

# Learning from Power Sector Reform

## The Case of Kenya

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## Abstract

Two successive waves of reform have fundamentally altered the structure and organization of Kenya's vibrant power sector, which boasts a tradition of strong technical and commercial performance. In the first wave—beginning in 1996 and largely donor-driven—policy and regulatory functions were separated from commercial activities; generation was unbundled from transmission and distribution; cost-reflective tariffs were introduced; and generation was liberalized. In the second wave—beginning in 2002 and led by domestic reform champions—the thrust of first-wave reforms was continued, with the strengthening of independent regulation, partial privatization of the generation company (KenGen), and establishment of complementary

entities. Although the government retains majority ownership of the largest power utilities in the country (Kenya Power, ~51 percent; KenGen, ~70 percent), Kenya has been able to position itself as one of the foremost destinations in the region for private energy investment. The reforms have improved the operational efficiency of the sector, increased cost recovery, and captured a significant amount of private sector investment. At the same time, the state has remained an important investor, playing a pivotal role in expanding generation capacity, scaling up electrification at an exceptionally rapid pace, and leading diversification toward geothermal energy. Political influence in sector decisions remains significant, in planning and tariff reviews.

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# Learning from Power Sector Reform: The Case of Kenya

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<sup>2</sup> Research for this paper was conducted by David Mwangi in Kenya. Valuable guidance was provided by Zubair Sadeque and Laurencia Njagi of the World Bank Country Team for Kenya.

## Foreword

Rethinking Power Sector Reform, a multi-year global initiative of the World Bank's Energy and Extractives Global Practice, provides an updated assessment of experiences with power sector reform across the developing world. Its goal is to refresh our thinking on power sector reform by analyzing lessons learned over the past 25 years in countries that have undertaken various types of reforms, and by articulating a new vision based on that analysis. Critically, the initiative examines how the recent technological trends and business models that are disrupting the sector may call for new reform strategies.

Since the 1990s, a standard set of policy prescriptions for power sector reform has been widely used. Those prescriptions include vertical and horizontal unbundling of power utilities; private sector participation; creation of an independent regulator; and competition in power generation (with associated cost-recovery pricing). Although this package of reforms was adopted, at least partially, by several developing countries, momentum and uptake slowed considerably in the 2000s, and it is past time to revise our approaches in the light of experience, evidence, and technological advances.

It is our hope and intention that the revision will provide practitioners with a flexible frame of reference that can help them identify the types of reforms most likely to improve the performance of the power sector in a given country context.

With support from the World Bank's [Energy Sector Management Assistance Program](#) (ESMAP) and the [Public-Private Infrastructure Advisory Facility](#) (PPIAF), Rethinking Power Sector Reform works with partners and experts across the World Bank Group and beyond to generate evidence, analysis, and insights on key themes of interest to power sector reform practitioners and decision makers. Findings and recommendations will be published in a forthcoming report.

The research undertaken by the initiative is grounded in an in-depth exploration of the 25-year reform journey of 15 World Bank Group client countries that represent a wide variety of geographies, income levels, and approaches to reform. The countries are Colombia, Dominican Republic, Arab Republic of Egypt, India, Kenya, Morocco, Pakistan, Peru, Philippines, Senegal, Tajikistan, Tanzania, Uganda, Ukraine, and Vietnam.

An important output of the project is a series of case studies—of which this is one—that provide a narrative of the reform dynamics in each country and evaluate the impact of reforms on key dimensions of sector performance, including security of supply, operational efficiency, cost recovery and energy access. With respect to a subset of countries that pursued deeper reforms—Colombia, India, Peru and the Philippines—the project also includes a series of free-standing case studies that evaluate experience with wholesale power markets. The purpose of all the case studies is to reflect upon the experiences of individual countries, with a view to extracting lessons of broader interest to the global community. It is not the role of these papers to recommend, let alone prescribe, any particular approach in any particular country or context.

These case studies, which constitute companions to an eventual flagship report, are being published in the World Bank's Policy Research Working Paper series. As such, they represent the views of the authors alone and should not be attributed to the World Bank Group or to any other person or institution.

## 1 Introduction: Successful reforms built on a firm foundation

Kenya was one of the first countries in Sub-Saharan Africa to institute market-oriented power sector reforms. The far-reaching reforms have achieved much, but challenges remain.

A first wave of reform commenced in 1996, thawing a donor-coordinated five-year freeze on sector funding. To meet the conditions of the new funding agreements, generation was split from transmission and distribution, the first two independent power producers (IPPs) began operation under seven-year contracts, and tenders for two larger 20-year IPPs were floated. In addition, the Electric Power Act of 1997 was passed, an independent Electricity Regulatory Board (ERB) established, and tariffs adjusted to 75 percent of long-run marginal cost. These steps are illustrated in figure 1.

A second wave began in 2002, this one led by local champions with the support of newly elected President Mwai Kibaki. Momentum built through the advancement of a new locally derived policy. Sessional Paper No. 4 of 2004 on Energy set the basis for passage of the 2006 Energy Act. Soon after, the Kenya Electricity Generating Company Limited (KenGen), was partially privatized through an initial public offering of 30 percent of its equity on the Nairobi Stock Exchange, increasing transparency and efficiency. The ERB was transformed into the Energy Regulatory Commission (ERC) in 2007, giving it greater independence and authority. In the process, its mandate was enlarged to include regulation of renewable energy and downstream petroleum activities. The Energy Tribunal was established at the same time to deal with appeals and disputes arising from ERC decisions. The sector was further restructured, with the establishment of the Rural Electrification Authority (REA) in 2007; a separate transmission company, Kenya Electricity Transmission Company (KETRACO), in 2008; and the Geothermal Development Company (GDC), also in 2008. The main institutions of Kenya's power sector are described further in box 1.

In the wake of these reforms, Kenya Vision 2030 was launched in 2008. A 22-year development plan, it sets out a path to Kenya becoming an industrializing, middle-income country by 2030. Much of the plan depends on the continued development of the energy sector, and power subsector, in order to support industrialization, the advancement of modern infrastructure, and socioeconomic development through increasing the access, availability and quality of supply. Some notable advances have been made in this regard, including increasing electricity access to around 75 percent,<sup>3</sup> moving to a position of 'surplus' capacity through a more resilient technology mix<sup>4</sup> with total generation now at 2,370MW, improved operational efficiency of the sector, and the successful attraction of private sector investment into independent power projects (of which there were 12 in 2017). While some of these outcomes can be linked to sector reforms, others—including in particular electrification and geothermal power development—depended critically on concerted action and significant funding from the government.

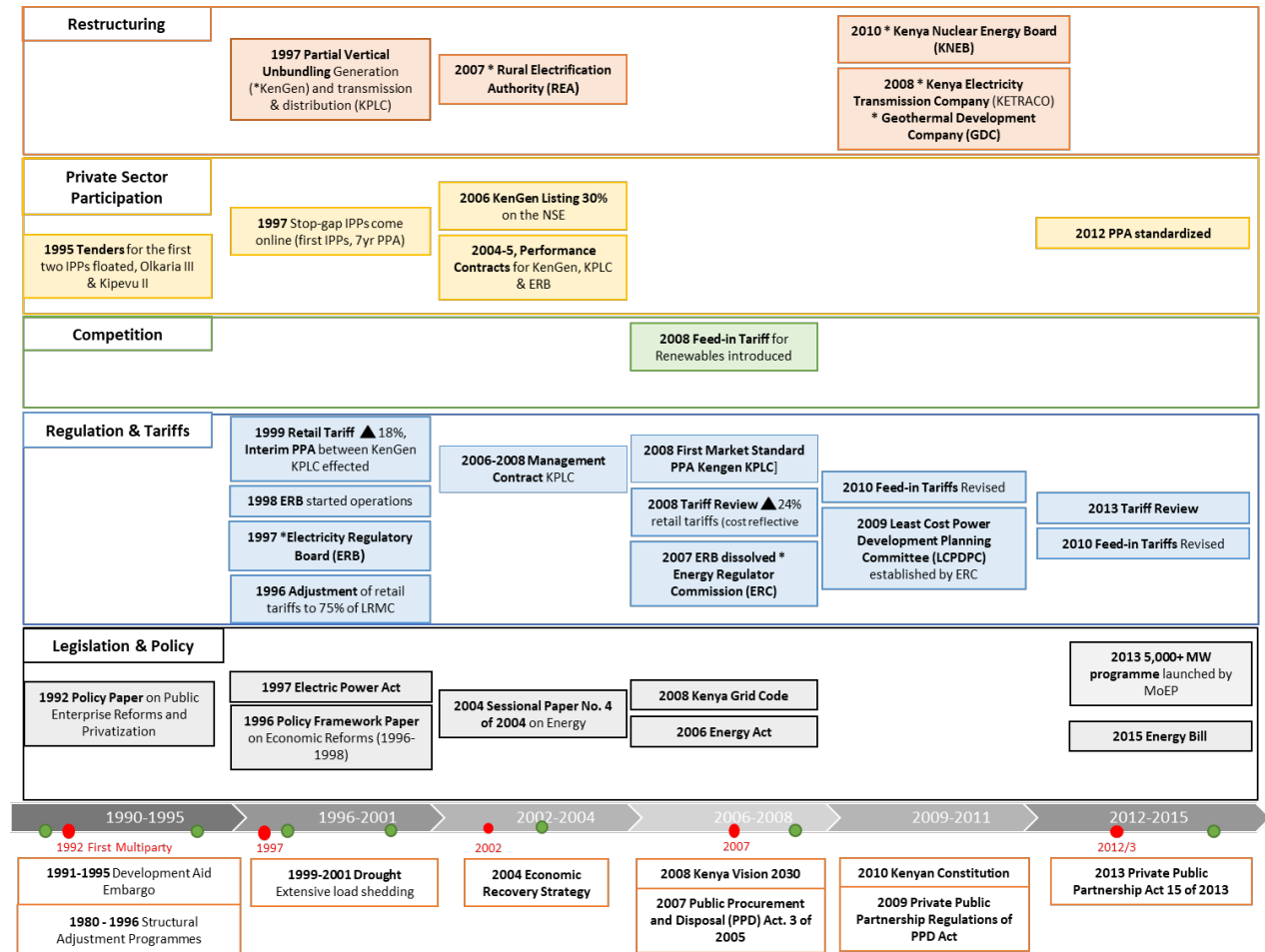
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<sup>3</sup> Based on the World Bank's Multi-Tier Framework Survey.

<sup>4</sup> In the 1990s, hydroelectric power plants accounted for almost 70 percent of installed capacity which had severe implications in the drought prone region, especially in the critical drought of 1999-2001 where the reserve margin had been reduced to a point that regular load shedding was necessary.

The current structure of the Kenyan power sector reveals the imprint of successive waves of reform—in the separation of policy from regulation; in the separation of generation from transmission and distribution; and in the ownership and governance relations between entities.

**Figure 1. Kenya power sector reform timeline**



NSE = Nairobi Stock Exchange; PPA = power purchase agreement.

While Kenya’s reforms have resulted in a substantial inflow of private sector investment, as well as the emergence of two dynamic publicly listed companies, the power sector still faces challenges. These include weaknesses in the transmission and distribution segments of the system, the politicization of long-term planning, the need for additional investment in grid expansion to advance universal access, an emerging surplus of power generation capacity, and the need to integrate more variable sources of energy without affecting system stability. In addition to these challenges, recent gains in electricity access and generation capacity have come at a cost: threats to the financial sustainability of Kenya Power and Lighting Company Limited (KPLC or Kenya Power) and KenGen have necessitated periodic debt restructuring. All of these factors have had a negative impact on system performance as measured by technical and commercial losses.

This case study explores Kenya’s experience with power sector reform by adopting a political economy lens, drilling down into the dynamics between sector development, performance, and important attempts at reform. Its primary objective is to distill lessons that may be more widely relevant to other countries. The study has two primary sections. The first provides a detailed,

chronological account of the sector's reform trajectory, couched within the broader political and economic history of Kenya. The second focuses on sector performance, probing links to institutional reforms, political economy dynamics, and macro-level structures and shocks in four areas: security of supply, access and accessibility, utility performance, and financial viability.

### Box 1. Kenya's power sector institutions

**Ministry of Energy and Petroleum (MoEP).** The MoEP is responsible for setting sector policies and overseeing utilities. Following the reforms, it no longer has direct operational responsibilities.

**Energy Regulatory Commission (ERC).** Established in 2007, ERC is an independent commission that operates under annual performance contracts with the MoEP. It is responsible for regulating the entire energy sector, including renewable energy, and approving power purchase agreements (PPAs). ERC is also the primary data hub for the sector and prepares national energy plans. To fulfill its mandate of preparing such plans, ERC established a Least Cost Power Development Planning Committee (LCPDPC) in 2009, with representation from all major stakeholder groups.

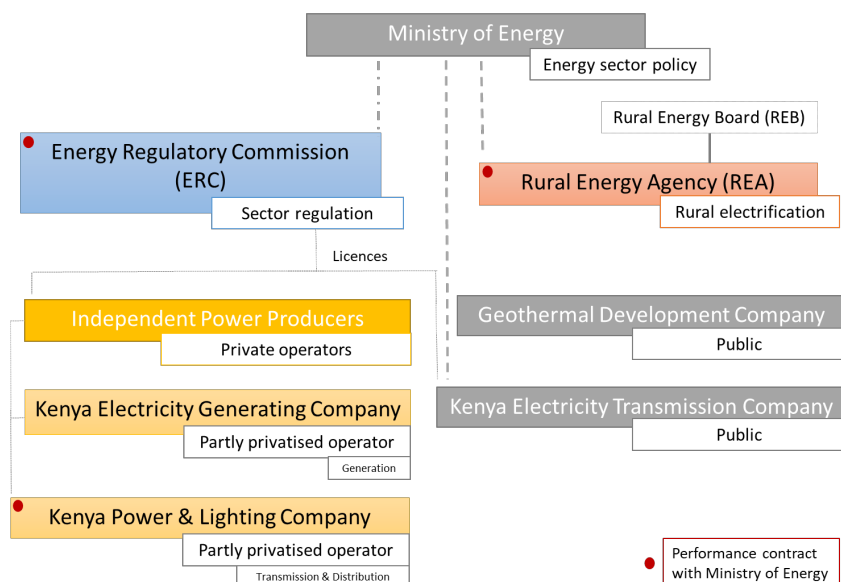
**Rural Electrification Authority (REA).** A state-owned entity that was established in 2007 to take over implementation of rural electrification projects from KPLC.

**Kenya Electricity Generating Company Limited (KenGen, formerly KPC).** A partly privatized generation company (the government share is 70 percent), KenGen owns more than 70 percent of total installed capacity in Kenya. KPC assumed the generation function after the vertical unbundling of Kenya Power and Lighting Company Limited (KPLC) in 1997.

**Geothermal Development Company.** Fully government owned company set up in 2008 to accelerate development of geothermal resources. Sells steam to KenGen for electricity generation.

**Kenya Power & Lighting Company Limited (KPLC).**<sup>a</sup> A partly privatized transmission and distribution company (the government share is 51 percent) and grid operator. Since the establishment of KETRACO in 2008, KPLC has focused on distribution, developing distribution lines/substations of 66kV and below.<sup>b</sup> However, it continues to operate the high-tension transmission lines that existed in 2008, since it retained all transmission assets that had been capitalized in its books when the new transmission company (KETRACO) was established. KPLC also operates the mini-grids owned by REA. KPLC acts as a single buyer in the electricity market; all generating companies must sign PPAs with it. Currently, KenGen and 12 independent power producers have long term PPAs with KPLC.

**Kenya Electricity Transmission Company Limited (KETRACO).** KETRACO is a state-owned utility established in 2008. Its mission is to design, construct, operate, and maintain new high voltage electricity transmission lines (over 132 kV).



a. KPLC was recently rebranded as Kenya Power (KP), however we have maintained it as KPLC to reduce confusion associated with various rebranding exercises of other entities.

b. KPLC operates some 132kV lines that it built using government funds. Ownership of the lines was transferred to KETRACO upon completion.



## 2 Seven phases in the evolution and reform of Kenya’s power sector

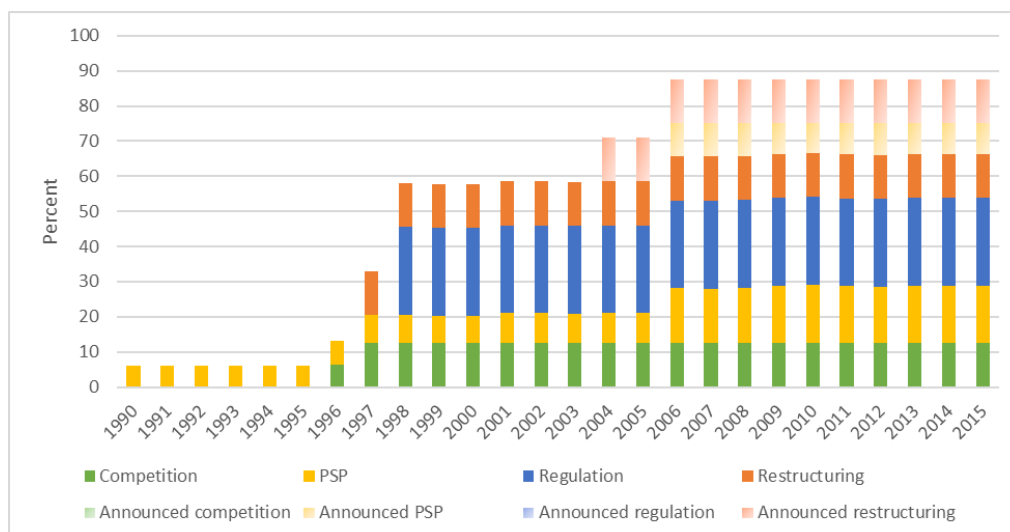
The standard package of reforms prescribed by international donors in the 1990s included four principal components: restructuring (vertical and horizontal unbundling of power utilities); private sector participation; creation of an independent regulator; and competition in power generation.

