

# Energy Subsidy Reform in Sub-Saharan Africa

## Experiences and Lessons



A staff team led by Trevor Alleyne

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**Cataloging-in-Publication Data**

**Joint Bank-Fund Library**

Energy subsidy reform in Sub-Saharan Africa:  
experiences and lessons—  
Washington, D.C.: International Monetary Fund, [2013]

73, 46 p.: col. ill., col. maps ; cm.  
At head of title: African Department.

Includes bibliographical references.

1. Energy policy—Africa, Sub-Saharan. 2. Electric utilities—Government policy—Africa, Sub-Saharan. 3. Fuel—Prices—Africa, Sub-Saharan. 4. Poor—Energy assistance—Africa, Sub-Saharan. I. International Monetary Fund. African Department.

HD9502.A357 E53 2013  
ISBN: 978-1-48436-654-7 (paper)  
ISBN: 978-1-48437-508-2 (ePub)  
ISBN: 978-1-48438-560-9 (Mobipocket)  
ISBN: 978-1-48439-072-6 (PDF)

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Internet: [www.elibrary.imf.org](http://www.elibrary.imf.org)  
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## Executive Summary

*Reforming energy (fuel and electricity) subsidies in sub-Saharan Africa (SSA) is critical to ensuring future energy supply to realize Africa's growth potential. Although subsidies continue to absorb a large share of public resources, power generation and access levels in SSA remain well below those in other low-income countries. There is a link between those facts because energy subsidies create at least two set of problems. First, they are poorly targeted. The subsidies provide benefits to all segments of society, but the main beneficiaries are the better off. Second, subsidies often create a disincentive for maintenance and investment in the energy sector, perpetuating energy shortages and low levels of access. Therefore, reforms are essential to make better use of budgetary resources for pro-poor and development spending and to facilitate the expansion of electricity output. But reforms are also difficult, because the public needs to be convinced that they will benefit more from the reallocation of government spending to other purposes than they will lose from the subsidy removal. Reform efforts must therefore focus on putting together credible packages of measures that are then used to build support for reform.*

In spite of reform efforts, energy subsidies still absorb a large share of scarce public resources in SSA. According to IMF staff estimates, the fiscal cost of fuel subsidies, taking into account both direct subsidies and foregone taxes, amounted to 1.4 percent of the region's GDP in 2012 (Appendix 1). Quasi-fiscal deficits of state-owned electricity companies in SSA, defined as the difference between the actual revenue collected and the revenue required to fully recover the operating costs of production and capital depreciation, amounted to a further 1.4 percent of GDP in 2009–10 (see Appendix 1).

These energy subsidies mostly benefit the better off, but their removal also would hurt the poor. Energy subsidies benefit mostly higher-income groups because they consume the most (Figure 11). Electricity subsidies are particularly regressive because connection to the electricity grid is highly skewed toward higher-income groups. Nevertheless, the welfare impact of eliminating subsidies (without compensating measures) would be significant for the poor because the share of total energy in their total household consumption is the same as the rich, although there are important differences in the types of energy products consumed across income groups (Table 3).

Energy subsidies have a negative impact on economic efficiency, in particular on allocation of resources and on competitiveness and growth. Energy subsidies can lead to resource misallocation through overconsumption. They may crowd out more productive government spending, as indicated by a



negative relationship between fuel subsidies and public spending on health and education (Figure 16). More importantly, underpricing and subsidies can create a vicious cycle of underinvestment, poor maintenance, and inadequate supply, notably in the electricity sector and oil refining. In the electricity sector, persistent shortages and limited access further drive up costs, widening the wedge between tariff and cost-recovery levels. As a result, Africa's power infrastructure lags behind other developing regions, and there has been relatively little convergence toward better-equipped regions (Figure 18). According to World Bank estimates, improving electricity to the regional leader's level could increase SSA's annual potential output growth by two percentage points.

Despite their drawbacks, universal energy subsidies are prevalent for a variety of reasons. An energy subsidy is a readily available mechanism, requiring very little administrative capacity, for governments to provide a highly visible benefit for important segments of the population. Other mechanisms simply may not exist. In addition, energy subsidies might be introduced by a desire to avoid the transmission of price spikes to the domestic economy, or to expand the access of the population to energy, or simply because of the difficulty of controlling the financial performance of energy companies, particularly state-owned ones. Energy subsidies are even more prevalent in oil-exporting countries because of the availability of financing, the presence of lower institutional quality levels, and/or a desire to establish energy-intensive industries. Furthermore, in some countries the population expects to consume petroleum products at below international market prices as a way to share the country's oil wealth, even if refined products are imported.

The longer the subsidies have existed, the more entrenched the opposition to reduce them. This is especially the case if their benefits have been capitalized, for example, by the adoption of energy intensive technologies and equipment in businesses. In addition, concerns about potential economy-wide loss of competitiveness and the impact of higher energy prices on inflation are usually raised in opposition to subsidy reform. In oil-exporting countries, the task of removing subsidies has proven even more challenging because it is difficult to convey to the public the rationale for products to be sold at their opportunity cost and not their cost of production.

Case studies of SSA countries that have attempted to reduce energy subsidies (compiled in the supplement to this paper) suggest several lessons:

- *First, transparency and public communication on the size of energy subsidies and their beneficiaries is helpful to kick-start reform.* In Nigeria, the government used the fact that fuel subsidies (\$9.3 billion, or 4.1 percent of GDP in 2011) exceeded capital expenditure to call for reform. In Niger, the

realization that oil tax revenue shrank from 1 percent of GDP in 2005 to 0.3 percent of GDP in 2010 contributed to triggering reforms. Ghana undertook an independent poverty and social impact analysis in 2003–4 and made the findings public to make the costs and incidence of subsidies, along with the impact of their removal on different groups, well understood.

- *Second, careful preparation, including public education and consultation with key stakeholders, is critical for success.* In planning a reform, it is important to clearly outline the goals and objectives, identify main stakeholders and interest groups, and develop strategies to address their concerns. In Kenya, consultation with unions allowed the electricity reform process to proceed without the retrenchment of staff in the utilities. In addition, early in the reform process, the support of large consumers for tariff increases was secured only with a commitment to use extra revenues to expand electricity supply. In Namibia, the National Deregulation Task Force in 1996 examined fuel price deregulation through a broadly consultative process, culminating in a White Paper on Energy Policy in 1998.
- *Third, a gradual phasing in and sequencing of subsidy reforms seem to work best.* This is especially true if subsidies are large or have been in place for a long time. A gradual approach will allow time for energy consumers to adapt and prevent sharp price increases that could undermine support. A gradual approach would also be preferred when the available instruments for delivering mitigating measures to the most needy are less developed, and when time is needed to improve the government's track record on spending quality. In Namibia, fuel subsidies started to be scaled back only in 2001, a full three years after the adoption of a consensual white paper on deregulating energy prices. In the case of electricity, the complex nature of the reform process requires that it be gradual. In Kenya, subsidies were eliminated over the course of 7–8 years through a combination of tariff increases, improvements in collections, and reductions in technical losses.
- *Fourth, strong institutions are needed to sustain energy subsidy reforms.* In Tanzania, the establishment of a specialized regulatory entity, not only to issue licenses and technical regulations (e.g., on the quality requirements of fuel products), but also to keep the public constantly informed about (current and historical) prices and price structures and to review the proper functioning of the market (e.g., to investigate concerns about potential price collusion practices) seems to have played an important role in sustaining fuel subsidy reforms.

- *Fifth, durably reducing electricity subsidies involves much more than tariff increases.* Breaking through the vicious cycle of underinvestment, poor maintenance, and high costs requires creating an environment conducive to seizing the considerable scope for efficiency gains. Low levels of public debt in many countries in sub-Saharan Africa provide an opportunity for significant investment in cheaper sources of energy production. Regional production and distribution pools can yield significant economies of scale. Public and private energy distributors have considerable scope to reduce distribution losses and improve revenue collection rates. And a strong, knowledgeable, independent regulator can play a critical role in assessing how much subsidy removal is done by tariff adjustment versus cost containment.
- *Finally, the credibility of the government's commitment to compensate vulnerable groups and use the savings from subsidy reform for well-targeted development interventions is essential for the success of energy subsidy reform.* In the case of electricity, timing subsidy reform with improvements in power services, such as new capacity or more reliable supply, seems to raise the likelihood of success (Kenya). Kenya also maintained a “lifeline” electricity tariff (below costs) for households that consume less than 50 kWh a month (cross-subsidized by higher rates imposed on larger consumers) together with donor-financed subsidies to connect the poor to the electricity grid. In terms of measures to mitigate the impact of higher fuel or electricity price on the poor, conditional cash transfers are the most appropriate instrument. However, this may not be feasible in the short run because of administrative constraints. A range of actions has been introduced in practice. For example, in Niger and Ghana, the authorities introduced a subsidy for public transport to keep it affordable for the poor despite the increase in oil prices.

## Introduction

The reform of energy subsidies is an important but challenging issue for sub-Saharan African (SSA) countries. There is a relatively large theoretical and empirical literature on this issue. While this paper relies on that literature, too, it tailors its discussion to SSA countries to respond to the following questions: Why it is important to reduce energy subsidies? What are the difficulties involved in energy subsidy reform? How best can a subsidy reform be implemented? This paper uses various sources of information on SSA countries: quantitative assessments, surveys, and individual (but standardized) case studies.

This paper is organized as follows. Chapter 1 discusses a few stylized facts about energy subsidies in SSA, their (quasi-)fiscal costs, distributional incidence, and their impact on economic efficiency. Chapter 2 focuses on policy issues linked to reforming the power sector and associated subsidies, while Chapter 3 presents a strategy for energy subsidy reform. A supplement to this paper builds on the lessons distilled from a number of case studies on energy subsidy reform—Ghana, Namibia, Niger, Nigeria (fuel); and Kenya, Uganda (electricity).

The paper was written by a staff team consisting of Trevor Alleyne, Christian Jozs, Sukhwinder Singh, Mauricio Villafuerte, Javier Arze del Granado, Antonio David, Philippe Egoume-Bossogo, Farayi Gwenhamo, Mumtaz Hussain, Clara Mira, Anton Op de Beke, Edgardo Ruggiero, Slavi Slavov, and Geneviève Verdier. Research assistance was provided by Promise Kamanga, Brian Moon, and Douglas Shapiro. Administrative assistance was provided by Elise Brun and Edison Narvaez. A presentation of some preliminary results was made at a Ministerial Seminar on Energy Subsidies in SSA during the 2012 IMF-World Bank Annual Meetings in Tokyo. The paper was also an input into a joint FAD/AFR/MCD paper, “Energy Subsidy Reform—Lessons and Implications” that was published in March 2013.

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## Energy Subsidies in Sub-Saharan Africa (SSA): Stylized Facts

### Recent Developments in Fuel Pricing and Fiscal Implications<sup>1</sup>

International oil and oil products prices rose sharply in 2003–2012 in two sequences (Figure 1). They increased steadily since 2003 and more than doubled from early 2007 to mid 2008 when they peaked. They fell precipitously until the end of 2008 before rebounding strongly. This evolution has been challenging for many importing countries that saw their energy bills surge, but it has also made it increasingly difficult for many countries to resist social demands for less than full pass-through into retail fuel prices.

