Conference Edition

Improving the Performance of Electricity and Water and Sanitation Utilities in Sub-Saharan Africa

October 2016

Water Global Practice
Energy and Extractives Global Practice

A Growing Need for Better-Performing Utilities in Sub-Saharan Africa

Two trends are shaping the future of economic growth in Sub-Saharan Africa. Rural to urban migration is expected to rise steeply. The urban population still comprises only 37 percent of the total population, despite tripling since 1990. And while poverty reduction efforts have been effective in decreasing the proportion of people living on less than $1.90 per day, the number of poor people in Sub-Saharan African continues to grow alongside population increases.

The growth potential of cities across Sub-Saharan Africa thus hinges on better progress toward reducing poverty in the face of rapid urbanization. One effective antidote to poverty is more and better infrastructure, yet Africa's infrastructure networks lag increasingly behind those of other developing countries in providing telecom, electricity, and water supply and sanitation services. Those people and industries that do have services pay twice as much as those outside Africa and receive fairly low quality service, further reducing regional competitiveness and growth. As cities continue to flood with migrants looking for better economic opportunities, power and water utilities are being challenged to improve the services offered to existing and new users. For power utilities, the added challenge is that they often have a responsibility to provide services nationally to urban and rural consumers. To have modern access to water[1] and electricity entails an affordable connection to the service, and continuous and affordable supply of sufficient quantity and quality. Utilities need to perform their operational and financial functions efficiently enough to provide such services.

What Makes a Well-Performing Utility?

There are many ways to define a well-performing utility, from one that is financially sustainable to one that provides a reliable supply. Each utility prioritizes its goals based on sector objectives and the enabling environment set by the government. Varied ways of measuring utility performance require different types of data and observation, which yield quite subjective conclusions about the level of performance. This topic is discussed in three Water and Energy Global Practice studies published in 2016.[2] These regional analyses looked at operational, financial, and commercial/customer performance of utilities. While a case study approach was used to dive deep into the main determinants of well-performing water and power utilities and progress in reform, additional benchmarking analysis for water utilities used the International Benchmarking

This paper is a synthesis of the findings of reports that look at the drivers of performance in energy and water utilities in Sub-Saharan Africa. This paper also provides other insights on issues that complement the findings of these reports. The following people contributed to this summary note: Caroline van den Berg, Pedro Antmann, Christiaan Heymans, Alexander Danilenko, Luis Andres, Sameer Shukla, Amanda McMahon Goksu, William Kingdom, Richard Damania, Alexander Bakalian, Jonathan Kamkwalala, Aroha Bahuguna, Joeri Frederik de Wit, and Diana Cubas. The authors also greatly appreciate the guidance of Jamal Saghir, Jennifer Sara, Jyoti Shukla, Lucio Monari, and the leadership team in the Energy and Extractive, and Water Global Practices.

[1] Hereafter *water* refers to water and sanitation utilities.

[2] These are: "Performance of Water Utilities in Africa: A Status Report," led by Caroline van den Berg and Alexander Danilenko; "Improving the Performance of Sub-Saharan Africa Electricity Utilities," led by Pedro Antmann; and "Providing Water to Poor People in African Cities Effectively: Lessons from Utility Reforms," led by Christiaan Heymans.

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Network for Water and Sanitation Utilities (IBNET) to give a more general view of utilities' performance across Sub-Saharan African countries.

Additional data and evidence were harvested from the analysis of water and electricity utilities in all three reports, which enabled a broader perspective on the sector-wide variables impacting performance, beyond internal variables for specific utilities. The two water studies provide guidance on how to provide good quality services to customers, including the poor. In contrast, because of data constraints, the energy study was limited to a narrower but deeper assessment of operational performance in Burkina Faso, Côte d'Ivoire, Kenya, Senegal, and Uganda. The reports fill a gap in the literature of the utilities' performance in Sub-Saharan Africa and expand on the determinants for performance, identify the traditional and nontraditional mechanisms for reaching the poor, and highlight the critical elements for turning bad-performing utilities around. The reports did not aim to systematically collect new performance indicators for the utilities or to scientifically assess institutional designs beyond the limited case studies relating determinants to sector performance. While the three background reports provide a significant step ahead (as they serve mainly as a mirror for performance assessment at the country and utility level), the reports also aimed at providing direction in the region for sector-wide improvement, as further discussed at the end of this summary.