In order to aggregate across the four dimensions of power sector reform considered in this study, a simple Power Sector Reform Index is constructed. The index gives each country a score on an interval of 0 to 100 on each dimension of power sector reform. The scores are based on giving equal weight to each step on each dimension of the reform continuum (see tabulation below). The average of the four 0-100 scores is used to provide an overall summary of the extent of reform.

<b>Regulation</b>	No regulator = 0		Regulator = 100		
<b>Restructuring</b>	Vertically integrated = 0	Partial vertical unbundling = 33	Full vertical unbundling = 67	Vertical & horizontal unbundling = 100	
<b>Competition</b>	Monopoly = 0	IPPs = 25	Single Buyer Model = 50	Bilateral Contracts = 75	Competitive market = 100
<b>Private Sector Participation</b>	$0.5 * (\text{Percentage of generation capacity with private sector participation})$ + $0.5 * (\text{Percentage of distribution utilities with private sector participation})$				

Announced reforms are by no means always implemented, and adoption can occur significantly delayed after the passing of a law or a formal official commitment to implement reforms. By 2015, Kenya had implemented just under 70 percent of the package, as shown in figure 2. Kenya’s experience with each component is described chronologically in this part of the report and, in Part 3, analyzed from the perspective of performance and institutional arrangements.

**Figure 2. Actual and announced reforms in Kenya, by subindex of the Rethinking Power Sector Reform index (1990–2015)**



Source: Rethinking Power Sector Reform.

PSP = private sector participation.

### 2.1 1922–1989: The historic commercial orientation of Kenya’s power utility

The East Africa Power and Lighting Company (EAP&L) was formed in 1922, with the merger of the private Mombasa Electric Power and Lighting Company and Nairobi Power and Lighting Syndicate. Just 15 years later, EAP&L had expanded its geographical reach by acquiring controlling shares in the Tanganyika Electricity Supply Company (TANESCO) in neighboring Tanzania and obtaining generation and distribution licenses in neighboring Uganda. However, as the trend toward the nationalization of power production and supply services gained traction globally, EAP&L soon retreated to its Kenyan base, moving out of Uganda in 1948, when the national, vertically integrated Uganda Electricity Board was established, and then from Tanzania in 1964, when that country’s government undertook to buy back TANESCO’s shares.

Unlike many of its neighbors, Kenya’s first post-independence government (1964), under the leadership of President Jomo Kenyatta, did not follow the path of African Socialism and nationalization. Instead, Kenyatta’s government made a formal decision not to interfere in the commercial operations of certain sectors—including the power sector. Listed on the Nairobi Stock Exchange in 1954, EAP&L ran according to commercial principles, managing the state-owned Kenya Power Company (established in 1954) and Tana River Development Company (established in 1964), and their respective assets, under contract. In the 1970s, the Tana and Athi Rivers Development Company (1974) and the Kerio Valley Development Authority (1979)—also 100 percent state-owned—were added to its portfolio.

Over this period, a steady transition from colonial to indigenous staffing and management at KPLC took place. A strong institutional culture was fostered through targeted capacity development and training, supported by involved leadership. In 1970, having gained insight into the operations of the

power sector, the Kenyan government acquired a majority share.<sup>5</sup> Nevertheless, it maintained a commitment to standing commercial principles. Board members were selected from various backgrounds, with a focus on continuity.

In 1983, EAP&L was rebranded as the Kenya Power and Lighting Company (KPLC). KPLC effectively worked as a vertically integrated utility, and the government—which, in addition to its majority share, held wide discretionary powers granted through the State Corporations Act (1986), the Electric Power Act (1920, 1986), and the Geothermal Resources Act (1982)—exercised a significant degree of control and influence through ownership of assets and involvement in strategic and operations management.

The top leadership of the utility enjoyed a high level of respect and loyalty from staff and was close to important political decision makers. These close relationships would characterize the way the sector was run well into the 1990s. In this way, KPLC was absorbed into the national political economy, which was becoming more centralized.

This absorption put the Kenyan power sector in the cross-hairs of the donor-led structural adjustment and democratization programs of the 1980s and 1990s. The fact that Kenya was a relatively strong performer in the region also made it a prime candidate for the new model being advanced by development partners, such as the World Bank. At the start of the 1990s, Kenya had an installed capacity of around 750 MW (compared to Uganda’s 150 MW and Tanzania’s 300 MW) and a more extensive and efficient network, with comparatively low losses of around 16 percent. Kenya’s access rates, however, were more in line with those of its neighbors, at between 7–8 percent.

## **2.2 1990–1994: Macroeconomic pressures lead to power tariff reforms**

The period was marked by a sharp decline in all major macroeconomic performance indicators, brought on by a confluence of factors—including drought, a general deterioration of trade, political instability, and the onset of an aid embargo in 1991 levied on the basis of poor macroeconomic performance and governance failures.<sup>6</sup>

Under mounting internal and external pressures, Section 2A of the Constitution was amended in 1991 to allow for multi-party democracy. The first multi-party elections were held in 1992, but it would be a decade until there was a change in leadership. Though incumbent President Moi’s government continued to be averse to reforms, the Kenyan economy and polity were suffering under the aid embargo, leading to a gradual acceptance of donor conditions.

The 1992 Policy Paper on Public Enterprise Reforms and Privatisation was one of the primary policy responses to the trouble. It set the basis for later reforms in the power sector, as did the rapid deregulation of the Kenyan economy that began in 1993. Over this time, the International Monetary Fund and World Bank also spearheaded a number of “policy framework papers” setting out

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<sup>5</sup> At that time, the Government of Kenya owned 51.49 percent of KPLC shares, while Kenyan residents and nonresidents owned 41.13 percent and 7.38 percent, respectively.

<sup>6</sup> This embargo has been linked to allegations of corruption and environmental and human rights concerns around the French-funded Turkwel hydro-electric power plant, which was tendered in the 1980s and came on stream in 1991. However, some individuals (predominantly from within KPLC and the Moi administration at this time) reject this interpretation, instead linking the embargo to political sabotage on the part of local and external (donor) actors. Either way, donor funding to the power sector was frozen between 1991 and 1996—which undoubtedly contributed to power shortages later in the decade.

recommendations for reforms, as well as targeted studies on tariffs, the reorganization of the power sector, and legal and regulatory reforms.

In this period, one of the most important aspects of power sector reform was initiated—the move toward cost-reflective tariffs (a component of commercialization). The 1992 Policy Paper had set out clear lines around commercial tariffs and subsidies for parastatals, placing the responsibility for covering any gaps with government. At the time, KPLC was making a profit, even though tariffs covered less than 50 percent of long-run costs, partly because costs incurred by certain generation companies were being covered by the government and not being reflected in retail tariffs. With the national treasury buckling under the pressure of the embargo, tariff reform gained considerable traction, particularly given that the proposed changes were in line with commercial principles already embedded in the corporate culture. Introducing a solid basis for tariffs would pave the way for later reforms.

### **2.3 1995–1996: Reluctant commitment to deeper power sector reforms**

Once macroeconomic and financial reforms began to take hold, attention turned to power sector reforms. In some ways, the structure of the sector was unusual in the region because the vertically integrated state-owned monopoly (KPLC) was also a *listed* company that managed and operated its own assets and those of four state-owned entities. It had better than average performance, technical expertise, and capacity, and it showed a commitment to strong sector development planning. However, it still exhibited many of the characteristic deficiencies of the traditional industry model, including cross-subsidization, tariffs that were still below long-run marginal costs, lack of transparency, utility inefficiency, and declining performance.

As with the structural macroeconomic and financial reforms, the Government of Kenya was not a willing reformer of the power sector; it was reluctant to lose control of a key strategic sector, one that was a source of revenue, political power, and influence. The sector leadership's close connections with the political leadership soon proved to be both a boon and hindrance in initiating power sector reforms and in crafting politically feasible approaches. On the one hand, the leadership had the capacity, cohesion, and authority to implement reforms. On the other hand, stakeholders were wary of selling public generation assets to private companies from developed countries. However, some key actors were cautiously open to the potential of reforms, as long as these incorporated local input and indigenous knowledge and were accompanied by study tours and training, both designed to arrive at politically defensible and locally relevant options. Top technocrats in the Ministry of Energy promoted this approach to the World Bank. In 1995, several key actors went on a study tour to the United States, Peru, Northern Ireland, and Portugal to learn about power sector restructuring experiences there.

While some actors were cautiously receptive to or even supportive of reforms, open advocacy for reforms was politically risky. Negotiating the World Bank Energy Sector Reform and Power Development Project, which was a central instrument of the reform, was thus slow going. All the while, the power situation deteriorated further. To provide some temporary relief in the face of a looming supply-side crisis, the World Bank supported the procurement of two stop-gap IPPs in 1996. However, the demanding conditions (escrow accounts, down payments, etc.) and the high costs associated with the IPPs made some actors even more wary of reforms.

At the end of 1996, then Finance Minister Musalia Mudavadi sent the World Bank a policy letter outlining a reform agreement. Reaching closure on the letter had been far from straightforward. It

was complicated by the existence of parallel negotiating tracks between the International Monetary Fund and the Treasury, and between the World Bank and the MoEP. The agreement imposed conditions in return for meeting the funding needs of the power sector and general budget. Nevertheless, the commitments had been made, were binding, and were necessary if much-needed financial assistance for the sector was to be obtained. Despite continued resistance to reform from some quarters, the first wave of measures was set in motion by the 1996 policy letter. It was succeeded by several other landmark steps that are described below and summarized in table 1.

#### **2.4 1997–1999: Stakeholder behavior takes time to adapt to implementation of structural reforms**

In the agreement reached at the end of 1996, World Bank funding was made conditional on unbundling the generation segment from KPLC—one of the most politically fraught and strongly resisted reform interventions. The division of assets between KPLC and the future separate generation company was especially sensitive, as well as technically demanding. The World Bank offered support for the process, funding a study by PricewaterhouseCoopers and supporting technical staff within the ministry. Even with this support, the full process of unbundling would take about three years, but the sector needed the pledged World Bank funding immediately. It was thus agreed that the loan would become active once the process of unbundling was initiated—the proof of which was to be the separation of the new generation company and the appointment of its first managing director. The Kenya Power Company (KPC), established in 1954 and hitherto managed by KPLC, was in 1997 vested with ownership and operation of all public sector generation assets. In 1998, it was rebranded as the Kenya Electricity Generating Company (KenGen). Edwin Wasunna, formerly KPLC’s chief manager of project development, was appointed managing director.

In the early years following the unbundling of generation, the line between KenGen and KPLC was far from clear. The KenGen management often looked to the KPLC leadership for guidance on management decisions, and, even though the two companies had separate boards, the KPLC company secretary continued to attend KenGen’s board meetings. In this way, KPLC maintained considerable influence over both utilities—and the subsector as a whole. This may be due in part to the fact that many from within KPLC’s ranks who had transferred to KenGen, had been wary of reforms and were still bound by a sense of loyalty and familiarity to KPLC and its leadership.

In other areas, as well, reforms were enacted, but behavior continued to reflect the status quo. This was certainly the case with the Electricity Regulatory Board (ERB), established under the 1997 Electric Power Act. While the ERB was nominally independent, in reality the legislative framework provided it with little real autonomy or authority. Interestingly, the influence brought to bear on the ERB over the period 1998–2002 did not seem to be in KPLC’s favor, as will be discussed below. This reflected the strong political culture of loyalty and obedience that developed under the then government, which required all decisions to be directly referred to the presidency.<sup>7</sup>

In addition to restructuring and reorganizing regulatory functions, KPLC—with support from the World Bank and external consultants—began the first competitive process for tendering and negotiating 20-year IPP contracts.<sup>8</sup> A comparative experiment between private and state-owned

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<sup>7</sup> President Moi famously used to announce appointments or “disappointments” (termination of appointments) on the 1 o’clock news, to which everyone would listen with a certain trepidation.

<sup>8</sup> The World Bank provided US\$ 600,000 in support of the tender design, model PPAs, and technical support.

generation was proposed to test their relative efficiency. Two sets of sites were selected: Kipevu I and Kipevu II, both sites for 75 MW medium-speed diesel plants, each to run on heavy fuel oil; and Olkaria II (70 MW) and Olkaria III (64 MW), both sites for geothermal plants. The negotiation of the IPP's power purchase agreements (PPAs) was slow, but the time to commissioning was not much slower than state-owned projects. Views on the relative success and merits of privately owned versus state-owned and operated plants are somewhat divergent. However, there is widespread agreement that this process had a positive impact on the sector in the years that followed, making Kenya an attractive destination for private sector investment and contributing to the development of capacity (specifically around negotiating PPAs) within the utilities, regulator, and the rest of the sector (box 2).

It should also be noted that tariffs had been increased to 75 percent of long-run marginal costs by 1997. Tariffs are always politically sensitive, especially during periods immediately preceding or following general elections and during periods of economic downturn. The impressive fact that Kenya managed to achieve the tariff increase over this period has been attributed to the presence of political buy-in on the issue. This is seen to have played a key role in making the reforms that followed successful and sustainable.

### **2.5 1999–2002: Drought conditions lead to tensions between KenGen and KPLC**

These early reform steps set in motion a transition from the monopoly order of the KPLC to a more multipolar balance of decision-making power between the government, KPLC, KenGen, and (at a later stage) the regulator. While KPLC's leadership remained antagonistic to reforms, several counterpoints emerged, most prominently KenGen, bolstered by discrete support from the ministry and the regulator. The transition then unexpectedly picked up speed with the onset of a critical drought that drastically cut generation at a time when the reserve margin had been eroded to almost zero. This led to a battle over end-user tariffs and generation PPAs—a battle that KenGen ultimately won.

Before the drought set in in 1999, an interim PPA between KPLC and KenGen had been reached based on a bulk-supply (non-fuel) tariff of K Sh 2.36/kWh. This tariff was seen by some to favor KenGen, though others have said that it had benefitted both until the drought hit. Regardless, to meet the revenue requirements that justified the tariff, KPLC would have to meet very ambitious sales targets. With the onset of the drought, however, electricity sales decreased radically as dwindling hydroelectric output necessitated frequent load-shedding. KPLC took heavy losses as a result of low revenues and increased thermal generation, in addition to higher operations and administration costs. Yet, at the same time, KenGen turned profits of a similar magnitude, given the high bulk-supply tariff of K Sh 2.36/kWh. That this was not remedied by the regulator was seen as a failure of regulatory independence. Indeed, during this period there was visible political interference in the functioning of the regulator, with multiple boards being constituted and then disbanded by the government, even though the nominally independent ERB was out of its jurisdiction. This situation put considerable financial pressure on KPLC, weakening the legitimacy of its leadership. Alternative views stress the fact that this period of losses had been preceded by decades of profits, and that the losses mounted without KPLC undertaking organizational reforms of a utility that was admittedly still bloated and inefficient. While there are those who see the ERB as working several sides over this period, others have advanced the argument that the regulator was rendered toothless by rampant interference and a lack of capacity, including on the issues of the imbalance in

the KenGen and KPLC tariffs. Whatever the motives behind the ERB's actions or inaction, by all accounts the regulator was neither independent nor suitably capacitated over this period.

Whatever the case may be, the imbalance came to a head in 2002, by which time KPLC owed KenGen K Sh 14 billion (~US\$140 million). At this stage, KenGen had already begun work on Olkaria II, where it was responsible for meeting 25 percent of project costs from its own revenues while the rest came in the form of contributions from funders—mainly the World Bank and the European Investment Bank. However, because KPLC was unable to pay its debts, KenGen found itself in a position where it could not pay the local contractors for whose costs it was responsible under the deal. Eventually, the contractors threatened to stop working—if they were to do so, the cost of restarting the project would be steep. This issue escalated, and a meeting between KenGen, KPLC, and the funders (the World Bank and the European Investment Bank) was held at the Treasury. At this meeting, KPLC promised to pay the amount due, but KenGen did not accept the promise, based on previous failures to pay. This led the funders to say that they would make their portion of payments to the contractors, if and when KPLC paid its debt. The debt was paid the following week, but this soured the relationship between the KenGen leadership and the authorities. Yet, at the same time, it demonstrated that unbundling was becoming a reality: KenGen was becoming independent, and KPLC's power and connections were being checked more effectively.

## **2.6 2003–2013: A second, more committed, wave of reform driven by a domestic champion**

Through the 1990s and into the early 2000s power sector reforms were hard-won battles under strenuous conditions, pushed mainly by outside actors with the support of a few reform-minded civil servants. With the election of President Mwai Kibaki in 2002, however, the government would itself begin driving reforms, led by the now widely acknowledged champion of second-phase reforms, MoEP permanent secretary Patrick Nyoike. The new president set an ambitious agenda for economic growth, and infrastructure—particularly in the power sector—was an explicit priority of his government.

Kibaki's leadership style provided a platform from which the MOE technocrats could advance power sector reforms. The new MOE leadership is believed to have been courageous, charismatic and knowledgeable, advancing reforms (even those that were politically unpopular) throughout its tenure and contributing to the sustainability of these reforms thereafter. During this period, new reforms took shape, even as earlier reforms began to bear fruit. Capacity building was prioritized across the sector, but especially in KPLC and the reform agenda was successfully sold to the sector stakeholders. Earlier staff implemented reforms under the impression that the changes were required by funding conditions, without reform ownership within the ministry or KPLC.