Since end-2008, the fuel price pass-through in SSA has been lower than that of advanced economies and emerging Europe, but has been in line with pass-through in the rest of the world (Box 1).<sup>2</sup> Only about two-thirds of the increase in international prices was passed through to domestic prices (Figure 2). From end-2008 to end-2011, when prices resumed their upward trend, the median pass-through in SSA was 66 percent. That was about the same level as in Latin America and Asia and Pacific, but well above that in the Middle East and Central Asia. Fuel price pass-through was higher than 100 percent in advanced economies and emerging Europe.

Between end-2008 and end-2011, fiscal costs increased in SSA as a result of relatively low pass-through of international fuel price increases during that period. Increases in international fuel prices not fully passed through imply a

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<sup>1</sup> This section was prepared by Javier Arze del Granado, Philippe Egoume-Bossogo, Christian Josz, and Anton Op de Beke, with research assistance from Promise Kamanga and Douglas Shapiro.

<sup>2</sup> The analysis of the dynamics of fuel price pass-through, fuel taxes, and fiscal costs in SSA between end-2008 and 2011 is based on data collected by the Fiscal Affairs Department of the IMF. Less than full pass-through implies a reduction in the tax per liter (or increase in the subsidy per liter). The change in fiscal cost is calculated by multiplying this change in tax/subsidy per liter by the change in annualized consumption between the two periods.

### Box 1. Methodologies and Key Concepts

#### *Methodologies*

##### **Fuel Subsidies**

The estimation of fuel subsidies has usually relied on two methods (and its variants): (1) a price pass-through analysis; and, (2) a price benchmark analysis.

The price pass-through analysis is dynamic in the sense of making inferences about the evolution of fuel subsidies or tax revenues over a certain period. An important advantage of this method is its simplicity in terms of data requirements. In fact, it only requires collecting domestic retail prices and the international fuel price for two points in time (for example, end-2008 and end-2011). By comparing the changes in domestic retail prices against the changes in international prices over that period, changes in fiscal tax/subsidy levels (be it in terms of lower fiscal revenue or budgetary outlays) can be obtained. In Figure 2, this methodology is used to highlight the fact that, in 2011, the median SSA country lost 1.6 percent of GDP in fuel tax revenue because of increased subsidization of fuel relative to end-2008. At the same time, this method has limitations. First, it assumes no changes in the cost structure of domestic fuels over time (e.g., transportation and distribution costs), although this may not be a serious problem when comparing two relatively close time periods. Second, it is quite sensitive to the choice of the starting point for the analysis.

The price benchmark analysis relies on detailed cost structures to determine cost-recovery fuel price benchmarks. The subsidy (tax) per liter of fuel product is obtained by subtracting the relevant benchmark from the domestic retail price. Benchmark prices are computed by adding CIF fuel import prices, national margins, and costs (e.g., transportation, distribution) and indirect taxes. There are various variants to this approach. On the one hand, pre- and posttax fuel subsidies can be obtained depending whether indirect taxes are excluded or included, respectively, from the measurement of the benchmark price. The presence of pretax subsidies (i.e., negative taxes) would clearly indicate operating losses within the supply chain and/or sale of fuel products. However, this measure may not fully reflect the true fiscal cost of the subsidies: even if the pretax subsidy is negative, thereby indicating positive revenue, those revenues may be less than if the rates stipulated in the official fuel pricing formula were applied.

There are various options to compute “posttax” fuel subsidies, which seek to measure the fiscal cost (and sometimes other costs). *In this study, the benchmark fuel taxation level was taken to be the sub-Saharan Africa average of gross tax (i.e., VAT and excises) per liter.* Such a benchmark focuses on the revenue potential of fuel taxation as stipulated by the tax rates in the countries’ fuel pricing formulas, where applicable. However, the recent IMF Board paper on energy subsidy reform (IMF, 2013) uses the national VAT rate to compute the benchmark fuel taxation level and also adds a corrective (or Pigouvian) tax to charge for externalities associated with CO<sub>2</sub> emissions, local pollution, and other

**Box 1. (continued)**

externalities such as traffic congestion and accidents. Clearly, the estimate of posttax subsidies will be very sensitive to the choice of the benchmark fuel taxation level.

**Electricity Subsidies**

In general, power utilities in sub-Saharan Africa are quasi-fiscal entities. These utilities channel a variety of transfers to consumers through underpricing, uncollected electricity bills, and a number of other inefficiencies (e.g., large power distribution losses). However, the total cost of such transfers is not reflected in the budget because a large portion is implicit or involuntary (e.g., power theft).

This study computes a unified measure of both explicit and implicit electricity subsidies called the quasi-fiscal deficit (QFD), which is defined as: “*the difference between the actual revenue charged and collected at regulated electricity prices and the revenue required to fully cover the operating costs of production and capital depreciation*” (Saavalainen and Joy ten Berge, 2006). The QFD is calculated as follows:

$$\text{QFD} = \text{Cost of underpricing of electricity} + \text{Cost of nonpayment of bills} + \text{Cost of excessive line losses}$$

where:

*Cost of underpricing of electricity* =  $Q \cdot (AC - P_e)$ ; where Q is the quantity of electricity billed to all types of consumers; AC is average cost of producing one kWh of electricity, including capital depreciation; and  $P_e$  is the weighted average effective tariff per kWh that is applied by the power utility. The effective tariff rate is the price per kWh of electricity consumed at a specific consumption level when all charges—variable and fixed—are taken into account.

*Costs of nonpayment of power bills* =  $Q \cdot P_e \cdot (1 - c)$ ; where c is the collection rate that varies between 0 percent and 100 percent.

*Costs of excessive line losses* =  $Q \cdot P_e \cdot (L - L_s)$ ; where L is actual line losses in the distribution of electricity as a percent of total consumption and  $L_s$  is the level of standard line losses—assumed at 10 percent in case of sub-Saharan Africa, in line with the generally held view of experts.

Thus, the quasi-fiscal deficit of a power utility is measured as:

$$\text{QFDe} = Q \cdot (AC - P_e) + Q \cdot P_e \cdot (1 - c) + Q \cdot P_e \cdot (L - L_s) = Q \cdot (AC - P_e \cdot [1 - (1 - c) - (L - L_s)])$$

**Some Key Concepts**

**Price pass-through:** Pass-through is defined as the absolute change in domestic retail prices divided by the absolute change in international prices, both in domestic currency.



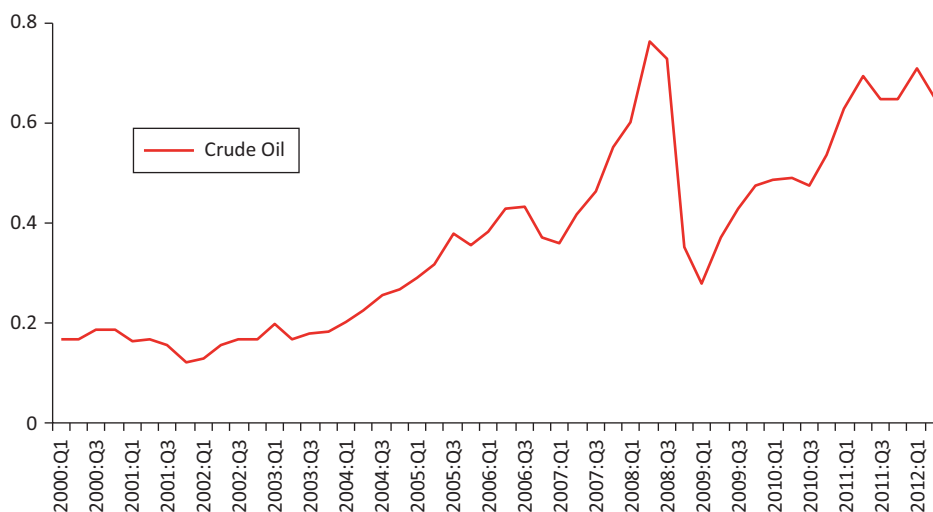
**Box 1. (continued)**

Pass-through above (below) 100 percent implies that net fuel taxes (i.e., taxes less subsidies) are increasing (decreasing). Pass-through is calculated based on end-of-period data on domestic retail prices, international prices, and domestic currency exchange rates. For instance, pass-through from end-2008 to end-2011 is calculated as the change in the domestic retail price in this period (expressed in domestic currency) divided by the change in the international price in this period (also in domestic currency).

**Pretax fuel subsidy:** The pretax fuel subsidy for gasoline, kerosene, and diesel is defined as the difference between an estimate of cost-recovery price (defined as CIF import price plus margins and costs) and domestic retail prices. This estimate is multiplied by fuel consumption to obtain the pretax fuel subsidy. All this information was obtained from official national sources. In computing total fuel subsidies both positive and negative values are added, hence products with positive taxes partially offset those with negative taxes (i.e., subsidies).

**Posttax fuel subsidy:** The posttax fuel subsidy for gasoline, kerosene, and diesel is defined as the difference between an estimate of cost-recovery price (defined as CIF import price plus margins and costs) plus the SSA average of gross tax per liter and domestic retail prices. This estimate is multiplied by fuel consumption to obtain the posttax fuel subsidy. All this information was obtained from official national sources. In computing total fuel subsidies both positive and negative values are added, hence products with positive taxes partially offset those with negative taxes (i.e., subsidies).

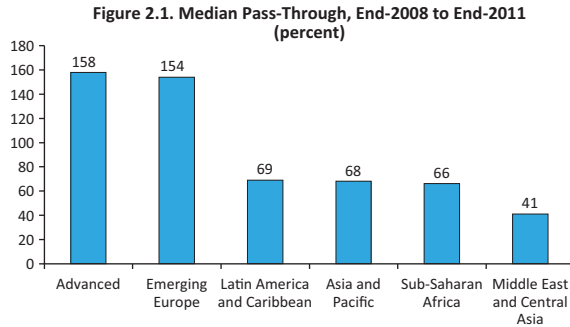
**Figure 1. International Petroleum Product Prices,  
US\$ a Liter**



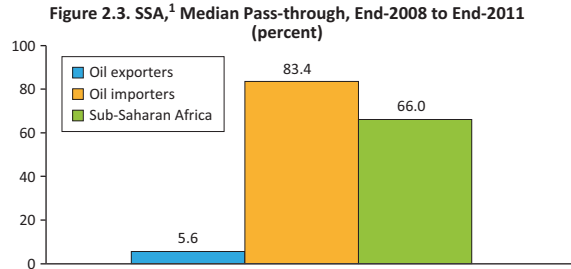
Source: U.S. Energy Information Administration.

**Figure 2. Fuel Price Pass-Through, Fuel Taxes, and Fiscal Cost**

The median pass-through in SSA has been lower than in advanced economies and emerging Europe, but has been in line with most other countries in the world.