The combined result is a heterogeneous sample of utilities with varied experiences. Despite the differences between these studies, there are some common messages that can help both sectors advance in Sub-Saharan Africa.

Main Message 1

The operation and management of utilities in Sub-Saharan Africa are characterized by big similarities in several business areas, but significant differences in others.

Commercial operations and customer service activities, which are inherent to a utility retail business, are essentially identical in electricity and water, as well as in other networked infrastructure services. In managing accounting, finances, human resources, procurement and logistics, information technology, and other corporate resources, well-performing utilities use state-of-the-art support tools. Both electricity and water utilities are responsible for the expansion, rehabilitation, and upgrade of the infrastructure they operate. In the power sector, overall sector planning—in particular, expansion of the generation and transmission segments at least cost for the country—can sometimes be under the responsibility of other government entities.

In a number of Sub-Saharan African countries, electricity regulation is the responsibility of an independent regulatory body. While pricing is politically sensitive in both water and electricity sectors, in water, the objective often is for prices to cover operations and maintenance. In electricity, prices are expected to cover both operating and capital expenditures, in part to ensure that electricity services can be maintained and expanded in future. The electricity sector is also exposed to external factors such as international oil price volatility and currency depreciation.

There are significant differences in the business structure of these sectors. The largest cost item for energy is power generation, while for water it is network infrastructure (rather than potable water generation). Additionally, in a majority of Sub-Saharan Africa countries, new generation investment is expected to come mainly from the private sector, which in turn has implications for the electricity utility and sector. Another key difference could be in the mix of consumers—in Sub-Saharan Africa, 40 percent of electricity consumption is by residential consumers, whereas about 31 percent of consumption is by industries and an additional 22 percent by commercial consumers. Both sectors have to deal with technical and nontechnical losses. Reducing technical losses in water requires investments in network rehabilitation—the economic and financial viability of which depends on a comparison of the investment costs versus costs savings from reduced amounts of water produced, or in the case of electricity, a comparison of costs

versus additional revenues from electricity sales. The optimal level of technical losses is in general quite far from zero. Nontechnical or commercial losses can be reduced by improving the metering, billing and collection systems, monitoring consumption regularly, particularly of the high-value consumers, and by enforcement of payment discipline among consumers.

Supply of potable water has direct implications on human health, and customers of water utilities are extremely sensitive to the quality of the product they receive. In electricity, the quality of the product (voltage, frequency, etc.) does not carry the same implications for public health, although particularly for some kinds of industry, as well as for hospitals and other essential services, the quality of electricity supply can be a very important factor. Similarly, the fact that some customers will have water storage at the household level and access to alternative water sources gives the utilities some flexibility in how rapidly they respond to disruptions in service or water quality complaints. Electricity utilities do not have that flexibility, and have to balance supply and demand in real time—this is perhaps one of the key differences between the water and electricity sectors. They must respond immediately to incidents affecting supply to their customers, which in general are full outages. Water utilities are often limited to urban areas whereas electricity utilities in most countries in Sub-Saharan Africa have a national mandate. Therefore, one of the key challenges facing Sub-Saharan Africa electricity utilities is that of expanding access across countries in an affordable way.