However, with the change in government and leadership in 2002, things began to change. The MOE immediately dealt with the imbalance between KPLC and KenGen tariffs and supported a KPLC management contract at the government level—seeing it as an opportunity to shield KPLC from political interference and to give local managers the space to become empowered and develop their careers. It should be noted that the management contractor team from Manitoba Hydro International was not well received due to tensions between expatriates and the local team. Nonetheless, once the contract had come to an end, there was a certain confidence in the local KPLC management team. Top MOE leadership spoke to KPLC's staff, encouraging them to use the time under management contract as an opportunity for learning, development and empowerment.

The MOE also encouraged KPLC senior staff to lead the IPP processes from the late 2000s. By that stage, KPLC staff had worked closely with external consultants on four IPP transactions (Westmont, Iberafrica, Kipevu II, and Olkaria III), developing capacity and gaining confidence in their own expertise. Senior KPLC staff members were then required to practice what they had learned. This approach to capacity building, in KPLC as well as in the regulator, ministry, and other segments, contributed to the rapid transformation of the power sector over this period.

The MOE leadership at the time also had a deep understanding of the importance of policy and legislation in making reforms actionable in the short-term and sustainable over time. The Sessional Paper No. 4 of 2004 was developed in close collaboration with the ERB and other key stakeholders. The ERB staff used consultative processes to produce a strong policy repeatedly rewriting the policy document till it met the high standards set by the ministry. Thus, by 2004, a robust policy was developed, and a strong, capable and cohesive technical team was gathered within the regulator. In part because of the quality of the document, and also in part because of the consultative and open processes involved in its drafting, the policy was passed in parliament in May 2004.

This policy set the agenda for Kenya’s next phase of reforms, most of which would be ushered in through the MOE leadership’s strategic use of personal and professional networks, as well as his strong relationships with the donor community. Those reforms, described in table 1, included the Energy Act of 2006; privatization of KenGen (starting with an initial public offering of 30 percent of its equity in 2006); establishment of the Energy Regulatory Commission as a single independent energy regulator under the Act in 2007; creation of REA in 2007; establishment of GDC and KETRACO in 2008 (operationalized in 2009); an increase in the lifeline tariff for domestic consumers of up to 50kWh per month from July 2008; and a decision to permit power generation companies to access bulk electricity consumers through the transmission network.

**Table 1. Power sector policy and legislation in Kenya, 1996–2015**

Policy/legislation	Description
1996 Letter of Power Sector Policy	In this letter, the Finance Ministry outlined the reform agreement reached after negotiations between Kenya, the International Monetary Fund, and the World Bank. Donor funding was made conditional upon reform of the power sector. The unbundling of Kenya Power & Lighting Company (KPLC) was the key point.
1997 Electric Power Act	The act marked the beginning of the sectoral reform process. Policy formation was designated as a Ministry of Energy and Petroleum (MoEP) function. Regulation was entrusted to the newly established Electricity Regulatory Board (ERB), which started operations in 1998. The generation segment was liberalized.
1997–1998 Restructuring of KPLC	Generation was vertically unbundled from transmission and distribution. KPLC was to focus on transmission and distribution. Kenya Power Company (KPC) took over all generation activities. In 1998, KPC became KenGen, the Kenya Electricity Generating Company.
Sessional Paper No. 4 of 2004 on Energy	This paper set new energy policy and strategy. The Kenya Electricity Transmission Company (KETRACO) was established in 2008 to implement new transmission line projects using government funds and concessionary financing from development partners. The Geothermal Development Company (GDC) was established to take up geothermal exploration previously performed by KPC (later KenGen).
2006 Energy Act	The act led to further restructuring in the sector through the establishment of new actors. The Electricity Regulatory Board (ERB) was transformed into the Energy Regulatory Commission (ERC), the mission of which was to regulate the



	entire energy sector, including renewable energy and petroleum downstream activities. The Rural Electrification Authority (REA) was established in 2007 to take over implementation of rural electrification projects from KPLC. The Energy Tribunal was also created to hear cases brought against the decisions of the ERC.
2005 Public Procurement and Disposal Act	Enacted in 2005 and operationalized in 2007, the act set the basis for procurement processes in power projects and for the regulation of public and private partnerships (through the 2008 regulations). In 2013, these functions were adopted as a stand-alone act governing power project procurement.
2015 National Energy and Petroleum Bill	The bill was a proposal to introduce further reforms to legal and institutional frameworks to facilitate competitive wholesale market structure.

As noted above, the policy paved the way for the partial listing of KenGen in 2006, which again drew mixed reactions. Some viewed the sale of the KenGen shares as a wasteful process that yielded the government no benefits, since the listing was preceded by the restoration of the KenGen tariff to K Sh 2.36/kWh, up from K Sh 1.76/kWh, and the government had to provide a K Sh 0.60/kWh subsidy to KPLC from July 2006 to June 2008 to obviate the need for a retail tariff increase. Others saw the tariff changes as a creative solution to the tariff problem. However, there is a broad consensus that the initial public offering boosted KenGen’s profile,<sup>9</sup> contributed to performance and efficiency gains through the adoption of private sector business practices, and reduced the scope for political interference (both due to financial independence and to the transparency requirements placed on listed companies)—all raising investors’ interest and confidence in KenGen.

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<sup>9</sup> KenGen CEO Eddy Njoroge played a crucial role in the KenGen initial public offering, using his reputation as a successful entrepreneur and his close relationship with President Kibaki to pull it off.

## Box 2. Public and private sector participation in generation<sup>10</sup>

Kenya has more experience with independent power producers (IPPs) than most countries in Sub-Saharan Africa. Between 1996 and the end of 2015, the country developed 12 IPP projects having a total capacity of approximately 1,106 MW and worth more than US\$2.3 billion in investment. More projects are in the pipeline. Two decades after the first wave of reforms, IPPs account for almost 30 percent of installed generation and 23 percent of production. About three-quarters of IPPs procured since 1996 run on medium-speed diesel or heavy fuel oil. Kenya has developed considerable expertise in running and awarding international competitive bids (Kapika and Eberhard 2013)<sup>11</sup>.

Notwithstanding the growth in IPPs, the public sector has retained a significant role in power generation. The major expansion of geothermal energy in Kenya would not have been possible without publicly funded exploration of the resource between 2007 and 2015, and subsequent investment by KenGen to develop generation capacity. Although licenses for geothermal development have been available to private companies for 20 years, just one IPP of 139 MW of capacity has been developed since 1998. The National Geothermal Strategy (2018) concluded that concessions for the development of greenfield sites was not an effective model owing to the high risks of steam field development.

Interventions to shift the balance toward renewables began in 2008, with the development of a feed-in tariff (FiT) policy. Renewable energy projects approved by 2015 included Kinangop Wind Farm (60 MW), Kipeto Wind (100 MW), Kwale Sugar Mill (18 MW), and several other small 0.5–2.0 MW projects. However, none of the projects awarded under the FiT policy have been commissioned. Challenges have included access to land and management of host communities, as well as lack of project development experience and financial capacity. Moreover, the FiT tariff, at US\$0.12/kWh, no longer looks attractive from the government perspective and needs to be revised downwards.

In addition to these competitively procured IPPs, the government has taken the lead in several recent directly negotiated bids, including the Lake Turkana Wind Project. In general, prices for power projects in Kenya have declined since the first IPPs were procured, demonstrating the benefit of private participation and competitive, transparent procurement of generation assets.

### IPPs installed capacity, June 2017

Technology	% of capacity	Project	MW	PPA (years)	COD
MSD/HFO	75.2%	Iberafrica Power Company (plant 1)	56	7 + 15	2004*
		Iberafrica Power Company (plant 2)	52.5	25	2009
		Tsavo Power Company Ltd.	74	20	2001
		Rabai Power	90	20	2010
		Thika Power (Melec)	87	20	2014
		Gulf Power	80.3	20	2014
		Triumph	83	20	2015
		Orpower 4 Inc.	13	20	2000
		Orpower 4 Inc.	35	20	2009
		Orpower 4 Inc.	36	20	2013
Geothermal	20.0%	Orpower 4 Inc.	26	20	2014
		Orpower 4 Inc.	29	20	2016
		Mumias Sugar Company Ltd.	26	10	2010
Cogeneration	3.7%				
Various small RE	1.1%	Biojule, Regen-Terem, Imenti Tea, Gikira	7.814	Various	Various
Total	1		695.6		

Notes: \*15-year PPA starting in 2004. MSD/HFO = medium-speed diesel/heavy fuel oil; PPA = power purchase agreement; COD = commercial operation date.

Source: Eberhard, Gratwick, and Kariuki 2018

The 2004 policy also set the course for the Energy Act of 2006 which, among other things, transformed ERB into the ERC. The policy provided a policy framework to guide the ERC, while the

<sup>10</sup> Eberhard, Anton, Gratwick, Katharine & Kariuki, Laban, (2018), Kenya's lessons from two decades of experience with independent power producers, Utilities Policy, 52, issue C, p.37-49.

<sup>11</sup> Kapika, J. & Eberhard, A. (2013), Power-sector reform and regulation in Africa: lessons from Kenya, Tanzania, Uganda, Zambia, Namibia and Ghana. Cape Town: HSRC Press.

Act added the legislative framework necessary to confer formal power upon it. Of particular importance, it provided that the ERC would be funded through fuel and electricity levies. The electricity levy had been funding ERB, but the fuel levy was now necessary to fund ERC's downstream petroleum regulation.

The period from 2003 to 2013 can be characterized as a period of massive capacity development across the sector, strong momentum in advancing power sector reforms, and improvements in many aspects of sector performance. In addition to those steps discussed above, this period also saw the further restructuring of the sector through the establishment of the KETRACO, GDC, and REA, and the publication of the Tariff Review Policy in 2005 and a grid code in 2008. These reforms, among others, contributed to a certain momentum in the sector that carried into the next period. KETRACO completed about 2,200 km of new transmission lines, including two major 400 kV lines (480 km Nairobi–Mombasa and 430 km Loiyangalani–Suswa). The company is also building regional interconnections to Ethiopia, Uganda, and Tanzania, which include a 500-kilometer HVDC interconnection with Ethiopia, co-financed by the World Bank, the African Development Bank, and the Agence Française de Développement. KETRACO owns 42 percent of the total transmission network and is poised to become the dominant transmission company once the committed transmission projects are completed. However, GDC has been less than successful in its mandate to lower the risks geothermal development for private sector investment. Further reforms, perhaps to check the market power and political clout of KPLC and KenGen, will be needed to make these institutions more effective.

## **2.7 2014–2017: Government embraces the electrification agenda**

The new administration came to power in 2013 on the back of three major promises in its manifesto—to end power shortages, to lower retail tariffs significantly, and to provide universal access to electricity. New targets were set, and the government moved aggressively to achieve them. Although the target for 5 GW of power generation within 18 months seemed ambitious, and the goal of tariff reduction raised issues of financial viability, increasing access, mostly through grid expansion, appeared to be low-hanging fruit.

With new leadership at KPLC eager to prove itself, the utility threw itself zealously into the Last Mile Connectivity Project. The focus on access did help the utility surpass its targets of a million new customers annually—though with some adverse effects. KPLC diverted resources to access-related infrastructure, and the diversions swelled over time as the utility tried to connect people living farther away from the grid. The diversions caused utility performance on billing and loss reduction to deteriorate. The last-mile program obliged the government to reimburse KPLC for connection costs, but the transfers were insufficient to avoid significant adverse financial impact on the utility.

As part of the 5 GW agenda, the government pushed implementation of some of the generation projects procured under the previous administration. That push brought the commissioning of some additional generation capacity, including the 300 MW Lake Turkana wind project, a 280 MW geothermal project at Olkaria, and 250 MW of new thermal capacity.

It may be too early to say where the current period stands in terms of the progression of reforms, but there is clear evidence of renewed political and governmental interest in the sector. In some cases, this appears to be a positive development—especially in the area of access. In others, concern about the government's interests appears to be growing—especially in relation to power planning and procurement of major projects, where, for example, projects that do not meet the criteria of the

ERC's Least Cost Power Development Planning Committee are receiving political sponsorship. The government's sudden suspension of the automatic pass-through mechanism of fuel costs in retail tariffs (later revoked) is also a concern.

The 2016 Energy Bill suggests further reforms, including outlining steps to facilitate the development of a competitive wholesale market, and many expect further movement on previous reforms, such as KETRACO taking over all transmission lines, assuming system operation functions, and attracting private investment and ownership. However, there are also some worrying indicators that reforms may be taken back a few steps. In June 2016, Kenya's president directed that all PPAs be reviewed. This directive followed from a growing perception that the cost of energy from thermal plants, and particularly from IPPs, had risen too high, and from lobbying by interested developers of renewable energy projects. With the government very sensitive to increases in retail tariffs and the country facing the prospect of excess capacity as some delayed IPPs come online, a task force was formed to review all existing PPAs, establish revenue requirements for each, explore possibilities for mutual termination (or compensation payments for termination), and compare PPA costs with costs of similar plants regionally and globally. The report of the task force has yet to be made public. Meanwhile, the government has watered down the commitment provided to IPPs in the letter of support covering political risks (in lieu of a sovereign guarantee). The task force's report, and the manner in which its recommendations are implemented will shape investors' appetite for more political risks and determine the outcomes of the "new" model—particularly with regard to private sector investment in Kenya.

### **3 The impact of the reforms on sector performance and institutions along four dimensions**

Kenya's first wave of reforms was primarily motivated by the need to access financial support and attract investment into the power sector after a punishing 5-year aid embargo. The second wave of reforms was championed by strong technocratic leadership motivated to embed, advance, and improve the model put in place under the first wave.

This part of the report considers the implications of Kenya's reform experience for sector performance and development over the period 1990–2015. The evidence-based analysis deals with improvements in Kenya's power sector performance along the following dimensions:

- Security of supply
- Access and affordability
- Efficiency and financial viability
- Tariffs and cost recovery

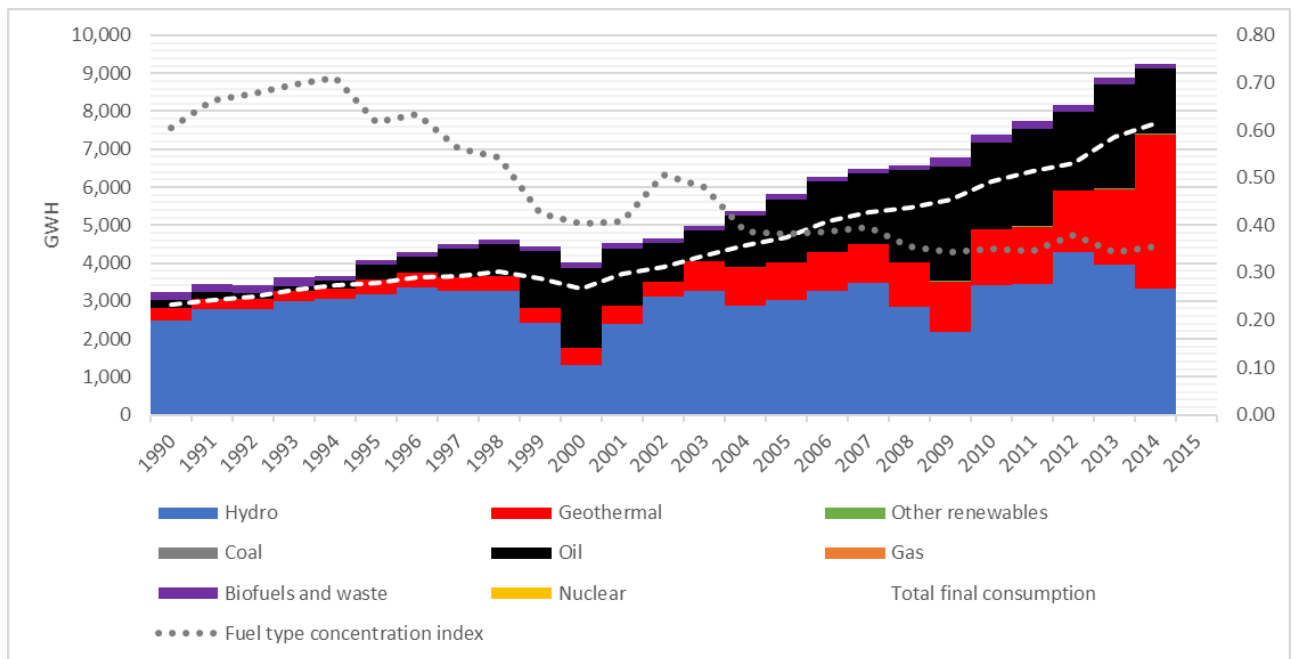
For each aspect of performance, we evaluate the extent to which the various institutional reforms, or lack thereof, are responsible for how performance has evolved.

#### **3.1 Security of supply**

##### *3.1.1 Performance*

Through the mid-2000s, Kenya relied on hydropower to meet most of its demand for electricity, with a smaller share derived from geothermal- and oil-fueled generation (figure 3). The heavy reliance on hydropower left the country exposed to hydrology risks. Good planning nevertheless allowed Kenya to increase capacity steadily and to manage supply side risks into the 1980s. The situation changed dramatically in the 1990s with the onset of a critical drought. Unable to access funding for new generation under the aid embargo and contending with changing international financial markets, Kenya was pushed into a situation of acute supply insecurity toward the end of the decade. Kenya was forced to ramp up liquid fuel generation (including Kipevu I and Kipevu II), increasing the cost of supply, while it waited on the commissioning of state-owned and IPP geothermal plants (Olkaria II and Olkaria III). It was under these conditions of acute supply insecurity that the first wave of reforms took place. Given the pressing need to release the hold on donor assistance and loans and to attract private investment into the sector, Kenya overhauled its approach to generation planning and funding. Generation was unbundled from transmission and distribution, with KenGen (the generation company) taking over all state-owned generation capacity.