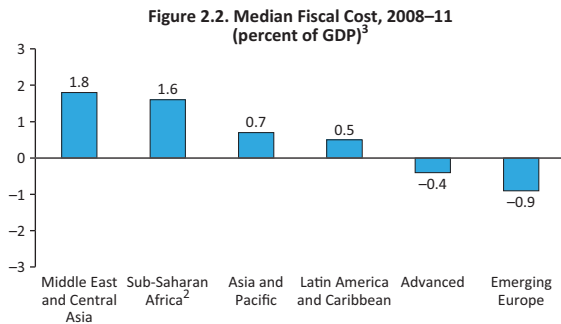


The median pass-through in SSA has been much lower in oil-exporting countries than in oil-importing countries.



<sup>1</sup>Swaziland excluded from end-2003 to mid-2008. Equatorial Guinea, Cape Verde, Liberia, and Mauritius excluded from end-2003 to end-2008. Seychelles excluded from mid-2008 to end-2011. Comoros, Eritrea, Zimbabwe excluded for all periods.

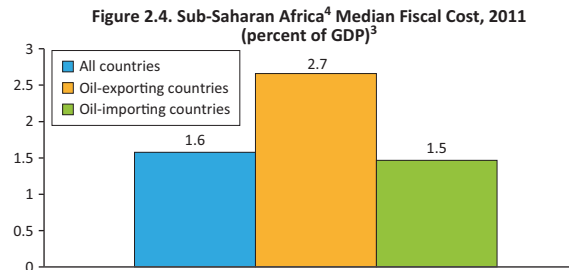
SSA had the second highest median fiscal cost due to the drop in the pass-through between 2008 and 2011.



<sup>3</sup>Fiscal cost is the shortfall in annualized tax revenues using end-2011 tax rates relative to annualized tax revenues using end-2008 tax rates.

<sup>4</sup>Comoros, Eritrea, Seychelles, and Zimbabwe are omitted.

The median fiscal cost in SSA was highest in oil exporting countries.

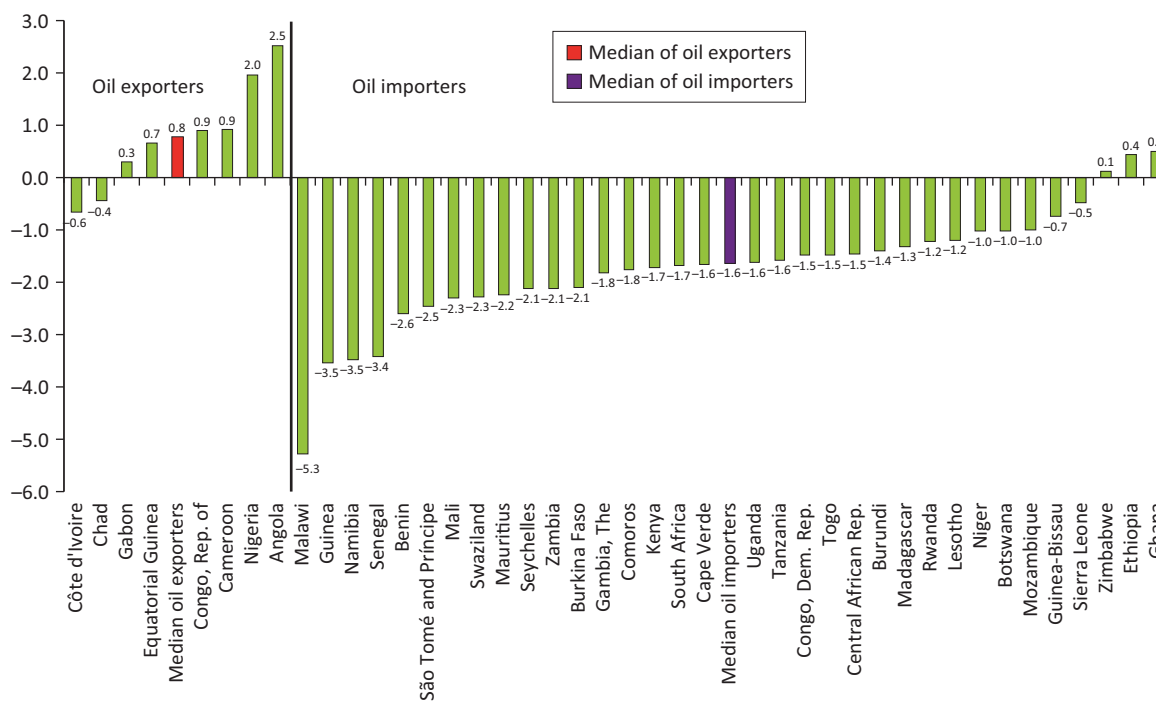


Sources: IMF *World Economic Outlook* and staff calculations.

loss of tax revenue and/or increased subsidies. The median increase in fiscal cost was 1.6 percent of GDP in SSA and was second only to that of the Middle East and Central Asia (Figure 2.2). These two regions experienced losses of more than twice those recorded by Asia and Pacific and Latin America and the Caribbean.

There is a clear difference in the pass-through behavior of oil exporters and oil importers in SSA (Figure 2.3). Looking at the period after the price shock (i.e., end-2008 to end-2011), the median pass-through for oil exporters was much lower than the median for oil importers. Oil exporters found it harder to pass through changes in international oil prices to consumers, who may consider low fuel prices the most convenient way to share in the oil wealth of their countries. As a result, the increase in fiscal cost in SSA oil-exporting countries was almost twice as high as in SSA oil-importing countries (Figure 2.4). This reflects both a lower pass-through and higher fuel consumption in oil-exporting countries.

Figure 3a. Pretax Fuel Subsidies in Sub-Saharan Africa (2012)  
(percent of GDP)

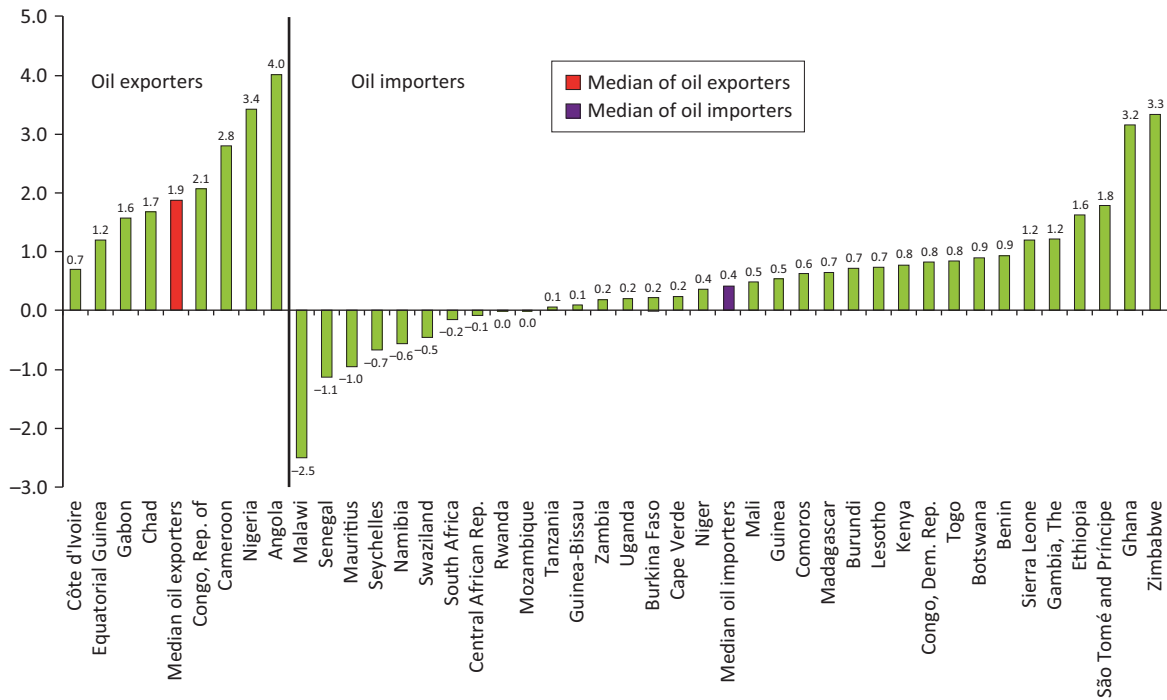


Sources: Authorities' data and IMF staff estimates.

Note. Negative values represent a tax. The pre tax data for gasoline, kerosene, and diesel in each country are calculated as the difference between an estimate of cost-recovery price (defined as: CIF import price plus national "margins and costs") and domestic retail prices

In addition to looking at the dynamic behavior of fuel prices between end-2008 and end-2011 to calculate the *change* in fuel taxation/subsidization, estimates of the absolute size of fuel subsidies at end-2012 were also calculated. Based on a detailed survey conducted for SSA countries, the fuel subsidies for gasoline, kerosene, and diesel were estimated based on the difference between an estimate of cost-recovery price and domestic retail prices. This estimate was multiplied by fuel consumption to obtain the fuel subsidy. Two alternative measures were computed. The "pretax" subsidy compares a cost-recovery price that includes the CIF import price plus national margins and costs with the retail price. The "posttax" subsidy compares an adjusted cost-recovery price (i.e., the CIF import price plus national margins and costs plus a measure of gross taxes per liter) with the retail price. For this paper, the SSA average gross tax per liter was used, but clearly other formulations could be justified (e.g., in IMF [2013], posttax subsidies were calculated using an adjusted cost-recovery price that includes

Figure 3b. Fuel Subsidies in Sub-Saharan Africa (2012) on Posttax Basis (percent of GDP)



Sources: Authorities' data and IMF staff estimates.

Note: Negative values represent a tax. The post tax data for gasoline, kerosene and diesel in each country are calculated as the difference between an estimate of cost-recovery price (defined as: CIF import price plus national "margins and costs" plus the SSA average gross tax per liter) and domestic retail prices.

the cost of externalities, such as CO<sub>2</sub> emissions and traffic congestion). Although the "pretax" subsidy reflects the more common understanding of a subsidy, the "posttax" subsidy aims to measure the fiscal cost or unutilized fiscal space.

Most SSA countries do not have "pretax" subsidies on fuel (Figure 3a). In other words, the retail price of fuel products is typically greater than the cost recovery price. However, while only 10 percent of oil importers have pretax subsidies, almost all of the oil exporters do and the median cost of the subsidies for this group is 0.8 percent of GDP.

"Posttax" fuel subsidies are significantly higher and more widespread across the region (Figure 3b). At 1.9 percent of GDP, these subsidies were almost five times higher in oil-exporting countries than in SSA oil importing countries (0.4 percent of GDP).

## Electricity Subsidies and Cost Recovery Tariffs<sup>3</sup>

This subsection gives estimates of fiscal and quasi-fiscal costs in the power sector in SSA countries and analyzes the factors that underlie these costs. A power utility company generates hidden costs when its realized revenue is less than the revenue it would collect were it operated with cost recovery tariffs based on efficient operations (i.e., operations with normal line losses and full collection of bills). In the last few decades, power companies in SSA tended to experience substantial hidden costs, which in turn constrained their ability to invest in new power capacity, to expand access, and to improve service quality. As a result, per capita installed generation capacity in SSA (excluding South Africa) is about one-third of that in South Asia and one-tenth of that in Latin America (Eberhard and Shkaratan, 2012). Similarly, per capita consumption of electricity in SSA (excluding South Africa) is merely 10 kWh a month, in contrast to about 100 kWh in developing countries and 1000 kWh in high-income countries.