Main Message 2

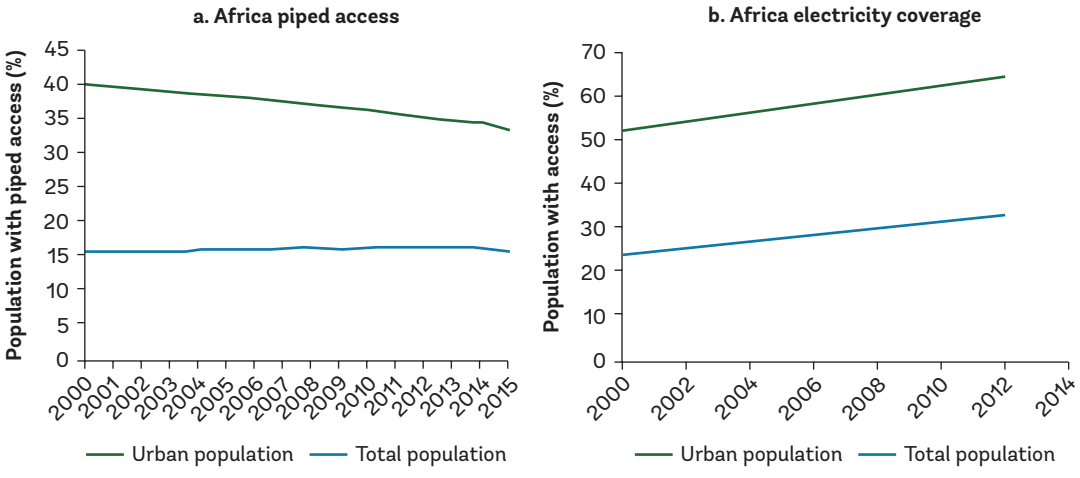
Overall, the performance of utilities is low, but there are some relatively well-performing utilities on par with the best performers in other regions.

Sub-Saharan African water utilities have been able to slowly improve water coverage, but overall coverage stands at only 60 percent. The level of service, however, varies greatly, with only 15 percent of the total population having access to piped supply (Figure 1). The average number disguises an important point—that the well-performing water utilities have shown that these piped connections (stand posts and to the premise) can get to well over 90 percent, if the basic aspects of efficiency and political support get worked through. Access to sewer services is in its infancy in Africa, with very few utilities providing such services. Nonrevenue water[3] decreased almost 15 percent from 30 percent to 25 percent from 2005 to 2014 in the region, and staff productivity (measured by the number of employees per 1,000 connections) improved from around 7.8 to 5.6. The average number of hours of service per day for water supply also increased 7 percent from 18.7 hours to 20 hours per day in the same period.

A well-performing utility provides services that are efficient, affordable, sustainable, and provide a minimum quality of service. Well-performing utilities are generally doing well in terms of operational and financial performance and the top performing water utilities

[3] Non-revenue water is water that has been produced and is "lost" before it reaches the customer.

Figure 1. Water and Electricity Coverage



Source: WHO-UNICEF Joint Monitoring Programme and World Development Indicators.

Table 1. Benchmarking Sub-Sahara African Water Utilities with Global Utilities

	Africa			Global		
2012	Bottom 10%	Middle 80%	Top 10%	Bottom 10%	Middle 80%	Top 10%
Non-Revenue Water (%)	61.2	35.0	10.5	63.2	30.8	9.7
Operational Cost Recovery (revenue/costs)	0.34	1.09	1.77	0.15	1.09	2.15
Staff Productivity (Staff/1000 Connections)	43.0	11.0	1.4	35.6	6.5	1.3
Continuity of Service (hrs/day)	6.0	15.6	24.0	8.7	22.6	24.0
Required Chlorine Test Compliance (%)	72.3	94.0	100.0	77.0	94.7	100.0
Total Water Consumption (Litres/Person/Day)	27.1	71.1	207.8	52.9	171.6	342.5

Source: World Bank calculations based on IBNET data (www.ib-net.org).

Note: i) Figures are based on unweighted observations; and ii) number of utilities represented in Sub-Saharan Africa is 344 and globally is 5,174.