**Figure 3. Kenya generation, consumption, fuel concentration**



Source: IEA

Kenya has been one of the most successful countries in the region at attracting private sector participation in generation and managing the development of generation assets. KenGen has been able to attract private investment from the capital market by issuing corporate bonds and rights. The listing of 30 percent of its shares on the securities exchange bolstered its ability to secure commercial lending, which accounts for 15 percent of the company's debt (as of 2017), albeit on relatively short terms that have adversely affected the company's cash position.

Kenya also has become an investment destination for IPPs. As of June 2017, the country had 12 IPPs in operation—primarily oil-fired—with aggregate capacity of 695 MW, or about 30 percent of the total national capacity of 2,370 MW, with the remaining 70 percent held by KenGen. In addition, a further 25 IPPs have approved PPAs; these have an aggregate capacity of about 4,000 MW (including a proposed 1,050 MW coal project in Lamu). It is not clear whether they will be finalized, and indeed doing so could potentially result in large excess capacity, given other projects that have been developed in the meantime. Some were procured through international competitive bidding, others through a selective bidding based on a shortlist of bidders from an earlier competitive round, and others through the feed-in tariff policy. The tenures of PPAs are typically 20 years, with a few exceptions.

The combined result has been to triple Kenya's generation capacity since 1990. With generation capacity expanding more rapidly than peak demand, which grew at a rate of 5 percent per annum between 2005 and 2015, the country's reserve margin reached 30 percent by 2018. And, as noted, with many IPPs in various stages of delayed implementation, the country's potential capacity far outpaces demand projections. The expansion of generation capacity translates into relatively reliable electricity supply, although reliability is still an issue in some parts of the network owing to bottlenecks.

Security of supply has also been improved through the marked diversification of the energy mix. Kenya's government (with considerable donor support) played a key role in this regard, including

through early exploration and de-risking of geothermal resources. Kenya now has 534 MW of geothermal capacity—fully 43 percent of generation in 2017. However, it is KenGen (not GDC) that has been able to successfully leverage donor and government support, as well as its own funding, to make geothermal the dominant source of electricity in Kenya today, becoming, in the process, the largest developer of geothermal power in Africa and among the top 10 globally. The increased share of geothermal generation has displaced energy from thermal plants, and the significant reductions in fuel costs have been passed through to end users. Following the commissioning in 2015 of the latest large geothermal capacity of 280 MW at Olkaria, consumers saw a reduction in fuel costs of K Sh 4/kWh. Despite the August 2018 increase in retail tariffs, average tariffs have remained below where they were before the new geothermal capacity was commissioned. Kenya’s new National Geothermal Strategy recommends a central role for KenGen and a stronger role for the private sector as financier and partner in geothermal development.

At times of drought and other supply-side challenges, Emergency Power Plants (EPPs), too, have supplied power, under generation licenses from KenGen. In 2000–2001, Aggreko, Cummins, and Deutz supplied 99 MW in Nairobi. Between 2006 and 2016, Aggreko supplied capacity ranging from 30 MW to 290 MW from plants based at various times in Nairobi, Eldoret, and Muhoroni. After EPPs began to raise costs, drawing critique from various quarters, the government invited the Kenyan private sector to participate in the procurement of the EPPs, asking the Kenya Association of Manufacturers to chair an Emergency Power Steering Committee to manage stakeholder expectations. However, the recent boom in geothermal energy, as well as other renewable energy sources, has helped to mitigate the need for EPPs, and the country was able to meet demand during the drought of 2017 without procuring any EPPs.

### *3.1.2 Institutions*

Kenya has a reputation for comprehensive and technically adroit planning for the power sector. That reputation endured the transition from a traditional industry model to the more complex hybrid structure it now has. The 2006 Energy Act vests responsibility for power development planning in ERC. As a result, ERC has engaged in a rolling Least Cost Power Development Plan (LCPDP). The LCPDP aims to enhance national power generation and supply by identifying new generation and supply sources, as well as new transmission infrastructure.

To fulfill its planning mandate, ERC set up multi-stakeholder steering and technical committees to develop the LCPDP. On the Technical Committee, ERC members hold the positions of chair and secretary, but the rest of the members are engineers and economists drawn from MoEP, KPLC, KenGen, KETRACO, GDC, REA, and the Kenya National Bureau of Statistics. The 20-year draft plans produced by the Technical Committee are reviewed by various actors before approval by the LCPDP Steering Committee—which comprises members from government and power subsector organizations convened by ERC; other key stakeholders (the Ministry of Devolution and Planning, the Kenya Investment Authority (KenInvest), the National Economic and Social Council, and the Kenya Private Sector Alliance)—and finally by the ERC commissioners, who adopt the plan as the official national update of the LCPDP. The rolling 20-year LCPDP is updated biennially, and a 5-year plan is conducted annually. ERC has also started developing 10-year plans. The most recent approved update of the plan is the 10 Year Power Sector Expansion Plan 2014–2024, prepared in June 2014. The rigor of Kenya’s planning framework has been instrumental in driving the country’s rapid capacity expansion. It is reflected in a high score on the planning index detailed in table 2.

**Table 2. Institutional arrangements for power sector planning and procurement in Kenya and comparators, 2015<sup>12</sup>**

Planning and Procurement	Kenya	Senegal	Tanzania	Uganda	International Benchmark
<b>Generation Planning</b>	86%	43%	43%	43%	56%
<b>Transmission Planning</b>	75%	100%	75%	75%	72%
<b>Procurement of Generation</b>	100%	50%	100%	95%	85%
<b>Transmission Procurement</b>	67%	42%	92%	92%	64%

Note: Scores based on index developed for the Rethinking Power Sector Reform Project. For more details go to project website at [http://www.esmap.org/rethinking\\_power\\_sector\\_reform](http://www.esmap.org/rethinking_power_sector_reform)

However, there have been times when clear tensions emerged between pragmatic, techno-economic plans (such as the LCPDP) and “political visions,” such as President Mwai Kibaki’s *Vision 2030* and President Uhuru Kenyatta’s 2013 5,000 MW Power Plan. Though the latter plans are not in line with the LCPDP methodology, the pressure to adopt optimistic assumptions around demand growth (and other factors) has seeped into power sector plans. For example, the 2011–2031 LCPDP was modified to support the MoEP’s 5,000 MW program. The subsequent scaling back of that program in the face of the sector’s projected surplus of supply is the result of undue political influence on planning. Different perspectives are possible on balancing the pragmatic and the visionary, but it is clear that the ERC’s LCPDP process is undermined by the ambitious political targets and pressure to push those targets into technical plans.

The LCPDP was originally meant to be updated annually (and then biennially). An update of the 2011 plan did not come until 2016, and this was updated again in 2018 (before being recalled for more consultations with government. These updates have been fed into the regulator’s periodic cost-of-service study. The review process for these plans has provided an opportunity to challenge technical assumptions. Nevertheless, linkages between planning and implementation could be further strengthened.

Kenya also scores well against other countries with respect to procurement (table 2). Procurement of generation projects can be done in several ways, as discussed in Part 2. Some projects identified in the LCPDP are earmarked for development by KenGen, which then floats tenders for engineering, procurement, and construction contracts. Alternatively, KPLC (the off-taker) issues tenders for IPP projects, especially for fossil-fuel-fired thermal technologies. In either case, the procurement is conducted in good time, taking into account projected online dates and project lead times.

Interventions to accelerate renewables began in 2008, with the development of a feed-in tariff policy. Under the policy, KenGen or IPPs develop projects according to the milestones stipulated and ultimately negotiate PPAs with KPLC. The MoEP can also offer private companies geothermal power concessions or generating licenses; timelines are stipulated in the concession agreement or license. Similar scenarios apply to coal and gas concessions.

More recently, Kenya’s county governments have been given a mandate to undertake planning and development with respect to the regulation of electricity and petroleum. Following the promulgation of the current constitution in 2010, MoEP formed an Energy Sector Committee on the

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<sup>12</sup> For the detailed planning and procurement index, see the Annex.



New Constitution to look into the roles and responsibilities for electricity supply and how the sector would operate under the newly decentralized system of governance. The MoEP conducted various stakeholder dialogues on the issues, which then informed revisions of the draft 2016 National Energy and Petroleum Policy and the 2016 Energy Bill. What effect this will have on planning and procurement has yet to be seen.

Kenya's relatively robust procurement framework is well linked to planning processes, yet political influences often come to bear. There have been cases where projects not identified in the LCPDP or procured according to the formal framework have been inserted into the LCPDP only once they were under way. This has been the case with large IPP-driven wind and geothermal projects. Unsolicited bids have been entertained for more than 500 MW of wind projects, and for more than 400 MW of geothermal licenses. Salient examples include the Lake Turkana Wind Project, Kipeto Wind, Kinangop Wind, AGIL geothermal and Akiira (geothermal)—which were not identified in the LCPDP when they were negotiated. The largest private sector project in the country, at 310 MW and around US\$ 850 million, was commissioned only after being mired in controversy relating to long delays in the associated transmission connection and related penalties for lost production (so-called deemed generation). Similar problems have been encountered with the feed-in tariff program, where the approval process was not transparent, leading to the award of 187 wind and solar projects amounting to 3,000 MW that were not originally included in the LCPDP.

### *3.1.3 Summary*

Kenya has a well-established planning and procurement framework and thus scores highly on the good practice index. However, in practice, political interference occasionally leads to tensions with the established procedures. In particular, the government's demand estimates have tended to be unrealistically high, leading to planning for investments beyond what was originally called for by technical plans. In addition, the link between planning and competitive procurement has weakened in recent years, and several generation projects have been procured through direct negotiation and without thorough technical and financial analyses to determine whether integration and system requirements are in line with least-cost planning standards (Eberhard, Gratwick, and Kariuki 2018)<sup>13</sup>. Well-integrated planning and procurement processes enabled Kenya to emerge from a devastating supply crisis in the 2000s, with a growing reserve margin and much more diversified power system. The politicization of these same processes has contributed to the recent emergence of a supply surplus, threatening the financial creditworthiness of the sector.

## **3.2 Access and affordability**

### *3.2.1 Performance*

Having outperformed other countries in the region in expanding access to electricity, Kenya had the highest rate of access in East Africa in 2018, with around 75 percent of the population benefiting from access to modern electricity services. In the same year, Uganda's electricity access rate stood at around 27 percent and Tanzania's at 33 percent. Kenya's government is currently pushing to achieve universal access by 2022. Unlike some countries in the region, Kenya was able to maintain a steady (if low) growth rate between 1990 and 2010, with access increasing from a low of around 7 percent

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<sup>13</sup> Eberhard, Anton, Gratwick, Katharine and Kariuki, Laban, (2018), Kenya's lessons from two decades of experience with independent power producers, Utilities Policy, 52, issue C, p.37-49.

in 1990 to 22 percent in 2010. That expansion was initially funded directly by the government; later, several donors came on board, among them the World Bank and Power Africa. The big push in programs run by KPLC has resulted in rapid growth in customer connections for the utility (table 3). One of the key success factors has been an approach that is not limited to grid extension but prioritizes connections close to existing and new grid infrastructure, particularly in peri-urban areas.

**Table 3. The evolution of KPLC’s customer base**

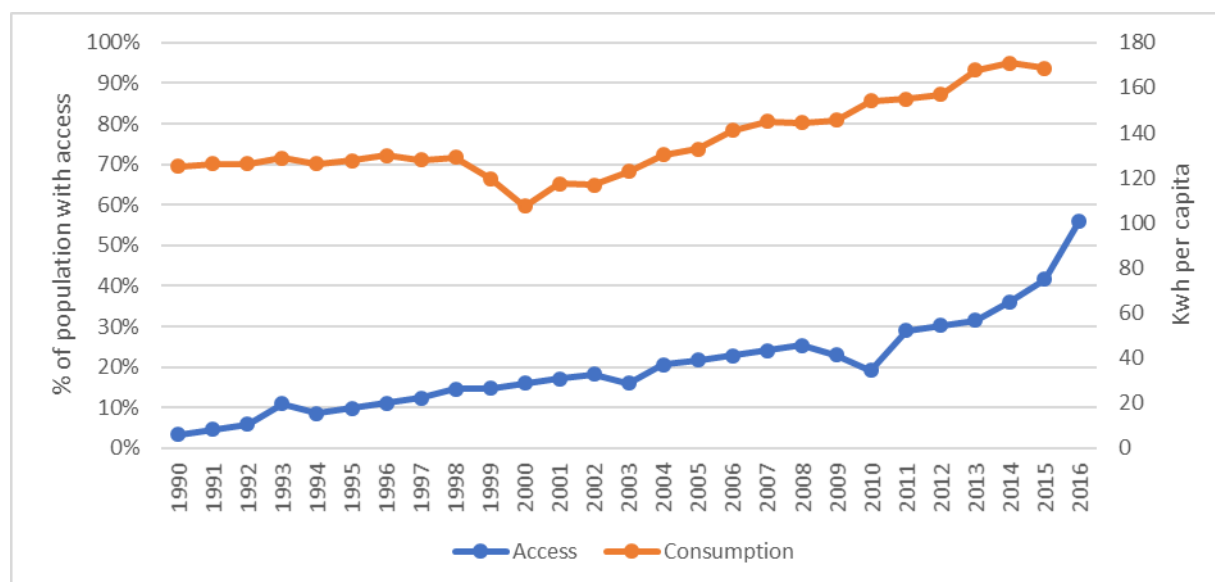
Years	Customer connections (millions)	Annual growth rate (percent)
2011/12	1.9	n.a.
2012/13	2.3	18
2013/14	2.7	17
2014/15	3.4	25
2015/16	4.6	35
2016/17	6.2	35

Source: KPLC annual report 2016.

n.a. = not applicable.

Kenya is also a leader when it comes to access to electricity from solar home systems and solar-powered mini-grids (IRENA, 2019). The World Bank’s recent Multi-Tier Framework survey reveals that, of the 75 percent of people accessing electricity in Kenya, 21.5 percent do so through off-grid solutions, especially solar home systems (13 percent of total households), the highest penetration rates in Sub-Saharan Africa.

**Figure 4. Electricity access and consumption in Kenya, 1990–2016**

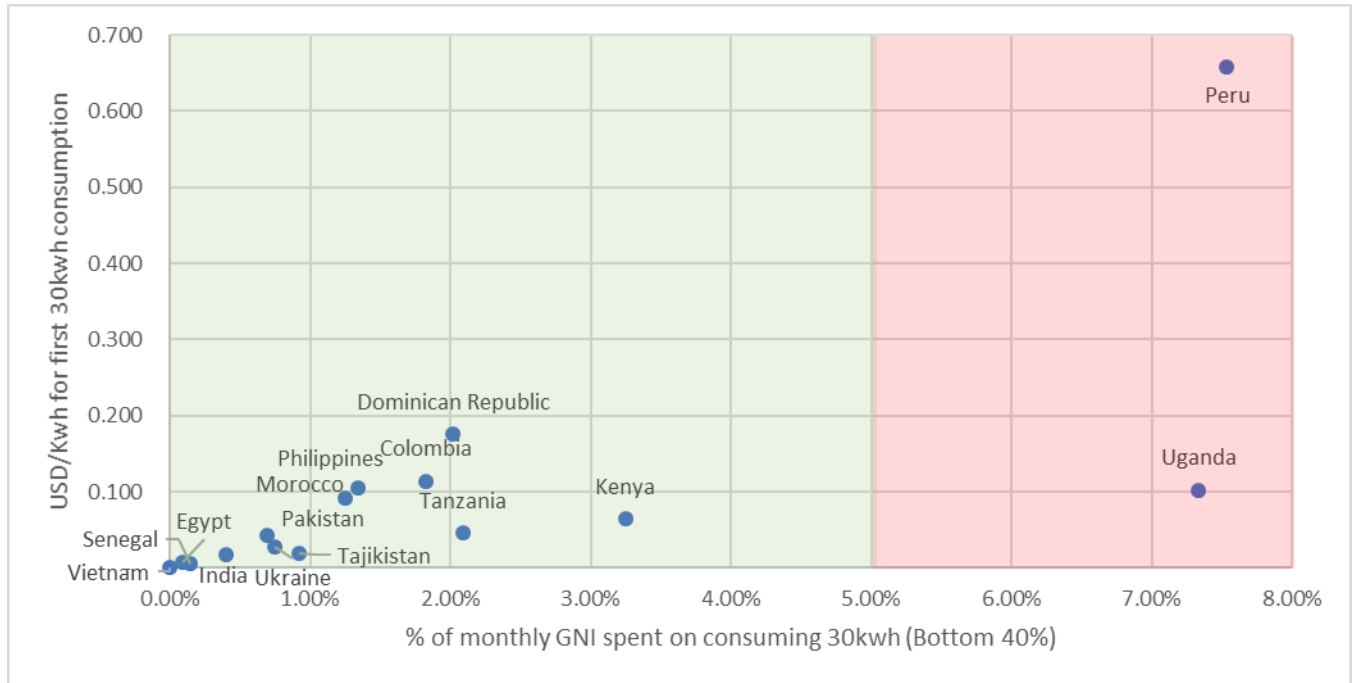


Source: International Energy Agency and Tracking SDG7, 2017.

Consumption, too, has shown signs of improvement, markedly so following the abatement of the supply crisis of the late 1990s. However, growth in consumption is low by international standards and has been slower than expected—contributing to the current situation of apparent surplus. This may reflect the fact that Kenya’s efforts to increase access have focused more on connections than on other interventions, such as appliance programs, that would raise consumption.

Turning to affordability, despite the relatively high cost of electricity in Kenya, the cost of a subsistence volume of 30 kilowatt-hours per month is well under 5 percent of the budget of the poorest 40 percent of households (figure 5).

