater efficiency of the sector; however, assessment of reform models and reform experience across countries indicates that electricity sector reform in most countries have not transmitted into competitive electricity market, and hence, consumers are yet to reap the full benefits from the several episodes of reform. In 2015, the adoption of Sustainable Development Goal 7 and the Paris Climate Accord expanded the scope of electricity sector reform with new emphasis on electrification and environmental sustainability which were not taking into cognizance in the 1990s electricity reform models.

## Electricity Sector Reform in OECD

Prior to the reform of the electricity sector in Chile in the 1980s, the electricity sector in most OECD countries were state owned and vertically integrated utilities with public ownership of the generation, transmission, and distribution segments of the industry. However, over the last three decades, most OECD countries have implemented electricity sector reforms in varying capacities and have introduced free entry to generation while allowing electricity consumers to choose their suppliers. Notably Chile, UK (The first OECD country to restructure its electricity industry), Germany, USA, Norway, Finland, and Sweden have pioneered the reform process focusing on market-centered reform with increasing disposition to privatization of the generation and supply segments of the industry. Australia and New Zealand also adopted similar reforms with deepening of the competitive market. Some OECD countries such Canada, Estonia, Iceland, Mexico, and Turkey have also restructured their electricity markets with far-reaching impacts on the economy, but in these countries, the largest companies in the electricity sector still remain under full public ownership (Asane-Otoo 2016). On the other hand, France has adopted a different reform model aimed at strengthening the dominant national utility provider in the electricity sector. Also, Germany and France are yet to unbundled their transmission system operators like some OECD countries. However, in assessing the impact of

electricity reform in OECD countries, some studies opined that reforms have significantly improve the sector's performance ((Zhang et al. 2008; Steiner 2001; Bacchiocchi et al. 2015; Polemis 2016; Polemis and Thanasis 2017; Urpelainen et al. 2018). In contrast to the aforementioned studies, Pollitt and Haney (2013) observed that there is no evidence that the electricity sector reform in some OECD countries have been more successful than elsewhere. Anaya (2010) stated that even Chile and Argentina have experienced power sector problems although being the most illustrative examples of successful market-based reform in Latin America. In the same vain, Nepal and Jamasb (2015) found that private ownership of the sector in countries such as Japan, Germany, and the USA had occurred before the 1980s and has been pervasive throughout the 1990s. This view is similar to Michael (2016) who opined that privatization has ambiguous effect on electricity performance in most OECD countries. Despite the disparity in performance, the perceived success in early reforming countries such as the UK, Chile, Nordic countries, Australia, New Zealand, and other OECD countries substantially motivated reform in developing countries.

## Electricity Sector Reform in Non-OECD Asia

Electricity reform in most non-OECD Asia countries began in the late 1990s. Prior to electricity sector reforms in Asia countries, the state was solely responsible for the provision of electricity through vertical integrated utilities. The electricity supply value chain such as generation, transmission, distribution, and retailing activities were publicly owned and controlled. Two major factors were responsible for electricity reform in non-OECD Asia, namely, the electricity sector inefficiency and the Washington Consensus of 1989. Notably, the push emanating from the Washington Consensus and the pressure from International Monetary Fund and the World Bank forced many Non-OECD Asia countries to reform their electricity sectors as a prerequisite to access loans (Williamson 2005). In specific, World Bank's

Electricity Sector Lending Policy of 1993 mandates developing countries to show evidence of real commitment to electricity sector reform. The widespread electricity sector reform in non-OECD Asia was the introduction of independent power producers (IPPs), the establishment of independent regulatory agencies, restructuring which entails vertical and horizontal unbundling of the utility as well as corporatization. Few countries such as Singapore, the Philippines, Indonesia, and India have introduced Open/Third-Party Access and privatization of the distribution segment in order to bring about competition in the sector.