Most countries in SSA have highly regulated electricity markets. A survey on SSA countries (Appendix 1) suggests that most countries implement some form of administered pricing for electricity, most frequently ad hoc nonautomatic price setting schemes (Figure 4). Even in countries with de jure pricing policies based on an automatic formula, these automatic mechanisms are frequently suspended or intervened. Most electricity utilities are state owned, and it appears that policymakers are reluctant to adopt market-based pricing policies, partly because of concerns related to access, affordability, and institutional capacity.

Subsidies for electricity services are common in SSA. A majority of countries have explicit subsidies for electricity (Figure 5). Despite shortcomings in terms of data availability, it is clear that explicit subsidies are substantial. We estimate that direct power subsidies average 0.4 percent of GDP for SSA, but can reach up to 0.8 percent (Mali). In addition, there has been a build-up of arrears by state-owned power utilities (on average 0.6 percent of GDP) and debt accumulation (on average 1.5 percent of GDP).

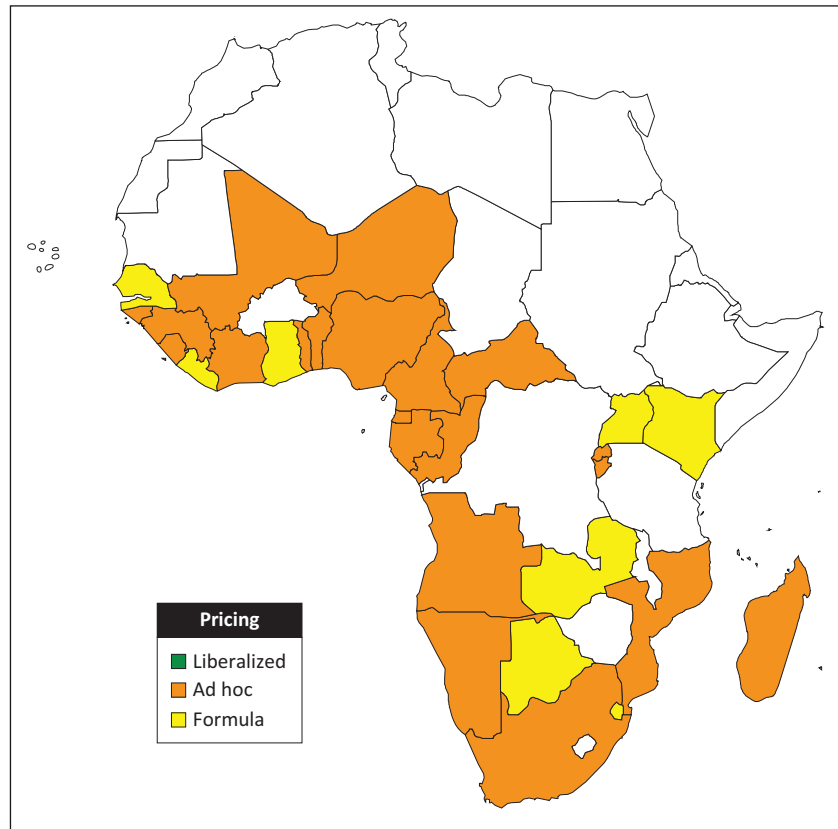
### Factors Contributing to the Under-Recovery of Power Costs

Excluding South Africa, the average cost of supplying one kWh in sub-Saharan African countries is the highest among developing countries

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<sup>3</sup> Prepared by Mumtaz Hussain.

Figure 4. Sub-Saharan Africa: Electricity Pricing Mechanisms



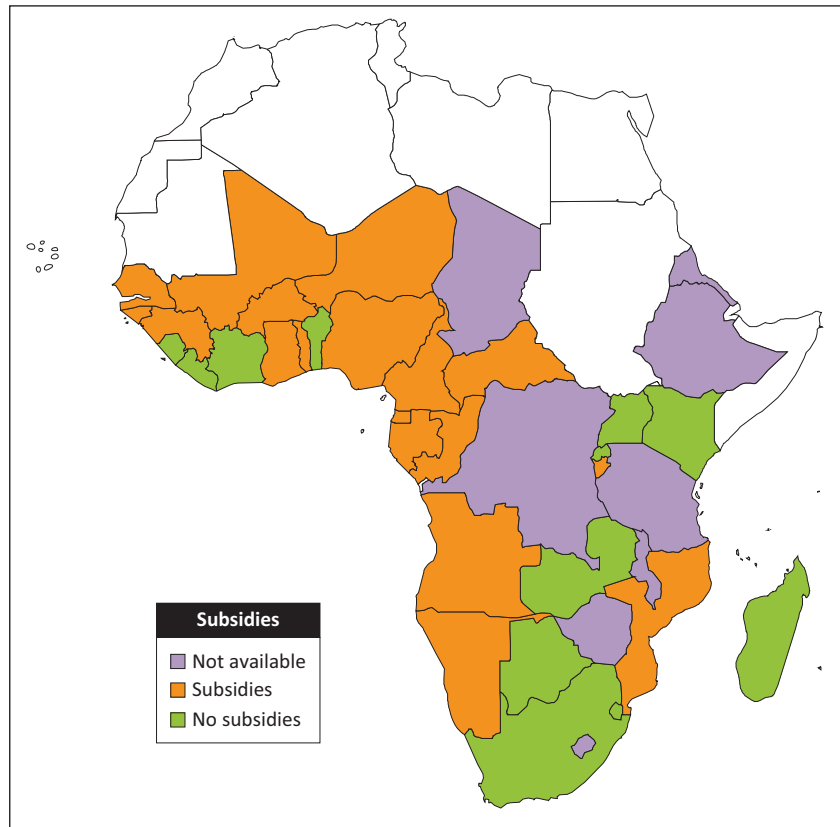
Source: Survey of IMF country teams for SSA countries (April 2012).

(Eberhard and Shkaratan, 2012). Using the latest annual data for 2008–10, the average cost of electricity in SSA was about US\$0.15 a kWh. The average cost of power was even higher in countries that rely primarily on thermal generation—US\$0.21 a kWh (Figure 6). Besides inefficiencies in power companies, high use of costly emergency power generation (e.g., in Uganda until early 2012), low economies of scale in generation, and limited regional integration also contributed to these high unit costs.

Effective power tariffs are generally set well below the historical average cost of supplying electricity (Figure 7).<sup>4</sup> Despite residential tariffs in SSA countries being much higher than in other regions of the world (Briceño-Garmendia and Shkaratan, 2011), they cover, on average, only about 70 percent of the cost of power (based on data for the latest year in 2005–09).

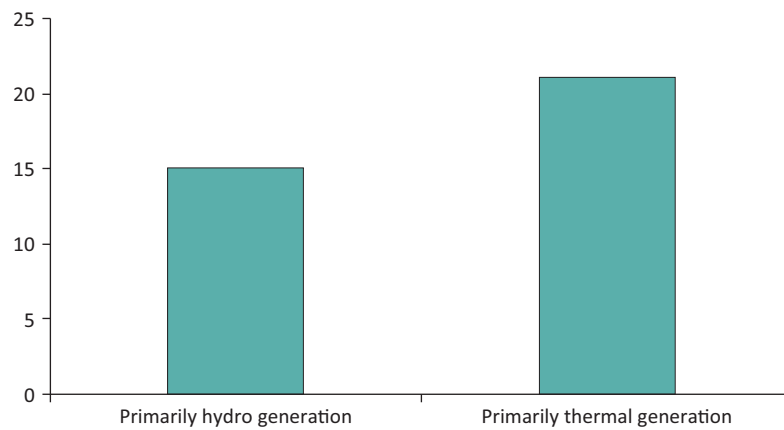
<sup>4</sup> The effective tariff rate is the price per kWh of electricity consumed at a specific consumption level when all charges—variable and fixed—are taken into account (Briceño-Garmendia and Shkaratan, 2011).

Figure 5. Sub-Saharan Africa: Explicit Electricity Subsidies



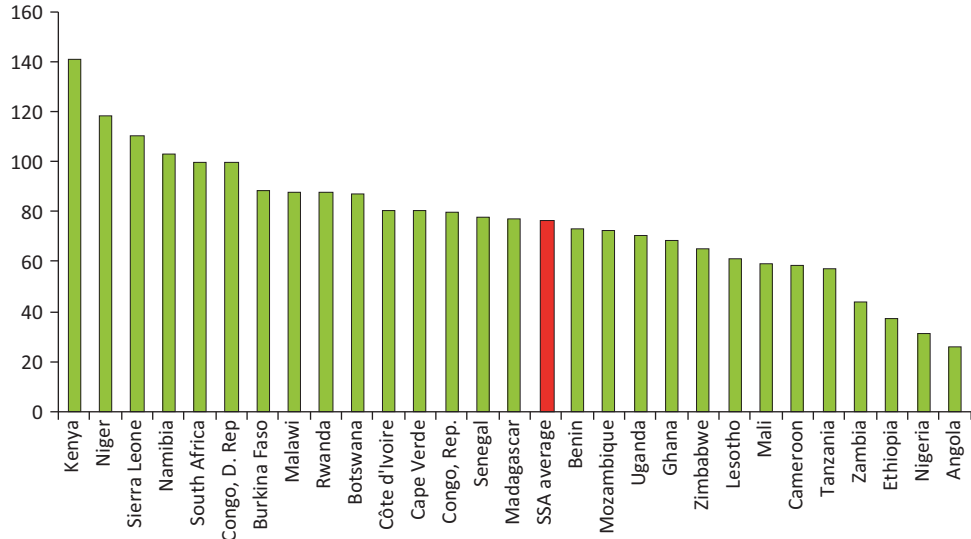
Source: Survey of IMF country teams for SSA countries (April 2012).

Figure 6. Sub-Saharan Africa Countries: Average Cost of Power Generation (US cents a kWh)



Source: The World Bank's AICD database and various country reports. Data is for 2008-10 (latest year available). South Africa is excluded.

Figure 7. Cost Recovery: Average Tariffs as a Percent of Average Historical Costs



Source: Briceño-Garmendia and Shkaratan (2011) and various country reports from the World Bank.