**Figure 5. Affordability of subsistence consumption in Kenya, 2016**



Source: RISE 2018

### 3.2.2 Institutions

Kenya scores high on the index of the regulatory framework for electricity access (table 4). The country's recent success with electrification is based on a holistic approach, championed and supported by the government and implemented by KPLC and REA. Growth in household connections has been driven primarily by KPLC, owing to the utility's strong technical capacity and rapid speed of implementation, while REA's role has been largely confined to the electrification of rural schools and clinics.

Key features of the approach adopted include a combination of both on-grid and off-grid solutions, the leveraging of donor resources to address barriers to access in urban and rural areas alike, and the harnessing of political will. Beyond the regular rollout of connections by KPLC, the early electrification efforts entailed government-funded contributions, with support from the World Bank (ESRP and KEEP projects). More recently, several major donor-funded programs were implemented. Customers in informal settlements were the major beneficiaries of a KPLC program, concluded in 2018, funded by the World Bank and the Global Partnership on Output-Based Aid. The Last Mile Connectivity Project, funded by the Kenyan government and donor grants, benefited customers within 600 meters of designated distribution transformers. In the off-grid space, privately owned mini-grids are active; connection fees and consumption tariffs are based on costs but are approved, either formally or informally, by ERC.

A National Electrification Strategy has been funded by the World Bank. The strategy applies GIS techniques to pinpoint areas suitable for grid and off-grid electrification and identifies the funding required to achieve universal access by 2022.

**Table 4. Regulatory framework for electricity access in Kenya and comparators, 2015**

	Kenya	Senegal	Tanzania	Uganda	International benchmark
<b>Energy Access Regulation</b>	81%	28%	81%	65%	56%
<i>Regulation of New Connections</i>	75%	50%	94%	79%	65%
<i>Regulation of solar home systems</i>	100%	0%	50%	50%	66%
<i>Regulation of mini-grids</i>	67%	33%	100%	67%	44%

Note: Scores based on index developed for the Rethinking Power Sector Reform Project. For more details go to project website at [http://www.esmap.org/rethinking\\_power\\_sector\\_reform](http://www.esmap.org/rethinking_power_sector_reform)

### 3.2.3 Summary

In summary, Kenya’s long-term electricity access trajectory reveals steady growth at an increasing pace, with strong recent progress in both grid electrification and off-grid access. Since 2006, Kenya has maintained a firm political commitment to the goal of universal access, backing it up with significant financial resources and a good regulatory environment. The pace of grid electrification appears to have accelerated dramatically in the past five years, and Kenya’s efforts to promote mini-grid and off-grid electrification continue to pay off.

## 3.3 Utility efficiency

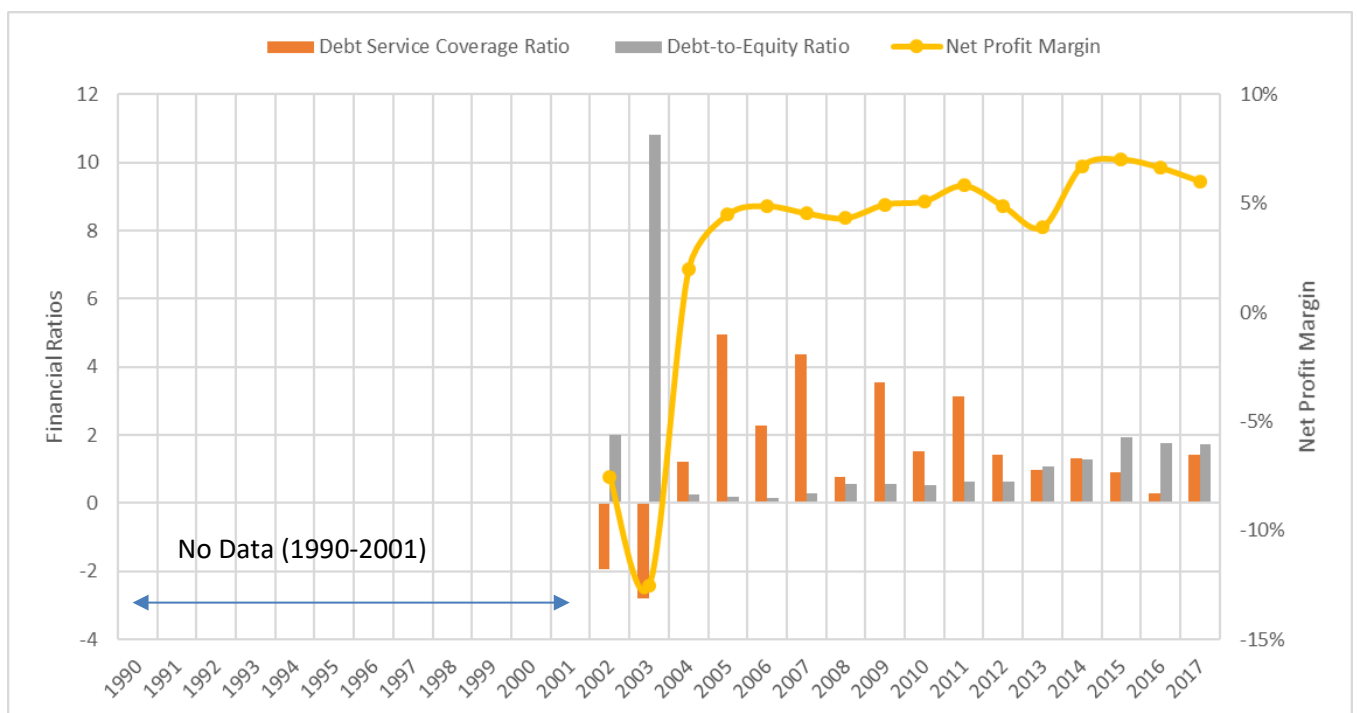
### 3.3.1 Performance

Before unbundling began in 1997, five state-owned entities owned power generation stations and transmission lines in Kenya. KPLC was one of them. A listed company with a government majority shareholding, KPLC operated as a vertically integrated utility, buying power in bulk from the other and supplied power to end-users. KPLC also imported power from Uganda under a contract between the Uganda Electricity Board, as it was then known, and one of the other Kenyan entities, KPC. This structure posed challenges, mainly around the high level of complexity in the system. Financial functions overlapped among the five key players, accompanied by recurrent disputes over asset ownership, unclear lines of responsibility for debt servicing, ill-defined lines of responsibility around the timely development of new generation facilities, and electricity tariffs that were not cost-reflective. Nevertheless, KPLC was a relatively strong performer in the region when it came to financial and technical efficiency, and the utility’s governing principles and structures were not completely out of line with the corporate and commercial tenets set out in the “standard reform model” that was taking hold. However, the sub-sector as a whole depended on external sources of funding for system expansion and development, and—under embargo—KPLC’s performance deteriorated in the 1990s, along with the country’s reserve margin.

When the structural reforms began in 1996, KPLC had already undertaken efforts to bring tariffs closer to long-run marginal costs and was initiating staff rationalization processes. Following the unbundling of generation functions (which were designated to KenGen), KPLC’s performance balanced that of KenGen’s relatively poor performance, buoyed by the increase in tariffs to 75 percent of long-run marginal costs. However, this quickly changed with the onset of a critical

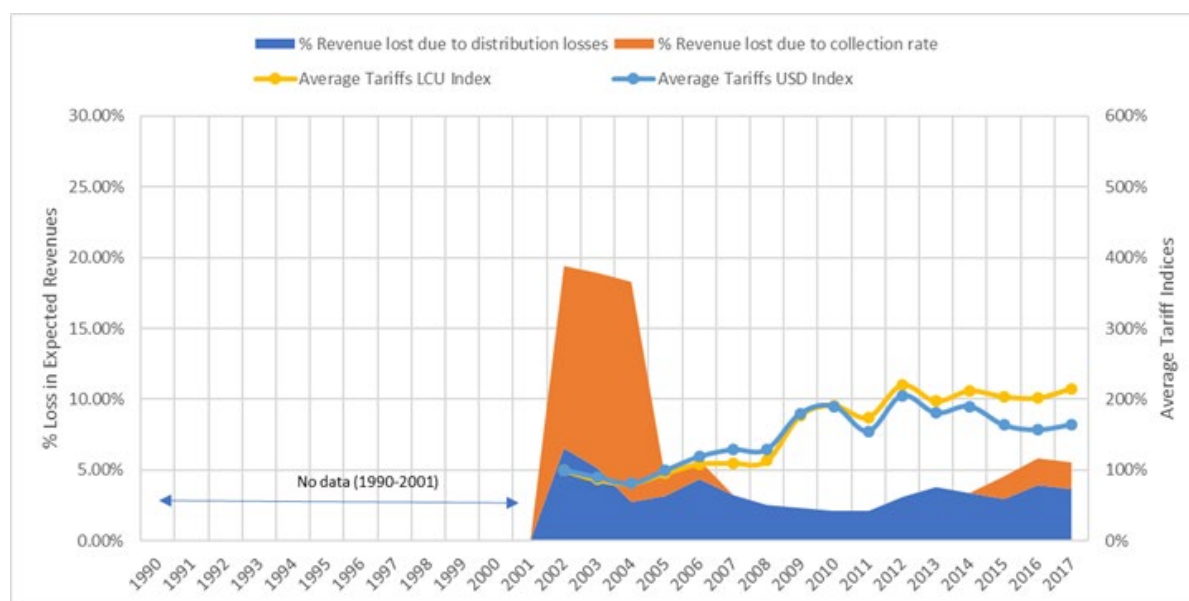
drought in 1999, which threatened KPLC’s financial viability. An interim PPA between KPLC and KenGen had been set before the drought began, based on an energy-only tariff of K Sh 2.36/kWh. Once the drought hit, however, electricity sales decreased radically because of load-shedding, theft, and nonpayment, causing KPLC to incur heavy losses. KPLC’s costs rose with the burden of providing emergency power. Debts rose as income fell. The regulator did not intervene, and, by 2002, KPLC was in extreme financial distress, registering a financial loss, a negative debt-service ratio, and a poor debt-coverage ratio (figure 6). Under these conditions, KPLC’s technical performance suffered. Transmission and distribution losses increased to about 22 percent. Meanwhile, collections had fallen below 80 percent, meaning that the utility was losing about 20 percent of the revenues it would have reaped if it had been able to work in the efficient ranges (i.e., full collection and distribution losses of 13 percent) (figure 7; table 5).

**Figure 6. Evolution of KPLC’s profit margin and debt ratios, 2002–2017**



Source: Rethinking Power Sector Reform Project

**Figure 7. Evolution of KPLC’s operational inefficiencies and end-user tariffs, 2002–2017**



Source: Rethinking Power Sector Reform Project

**Table 5. KPLC’s collection and distribution losses, 1997–2017**

Percent

Year	Collection rate	Distribution losses
1997	—	21
1998	—	20
1999	—	22
2000	—	22
2001	85	21
2002	84	23
2003	83	21
2004	81	18
2005	99	18
2006	99	20
2007	100	18
2008	100	17
2009	101	16
2010	101	16
2011	101	16
2012	100	17
2013	100	19
2014	100	18
2015	98	18
2016	98	19
2017	98	19

— = data not available.

Source: Rethinking Power Sector Reform Project

Following the change in government and leadership in 2002, the imbalance between KPLC and KenGen tariffs was finally resolved (see discussion in Part 2), and, in October 2004, KPLC was put on a performance contract. Performance contracts for KenGen and ERB followed in July 2005. The impact of the performance contract, coupled with resolution of the KenGen tariff situation, can be seen almost immediately. Collection rates increased to almost 100 percent, while transmission and distribution losses fell back down to 18 percent (table 6)—in line with KPLC’s performance before the drought. The debt-service-coverage ratio also returned to a healthy range (figure 7). (However, KPLC’s recent financial performance has come under stress again; the company’s debt-to-equity ratio is rising, while its debt-service-coverage ratio is dropping.)

Following the successful recovery, KPLC was put under a private management contract, which was seen as a means of severing influence between utility staff and government officials. A two-year contract was awarded to Manitoba Hydro in May 2006 after a competitive tender. It continued the positive trends of reducing system losses and improving collection rates, with collection rates touching 100 percent, while losses decreased further to 16.6 percent in 2008 (table 6). At the same time profits increased and a healthy debt-service-coverage ratio was maintained (figure 7). The utility also saw an increase in new customers (almost doubling in the first year and increasing by 25 percent in the next). Though the management team was not well-liked by local KPLC staff, the two-year period allowed them to build internal capacity and a greater degree of independence from political influence, as well as a sense of purpose and ownership over the new trajectory of power sector reform and development in Kenya.

Given the tensions between the board and staff, the management contract was not renewed in 2008. From 2008 to 2011, the positive trends observed under Manitoba Hydro’s management continued. System losses declined further, collection rates stayed at 100 percent, and tariffs were revised to be more cost reflective. The effects can be seen in improving efficiency ratios and steady financial ratios.

Periods of drought in the late 2000s and early 2010s once again necessitated the procurement of power from EPPs, raising KPLC’s operating costs and putting a dent in the company’s financial indicators. Net profit margins were cut from 10 to 5 percent between 2010 and 2012, coinciding with a 64 percent increase in fuel purchase costs in 2012. KPLC saw a recovery in 2014, with the net profit margin returning to 7 percent. Financial performance was consistently good through 2016. Though technical indicators wavered in the aftermath of the drought, recovery was relatively swift.

KPLC has been investing heavily in the government’s universal access program. Investments reached US\$481 million in 2016, equal to about 45 percent of company revenue. As a result, the company’s ability to finance its own investment program fell from 92 percent in 2009/2010 to 52 percent in 2015/2016. The government has been providing grants to support the expansion of the national grid, while avoiding any increase to connection charges. Those grants amount to 5–10 percent of KPLC’s capital expenditure for the period 2014–2016. More recently, KPLC’s finances began to suffer again as government demanded more rapid progress on electrification in the 2017 electoral year. Owing to a shortage of government funds and political unwillingness to allow KPLC the stipulated tariff adjustment in 2017, the gap had to be partially funded by expensive short-term borrowing. KPLC’s current ratio and quick ratio, which have fluctuated around 1 in recent years, suggest that the company may have some difficulty paying short-term liabilities (table 6). KPLC’s debt was recently restructured to accommodate continued investment. The short-term debt-refinancing offer of

US\$300 million (with a World Bank guarantee) was oversubscribed by 70 percent. The average interest rate on KPLC's total borrowings, which is a blend of commercial and concession debt, is around 6 percent for the period under analysis.

**Table 6. Summary of financial indicators against global comparators**

	Kenya	Global comparator*
Net profit (loss) margin	7%	-12%
EBITDA margin	11%	6%
Current ratio	0.98	0.79
Debt service coverage ratio	0.85	-4.56
External Financing Index Ratio <sup>14</sup>	0.02	6.92
Investment as a percent of revenues	45%	18%
Average borrowing rate	6%	7%
Government transfers as a share of utility revenue	3%	6%
Net capital cost recovery ratio <sup>15</sup>	44%	16%

Note: Sample average from the Rethinking Power Sector Reform Project data observatory and includes data from Tanzania, Senegal, Peru, Colombia, Pakistan, the Philippines, Vietnam, Kenya, Uganda, Tajikistan, the Indian states of Rajasthan, Odisha, and Andhra Pradesh, and Egypt

### 3.3.2 Institutions

The structural reforms initiated in the 1990s left Kenya's power sector partially vertically unbundled, with private sector participation in generation and distribution (table 7). The government has made commitments to further unbundle transmission and distribution, but this seems unlikely in the short-term.

**Table 7. Comparing the extent of utility restructuring in Kenya and comparators, 2015<sup>16</sup>**

	Kenya	Senegal	Tanzania	Uganda	International Benchmark
<b>Utility Restructuring</b>	<b>25%</b>	<b>0%</b>	<b>0%</b>	<b>55%</b>	45%
<i>Vertical Unbundling</i>	50%	0%	0%	60%	55%
<i>Horizontal Unbundling</i>	0%	0%	0%	50%	34%
<b>Pvt sector participation</b>	<b>16%</b>	<b>11%</b>	<b>3%</b>	<b>38%</b>	24%
<i>PSP in Generation</i>	25%	34%	10%	53%	41%
<i>PSP in Distribution</i>	25%	1%	0%	63%	16%
<i>PSP in Transmission</i>	0%	0%	0%	0%	14%

Note: Scores based on index developed for the Rethinking Power Sector Reform Project. For more details go to project website at [http://www.esmap.org/rethinking\\_power\\_sector\\_reform](http://www.esmap.org/rethinking_power_sector_reform)  
PSP = private sector participation.

<sup>14</sup> *External financing index ratio* measured as net cash flow from financing divided by the net cash flow from operations

<sup>15</sup> *Net capital cost recovery ratio* is the percent of full capital costs that can be recovered through tariff revenues net of operating costs

<sup>16</sup> For a more detailed look at the indices used in this section, see the Annex



KPLC is a public company incorporated under the Companies Act and listed on the Nairobi Stock Exchange. The state owns 50.1 percent of its shares, while 49.9 percent are in private hands. The company operates with policy guidance from the MoEP, as well as the National Treasury (Ministry of Finance), under the State Corporations Act. Regulatory affairs are dealt with by the ERC under the 2006 Energy Act and by the Capital Markets Authority under the Capital Markets Act.

On our index of governance, KPLC scores well (90 percent) compared to the comparator group (63 percent)<sup>17</sup> (table 8).<sup>18</sup> Its one black mark is the sway of government in board appointments. At each annual general meeting, at least one-third of the board’s members retire by rotation but are eligible for reelection.<sup>19</sup> Any shareholder is free to nominate someone to fill a vacancy on the board and to participate in the ensuing voting. The vote is normally conducted by a reputable auditing firm and the results published in the press. In practice, however, the government’s 50.1 percent share means that it can decide who serves on the board.