Table 2. Benchmarking Sub-Sahara African Power Utilities with Global Utilities

	Sub-Saharan Africa				Global (excl. high income)			
Indicator / Average of:	All	Bottom 10%	Middle 80%	Top 10%	All	Bottom 10%	Middle 80%	Top 10%
Access to electricity (%)[1] – 2012	36	7.5	34	83	69	12	64	100
Access to electricity, rural (%)[1] – 2012	19	1.4	15	64	58	3.3	51	100
Access to electricity, urban (%)[1] – 2012	66	20	68	100	84	36	83	100
Time required to establish a connection (days)[2] – 2015	137	413	110	50	110	287	97	37
Number of electrical outages in a typical month[3] – various years	8.6	27	7.0	0.94	7.4	37	4.3	0.23
If there were outages, average duration (hours)[3] – various years	6.3	18	5.3	2.0	5.0	17	3.9	1.6
Transmission and distribution losses (%)[4,5] – 2014 for SSA, 2012 for Global	23	49	21	8.5	19	44	17	7.7
Bill collection rate (%)[4, 6] – 2014	87	59	88	99	90	60	92	100
Utility transparency and monitoring[6] – 2014	49	1.4	46	93	66	6.0	66	100

Notes:

[1] World Bank; International Energy Agency. 2014. Sustainable Energy for All 2013-2014: Global Tracking Framework. Sustainable Energy for All, World Bank, Washington D.C. © World Bank. https://openknowledge.worldbank.org/handle/10986/16537 License: CC BY 3.0 IGO.

[2] World Bank. (2016, 9 28). Getting Electricity. Retrieved from Doing Business: http://www.doingbusiness.org/data/exploretopics/getting-electricity.

[3] World Bank. (2016, 9 28). Retrieved from Enterprise Surveys: http://www.enterprisesurveys.org/.

[4] Trimble, Christopher Philip; Kojima, Masami; Perez Arroyo, Ines; Mohammadzadeh, Farah. 2016. Financial viability of electricity sectors in Sub-Saharan Africa: quasi-fiscal deficits and hidden costs. Policy Research working paper; no. WPS 7788. World Bank Group, Washington D.C. http://documents.worldbank.org/curated/en/182071470748085038/Financial-viability-of-electricity-sectors-in-Sub-Saharan-Africa-quasi-fiscal-deficits-and-hidden-costs.

[5] International Energy Agency (2015) IEA Statistics. Retrieved from: http://www.iea.org/stats/index.asp.

[6] World Bank. (Forthcoming). Readiness for Investment in Sustainable Energy 2016; World Bank, Washington D.C.

are even able to achieve global benchmarks of operational and financial performance. The top 10 percent of performers in Sub-Saharan Africa are better than the global middle 80 percent in all indicators.

A recent study[4] found that of 39 electricity utilities examined in Sub-Saharan Africa, only two fully covered operating and capital costs in 2014 with their cash collections. Nineteen countries out of the sample cover operating costs with cash collections. Utilities also continue to suffer from low operational performance, with high technical and nontechnical losses, on average about 23 percent (the bottom 10 percent of countries face losses as high as 49 percent)—refer to Table 2.

But good performance varies widely between countries—irrespective of income level or political regime or sector structure—and even within countries. Variation in local circumstances can include the availability of alternative sources, spatial patterns and levels of economic development that affect

[4] "Making Power Affordable for Africa and Viable for Its Utilities," Masami Kojima and Chris Trimble, 2016.

the cost of infrastructure and service delivery, the type of consumers, the willingness of users to connect and pay for utility services, the quality of sector and utility management, and the general level of governance and institutions in the country. Unfortunately, it was not possible to capture all these local particularities in the data collection.

Main Message 3

Even amongst the best-performing utilities, customer performance is relatively weak.

Customer performance is not very well developed in Sub-Saharan African utilities. Most utilities provide less than 16 hours of water per day. Water consumers in Sub-Saharan Africa rely heavily on shared connections and public standposts. Less convenient supply leads to less consumption. Only two of the five water utilities studied sold more than 50 liters per capita per day (the minimum volume of water set by the World Health Organization to guarantee good health and hygiene). Low consumption is prevalent in low-income countries and prevents utilities—especially small ones—from having a strong revenue base. The cycle of poor performance thus continues.