The pace of electricity sectors reforms in these countries differ considerably in terms of size, structure, and resource mix. While Thailand and Malaysia have developed their IPP markets by letting private generators build greenfield projects, the Philippines and Singapore have created it by privatizing the generation assets of the dominant state utilities (Sent et al. 2018). Indonesia and Vietnam are increasing the capacity of public spending to attract IPP investments. China, the Philippines, and Vietnam implemented corporatization before vertical unbundling (Dupuy et al. 2015). Similarly Jamasb et al. (2017) noted that IPPs have now been predominant in Asia market, particularly in Indonesia, the Philippines, China, Pakistan, India, Malaysia, and Thailand under a single-buyer model. Overall, many developing countries are still few distance away from the full implementation of liberalized standard model and transition from state control to markets. In Table 1, most of the countries except Indonesia and Bangladesh have established independent regulatory agencies. However, in most cases these agencies are not truly independent from government, and regulators are still battling with costs reflective tariff. Despite these reforms, the region has been characterized by continued problems of sector's inefficiency, weak institutions, and financial and technical challenges. Eberhard et al. (2017) observed that IPP projects in Asia have faced significant challenges due to increasing pressure on profit margins, rising competition, and access to finance. Sen and Jamasb (2012) revealed that electricity performance tended to

**Assessing the Electricity Sector Reform Paradigm, Table 1** Status of electricity reforms in non-OECD Asia

	Independent power producers	Regulator	Unbundling	Corporatization	Open/third-party access	Distribution privatization
Vietnam	√	√	√	√		
Thailand	√	√	√	√	√	
Singapore	√	√	√	√	√	√
Philippines	√	√	√	√	√	√
Pakistan	√	√	√	√		
Nepal	√	√	√	√		
Malaysia	√	√	√	√		
Indonesia	√		√	√	√	
India	√	√	√	√	√	√
Bangladesh	√		√	√		

Source: Sen et al. (2018)

worsen in India rather than improve in the early stages of reform. Similarly, the study by Ahmed and Bhatti (2019) found that the implementation of unbundling, independent regulatory agency, and third-party access in most Asian countries do not necessarily improve the sectors' performance. This view is confirmed by Erdogdu (2011) who found that some specific features in reforming countries such as income level and the political support for reform are major determining factors of reform success rather than reform in itself. The identified reform lapses reinforce the assertion that the "textbook" model of reform in its original form is incompatible with the contexts of non-OECD developing countries' electricity sectors (Sen et al. 2018). Further, evidence has shown that the power sector is highly politicized especially in developing countries, with reform announcements providing no guarantee of sustained reform implementation (World Bank 2019).

## Electricity Sector Reform in Sub-Saharan Africa

Over the last two decades, the electricity sectors in Sub-Saharan Africa were dominated by state-owned and vertically integrated power companies with few or no private sector participation. The Volta River Authority was dominant utility company in Ghana. In Namibia, Nampower was the

main electricity company. In Mali, Energie du Mali Société Anonyme (EDMSA) controlled the electricity sector. In Tanzania, it was Electric Supply Company (TANESCO). Eskom dominated the electricity sector in South Africa, and the National Electricity Power Authority (NEPA) was in charge of the power industry in Nigeria.

Following the reform experience in developed countries in the beginning of the 1980s and early 1990s, Sub-Saharan Africa began exploring new models of electricity market by unpacking the traditional monopolies model of the industries. Among the pressing reasons for electricity reforms in these countries are the inability of government to generate adequate fund for the sector's development and expansion, the dissatisfaction over the inefficient management of the sector, and the poor security of supply due to a lack of generation capacity.

In line with this development, Cote d'Ivoire was the first to initiate the process of power sector reform in 1990; South Africa in 1994; Ghana in 1997; Kenya in 1998; Uganda in 1999; Gambia, Mauritania, Rwanda, Tanzania, and Malawi in 2001, respectively; Zimbabwe in 2002; and Nigeria in 2005 with the establishment of the Electric Power Sector Reform Act (EPSRA).