**Table 8. Corporate governance of utilities in Kenya and comparators, 2015**

	Kenya	Senegal	Tanzania	Uganda	International benchmark
	Kenya Pov	SENELEC	TANESCO	UMEME	
<b>Overall Utility Governance</b>	<b>90%</b>	<b>65%</b>	<b>61%</b>	<b>80%</b>	63%
<b>Corporate Governance</b>	100%	74%	57%	85%	62%
<i>Accountability</i>	<i>100%</i>	<i>58%</i>	<i>58%</i>	<i>92%</i>	60%
<i>Autonomy (SOEs)</i>	<i>100%</i>	<i>89%</i>	<i>56%</i>	<i>78%</i>	63%

Note: Scores based on index developed for the Rethinking Power Sector Reform Project. For more details go to project website at [http://www.esmap.org/rethinking\\_power\\_sector\\_reform](http://www.esmap.org/rethinking_power_sector_reform)

KPLC operates under an annual performance contract with the MoEP, with targets set for key performance indicators based on the concept of the “balanced scorecard.” The company reports its performance to the government at least quarterly. Though KPLC performs well on most items and is known to have a long history of strong corporate culture, the discretionary influence of government should be kept in mind when interpreting the score. The cause for doubt is confirmed when one considers that (i) the board’s decisions have largely been in line with government positions, (ii) the government has removed board members before their term is up, and (iii) the board has failed to perform on all ten areas defined in the legal and regulatory framework as “explicit responsibilities.”

When it comes to financial management, KPLC stands head-and-shoulders above other countries in the region and compares favorably with the broader global benchmark group (table 9). As KPLC’s shares are traded on the Nairobi Stock Exchange, its financial reporting is done in compliance with the International Financial Reporting Standards. The company is ISO-certified and has set procedures for budgeting operating and capital expenditures, as well as for other processes. KPLC has set internal auditing procedures with adequate reporting and supervision mechanisms. Because it is a

<sup>17</sup> Data for utility governance indicators were collected in 2015. Given the dynamic nature of governance frameworks, specific conditions may have changed since then.

<sup>18</sup> For a more detailed look at the indices used in this section, see the Annex.

<sup>19</sup> The requirements of the sector, diversity of skills, academic qualifications, gender, age, and experience are among the factors to be taken into consideration when constituting the board.

state-owned company, the auditor general carries out the external audit, which is contracted out to a reputable independent audit firm.

**Table 9. Utility management index of utilities in Kenya and comparators, 2015**

	Senegal SENELEC	Kenya Kenya Pov	Tanzania TANESCO	Uganda UMEME	International benchmark
<b>Utility Management</b>	<b>56%</b>	<b>80%</b>	<b>65%</b>	<b>76%</b>	64%
<i>Financial Discipline</i>	57%	76%	64%	77%	59%
<i>Human Resource</i>	57%	64%	71%	71%	62%
<i>Information and Technology</i>	53%	100%	60%	80%	71%

Note: Scores based on index developed for the Rethinking Power Sector Reform Project. For more details go to project website at [http://www.esmap.org/rethinking\\_power\\_sector\\_reform](http://www.esmap.org/rethinking_power_sector_reform)

KPLC has a highly competent and technically qualified staff, putting Kenya’s scores for human resources policies in line with the average for the global benchmark group (table 9). Although salaries are fixed by the Salaries and Remuneration Commission (as it is state-owned company), KPLC is considered an attractive employer in Kenya. Managerial autonomy with respect to staff decisions remains somewhat restricted. In 2018, KPLC had 11,270 staff, of whom 32 percent had short-term or contract status. About 20 percent of the staff are women. The utility runs its own training school, open to all Kenyans, from which it hires part of its technical staff. In addition to hiring graduates of the training school, staff recruitment is done by internal advertisement, with subsequent short-listing and interviewing. Higher-level posts, such as senior managers and general managers, are the subject of external searches conducted by reputable human-resources firms, with short-listing and interviewing facilitated by the firms.

Kenya again outperforms the cohort when it comes to information and communications technology and internal business procedures (table 9). The utility has put in place exhaustive formal procedures for major operations. It also employs the latest IT solutions for increasing reliability of supply and for serving customers better.

### 3.3.3 Summary

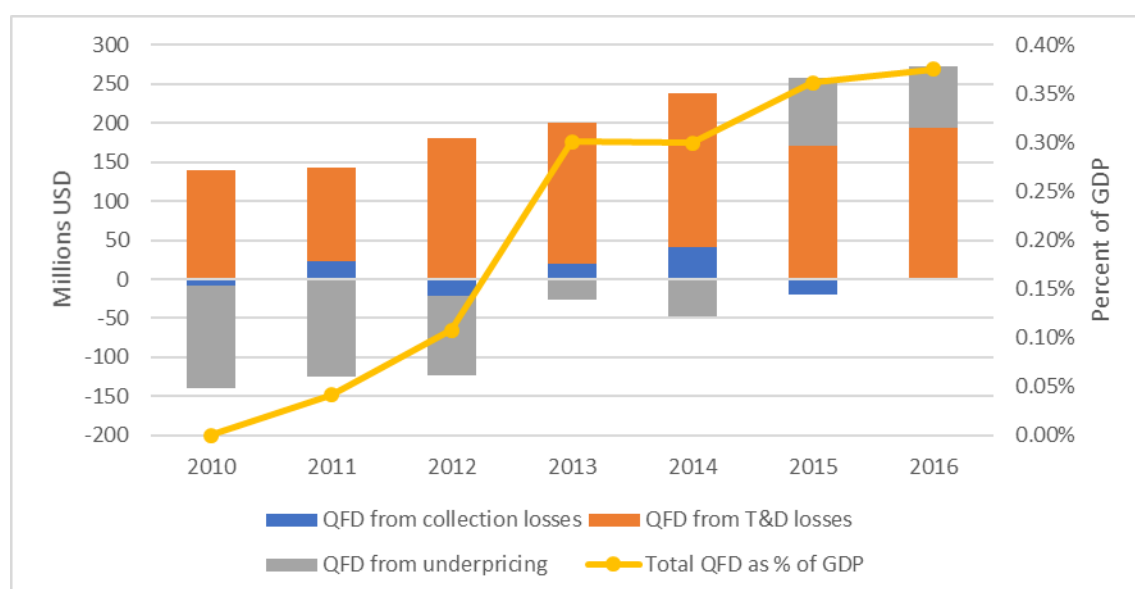
A prominent feature of Kenyan power sector reform is the strong performance of the two publicly listed power companies, KPLC (transmission and distribution) and KenGen (generation). Operational performance has improved consistently throughout the reform process, with collections reaching 100 percent in some years. There is room for improvement on technical and commercial losses, which stand at 20 percent. Financial performance has also been strong, but has suffered recently from a partially unfunded mandate on electrification. Despite some political influence, KPLC was already a good regional performer ahead of the structural reforms, but it experienced deteriorating performance during the supply crisis of the 1990s. Following unbundling, the introduction of robust policy and legislation, and the advent of performance contracts, KPLC is again a top performer in the region. The company has a fair credit rating of B1 (though there were a few defaults in payments to IPPs in FY 2016 and 2018); a remarkable achievement in a region where most power utilities are not even rated and cannot raise any commercial debt. When it comes to utility governance, financial discipline, and other internal functions, KPLC is ahead of the global benchmark group on most items.

### 3.4 Cost recovery

#### 3.4.1 Performance

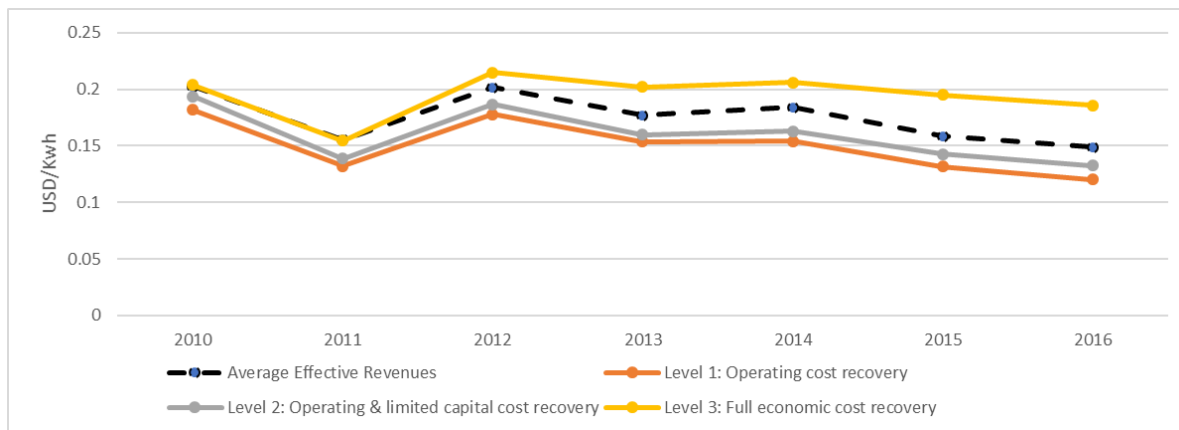
The quasi-fiscal deficit (QFD) is a measure that compares the revenues of a fully efficient utility charging full capital-cost-recovery tariffs, with those of a real utility. The measure captures the size of the economic gap between efficient costs and revenues and can be disaggregated to reflect how much is attributable to underpricing, under-collection of revenues, and excessive distribution losses. In the case of Kenya, the QFD is around US\$271 million, or 0.35 percent of GDP (figure 8). Technical losses at 19 percent are much above the benchmark (5 percent) level and are the main contributor to the QFD (Over 70 percent in 2016). Technical losses are rising because of overloaded transformers and long low-voltage lines with low levels of consumption. KPLC’s focus on investment in generation and new connections has sidelined efforts to improve network quality. Collection rates have fluctuated between 97 and 102 percent since 2010 and have a very low to negative contribution to the QFD.

**Figure 8. Quasi-fiscal deficit attributable to KPLC, 2010–2016**



To assess Kenya’s progress toward cost recovery, a detailed analysis of the sector’s financials was conducted for the past four years. The analysis sets benchmarks for three levels of cost recovery: (i) operating costs only; (ii) operating costs plus limited capital costs, such as debt service; and (iii) full capital costs on current and planned future investments. The financial viability analysis does not account for costs associated with service delivery that are covered separately by other parties, for example if a donor provides concessional capital. In a second stage, the analysis evaluates the sector against a full-cost-recovery benchmark that incorporates any costs that are currently subsidized. Data for the analysis were available only for the period 2010–2016. The results for the second stage (figure 9) show that, with the exception of 2015, the average annual tariff for the end-user has always been at or slightly above the second of the three cost-recovery levels (operating costs plus limited capital costs). No operating costs are covered on KPLC’s behalf through budgetary transfers or provision of subsidized goods and services. This is a relatively good and stable position when compared to other countries in the region.

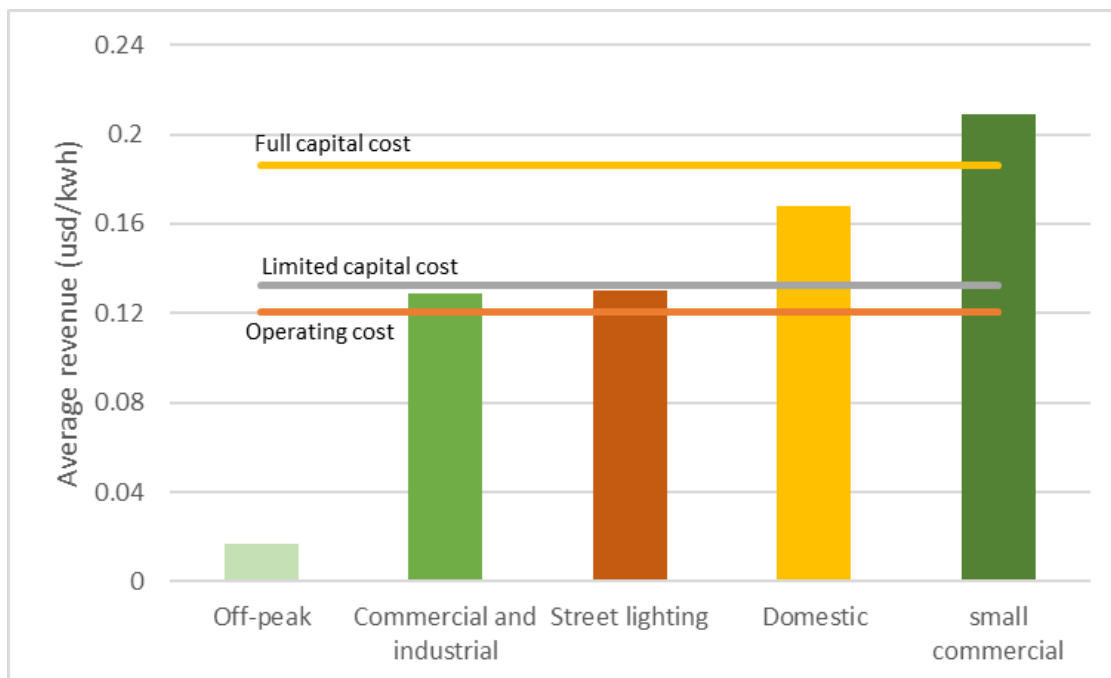
**Figure 9. Evolution of full financial cost recovery for KPLC, 2010–2016**



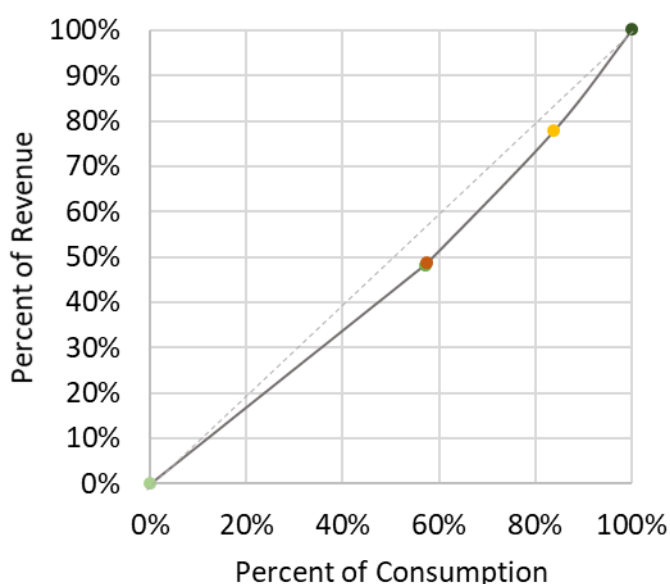
The picture changes somewhat when applying the more stringent cost-recovery criteria of level 3. Since 2010, KPLC has become less able to finance planned investment from its own resources. If the company were to self-finance planned investments from now on, tariffs would have to increase by 20 percent in U.S. dollar terms. This conclusion reflects spending on extending the grid and advancing access, promoted by the government and partially supported by donors.

Average tariffs vary somewhat across customer groups (figure 10). With the exception of off-peak, interruptible supply, all customer groups pay at a rate consistent with limited capital cost recovery, while small commercial customers cover the full capital cost of service. There is some evidence that the above-cost tariff for small commercial users cross-subsidizes other customer groups (figure 11).

**Figure 10. Average tariff revenue and cost recovery by customer group, 2016**



**Figure 11. Percentage of revenue against percentage of consumption by customer group, 2016**



### 3.4.2 Institutions<sup>20</sup>

Independent regulation in Kenya—by ERB in 1997 and by its successor, ERC, since 2007—has been an integral aspect of diversifying and balancing decision-making in the sector. As an independent commission, ERC is tasked with sector regulation, operating under annual performance contracts with the MoEP. ERC is responsible for regulating the entire energy sector, including renewable energy and petroleum downstream activities. As a result of important gains in technical capacity and expertise related to tariffs, quality, and market regulation, ERC has become the data hub for the sector and is responsible for technical planning. However, government continues to involve itself in sector regulation and technical planning, in large part through governance arrangements, including for the appointment of commission members. Though ERC’s relative performance in the region and the broader global benchmark group is strong, this lack of independence has hampered the regulator’s effectiveness in some instances—including the regulation of market entry, technical planning, and tariff review.

A good framework for regulatory governance must balance accountability to stakeholders with an adequate degree of autonomy for decision-making, especially when it comes to tariff setting. The legal basis for ERC’s existence is primary legislation (the 2006 Energy Act), reflecting international best practices. Benchmarking analysis suggests Kenya performs well when it comes to accountability (table 10), both in absolute terms and relative to its African neighbors, with the exception that ERC’s recommendations (and the responses of the government body receiving them) need not be made publicly available. This study found that accountability requirements are, for the most part, met.

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<sup>20</sup> For a more detailed look at the indices used in this section, see the Annex.

**Table 10. Formal regulatory governance in Kenya and comparators, 2015**

<b>Indicators</b>	<b>Kenya</b>	<b>Senegal</b>	<b>Tanzania</b>	<b>Uganda</b>	<b>International benchmark</b>
<b>Regulatory Governance</b>	56%	50%	65%	59%	59%
<b>Accountability</b>	95%	70%	95%	74%	83%
<i>Regulatory Oversight</i>	100%	67%	100%	67%	81%
<i>Legal Appeals</i>	100%	100%	100%	100%	100%
<i>Transparency</i>	85%	44%	85%	55%	67%
<b>Autonomy</b>	59%	71%	68%	81%	71%
<i>Decision-Making Autonomy</i>	79%	33%	86%	85%	79%
<i>Budgetary Autonomy</i>	94%	100%	100%	100%	80%
<i>Leadership Autonomy</i>	63%	50%	88%	88%	66%
<i>Managerial Autonomy</i>	0%	100%	0%	50%	59%

Note: Scores based on index developed for the Rethinking Power Sector Reform Project. For more details go to project website at [http://www.esmap.org/rethinking\\_power\\_sector\\_reform](http://www.esmap.org/rethinking_power_sector_reform)

When it comes to autonomy, however, ERC’s scores are below average—with the overall score of 59 percent below the average for the global benchmark group of 71 percent, as well as the results of other Sub-Saharan African cases (table 10). Excluding the higher-than-average score on budgetary autonomy, the benchmarking exercise finds that ERC’s independence and authority are somewhat limited when it comes to decision-making, leadership, and management.