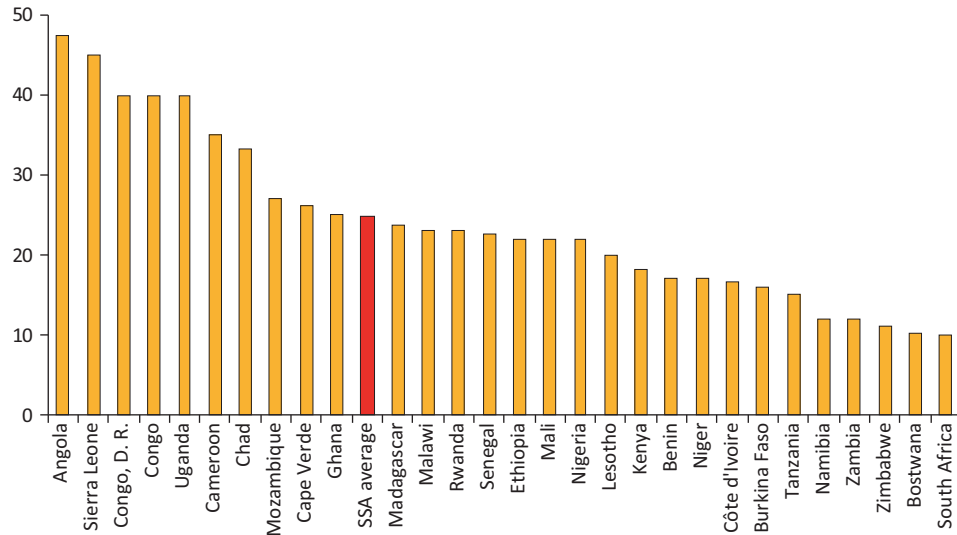
In addition, power utilities tend to be subject to high line losses—in some cases half of power injected into the distribution system is lost—and undercollection problems. On average, distribution losses (the amount of electricity injected into the distribution network that could not be billed) are around 25 percent—well above the international norm of 10 percent (Figure 8). Similarly, the average collection rate was around 85 percent. The costly power supply relative to per capita income in SSA has contributed to power theft and nonpayment of bills. Evidence from household surveys indicates that as much as 60 percent of poorer households do not pay their electricity bills (Briceño-Garmendia and Shkaratan, 2011).

### Power Sector's Quasi-Fiscal Deficits in SSA Countries

Quasi-fiscal deficits of power utilities in SSA countries are large in terms of GDP (Figure 9). Using the latest available data for 2008–10, the median quasi-fiscal deficit (QFD) was about 1.7 percent of 2009 GDP. However, there are large variations in QFDs across countries: from about 11 percent of GDP in Zimbabwe to less than 0.5 percent of GDP in Botswana and Chad. Also, a number of countries have managed to reduce deficits (e.g., Kenya) while others have experienced increased QFDs (partly due to increased reliance on emergency power generation). Kenya implemented a number of reforms in

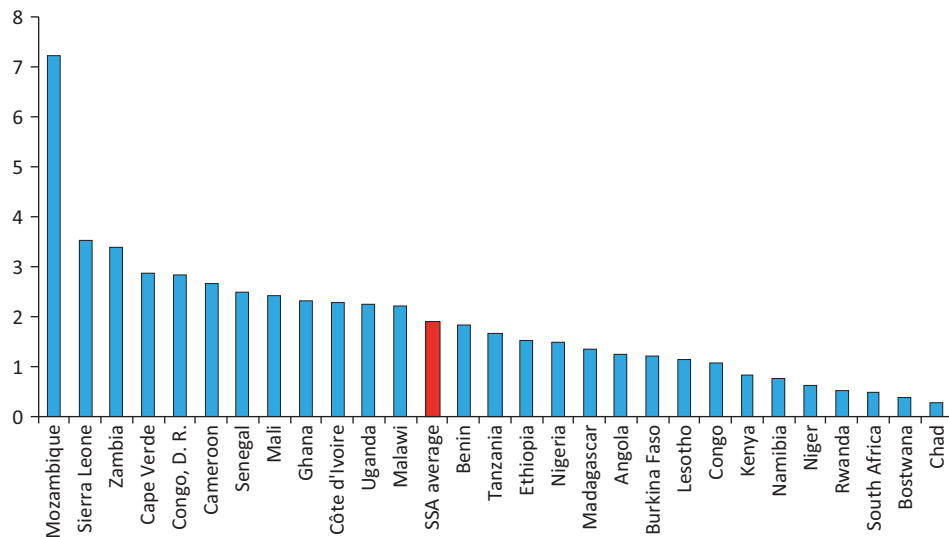


Figure 8. Sub-Saharan African Countries: Distribution Line Losses of Power Utilities (Losses in percent of power supplied)



Source: Eberhard and others (2008) and various country reports from the World Bank.

Figure 9. Sub-Saharan African Countries: Quasi-Fiscal Deficits of Power Utilities (QFD in percent of 2009 GDP)<sup>1</sup>



Source: IMF staff calculations based on data from the IMF, the World Bank, and International Energy Agency.

<sup>1</sup> Zimbabwe, which had QFD of 11 percent of GDP in 2009, is excluded from the calculation of average.

**Table 1. Sub-Saharan Africa: Trends in Quasi-Fiscal Deficits of Power Utilities (Percent of GDP, averages unless otherwise noted)**

	2005–06	2009–10
Quasi-fiscal deficit generated by:		
Underpricing	1.1	0.8
Distribution line losses	0.7	0.8
Undercollection of bills	0.2	0.2
Total quasi-fiscal deficit (excluding Zimbabwe)	1.9	1.8
Total quasi-fiscal deficit (median)	1.7	1.7

Source: IMF staff calculations based on data from country authorities, the IMF, the World Bank, and International Energy Agency.

its power sector during the last decade that reduced the QFD by about 0.7 percent of GDP. In any case, these estimates of total subsidy are about three times as large as the levels reported as direct fiscal transfers in the AFR survey (Appendix 1).

SSA countries have made little progress in reducing QFDs (Table 1). The median power sector’s QFD has remained unchanged between 2005 and 2010. A slight reduction in underpricing was mostly offset by increased distribution losses.

### **Affordability vs. Cost Recovery: Is There Room for Raising Power Tariffs to Cost Recovery Levels?**

Power sector reforms to enhance efficiency and reduce losses should help reduce substantially the QFD of power utilities. Average residential tariffs in SSA are already higher (in some cases twice as much) than in other regions of the world, while average per capita incomes in Africa are substantially lower. Therefore, it could be argued that tariff policy is not an effective tool to reduce QFDs because further tariff hikes only lead to lower collection rates and increased distribution losses (e.g., theft). This argument has some truth to it and points to the need to address these operational inefficiencies as part of any credible subsidy reform strategy (this is discussed in detail in Chapter 2). In fact, long-run marginal costs estimated by the World Bank are about 12 percent less than historical costs and as much as 50 percent less in some cases (e.g., Malawi, Cameroon, Botswana, Tanzania) (Briceño-Garmendia and Shkaratan, 2011).

Nevertheless, cost-recovery tariffs can be achieved when combined with better services from power utilities. It is important to note that households and firms spend considerable amounts to deal with intermittent power

supply and shortages (e.g., purchase and operation of petroleum-powered generators). The costs of own generation (by firms) is estimated in the range of US\$0.3–US\$0.7 a kWh—about three to four times as high as the price of electricity from the public grid (Foster and Steinbuks, 2008). These costs are even higher for households.

## Who Benefits from Energy Subsidies?<sup>5</sup>

Fuel and electricity consumption in SSA countries is highly skewed toward higher income households. Available data show that patterns of fuel and energy consumption across households in various income quintiles vary significantly (Table 2). Household survey evidence from nine African countries (Arze del Granado, Coady, and Gillingham, 2012) suggests that poorer households consume directly a much smaller share of the total fuel and electricity supplied. In fact, households in the richest quintile spent on per capita terms close to 20 times more on fuel and electricity than households in the poorest quintile (kerosene is the only exception, with broadly evenly distributed consumption across households). Beside relatively higher incomes, better access to energy resources (particularly electricity in urban areas) contributes to the higher fuel consumption of richer households.

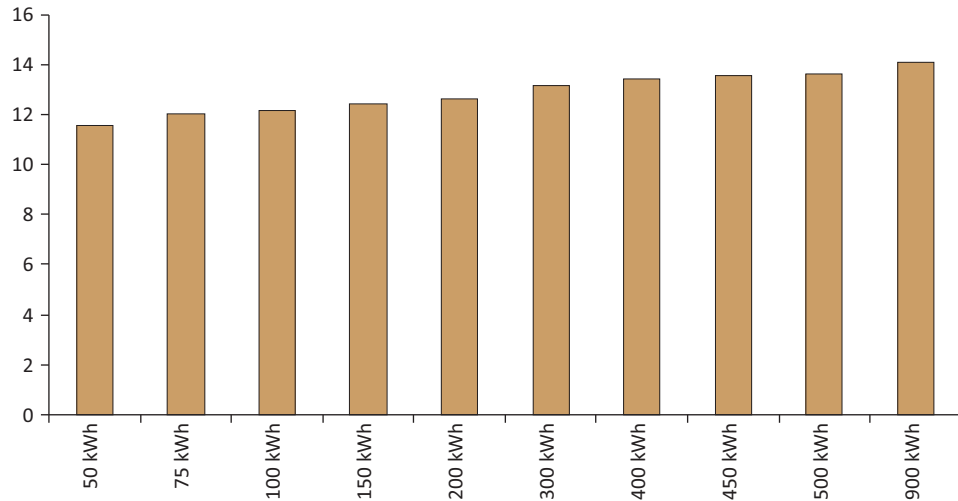
**Table 2. Sub-Saharan African Countries: Per Capita Spending by Household Income Groups (PPP values in 2005 U.S. dollars, sample averages)**

		Q1 (Poorest)	Q2	Q3	Q4	Q5 (Richest)
Spending on diesel fuel	\$ amount	0.3	0.5	0.9	1.3	6.9
	ratio of Q5 to Q1					20.0
Spending on gasoline	\$ amount	0.1	0.4	0.9	1.7	3.0
	ratio of Q5 to Q1					27.4
Spending on kerosene	\$ amount	1.5	1.9	2.0	2.1	2.7
	ratio of Q5 to Q1					1.8
Spending on electricity	\$ amount	0.5	1.3	2.2	3.9	8.9
	ratio of Q5 to Q1					17.0

Countries in the sample are (survey year in brackets): Cameroon (2007), Côte d'Ivoire (2008), Ethiopia (2004), Ghana (2005), Mozambique (2009), Rwanda (2005), Senegal (2005), Uganda (2010), and Zambia (2010).  
Source: World Bank (2012) Africa Pulse Database.

<sup>5</sup> Prepared by Mumtaz Hussain and Clara Mira. This section draws on Arze del Granado, Coady, and Gillingham (2012) and World Bank (2012).

**Figure 10. Sub-Saharan Africa: Effective Residential Tariffs by Consumption Levels (US cents per kWh)**



Source: Briceño-Garmendia and Shkaratan (2011).

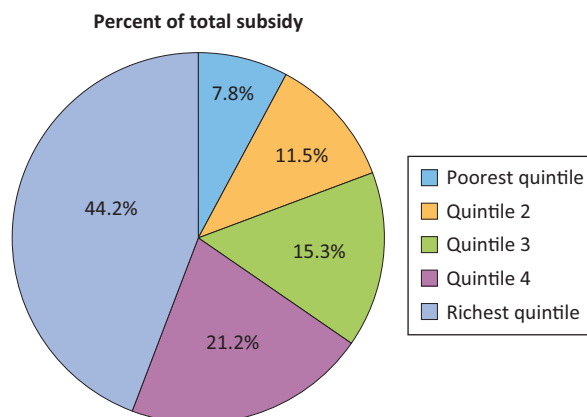
Furthermore, differences in effective tariffs across various electricity consumption levels are small. About two-thirds of sub-Saharan African countries use increasing block tariffs (IBTs) (Briceño-Garmendia and Shkaratan, 2011). However, the progressivity of tariffs is limited in most countries partly because of relatively large fixed monthly charges. This results in rather modest differences in effective tariffs at vastly different levels of electricity consumption by households (Figure 10).