These reforms have introduced new development to the operation of the power sectors with major changes to utility structure, ownership, governance, and the regulatory framework. In most cases, reforms have resulted in hybrid

power markets, where independent power producers and state-controlled utilities mutually operate without element of competition in the sector (Eberhard 2015). In this wise, the electricity market is operated in the form of partial private and public ownership through management contracts, concessions, and equity. However, the most common of these reforms have been the implementation of independent power projects. Notably, of the 49 Sub-Saharan Africa countries, 29 have implemented independent power producers; 12 of these countries with independent power producers, however, still have vertically integrated electricity sectors. Also, about seven of these countries with independent power producers have unbundled their vertically integrated electricity sector into distribution, generation, and transmission segments controlled by different companies with varying levels of privatization and corporatization (Eberhard and Gratwick 2015).

Specifically, Kenya, Nigeria, Uganda, Ghana, and Cote d'Ivoire have unbundled, established independent regulatory agencies, corporatized utilities, involved independent power producers and enacted electricity laws. Mali, Rwanda, Ethiopia, Namibia, Angola, and Mozambique have vertically unbundled and corporatized their electricity sectors. Tanzania, Zimbabwe, Botswana, Congo Rep, Burkina Faso, Gabon, and Guinea have exhibited reluctance toward reforms and hence have low patronage of private investments as the electricity sectors remain predominantly state controlled and vertically integrated. Reforms have been relatively effective in Mauritius, Ghana, and South Africa due to effective market structures (Eberhard and Gratwick 2015). Evidence indicates that electricity sector reforms in most countries in Sub-Saharan Africa have not transmitted into competitive electricity market, and hence, consumers are yet to reap the full benefits from the several episodes of electricity reform in the region. Given these challenges, the question arises whether reform model pioneered in the developed countries is helpful in solving the electricity crises in Sub-Saharan Africa. Electricity reform in Sub-Saharan Africa often occurred within ill-defined institutional and legal contexts;

hence the states still control the power sectors despite reforms. Eberhard (2015) observed that since the inception of sector reform in Sub-Saharan Africa, no country has accomplished the shift to a fully vertical and horizontal unbundling with private investors led electricity sector and that most Sub-Saharan Africa countries have not adopted the standard model of reform. Eberhard et al. (2017) further opined that most governments in the region have shown little or no concern in attracting private investments and reform programs were initiated without sufficient human resource with requisite skills and experiences regarding the nature and complexities of the electricity sector. Nepal and Jamasb (2012) observed that a more serious problem in power sector reforms in developing countries is that there is often great resistance to reform as compared to developed countries, and even when reforms are implemented, the political processes and institutions in developing countries often adapt themselves to counter the effect of reforms in different ways. Similarly, Gregory and Sovacool (2019) found that electricity poverty in some Sub-Saharan Africa countries including Kenya, Tanzania, and Mozambique is worsened by the government's inability to finance the construction of new electricity infrastructure in the region due to the excessive risks and volatile business environment that make such investment unattractive to the private sector. In 2015, nearly two-thirds of Sub-Saharan Africans, or 630 million people, lacked access to electricity (IEA 2016a). In view of this, Gore et al. (2019) stressed that the poor performance of the electricity sector and the divergence in reform activities in Sub-Saharan Africa is not due to lack of knowledge of "best practices but solely a decisions to embrace certain reforms, based on political consideration about which reforms respond to country's domestic political history, conditions and contemporary needs".

## Electricity Sector Reform Drivers

The drivers and magnitude of electricity sector reforms differ considerably among countries due to differences in industry composition, resource



endowment, institutional factors, and the degree of legal and regulatory frameworks. However, evidence suggests that electricity sector drivers in developed countries are not the same from those of developing countries. In developing countries, the major forces driving reform were the poor performance of state controlled electricity sector, the successful reform pioneered in developed countries and the fiscal burden of the sector on government revenue (Bacon 2018). The electricity sectors in developing countries were characterized by operational inefficiency and high cost, electricity supply shortages, insufficient electricity generating capacity, the need to remove subsidies in the electricity supply industry, and channel the resources to other pressing public needs as well as poorly maintained distribution and transmission networks. Jamasb et al (2016) opined that the electricity sectors of most developing countries were fraught with inefficient management and fiscal challenges as they could not generate adequate fund for the sector's development and expansion. Prior to reform, the issue of cost recovery and underpricing was prevalent in the electricity sectors of developing countries. In specific, about two-thirds of African power utilities set tariffs lower than cost, with only one-fifth of them charging prices that cover their full capital cost (Kessides 2012). Reforms were further driven by the deteriorating fiscal condition of public fund occasioned by volatility in international commodity prices and economic dynamics such as oil price hike, currency devaluation, and debt crises. There was also pressure for electricity sector reform by international financial agencies including the World Bank and the IMF as a precondition for accessing loan as contained in the World Bank's Electricity Sector Lending Policy of 1993 (World Bank 2019).