With respect to the decision-making dimension of autonomy, ERC’s mandate is expansive, scoring 79 percent in the benchmarking analysis. However, there are formal provisions under which the MoEP and the legislature can overturn a decision from the regulator. Another important limitation to ERC’s autonomy is related to the fact that ERC does not have the authority to issue subsidiary legislation, such as statutory instruments. Instead, it must make proposals to the MoEP on regulations and rules. Moreover, when a government body receives a recommendation from ERC and rejects or modifies it, it is not required to provide a public explanation for doing so. Though no ERC decision has been overturned by a ministry or government body in the last five years, ERC’s intended tariff increases have been delayed three times at the insistence of the government, before being implemented.

Kenyan retail tariffs are set so as to shield investors from volatility: foreign exchange and fuel costs are passed through automatically every month, and inflation semi-annually. The pass-through mechanism worked seamlessly from its introduction until 2017—an election year. The administration, already very sensitive to retail tariffs, refused in 2017 to allow the fuel-cost pass-through to increase retail tariffs as the country suffered from a drought. After the election, the pass-through was implemented. In the same vein, the regulator is meant to conduct a tariff review every three years. However, only four tariff reviews have been carried out to date—in 1999, 2008, 2013 and 2018. Tariffs are a politically sensitive issue, with each adjustment falling under close scrutiny—even the small adjustments linked to fuel, foreign exchange rates, or inflation are sometimes blocked. Full reviews are even more political, making them near impossible to conduct in the run-up to or just after elections, as politicians predictably include promises to reduce electricity tariffs in their election campaigns. However, it is precisely because of this politicization of tariffs that the

regulator is supposed to conduct reviews regularly and independently. ERC has yet to fulfill this function as regularly as the law dictates.

There is room for advancing the independence of ERC. Over the past 20 years, its technical capacity has increased substantially; the policy, legislative, and financial basis for independent functions has improved; and ERC has gained a greater voice in decision-making. However, it has been unable to act freely on politically fraught matters—revealing the pressures that the commission’s chairman, who is appointed by the Kenyan president, and other board members, appointed by the MoEP, must contend with. The perceived deficiency in regulatory independence was highlighted by a step taken the recent ERC director general. In January 2017, seven months ahead of the expiry of his contract, the ERC DG unexpectedly took terminal leave under unclear circumstances. His decision came just after four IPPs that produced solar PV power jointly appealed to the cabinet secretary to have the regulator reconsider its decision to approve PPAs at a tariff lower than that provided in the feed-in tariff policy.

Regarding leadership autonomy, ERC earns a middling score—primarily because the leadership is, in effect, appointed by the political executive. As designated in the 2006 Energy Act, ERC’s chairperson is appointed by the president; the MoEP’s permanent secretary and director general also serves on the board; and the minister appoints the remaining members. Though there are strict rules pertaining to the balance of expertise and requisite qualifications, the presence of government officials and the rules of appointment undermine independence from political pressures or conflicts.

Nevertheless, when it comes to regulatory substance, Kenya performs relatively well (table 11). ERC determines end-user electricity tariffs, which, of course, is central to the financial viability of KPLC and the sector as a whole. The methodology used to determine the end-user tariffs is based on KPLC’s revenue requirement, that is, that the company’s revenue must be sufficient to provide a return and cover taxes on the regulated asset base, the cost of purchases of capacity and energy, and the company’s operating and maintenance costs. ERC is also responsible for approving PPAs between KPLC and various power providers—among them KenGen, IPPs, TANESCO, the Uganda Electricity Transmission Company, and the Ethiopian Electric Power Corporation. Regulatory objectives (i.e., allocative efficiency, productive efficiency, equity, and financial sustainability) are acknowledged and clearly specified in the sectoral legal framework, specifically in ERC’s 2005 Retail Electricity Tariffs Review Policy. The relevant policies not only address substantive issues, but also the following formal objectives: simplicity, transparency, stability, and administrative feasibility. The ERC, with World Bank support, developed the sixth Cost of Service Study, which will provide the baseline for the next tariff cycle, expected sometime in 2019.

Kenya’s comprehensive regulatory framework for tariffs includes an automatic tariff adjustment mechanism (introduced in 1997) that allows exogenous costs related to inflation, exchange rate, and oil price to pass through to the user. Application of the mechanism has fortified the sector against external shocks by reducing the discretion involved in making tariff adjustments. However, the requirement for tariff reviews—which are to be carried out every three years according to the 2005 policy—has been inconsistently applied and delayed in some cases, jeopardizing the financial sustainability of the system. It is widely believed that the delays have occurred for political reasons, such as to forestall a drop in public opinion ahead of or immediately after national elections. As a result of these parallel institutional features—robust technical capacity and comprehensive

regulatory frameworks, in contrast with vulnerability to political pressure and lower levels of autonomy—ERC’s tariff regime has been stable, if not exemplary.

ERC performs poorly in quality regulation, computed as the average of quality-of-service standards and quality-of-service enforcement. The main reason for the low score is the lack of enforcement of quality-of-service standards. Moreover, ERC does not specify how technical performance data are to be collected and does not independently review or validate technical performance data. Measurements of reliability of the power supply are not publicly available, and there are no incentives for utilities to increase customer satisfaction.

**Table 11. Formal regulatory substance in Kenya and comparators, 2015**

<b>Indicators</b>	<b>Kenya</b>	<b>Senegal</b>	<b>Tanzania</b>	<b>Uganda</b>	<b>International benchmark</b>
<b>Regulatory Substance</b>	81%	73%	83%	78%	76%
<b>Tariff Regulation</b>	88%	76%	88%	92%	77%
<i>Regulatory Framework for Tariffs</i>	100%	86%	100%	100%	90%
<i>Determination of Tariffs</i>	75%	67%	75%	83%	64%
<b>Quality Regulation</b>	54%	42%	63%	58%	75%
<i>Quality of Service Standards</i>	75%	50%	75%	50%	82%
<i>Quality of Service Enforcement</i>	33%	33%	50%	67%	68%
<b>Market Entry Regulation</b>	100%	100%	100%	83%	77%
<i>Permitting New Entrants</i>	100%	100%	100%	100%	90%
<i>PPA Approvals</i>	100%	NAP	100%	67%	57%

Note: Scores based on index developed for the Rethinking Power Sector Reform Project. For more details go to project website at [http://www.esmap.org/rethinking\\_power\\_sector\\_reform](http://www.esmap.org/rethinking_power_sector_reform)

### 3.4.3 Summary

Kenya has been able to maintain tariffs at a level sufficient to cover operating and limited capital costs, supported by a comprehensive tariff-setting framework that has included an automatic tariff adjustment mechanism since the late 1990s. However, regulatory autonomy remains a challenge, and tariff reviews are regularly delayed, even as the rules and regulations surrounding the regulator are very clearly articulated in the concerned laws. Consequently, Kenya scores much lower when it comes to comparing how the regulation on paper translates in real life (table 12).<sup>21</sup> Kenya is a (positive) outlier in the region when judged on the financial viability and sustainability of its primary power company (in large part due to its tariff regime), but political involvement in regulatory decisions remains a concern.

<sup>21</sup> The “perception” index is calculated based on expert assessment of whether the provisions that exist on paper are applied in practice. The expert assessment was provided by the local consultant in each country, whose professional opinion was also informed by some 20 stakeholder interviews he or she conducted with key stakeholders in the power sector reform process. The resulting “perception” index was also reviewed by the World Bank country energy team, which is also knowledgeable about the local context. Despite best efforts, it is important to acknowledge that this second index is inevitably more subjective in nature than the de jure index.



**Table 12. Power sector regulation in Kenya: de jure vs perceived performance**

<b>Indicators</b>	<b>De Jure</b>	<b>Perceived</b>
<b>Overall Regulation</b>	<b>45%</b>	<b>19%</b>
<b>Regulatory Governance</b>	56%	38%
<b>Accountability</b>	95%	71%
<i>Regulatory Oversight</i>	100%	67%
<i>Legal Appeals</i>	100%	100%
<i>Transparency</i>	85%	46%
<b>Autonomy</b>	59%	53%
<i>Decision-Making Autonomy</i>	79%	57%
<i>Budgetary Autonomy</i>	94%	94%
<i>Leadership Autonomy</i>	63%	63%
<i>Managerial Autonomy</i>	0%	0%
<b>Regulatory Substance</b>	81%	51%
<b>Tariff Regulation</b>	88%	58%
<i>Regulatory Framework for Tariffs</i>	100%	67%
<i>Determination of Tariffs</i>	75%	50%
<b>Quality Regulation</b>	54%	29%
<i>Quality of Service Standards</i>	75%	25%
<i>Quality of Service Enforcement</i>	33%	33%
<b>Market Entry Regulation</b>	100%	67%
<i>Permitting New Entrants</i>	100%	100%
<i>PPA Approvals</i>	100%	33%

#### 4 Conclusion: Successful reforms, looming challenges, and useful lessons

Two successive waves of reform have fundamentally altered the structure and organization of Kenya’s vibrant power sector, which boasts a tradition of strong technical and commercial performance. In the first wave—beginning in 1996 and largely donor-driven—policy and regulatory functions were separated from commercial activities; generation was unbundled from transmission and distribution; cost-reflective tariffs were introduced; and generation was liberalized. In the second—beginning in 2002 and led by domestic reform champions—the thrust of first-wave reforms was continued, with the strengthening of independent regulation, the partial privatization of the generation company (KenGen), and the establishment of complementary entities. Although the government retains majority ownership of the largest power utilities in the country (KPLC, ~51 percent; KenGen, ~70 percent), Kenya has been able to position itself as one of the foremost destinations in the region for private energy investment. The reforms have improved the operational efficiency of the sector, increased cost recovery, and captured a significant amount of private sector investment. At the same time, the state has remained an important investor, playing a pivotal role in expanding generation capacity, scaling up electrification at an exceptionally rapid pace, and leading diversification toward geothermal energy. Political influence in sector decisions remains significant, both in planning and tariff reviews.

The results of Kenya’s efforts to reform its power sector along the four dimensions of security of supply, access and affordability, utility efficiency, and cost recovery are summarized in table 13 and in the succeeding paragraphs.

**Table 13. Summary of Kenya’s power sector reform efforts**

	Performance	Institutions
Security of supply	Power generation has tripled through development of geothermal and (secondarily) thermal resources, thereby diversifying away from exposure to hydrological risk. Planning failures have allowed supply to outpace demand, creating a situation of surplus supply.	The public sector played a critical role in assuming the risks of geothermal power exploration and development. Kenya has also attracted significant IPP investment (on the order of 600 MW), mainly for thermal power. However, a further 3,000 MW of contracts awarded for the development of renewable resources have not yet been completed for various reasons. While the country has a strong planning and procurement framework, it remains subject to political interference, affecting demand projections, project selection, and procurement methods.
Access and affordability	Kenya’s progress toward electrification accelerated markedly in 2010. Access reached 75 percent in 2017, including exceptionally high off-grid coverage. Service appears to be affordable, but consumption growth has been modest.	Early reforms of the Kenya Power and Lighting Company (KPLC) did not materially affect the pace of electrification, until the government adopted aggressive targets for universal access and backed them with dedicated financing. KPLC has been the main implementing agency for electrification. Despite public and donor subsidies, the electrification effort has weakened KPLC’s finances.
Utility efficiency	The operational efficiency of the utility, Kenya Electricity Generating Company	KenGen has a long tradition of technical competence and commercial orientation. Further

	Performance	Institutions
	Limited (KenGen), has been relatively good, with small ups and downs linked to external shocks. System losses, at 19 percent, remain above regional benchmarks. Financial indicators have been strong but deteriorated markedly in 2017 owing to heavy investment in providing new connections.	efficiency improvements can be traced to the utility's listing on the stock exchange, management contracts, and ongoing performance contracts with the regulator. Government involvement in utility governance remains a concern.
Cost recovery	Following tariff increases in the 1990s, tariffs have been stable and automatically indexed to inflation and other cost drivers. Tariffs cover operating and limited capital costs.	The regulator, ERC, benefits from a strong legislative foundation and has built strong technical capacity. It is having an impact on cost recovery, but the tariff-setting process remains subject to political influence.

**On security of supply**, Kenya tripled its electricity generation between 1990 and 2014, keeping pace with the growth of peak demand. The entire increase was derived from geothermal exploitation, supplemented by some oil-fired resources. Together, the new assets have substantially reduced Kenya's exposure to hydrological risk. Improved planning procedures, led by the regulatory agency in the 2000s, supported the timely and competitive procurement of new generation capacity. The bulk of that capacity was publicly developed by KenGen, which played a pivotal role in bearing the risk of geothermal exploration. Kenya has also operated a successful IPP program that led to the construction of about 600 MW of new capacity (mostly thermal), and to the award of PPA contracts for a further 3,000 MW of capacity fueled by renewable energy. The latter has not yet been forthcoming for a variety of reasons and now risks creating surplus capacity. Despite a sound regulatory framework, the government has increasingly exerted political influence on sector planning by inflating demand estimates and channeling resources to projects not included in the least-cost plan, sometimes by means of direct negotiation.

**On access and affordability**, Kenya has emerged as a leader in the region in the past decade. In 2017, around 75 percent of the population was benefiting from access to electricity. Kenya's electrification program includes one of the highest levels of off-grid power in the world, reflecting the strong enabling framework that was put in place by ERC. Service appears to be affordable with lifeline tariffs and subsidized connection charges. However, electricity consumption has not risen as sharply as connections. The reforms of KPLC in the 1990s and 2000s did not materially affect the pace of electrification. It was only when the government made a firm policy commitment to universal access around 2010 and channeled dedicated public resources through KPLC that the process accelerated markedly. Additional donor resources have followed. More recently, public funding for the electrification program has not kept pace with the scale of ambition, and KPLC has seen its financial situation suffer as a result.

**On efficiency**, KPLC and its predecessor companies have had a long tradition of technocracy and commercial orientation, which has facilitated subsequent reforms. The power sector was unbundled during the first wave of reform, with private sector participation taking the form of stock exchange listings of minority stakes. Governance arrangements are relatively good, and performance started to improve following a management contract that was used to transfer know-how to local staff. KPLC fully collects revenues, but distribution losses, at 19 percent, remain above regional good

practice. The company's financial performance, outside of drought periods, had been good until it was overstretched by the recent electrification campaign.

**On cost recovery**, Kenya again emerges as a strong performer in the region, with tariffs at a level that allows KPLC to recover all operating costs as well as limited capital costs in the form of debt service. Supported by a comprehensive tariff-setting framework, which has included an automatic tariff-adjustment mechanism since the late 1990s, tariffs have been stable and grown with inflation. The regulatory entity, ERC, is embedded in a strong legal framework and has developed technical capacity. However, political considerations have regularly interfered with the timing and magnitude of tariff increases, underscoring the regulator's lack of decision-making autonomy.

\* \* \*

Kenya's rich experience with power sector reform offers important lessons for other countries contemplating similar reforms.

**First**, history counts. Kenya enjoyed a significant advantage when it came to power sector reform, thanks to a long tradition of a relatively strong, professionally competent, and commercially oriented utility. This provided a good foundation on which to build the reform and meant that many of the principles on which the reform was based were already familiar.

**Second**, power sector reforms had their greatest impact when they enjoyed strong local ownership and were driven by domestic champions. Kenya's first wave of reform was driven by the need to meet donor conditions in order to lift an aid embargo. While substantial reforms were undertaken in the late 1990s, including sector unbundling as well as the introduction of a regulatory entity and IPPs, their impact remained limited, as key actors continued to behave along established lines. Kenya's second wave of reform was based on the conviction of key domestic champions and led to substantial private sector participation, a significant enhancement of managerial capacity at KPLC, and a boost in the technical capability of the regulator, ERC.

**Third**, Kenya's relatively unusual model of private sector participation in the power sector involves the listing on the stock exchange of minority shares in both KenGen and KPLC. This approach has made it possible to raise capital from local investors, keeping the companies in domestic hands and facilitating interaction between government and shareholders. It has also provided an effective framework for strengthening utility governance to comply with stock exchange requirements.

**Fourth**, the standard reform model applied during the first wave of reform did not in and of itself have any material impact on the pace of electrification. *That* required complementary measures, such as a firm political commitment to the universal target, backed by significant public grants to support the necessary investment. Nevertheless, the reformed utility—rather than the REA—was the key actor in the implementation of the government's electrification program, which to that extent benefited from the operational competence and relative financial strength of the company.

**Fifth**, without adequate planning, countries can end up in a situation of surplus capacity, undermining the financial equilibrium of the sector. The use of IPPs to develop first-generation renewables projects in Kenya proved problematic because of various risks; those projects have left a legacy of capacity commitments that may materialize inopportunistically, long after they were considered necessary.