Sub-Saharan Africa still lags behind other regions in terms of generation capacity, electricity consumption and access. The total generation capacity in Sub-Saharan Africa, with a population of nearly 1 billion, is less than 100 GW (less than that of Spain with a population of 46 million). Only about 36 percent of the population had access to electricity in 2012—69 percent in urban areas, and only 15 percent in rural areas. Businesses and other consumers are severely affected by poor quality of electricity—as noted in Table 2, an Enterprise Survey found that business in Sub-Saharan Africa on average face 8.6 outages per month (compared with a global average of 7.4). More than 50 percent of them own generators (compared to 32 percent globally). Very few utilities measure performance at the consumer level, which makes it harder to gauge whether investments and other measures aimed at improving quality are having an impact.

Main Message 4

Strong institutional frameworks and norms and policies that promote transparency and accountability are key determinants for success.

Well-performing utilities in Sub-Saharan Africa benefit from a strong institutional framework and norms and policies that promote transparency and accountability, protecting

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customer interests. They are characterized by efficient, decentralized operations that are customer-oriented to provide feedback mechanisms for continual improvements. Such utilities use incentivized contracts, both external and internal, to meet key performance indicators. They are also relatively autonomous and free from political interference with regard to decision making on human resources and financial management.

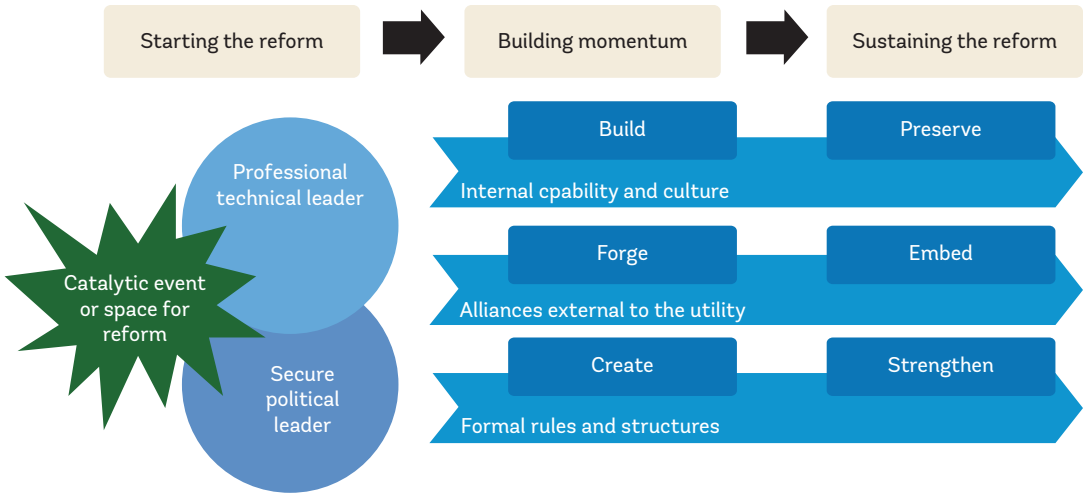
At least in the five relatively better-operating electricity utilities studied, the structure and ownership of the utility appears not to be an important driver of performance as long as the factors mentioned above are present. Of the five, three utilities are vertically integrated, while two are unbundled distribution companies. Two utilities are government-owned, two are private concessions and one is a public-private partnership with majority government ownership. Generally speaking, as noted in Table 2, utilities in Sub-Saharan Africa rank quite low on an index of transparency—49 on a scale of 100 (as opposed to a global average of 66).

However, while the technical, financial, and managerial techniques needed to meet these standards are quite well known and could often be applied elsewhere, context-specific application depends largely on factors in the political economy. When alignment is achieved with other interests in a city or society, or along with finance and technical assistance from development partners, a utility can solve urgent problems while creating competence, strong stakeholder relations, and complementary institutional structures. This is the platform for developing and sustaining good service to the poor.

Main Message 5

Turning utilities around is possible, and a catalytic event can create a space for reform, and savvy political and technical leaders need to seize the opportunity.

Figure 2. Starting the Reform, Building Momentum, and Sustaining the Reform



Source: "Providing water to poor people Providing water to poor people," Chris Heymans, Rolfe Eberhard, David Ehrhardt, and Shannon Riley, May 2016.