In this context, it is not surprising to find that fuel and electricity subsidies tend to benefit the better off. Because the richer households have higher consumption levels of fuel and electricity than the lower-income households, they capture the majority of the funds allocated to universal subsidies—such subsidies are per unit of fuel or electricity consumption regardless of consumers’ income levels. In sub-Saharan Africa, on average, the households in the top consumption quintile capture about 45 percent of fuel subsidies, while the poorer segments of the population (the bottom 40 percent of households) receive about 20 percent of the subsidy benefit (Figure 11).

If protecting poor and vulnerable groups is a key policy objective, universal subsidy schemes do not do a good job. The evidence suggests that providing 1 dollar of relief to the poorest 40 percent of the population under the universal subsidy policy requires the government to spend 5 dollars, of which about half would accrue to the richest quintile.

However, a subsidy reform implying an increase in energy prices would still have a sizable impact on the poorest segments of the population. For

**Figure 11. Sub-Saharan Africa: Distribution of Benefits from Fuel Subsidies**



Source: Arze del Granado, Coady, and Gillingham (2010).

example, an increase of \$0.25 a liter in fuel prices in SSA countries would reduce, on average, the 40 percent poorest households' real income by 5.7 percent (Table 3). Over half of this purchasing power loss would occur through the indirect effect—pass-through of higher fuel prices into food and transportation costs—reflecting the importance of fuel as an intermediate input in the production process.<sup>6</sup> Such an impact might be even larger if distribution of electricity spending is adjusted for the disparity in the access to electricity. Electricity in SSA countries is skewed to richer households—among the poorest 40 percent of households, this access rate is below 10 percent, whereas it rises to close to 80 percent for the richest household quintile (Eberhard and Shkaratan, 2012). When corrected for this disparity in access, the cost of electricity to low-income households (having access to the grid) rises substantially. For example, an analysis for Burkina Faso undertaken by Arze del Granado, Coady, and Gillingham (2012) suggests that the poorest 40 percent of the population with electricity provision devote, on average, 4.4 percent of their budgets to electricity consumption (rather than the 0.4 percent implied by an analysis including all households regardless of access).<sup>7</sup>

Although the overall impact of a fuel price increase looks similar across income groups, there would be significant variation in the distribution of the

<sup>6</sup> Indirect effects can be calculated through price shifting models, assuming that increases in fuel costs are fully passed to domestic prices (Arze del Granado, Coady, and Gillingham, 2012).

<sup>7</sup> Household surveys also indicate that as much as 60 percent of households at the bottom with service do not pay their electricity bills, compared with about 20 percent of those in the highest consumption quintile (Briceño-Garmendia and Shkaratan, 2011).

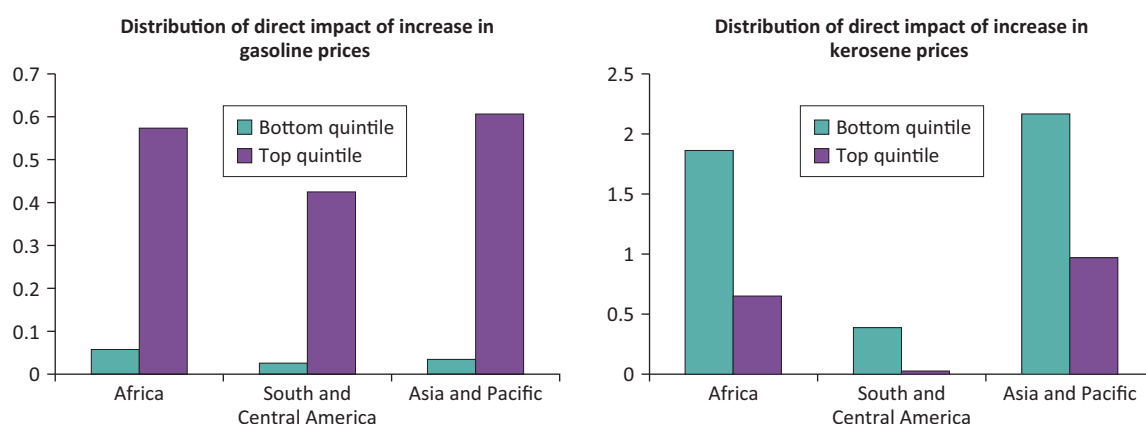
**Table 3. Africa: Total Welfare Impact of Fuel Price Increases per Consumption Quintile (Impact in percent of total household consumption)**

	Household Groups (per Capita Consumption Quintiles)					
	Bottom	2	3	4	Top	All
<b>Total</b>	<b>5.6</b>	<b>5.3</b>	<b>5.3</b>	<b>5.3</b>	<b>5.3</b>	<b>5.3</b>
<b>Direct impact</b>	<b>2.2</b>	<b>2.0</b>	<b>2.0</b>	<b>1.9</b>	<b>1.9</b>	<b>2.0</b>
Gasoline	0.1	0.2	0.3	0.4	0.7	0.3
Kerosene	1.7	1.3	1.2	1.0	0.6	1.2
LPG	0.3	0.3	0.3	0.3	0.4	0.3
Electricity	0.2	0.2	0.2	0.2	0.2	0.2
<b>Indirect impact</b>	<b>3.4</b>	<b>3.3</b>	<b>3.3</b>	<b>3.4</b>	<b>3.4</b>	<b>3.3</b>

Source: Arze del Granado, Coady, and Gillingham (2012).

direct impact across fuel products. In fact, the distributional impact of a price hike for kerosene is substantially different from a gasoline price increase. The direct impact of an increase in gasoline prices has a more pronounced effect on the richest households, while a similar increase in the price of kerosene has a much larger impact on real consumption of households in the bottom quintiles (Figure 12). In other words, the welfare loss from gasoline price hikes is progressive (the richer households get a larger percent decline in purchasing power), and the welfare loss from kerosene price increases is regressive (the price increase reduces the welfare of poorer households to a greater extent). This pattern is broadly similar across the world.

**Figure 12. Distribution of Direct Impact of Increases in Gasoline and Kerosene Prices**



Source: Arze del Granado, Coady, and Gillingham (2012).

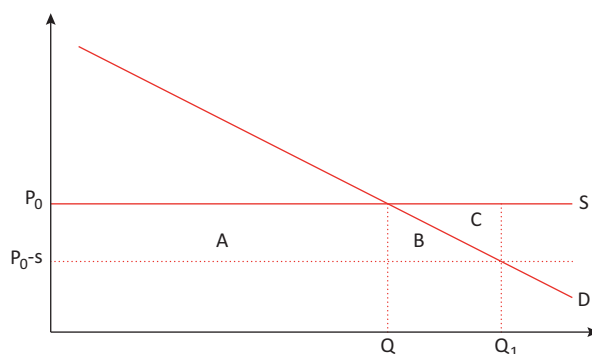
## Energy Subsidies and Economic Efficiency<sup>8</sup>

An important aspect of energy subsidies is their impact on economic efficiency, competitiveness and growth, the environment, and macroeconomic management. Although some countries have rationalized their use of energy subsidies as a way to enhance competitiveness and the development of certain economic activities, this section argues that energy subsidies in their various forms can have a detrimental impact on growth and efficiency by misallocating resources, reducing investment, creating significant negative externalities and unintended distortions, and complicating overall macroeconomic management.

Energy subsidies generate welfare deadweight losses. Figure 13 illustrates the deadweight loss from a fuel subsidy of size  $s$ , under the assumption that the supply of fuel is infinitely elastic, as is likely to be the case for a small economy. The subsidy lowers the market price of fuel and increases the quantity consumed. Note that the increase in consumer surplus (represented by areas A+B) falls short of the subsidy's fiscal cost (A+B+C). The difference (area C) is the deadweight loss of the subsidy.

As shown in Figure 13, the most significant example of misallocated resources owing to energy subsidies is overconsumption of energy owing to distorted price signals. The extent of overconsumption depends on the elasticity of demand, for which cross-country empirical estimates vary widely in the literature.<sup>9</sup> Figure 14 offers some evidence of overconsumption in SSA

**Figure 13. The Deadweight Loss from a Fuel Subsidy**

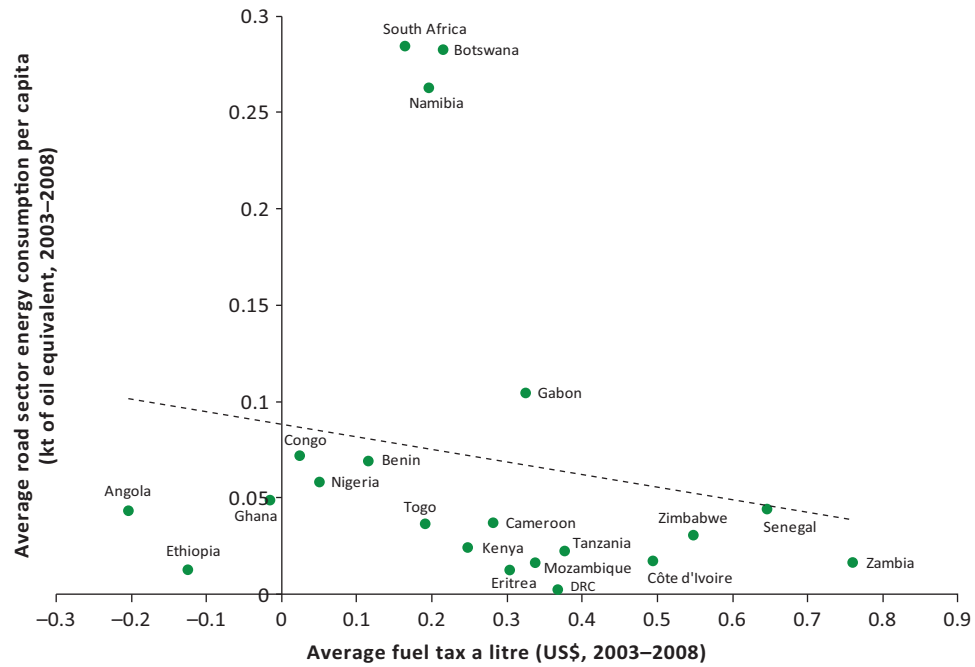


Source: Gupta and others (2002).

<sup>8</sup> Prepared by Farayi Gwenhamo, Slavi Slavov, and Mauricio Villafuerte.

<sup>9</sup> For example, Burke and Nishitateno (2011) study a sample of 132 countries around the world and obtain estimates of the long-run price elasticity of gasoline demand between  $-0.2$  and  $-0.4$ . In contrast, Golombek, Hagem, and Hoel (1995) estimate price demand elasticities of around  $-0.9$  for Organization for Economic Cooperation and Development (OECD) countries and  $-0.75$  for non-OECD countries.

Figure 14. Fuel Taxes vs. Per Capita Road Sector Energy Consumption, 2003–08



Sources: IMF Fiscal Affairs Department (FAD) and World Economic Indicators (WDI) databases.