## 5 Annex: Detailed RPSR Indices

### A. Generation and transmission planning index for Kenya and comparators, 2015

	Kenya	Senegal	Tanzania	Uganda	International Benchmark
<b>Generation Planning</b>	86%	43%	43%	43%	56%
Country has a generation master plan	○	○	○	○	94%
Country has an overall energy plan	○	●	●	○	65%
Competent entity is responsible for producing the plan	○	○	○	○	88%
Inter-governmental committee oversees the planning unit	○	●	●	●	29%
Power generation system plan is mandatory	●	○	●	●	19%
Plan leads to timely initiation of procurement	○	●	●	●	38%
Planning process is transparent and participatory	○	●	○	●	59%
<b>Transmission Planning</b>	75%	100%	75%	75%	72%
Competent entity is responsible for producing the plan	○	○	○	○	100%
Explicitly linked to power generation plans	○	○	○	○	88%
Plan is mandatory	●	○	●	●	29%
Planning process is transparent and participatory	○	○	○	○	71%

### B. Generation and transmission procurement index for Kenya and comparators, 2015

	Kenya	Senegal	Tanzania	Uganda	International Benchmark
<b>Procurement of Generation</b>	100%	50%	100%	95%	85%
There is a framework for procurement	○	●	○	○	82%
Country allows International competitive bidding or public auctions for procurement	○	○	○	○	94%
Types of procurement methods allowed					
<i>Unsolicited bids</i>	○	●	○	○	29%
<i>Direct negotiation</i>	○	●	○	●	47%
<i>International competitive tendering</i>	○	○	○	○	88%
<i>Public auctions</i>	●	●	●	○	41%
<i>Stand-alone capacity market</i>	●	●	●	●	0%
Auction design score	NAP	NAP	NAP	0.86	80%
Country uses public auctions for procurement	●	●	●	○	41%
Clear and comprehensive established rules	NAP	NAP	NAP	○	100%
Credible penalties for violating the rules	NAP	NAP	NAP	○	86%
Guarantees and penalties to ensure timely completion	NAP	NAP	NAP	○	86%
Standard, non-negotiable contracts	NAP	NAP	NAP	○	86%
Stapled financing terms or risk mitigation instruments	NAP	NAP	NAP	○	86%
No concerns regarding the transparency and fairness of the auction	NAP	NAP	NAP	●	14%
Efforts to inform and attract bidders to the auction	NAP	NAP	NAP	○	100%
<b>Transmission Procurement</b>	67%	42%	92%	92%	64%
Framework for procurement of new transmission lines	○	●	○	○	59%
Methods used to procure new transmission-	●	●	●	●	69%
<i>Competitive tender</i>	●	○	○	○	65%
<i>Direct negotiation</i>	●	○	○	○	24%
All projects are awarded to the incumbent transmission company	○	●	●	●	47%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available

C. Access policy framework index for Kenya and comparators, 2015

	Kenya	Senegal	Tanzania	Uganda	International benchmark
<b>Energy Access Regulation</b>	81%	28%	81%	65%	56%
<b>Regulation of New Connections</b>	75%	50%	94%	79%	65%
Roles of regulator, utility, rural electrification agency clearly defined	○	○	○	○	93%
Utilities have regulatory obligation to connect new customers	○	○	○	○	94%
Regulatory entity has authority to approve connection charges for new customers	○	●	○	○	71%
Connection charges are set using shallow entry	○	NAP	○	○	58%
Government provides subsidy for new connections	○	●	○	○	53%
Connection has to be provided in a specified time	○	○	○	○	94%
Regulatory entity monitors tiem taken to provide new connections	●	○	○	○	44%
Regulator has authority to levy penalties for not connecting customers on time	NAP	○	○	●	71%
Time taken to provide connections publicly available	●	●	○	●	24%
There are connection charges	○	●	○	○	94%
Customer pays limited connection charges	●	NAP	●	●	43%
Connection charge is publicly available	○	●	○	○	71%
<b>Regulation of solar home systems</b>	100%	0%	50%	50%	66%
Minimum technical standards and post-installation warranty requirements for solar home systems	○	●	○	○	71%
Regulator reviews and approves prices of surplus SHS sales of electricity to the grid operator	○	NAV	●	●	62%
<b>Regulation of mini-grids</b>	67%	33%	100%	67%	44%
Privately owned mini-grids legally allowed to operate	○	○	○	○	81%
Clear options for mini-grid operator when the interconnected grid reaches the area, including compensation	●	●	○	●	7%
Subsidy or other mechanism to help mini-grid operators recover their costs	○	●	○	○	47%

D. Corporate governance- accountability index for Kenya and comparators, 2015

Corporate Governance	Kenya	Senegal	Tanzania	Uganda	International benchmark
	Kenya Power	SENELEC	TANESCO	UMEME	
<b>Accountability</b>	100%	58%	58%	92%	60%
Private or public shareholders appoint board	○	●	●	○	36%
Transparent process exists for Board selection	○	●	●	●	36%
Board members cannot be removed at will	○	●	●	○	29%
Chairperson & CEO are separate positions	○	○	○	○	75%
Function of Company Secretary exists	○	○	○	○	82%
Board Sub-Committees for different issues	○	○	○	○	68%
Audit committee of the Board	○	○	○	○	71%
Board Code of Conduct exists	○	●	○	○	64%
Requirement to declare conflicts of interest	○	○	○	○	75%
Utility has carried out any third party transactions in last five yrs	○	○	○	○	46%
Minority shareholders' rights are protected	○	●	●	○	39%
Utility publishes an Annual Report	○	○	●	○	93%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available

E. Corporate governance- autonomy index for Kenya and comparators, 2015

Corporate Governance	Kenya	Senegal	Tanzania	Uganda	International
	Kenya Power	SENELEC	TANESCO	UMEME	benchmark
<b>Autonomy (SOEs)</b>	100%	89%	56%	78%	63%
Board is the final body to take decision on-					
<i>Defining corporate strategy</i>	○	○	○	○	96%
<i>Approving business plans</i>	○	○	○	○	96%
<i>Setting and monitoring performing objectives</i>	○	○	○	○	92%
<i>Selecting, appointing and overseeing the CEO</i>	○	○	●	○	56%
<i>Raising capital from debt</i>	○	○	●	○	68%
<i>Raising capital from equity</i>	○	○	●	○	48%
<i>Major capital expenditures</i>	○	○	○	○	88%
<i>Deciding and implementing tariff adjustments</i>	○	○	●	●	24%
<i>Human resource hiring and firing decisions</i>	○	●	○	●	72%

F. Utility management- financial discipline index for Kenya and comparators, 2015

Utility Management	Kenya	Senegal	Tanzania	Uganda	International
	Kenya Power	SENELEC	TANESCO	UMEME	benchmark
<b>Financial Discipline</b>	76%	57%	64%	77%	59%
Utility has a credit rating	●	●	●	●	36%
Utility can issue new bonds	○	●	●	○	36%
Utility can issue new equity	○	○	●	○	26%
Utility pays dividends to shareholders	○	●	●	○	29%
Public service obligations are explicitly defined	○	●	●	●	46%
PSO is publicly disclosed	●	NAP	NAP	NAP	38%
PSOs are costed	●	NAP	NAP	NAP	0%
PSOs are compensated by government	●	NAP	NAP	NAP	0%
Utility required to meet financial performance targets	○	●	○	NAP	52%
System of internal financial controls exists	○	○	○	○	96%
Internal audit function exists	○	○	○	○	93%
Utility is subject to state auditing procedures	○	○	○	●	71%
Financial accounts are produced	○	○	○	○	96%
Financial accounts are audited by external auditor	○	○	○	○	93%
Financial accounts are publicly disclosed	○	○	○	○	79%
Financial accounts meet national standards	○	○	○	○	82%
Financial accounts meet international standards	○	●	○	○	57%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available

G. Utility management- human resources index for Kenya and comparators, 2015

Utility Management	Kenya	Senegal	Tanzania	Uganda	International benchmark
	Kenya Power	SENELEC	TANESCO	UMEME	
<b>Human Resource</b>	64%	57%	71%	71%	62%
<i>Annual staff performance reviews exist</i>	○	○	○	○	93%
<i>Employees receive performance related bonuses</i>	○	●	○	○	70%
<i>Employees can be fired for poor performance</i>	○	○	○	○	79%
<i>Government employment regulation don't apply</i>	●	○	●	●	26%
<i>Wages not based on government pay scales</i>	●	○	○	○	48%
<i>Staff training policy exists</i>	○	●	○	○	86%
<i>Managers are free to hire employees</i>	●	●	●	●	12%
<i>Managers are free to fire employees</i>	●	●	●	●	24%
<i>Managers can execute budget</i>	○	○	○	●	60%
<i>Managers can implement investment projects</i>	●	○	●	○	44%
<i>Recruitment involves advertisement of positions</i>	○	●	○	○	71%
<i>Recruitment involves short-listing candidates</i>	○	●	○	○	89%
<i>Recruitment involves interviewing candidates</i>	○	○	○	○	82%
<i>Recruitment involves reference checks</i>	○	○	○	○	75%

H. Utility management- information & technology index for Kenya and comparator, 2015

Utility Management	Kenya	Senegal	Tanzania	Uganda	International benchmark
	Kenya Power	SENELEC	TANESCO	UMEME	
<b>Information and Technology</b>	100%	53%	60%	80%	71%
<i>SCADA system</i>	○	○	○	○	93%
<i>IT system to support incidence resolution</i>	○	○	●	○	75%
<i>IT system to support distribution management</i>	○	○	●	○	79%
<i>IT system to support energy management</i>	○	○	●	●	64%
<i>Geographic Information System (GIS)</i>	○	●	○	○	78%
<i>KPIs are used to monitor quality of supply</i>	○	○	○	○	100%
<i>Advanced Metering Infrastructure (AMI)</i>	○	●	●	○	52%
<i>Accurate customer database</i>	○	○	○	○	96%
<i>Call center for dealing with customer complaints</i>	○	○	○	○	96%
<i>Website for submission of customer complaints</i>	○	●	○	●	85%
<i>Customer satisfaction regularly monitored</i>	○	●	○	●	59%
<i>Commercial management system (CMS)</i>	○	●	●	○	41%
<i>Resource Management System (RMS)</i>	○	●	●	○	35%
<i>KPIs are used to monitor commercial cycle</i>	○	○	○	○	86%
<i>KPIs are used to monitor corporate resource management</i>	○	●	○	○	54%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available



I. Regulatory governance- accountability index for Kenya and comparators, 2015

Regulatory governance		Kenya	Senegal	Tanzania	Uganda	International benchmark
<b>Accountability</b>		<b>95%</b>	<b>70%</b>	<b>95%</b>	<b>74%</b>	<b>83%</b>
<b>Regulatory oversight</b>		100%	67%	100%	67%	81%
Regulator's objectives formally stated in law		○	○	○	○	100%
Regulator required to report on its activities		○	○	○	○	88%
Independent third party evaluations of regulator have taken place		○	●	○	●	56%
<b>Legal appeals</b>		100%	100%	100%	100%	100%
Legally established process to challenge/appeal		○	○	○	○	100%
<b>Transparency</b>		85%	44%	85%	55%	67%
Publicly available annual reports		○	○	○	○	94%
Recommendations are required to be made public		●	●	●	●	33%
Government body receiving recommendations required to respond publicly		●	●	●	●	33%
Regulator is required to publish its decisions on-	End-user tariffs	○	○	○	○	100%
	Licensing generation or supply	○	○	○	○	100%
	Wholesale or PPA prices and contract terms	○	NAP	○	○	100%
	Market design	○	NAP	○	NAP	100%
	Oversight of regulated utilities	○	●	○	●	85%
Regulatory decision-making process legally requires the participation of non-government stakeholders in case of-	End-user tariffs	○	○	○	○	69%
	Licensing generation or supply	○	●	○	○	69%
	Wholesale or PPA prices and contract terms	○	NAP	○	●	38%
	Market design	○	NAP	○	NAP	30%
	Oversight of regulated utilities	○	●	○	●	38%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available

J. Regulatory governance- autonomy index for Kenya and comparators, 2015

Regulatory governance		Kenya	Senegal	Tanzania	Uganda	International benchmark
<b>Autonomy</b>		<b>59%</b>	<b>71%</b>	<b>68%</b>	<b>81%</b>	<b>71%</b>
<b>Decision-making autonomy</b>		<b>79%</b>	<b>33%</b>	<b>86%</b>	<b>85%</b>	<b>79%</b>
Areas where entity has a mandate to regulate-	End-user tariffs	○	○	○	○	100%
	Quality of supply and service	○	○	○	○	100%
	Electrification or increased access to energy	○	●	○	○	53%
Decision of the regulatory entity are legally binding in the area of-	End-user tariffs	○	○	○	○	88%
	Grid access charges	○	●	○	○	87%
	PPA/wholesale prices	○	NAP	○	○	92%
	Quality of supply/service	○	●	○	○	87%
	Market design	●	NAP	●	NAP	50%
	Licensing	○	●	○	○	85%
	Utility oversight	●	●	○	○	71%
Government body rejecting or modifying regulatory decisions		●	●	●	●	17%
Law precribes decision making process for-	End-user tariffs	○	○	○	○	94%
	Grid access charges	○	●	○	●	81%
	Quality of supply/service	○	●	○	○	87%
<b>Budgetary autonomy</b>		<b>94%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>80%</b>
Funding for regulator established by law		○	○	○	○	100%
Percentage of regulator's budget that comes from levies or taxes		0.88	1	1	1	59%
<b>Leadership autonomy</b>		<b>63%</b>	<b>50%</b>	<b>88%</b>	<b>88%</b>	<b>66%</b>
Legal basis for existence is primary legislation		○	○	○	○	100%
Power to determine own organizational structure and rules		●	●	○	○	50%
Power to determine the allocation and use of budget		●	●	○	●	44%
Legal requirements or restrictions regarding professional profile of leadership		○	○	○	○	94%
There is a fixed term for the leadership of the regulatory entity		○	○	○	○	88%
Legal provisions under which leadership an be removed from office		○	○	●	○	75%
Current leadership of entity connected to government or utilities		●	●	○	○	25%
Over 60% of employees are in technical positions		○	●	○	○	57%
<b>Managerial autonomy</b>		<b>0%</b>	<b>100%</b>	<b>0%</b>	<b>50%</b>	<b>59%</b>
Pay scale not linked to govt pay scale or is 90% of utility pay scale		●	○	●	●	53%
Not required to follow govt employment regulations		●	○	●	○	63%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available

K. Regulatory substance- tariff regulation index for Kenya and comparators, 2015

Regulatory substance	Kenya	Senegal	Tanzania	Uganda	International benchmark
<b>Tariff regulation</b>	88%	76%	88%	92%	77%
<b>Regulatory framework for tariffs</b>	100%	86%	100%	100%	90%
Objectives in determining tariffs mentioned explicitly in policy or legal mandate	○	○	○	○	100%
Principles of tariff-setting clearly articulated	○	○	○	○	88%
Authority over the tariff level	○	○	○	○	94%
Clear definition of “cost recovery”	○	●	○	○	88%
Legitimacy of costs is used as a basis for tariff calculations	○	○	○	○	88%
Tariff-setting based on a clearly specified regulatory framework	○	○	○	○	88%
Frequency and schedule of revisions determined by law or regulation	NAP	○	NAP	NAP	75%
<b>Determination of tariffs</b>	75%	67%	75%	83%	64%
Publicly available written formula is to be used for tariff setting and utilities are legally required to adhere to it	○	○	○	○	88%
Avoid passing-through inefficient costs to customers	○	○	○	○	76%
Requirement to submit financial information according to set standards	●	●	●	○	53%
Users bear the costs of incentive mechanisms for renewable energy generation	○	NAP	○	●	75%
Regulatory mechanisms to compensate generators for the provision of firm capacity or ancillary services	NAP	NAP	NAP	○	58%
Utilities are compensated for the costs of stranded assets	NAP	NAP	NAP	○	25%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available

L. Regulatory substance- quality of supply index for Kenya and comparators, 2015

Regulatory substance	Kenya	Senegal	Tanzania	Uganda	International benchmark
<b>Quality regulation</b>	54%	42%	63%	58%	75%
<b>Quality of service standards</b>	75%	50%	75%	50%	82%
Requirement to meet quality of service standards	○	○	○	○	100%
Specific quality of service standards are formally written and publicly available for- quality of the product, quality of the service and customer service	○	○	○	○	97%
Performance on quality of service standards is public	○	●	●	●	71%
Fines for failing to meet quality of service standards	●	●	○	●	59%
<b>Quality of service enforcement</b>	33%	33%	50%	67%	68%
Requirement to report technical data on a periodic basis	○	○	○	○	100%
Regulator specifies how to collect technical performance data	●	●	○	○	71%
Regulator reviews or validates technical performance data	●	●	○	○	47%
Automated information management systems are required to measure the quality or reliability of the power supply	○	●	●	○	71%
Measurements of the quality or reliability of power supply are made public	●	●	●	●	65%
Financial incentives to meet customer service standards or increase customer satisfaction	●	○	●	●	53%

○	Satisfactory result
●	Unsatisfactory result
NAP	Not applicable
NAV	Not available

M. Regulatory substance- market entry index for Kenya and comparators, 2015

Regulatory substance	Kenya	Senegal	Tanzania	Uganda	International benchmark
<b>Market entry regulation</b>	100%	100%	100%	83%	77%
<b>Permitting new entrants</b>	100%	100%	100%	100%	90%
Responsible for monitoring compliance with the terms of the license or permit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	88%
Authority to impose penalties for violating license or permit terms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	100%
Penalties are formally written and publicly available	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	80%
Provisions to force companies to relinquish licenses or permits for violation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	100%
<b>PPA approvals</b>	100%	NAP	100%	67%	57%
Legally required to approve all power sales contracts either directly or indirectly	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	59%
Approve or refuse a proposed PPA in a legally specified period of time	<input type="radio"/>	NAP	<input type="radio"/>	<input checked="" type="radio"/>	60%
Authority over the process by which utilities can select or procure power from IPPs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	50%

<input type="radio"/>	Satisfactory result
<input checked="" type="radio"/>	Unsatisfactory result
NAP	Not applicable
NAV	Not available