In developed countries, electricity sector reform were necessitated by the need to share investment risks with the private sector, offer customers' choice of utilities suppliers, reduce electricity prices, enhance economic efficiency, and improve electricity service quality (Jamasb et al. 2016). Reform was also driven by the need to take advantage of more efficient technologies such as the combined cycle gas turbine (CCGT) that could

lower generation costs in order to reap the benefits of economies of scale. Power sector reform was seen as a means to reduce prices for consumers while raising proceeds for the national treasury in developed countries (Bacon 2018). Reform was also necessitated by the need to introduce pricing mechanism in the electricity industry by fostering competition and leading to improved efficiency and lower energy prices (Yang and Sharma 2012) (Table 2).

### **Implication of Reform Outcomes for Sustainable Development Goal 7**

The increasing importance of electricity supply in the global economy cannot be overemphasized. Reliable and affordable electricity access is considered a key ingredient of economic and social development as contained in the Sustainable Development Goal (SDG). It is fairly settled in the literature that electricity plays a critical role in human well-being and the economic development of any economy (Nilsson et al. 2013). Thus, countries that are able to provide adequate electricity for its citizens are richer, more resilient, and better equipped to advance human development. Lack of adequate electricity supply constrains opportunities for income generation, hampers human development, and contributes to poverty. This problem is widely recognized in the SDG7, which seeks to "ensure access to affordable, reliable, sustainable and modern energy for all." IEA (2017) observed that the outlook for universal electricity access indicates that global efforts between 2016 and 2030 must increase to 0.8% points annually to reach universal access by 2030. If access deficit countries fail to make significant progress, there would still be about 674 million people without electricity access in 2030 (IEA 2017). In achieving this goal, many countries have carried out electricity sector reform to enhance electricity access, stimulate new investment, adopt new technology, and make utility affordable.

The standard reform model that emerged from Europe and Chile has been widely adopted in reforming countries. However, despite the

**Assessing the Electricity Sector Reform Paradigm, Table 2** Drivers of electricity reforms in developed and developing countries

Electricity sector drivers	Developed countries	Developing countries
<b>Internal drivers</b>	Excess capacity Use of costly generation technologies Economic inefficiencies Growing consumer demand for cheap energy	Lack of public investment to meet growing demand Institutional inefficiencies, burden of price subsidies High electricity losses, poor quality of service and coverage Capacity shortages, under investments in the sector
<b>External drivers</b>	Lack of political and economic ideologies: faith in the market, competition, and privatization OECD energy deregulation: creation of new energy multinationals looking for new investments opportunities Technological innovation: for instance, the development of Combined Cycle Gas Turbine (CCGT) plants	Macroeconomic factors: such as the post-Soviet economic transition (1989), Latin American debt crisis (1980s), Asian financial crisis (1997–1998) Lending policies of donors: such as those of the IMF and World Bank with strings attached National economic reform context: for example, the result of economic crisis and structural adjustment programs