Note: Fuel taxes (or subsidies) are obtained as the difference between domestic (tax-inclusive) fuel prices and benchmark prices (based on the international price at the nearest international hub plus standardized transportation and distribution costs).

countries in which consumer fuel prices fall short of appropriate benchmark levels. The figure suggests that lower fuel taxes (and correspondingly higher fuel subsidies) are associated with higher per capita energy consumption by the road sector in SSA countries. An additional effect comes from changes in the nature of energy demand: Burke and Nishitaten (2011) and Beresteanu and Li (2011) find that lower gasoline prices induce consumers to switch to less fuel-efficient vehicles. The dynamic effects of overconsumption should also be considered: it leads to faster depletion of nonrenewable resources, necessitating higher prices in the future than would otherwise be the case.

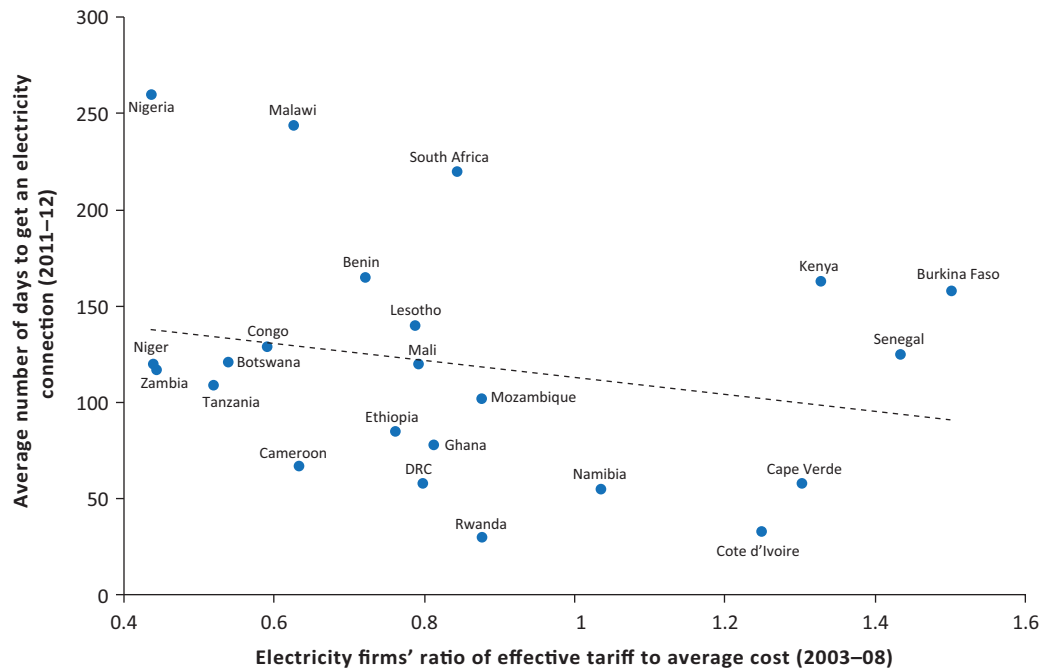
Underpricing and subsidies have negative effects on energy supply through various channels. If the cost of the subsidy is borne by the energy companies, which are forced to consistently sell below cost (including normal returns on investment), this will affect the entire supply chain, both in the short and the long term. Low profitability leads to underinvestment and poor maintenance, and this in turn results in persistent shortages, reduced quality, and deteriorating infrastructure along the entire energy supply chain. Nigeria's and Ghana's dilapidated petroleum refining infrastructure are examples, as



is the huge electricity supply shortage across SSA. While proponents of energy subsidies argue for the need to lower costs to boost competitiveness, inadequate or unreliable supply of electricity has forced customers across SSA to invest heavily in self-generation, raising the effective cost above the subsidized price. In many cases, it is the inadequate supply of electricity rather than its price that weighs most heavily on competitiveness. Indeed, in countries that have undertaken reforms, evidence from surveys shows that customers are willing to pay higher tariffs if better service can be guaranteed. In the AFR survey, 28 countries had frequent or significant electricity shortages (such as load shedding or blackouts), while only 4 had infrequent or insignificant electricity shortages.<sup>10</sup> Figure 15 shows that it takes longer to get an electricity connection (a form of rationing) in SSA countries in which electricity firms cannot recover their costs.

Even if the cost of subsidies is borne directly by the government, the problem of undersupply and inefficiency may not be resolved. First, direct government transfers to refineries and power companies (e.g., to compensate for underpricing) can lead to soft budget constraints and reduce the incentive

**Figure 15. Cost Recovery by Electricity Firms vs. Ease of Getting Electricity**



Sources: World Bank databases.

<sup>10</sup> Seven countries reported frequent or significant fuel shortages, but fuel shortages were not a serious problem in 17 countries (see Appendix 1).

for restructuring and efficiency improvements, including efforts to improve collection rates. Refineries, in particular, tend to be subsidized for a variety of reasons, including job protection and supply security. However, oil refining is a capital-intensive industry (i.e., the number of jobs at stake is small). Relying on poorly maintained refineries might actually reduce the security of energy supplies. Second, subsidizing refineries is also sometimes times justified as a way to reduce fuel prices, particularly in oil-exporting countries. However, the small market size in most SSA countries makes it difficult to achieve scale efficiencies.<sup>11</sup> Third, in oil-exporting countries there might be a misconception about the true cost of producing refined products: crude oil (their main input) is mistakenly valued at its actual production cost, rather than at its opportunity cost (i.e., its export value). Using the former creates an incentive to run inefficient refineries cushioned by the wedge between opportunity and production costs. Finally, subsidizing fuel to lower the cost of thermal power-generating plants may reduce the incentive to explore more economical options for producing power, including regional power pools.

Deficient power infrastructure and shortages dampen economic growth and weaken competitiveness. Escribano, Guasch, and Peña (2008) find that in most SSA countries infrastructure accounts for 30–60 percent of the adverse impact on firm productivity, well ahead of factors like red tape and corruption. Moreover, in half the countries analyzed in that study, power accounted for 40–80 percent of the infrastructure effect. Kojima, Matthews, and Sexsmith (2010) estimate that potential efficiency gains in electricity generation and distribution could create savings of more than 1 percentage point of GDP for at least 18 SSA countries. Calderón (2008) uses simulations based on panel data to show that if the quantity and quality of power infrastructure in all sub-Saharan African countries were improved to that of a better performer (such as Mauritius), long-term per capita growth rates would be 2 percentage points higher. The scarcity of power in sub-Saharan Africa also affects the delivery of social services and the quality of life: without electricity, clinics cannot safely deliver babies at night or refrigerate essential vaccines. Similarly, lack of illumination restricts the ability of children to study at night and fosters crime.

The argument in favor of energy subsidies as a way to foster competitiveness and encourage private investment in certain sectors (e.g., manufacturing) often fails to fully account for the full implications of these policies. Subsidies have to be financed somehow, by either higher taxes or lower spending (including on infrastructure or human capital). High taxes, poor infrastructure, and low stocks of human capital reduce a country's attractiveness to private investors.

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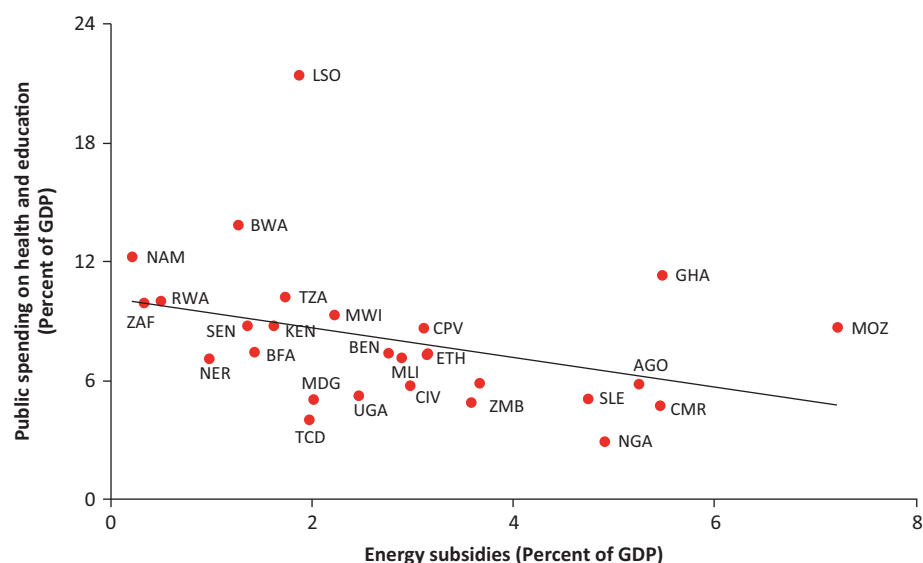
<sup>11</sup> Madagascar and Tanzania are examples of SSA countries that have shut down inefficient refining facilities. See Gillingham, Lacoche, and Manning (2008); and Kojima, Matthews, and Sexsmith (2010).

Energy subsidies might crowd out more productive government spending. Figure 16 shows a negative relationship between fuel subsidies and public spending on health and education. In Nigeria, fuel subsidies exceeded federal capital expenditure by 20 percent in 2011. Ad hoc government interventions in energy pricing can result in heightened uncertainty, which makes business planning more difficult and turns away investors.

Competitive advantages gained through fuel subsidies are likely to be temporary and unsustainable. Because these subsidies tend to be strongly correlated with world prices, some sectors or industries would benefit from the subsidy in the presence of high world prices. However, this advantage would disappear as soon as international prices fall. This is what happened to some (large-scale) resource-based industries (e.g., aluminum, steel) in oil-exporting countries during and after the 1970s oil booms (Gelb, 1988). In addition, even if oil prices were to remain high, those sectors or industries would be vulnerable to the reduction of the subsidies (e.g., because of fiscal constraints).

Subsidies may invite rent seeking and their removal might become politically difficult. Examples include the copper-mining industry in Zambia and the aluminum-smelting industries in Cameroon, Ghana, and South Africa, where the offer of low, subsidized energy prices was meant as a temporary policy to lock in large-scale energy projects. Given the growth in energy demand in these countries, these arrangements are no longer needed and are extremely

**Figure 16. Energy Subsidies vs. Public Spending on Education and Health**



Sources: IMF Fiscal Affairs Department (FAD) database and staff calculation for energy subsidies.

costly but are politically difficult to terminate. Given the potential large benefits from rent seeking, there is also a risk that it encourages corruption that substantially inflates the fiscal costs of the subsidy, as demonstrated by recent revelations of widespread abuses in Nigeria's fuel subsidy regime.

Energy subsidies often misallocate resources to unintended beneficiaries or with unintended consequences. In Burkina Faso, fuel subsidies appear to exist mainly to sustain the truck transport sector, which is cartelized and less efficient than rail. Large foreign-owned hotels in the Seychelles and international airlines in Equatorial Guinea seem to be the main beneficiaries of subsidized fuel. Given that kerosene (typically subsidized for equity reasons) is a perfect substitute for jet fuel, significant amounts of it get diverted for alternative uses. Kerosene might also be mixed with diesel, for which it is only an imperfect substitute, resulting in damage to diesel engines. Fuel subsidies may have significant unintended cross-border spillover effects. The existence of large gasoline subsidies in Nigeria has encouraged widespread smuggling to other countries in West Africa. For example, it is estimated that official gasoline sales accounted for only 10–15 percent of total sales in Benin in 2011. While the informal fuel trade between Nigeria and Benin generates a transfer to the consumers of Benin, the Beninese government lost revenue of about 2 percent of GDP. Energy subsidies might generate perverse labor shifts, given that urban populations tend to be their main beneficiaries. Reduced labor supply in agriculture could lead to higher food prices—this happened in several oil-exporting countries during the 1970s boom (Gelb, 1988). Spending on agricultural infrastructure would be much more productive than energy subsidies in these countries.