The findings from the cases in the study on services to the poor highlight three distinct but interrelated avenues of inquiry: how reforms are started, how reform momentum is built, and how successful outcomes are sustained (Figure 2). A catalytic event, such as a cholera outbreak or a change in the political landscape,[5] or an unsustainably large fiscal impact of the electricity sector, can create a space for reform, but savvy political and technical leaders need to seize the opportunity to formulate a mutually beneficial partnership. Together they must help shape networks and alliances for change and start to embed the reform legacy. Success is possible only if the balance of political economy pay-offs remains in favor of reform, and—once achieved—in favor of sustained good service, even as the attractions of predation on the utility increase.

Main Message 6

Governments are finding innovative ways to balance financial performance with affordability, especially for the poor.

For the average 80 percent of water utilities, operational cost recovery was positive for most years between 2006 and 2013; however, many utilities remain unable to recover operation and maintenance (O&M) costs. Because tariffs are almost always set on the basis of O&M costs, controlling costs is a major element in making the service more affordable. For water, O&M costs are highly variable, ranging from less than $0.23 to $2.07 per cubic meter of water sold. The variance is due to multiple local variables, which can include raw water quality, energy subsidies, and labor laws. In electricity, Sub-Saharan Africa suffers from very high generation costs and operational inefficiencies, and so improving the financial viability of utilities will come in large part from reducing costs. Kojima and Trimble (2016) found that 11 of the 39 countries studied could achieve full O&M and capital cost recovery if costs could be reduced to efficient levels. In the remaining countries, a combination of change in fuel mix (for instance, away from high cost imported diesel) and price increases is needed.

Interestingly, while costs have risen in recent years, so has the affordability of services, particularly in the water sector, thanks to new innovations in utilities in Sub-Saharan Africa in helping the poor tackle barriers to access, including financial, legal, social and technical challenges. Several utilities have kept connection costs down for low-income consumers and helped the poor manage their cash flow to continue paying for service. Innovations like flow limiters, providing a "basic needs" quantity of water for free (as in Durban), a lifeline tariff for electricity, or frequent meter readings and mobile payment mechanisms have helped in this regard. Cross-subsidizing has also enabled governments to meet both equity and financial sustainability objectives. Some utilities cross-subsidize among residential users based on income levels (as in Dakar and Kampala); others utilities cross-subsidize between residential

[5] For instance, the democratization of South Africa in the 1990s opened a new agenda toward universal services that created a strong point of entry for better-performing municipalities and water service providers like Durban to drive reform and service delivery improvements.

and commercial users, as in Uganda, where decreasing block tariffs have shown to be effective in increasing revenues. Particularly in electricity, where a large chunk of current electricity consumption is by consumers who can afford electricity (industries, businesses, middle and high income residential consumers), there may be a possibility for additional cross-subsidies, provided utilities also embark on visible improvements in quality of service.

Less obvious barriers to serving the poor are legal, social, and technical in nature. These issues require multisectoral solutions, including provision of title to land and services to plots, adequate transport for travel to jobs, and fairer tenancy laws. Utilities are using a variety of approaches to overcome these barriers in the short term, including pre-paying water dispensers that cut the monopoly power of water vendors; using small providers to serve informal areas as utility agents; and ensuring access in hard-to-reach areas trough water kiosks or providing a connection at a "meter bank" at the boundary of the community. Another key innovation taking place in energy is the use of off-grid solutions to provide energy access, particularly using solar PV—as the price of solar PV technology continue to drop, distributed generation by consumers is likely to increase.