Source: Jamasb et al. (2016)

increasing wave of electricity sector reform across the world, many low-income countries are still far from achieving the SDG goal of universal electrification by 2030. While Europe and Latin America have electrification rate of almost 100% (REN21 2016), about 1.2 billion people (approximately 17% of the world population) live without electricity (IEA 2016b). It further stated that of the 1.2 billion people without electricity access, 591 million are in Sub-Saharan Africa, 378 million in South Asia and 99 million are in East Asia and Pacific region. While East Asia and South Asia are broadly on track to nearly close its access gap by 2030 due to the increasing pace of new connections in recent years, the challenge is most acute in Sub-Saharan Africa, which accounts for 40 of the world's 51 low-access countries (World Bank 2014). Against this backdrop, Sub-Sahara Africa may become the only region lagging behind from achieving the SDG7 of universal electrification by 2030 due to her increasing share of population without access to electricity (Karplus and Hirschhausen 2019). This reinforces the assertion that electricity sector reform in developing countries was relatively unsuccessful compared to developed countries (Bacon 2018). Various factors have contributed to varying degrees in electrification efforts in reforming countries. Gratwick and Eberhard (2008)

observed that the market-based reform model was largely designed to suit the electricity sector of developed countries without taking into cognizance the peculiarities of developing countries electricity structure. As such, developing countries were selective about the policy recommendations, an approach that produced various reform outcomes. Markedly, market driven reforms among OECD countries like Chile, Norway, New Zealand, the UK, and Sweden were adjudged successful, while reform in Sub-Saharan African countries like Congo Rep, Namibia, Zimbabwe, Uganda, and Zambia remains abysmal due to weak institutional framework and continued government intervention in the process (Jamasb et al. 2016). Electricity is one of the main inputs to economic growth and development. Any programs and policies that increase access to electricity supply are expected to generate positive impacts on economic welfare and growth and also reduce poverty.

The overarching evidence from literature suggest that most developing countries currently lack the required infrastructure to ensure access to affordable, reliable, sustainable electricity for its citizens (IEA 2014). Therefore, for developing countries to meet the United Nation's Sustainable Development Goal of universal electrification by 2030 requires a significant scale-up of electricity



infrastructure. Recognizing the fact that electrification is a long-term investment and a necessary input for economic transformation, plans to increase electricity access should not be evaluated only on short-term benefits. Against this backdrop, a wide array of stakeholders including governments, private sector players, international financial organizations, and multilateral development must play critical role in fostering rapid electrification in developing countries.

## Conclusion

This entry has assessed electricity reform models, reform, process and reform outcomes of developed and developing countries. In all reforming countries (whether developed or developing), the reform process varies in terms of objectives, sector structure, political structure, and institutional framework. In most cases, the scale and magnitude of reform in each country are determined by the political structure of that country. However, most developing countries have tended to adopt the reform models and design implemented by developed countries, a model which does not fit into their electricity structure. As a result, reforms have been ineffective, incomplete and fraught with several.

Evidence from the literature showed that although the market-driven model was shown to deliver positive outcomes in developed countries, however, the reform in developing countries have been limited after more than two decades of reforms. Notably, the pricing reform continues to be one of the daunting challenges facing policymakers in the electricity sectors of developing countries. Efforts to rebalance tariffs have been encountering considerable public opposition on social equity grounds. Thus, there is an urgent need for developing countries to identify electricity pricing schemes that incentivizes private investors while striking a balance between economic efficiency and social equity. Furthermore it is observed in the study that differences in electricity sector performance across reforming countries are manifestation of the nature of institutional and regulatory framework. Weak institution and

ineffective regulatory framework that characterized the electricity sector in developing countries could dim the chances of private investment in the sector. In this wise, while strengthening the institutional and regulatory framework, developing countries are encouraged to focus and adopt local electricity models and solutions based on country capacity, resources, and needs rather than concentrating on the standard reform model, a model which has remained work in progress.

## Cross-References

- [Determinant of Electricity Consumption in Nigeria](#)
- [Electric Mobility](#)
- [Electricity](#)
- [Electricity Generation from Renewable Resources](#)
- [Energy Consumption: Strategies to Foster Sustainable Energy Consumption](#)
- [Energy Efficiency](#)
- [Energy Supply](#)
- [Microgrids: Impact on Development of Sustainable Electric Energy Systems](#)
- [OFF-Grid Sustainable Energy Systems for Rural Electrification](#)
- [Universal Access to Energy and Sustainable Development](#)

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