Finally, the utilities in the sample have had mixed experiences when creating a special unit to help them adapt to serving poor customers and informal areas. Unfortunately, some utilities have found that such units remain marginal to the core operations and therefore have not had the desired impact of mainstreaming services to the poor. Dedicated pro-poor units are sometimes seen as necessary to counter a perceived lack of political will on the part of utility owners and/or managers to serve the poor. Utilities also intend using these units to house "one-stop" facilities that would make it easier for the residents of these settlements to interface with the utility on all service-related issues. Pro-poor units have been established in such cities as Dar es Salaam, Kampala, Lusaka, and Nairobi. These units can play an important role in catalyzing change, especially as a transitional mechanism in a utility reform process. The positive impacts these units had were made possible by factors such as effective political mobilization and coalition building and sound utility management.

Main Message 7

Expanding water and electricity coverage is a priority and can be achieved by making utilities more efficient and targeting investments better.

Regional coverage of piped water and electricity is 15 and 33 percent, respectively. Large utilities in low-income countries (which to some degree can generate internal funds

to increase access) and utilities in middle-income countries seem to be able to relate improved financial performance to better water coverage. For other utilities, the contribution of good financial performance to water coverage is still not clear. This suggests that many utilities find it difficult to improve access through improved financial performance, but depend on external funds to do so.

This does not imply an inevitable trade-off between cost recovery on the one hand and affordability and service improvement on the other. The good utilities in the sample could transcend any such trade-off by providing lower tariffs for residential customers (or, as in South Africa, free water for the poor), or by enabling customers to pay back connection costs over time. New technologies like cellphone meter readings and payments, and the introduction of prepaid meters, have also opened ways for poor households to spread out water payments into affordable portions. The net result has been that investment needs and operational costs have been proven not to be inevitably prohibitive to extending and improving water services to poor people.

Increasing access to electricity will require a steady improvement in the financial health of utilities, a reduction in the high cost of electricity generation and transmission, and a targeted use of subsidies. Measures that reduce the magnitude of required tariff increases, noticeably improve quality of service, and avoid hardships on the poor can help win public acceptance and expand access without compromising financial sustainability. Least cost expansion planning, competitive procurement of future generation, switch to cheaper and cleaner fuels and reduction in inefficiencies, can all help to reduce the need for large tariff increases. Transparent accountability and governance frameworks, coupled with independence in utility commercial operations could help utilities improve their performance. Improved focus on service quality improvement, customer management systems and revenue enhancement efforts, could also help improve the financial condition of the sector.

Main Message 8

Africa needs substantial investments in water and electricity, both for new infrastructure and for the upgrading of existing facilities.

A combination of grants and concessional loans have assisted utilities that have reached the poor, but the utilities have also worked hard at improving operating efficiency, especially reducing non-revenue water, improving productivity, and increasing collection rates. This made them able to raise new revenue, thus providing more operating cash, which in turn

has enabled them to pay back loans and finance more capital investment. Fiscal or lender incentives could aim at investment selection criteria to encourage good practices, such as: (a) more comprehensive processes and methods to conduct technical, economic, financial, and social due diligence; (b) adherence to competitive and transparent procurement, particularly of new electricity generation capacity,[6] (c) sufficient attention to the commercial performance of the utility and its capacity to operate and maintain its existing and new infrastructure so as to ensure long-term sustainability and value for money; (d) ensuring that investment expansion and institutional capacity to manage the new infrastructure assets are in sync; and (e) putting in place adequate and transparent sector financing policies (that is, tariff and subsidy policies that ensure that the assets can be properly operated and maintained).

The Way Forward to a More Comprehensive Analysis of Utility Needs

Beyond the three background reports and this analysis, much more needs to be done to get a complete picture of the drivers of good performance in electricity and water and sanitation in Sub-Saharan Africa. The two sectors can continue to be researched together, where data permits, to learn from each other. However, reaching a more consistent understanding across both sectors would require progressing from a descriptive framework supported by detailed databases in the region to an analytical phase in order to learn from the past, work within the present, and promote a future of good sector performance. Thus, a future analytical phase is proposed to build a bridge from the "value added" of the previous studies and to answer important new questions that affect and may challenge the ability of utilities in the region to meet better sector performance goals and successfully design and implement reforms. The results available from the analytical work of this proposed program could generate a renewed credibility for reforms and innovative solutions to the pending deficiencies facing energy and water sector performance. Some considerations for undertaking such a new analytical phase, as well as potential research questions, follows:

a. **More and better data are critical to assess performance and guide sector planning.** To properly assess utility performance requires reliable and complete data, which is a major challenge for both the energy and water sectors. It is hard to improve performance without having reliable data and basic reporting mechanisms in place that are available to the public (externally audited financial statements are often missing, for example). Utilities themselves do not always collect basic performance data; this is especially challenging in the case of the energy sector, which does not report on service quality at the end-user level. Performance monitoring is most common in countries where a regulator is active, and is generally underdeveloped in the absence of a regulator. Moreover, there is a huge demand from many professionals for more data beyond the basic financial and operational data that was collected for this study. Focusing on a very small set of indicators may result in a distorted picture. For instance, O&M cost has become a major area of focus to measure utility performance. Although, in theory, many utilities in Africa cover their O&M costs, the actual cash flow performance of utilities is insufficient to cover basic expenditures, resulting in a decline in service levels and slow progress in increasing access to piped water supply. Data on collection efficiency are very often not reported or are only partially reported. Thus on paper, but not in reality, a utility may be able to generate sufficient billed revenue to pay for its O&M. Finally, most utilities have little insight into their customer profiles. There are large discrepancies between the data provided by utilities on the access to water supply services and those registered in household surveys. Utilities should regularly calibrate their insights on customers to better predict the demand for their services and to draw up investment plans that are based on this demand.
b. **Different efficiency analysis instruments need to be analyzed for their advantages and disadvantages.** The future analytical phase would review the different efficiency analysis instruments (data envelope analysis, stochastic frontier, new engineering-economic models), and analyze their advantage/disadvantages over simple benchmarking, as well as their data requirements. This would include a nontechnical summary and a much more technical annex. This work would also present a new

[6] "Independent Power Projects in Sub-Saharan Africa: Lessons from Five Key Countries," Anton Eberhard, Katharine Gratwick, Elvira Morella, and Pedro Antmann.

generation of structured benchmarking exercises for each sector. The output from this phase of the research would guide the future analytical work of the World Bank Group and other researchers.

c. **Better determinants of performance across state-owned enterprises need to be specified.** Notwithstanding the existing studies, there are still important questions to be addressed in this regard. For instance, what correlations can be made between performance and regulation, and between performance and specific characteristics of market reforms (such as the introduction of wholesale markets and third-party access)? Does regulatory quality matter? What can be done to increase the efficiency of state-owned enterprises? Is there a new model for utilities? What are the conditions for success? What are the causes of lack of cost recovery and inadequate regulation?
d. **The ways in which regulatory quality cannot just be used as a tool to improve sector performance need to be better understood.** A number of possible actions and models have been analyzed with regard to the impact of regulatory quality on sector performance. However, several important questions remain unanswered: To what extent does regulatory quality matter? Does regulation have any effect on sector performance? Is the independent regulatory agency model still valid for the region? Are there better alternatives? Who are the leaders in the region? What are the effects of the procedures aimed at improving the governance of regulatory agencies (formal regulation), as well as the practice (informal regulation), on performance?
e. **Management mechanisms that can create incentives for improved performance should be identified and studied.** A number of possible actions affecting budget allocations, compensation, and managerial interventions can be provided so as to create incentives for improved performance. Likewise, identified performance indicators can be highly publicized so as to create a context for change. The following are questions to tackle: What have the boards and the managers of the most competitive and efficient utilities done and are currently doing to improve their governance? What have the governments that own utilities done and what are they currently doing? What expectations do they have and what results have they already achieved? What is and has been their rationale for focusing their efforts in this area? What have been and are the measures they are taking and/or are planning to take? How are and have they been organized to perform this task? What are the main legal difficulties and other obstacles they face in this work? How important is it to enjoy a good reputation and solid social support in carrying out these types of reforms? Under which circumstances does solid social support make reform easier? How does operating in regions characterized by challenging social circumstances affect the chances of introducing these types of reforms? What are the main lessons so far? Is there any difference across sectors?

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