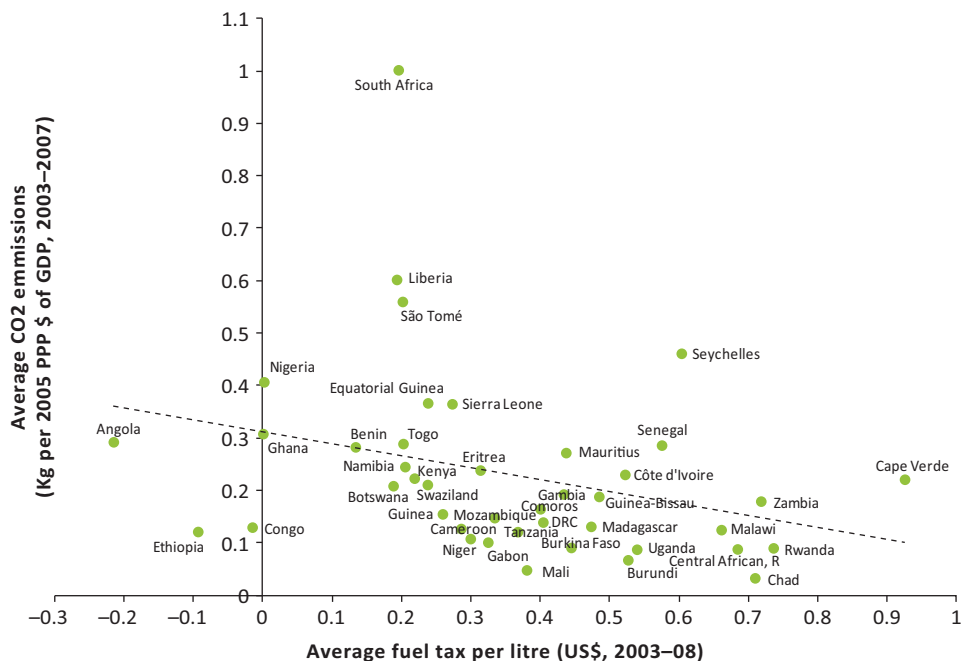
Energy subsidies produce negative externalities and have a significant environmental impact. Some of these externalities could be local: traffic congestion and accidents, road damage, air pollution, and urban sprawl. Their adverse effect on human health and productivity constrains long-term economic growth. These externalities could also be global—emissions of CO<sub>2</sub> and other greenhouse gases contribute to global climate change. Figure 17 suggests that lower fuel taxes (and correspondingly higher fuel subsidies) are associated with higher CO<sub>2</sub> emissions in SSA countries.<sup>12</sup>

Energy subsidies complicate macroeconomic management (beyond their impact on fiscal revenue). Fuel subsidies are procyclical in oil-exporting countries (i.e., they tend to be positively correlated with oil prices). This procyclicality is sometimes hidden, because the fuel subsidies tend to be implicit: they are not included in the budget but instead are offset against oil-export revenue (e.g., in Nigeria). Monetary policy gets more complicated as

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<sup>12</sup> However, it is important to note that SSA countries emit low levels of CO<sub>2</sub>, relative to the rest of the world.

Figure 17. Fuel Taxes vs. CO<sub>2</sub> Emissions



Sources: IMF Fiscal Affairs Department (FAD) and World Bank World Development Indicators databases.

Note: Fuel taxes (or subsidies) are obtained as the difference between domestic (tax-inclusive) fuel prices and benchmark prices (based on the international price at the nearest international hub plus standardized transportation and distribution costs).

well. The introduction of energy subsidies drives the inflation rate down and hides the true stance of monetary policy. If the subsidies are unsustainable, their sudden removal could lead to sudden spikes in prices and negatively affect inflation expectations. Energy subsidies also affect the balance of payments and the exchange rate. The overconsumption of petroleum products induced by subsidies may put pressure on the balance of payments of oil-importing countries and limit the amount of oil available for export in oil-exporting countries.

## Electricity Sector Reform: Lessons and Policy Options<sup>13</sup>

### Introduction

SSA faces chronic power problems, including insufficient generation capacity, low access, poor reliability, and high costs and tariffs. The combined power generation capacity of the 48 SSA countries is about 80 gigawatts, less than that of Spain. Less than 3 in every 10 Africans have access to electricity. Per capita consumption of electricity is extremely low, averaging 40 kWh a month and only 10 kWh if South Africa is excluded. Power is unreliable: 15 percent of installed capacity is not operational because of lack of maintenance of aging equipment, and power outages are frequent. As a result, expensive own generation constitutes a significant portion of total installed capacity. In the Democratic Republic of the Congo and Equatorial Guinea, back-up generators account for half of installed capacity. For West Africa as a whole, back-up generators account for 17 percent of installed capacity. Notwithstanding limited and unreliable supply, power is expensive: the average tariff in SSA is \$0.17 per kWh, about twice that in other developing countries (Eberhard and Shkaratan, 2012).

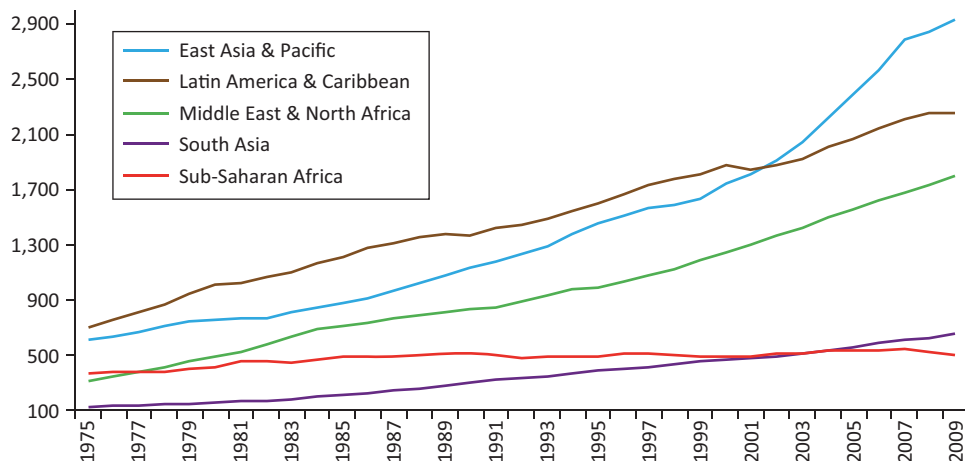
The immediate reason for such shortfalls is underinvestment in the power sector. In 1974–2008, per capita production of electricity in SSA increased only marginally, lagging developments in other developing countries (Figure 18). As a result, although in the mid-1970s power supply in SSA compared favorably with most developing countries, by 2009 it ranked below all other regional groupings.

Power supply in SSA is not only more limited, but tariffs are also higher than in other developing countries (Figure 19). This is mainly due to high costs of producing energy in SSA (Figure 20). Most countries rely on small generation units (that do not benefit from economies of scale) and operate expensive thermal plants, often using heavy fuel oils or diesel rather than cheaper natural gas.

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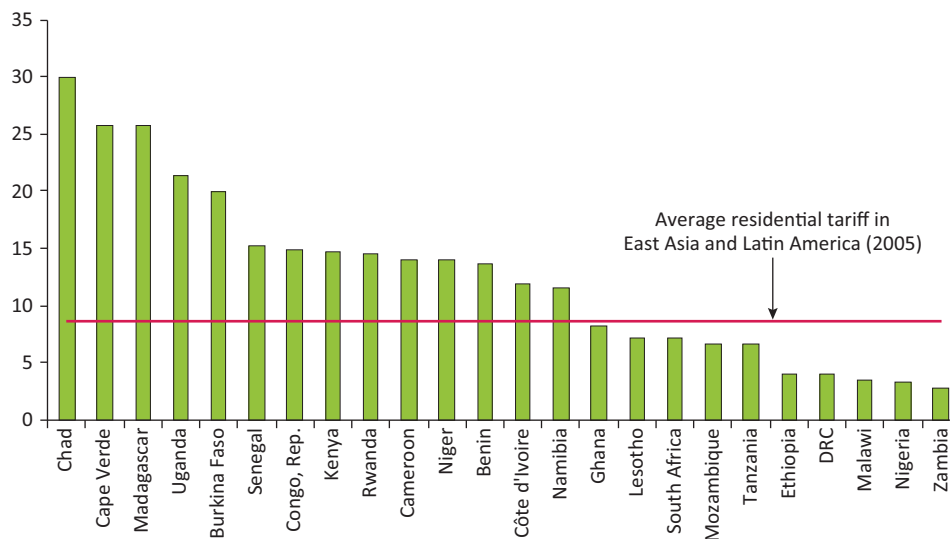
<sup>13</sup> Prepared by Edgardo Ruggiero, Mumtaz Hussain, and Sukhwinder Singh.

**Figure 18. Sub-Saharan Africa: Electricity Production Compared to Other Regions, 1975–2009 (kwh per capita)**



Source: World Development Indicators; and IMF staff estimates.

**Figure 19. Sub-Saharan Africa: Residential Tariffs Compared to Other Regions<sup>1</sup>**

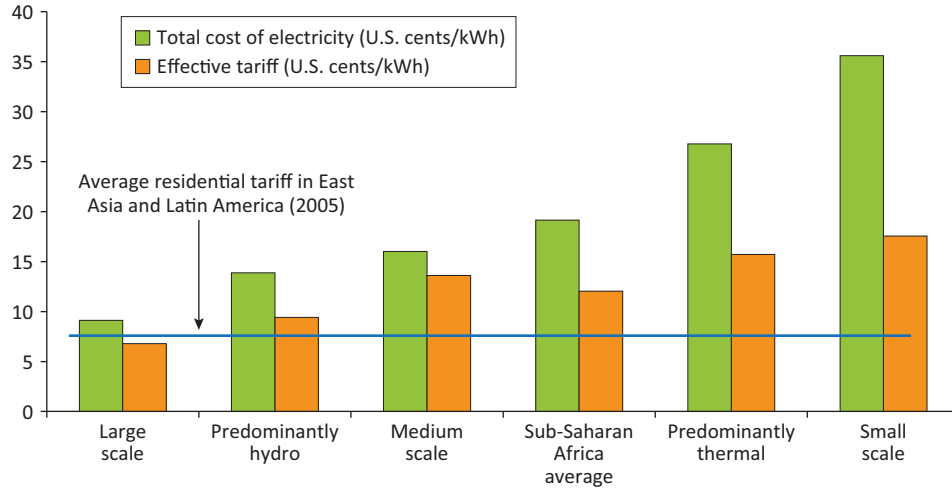


Source: AICD (2010); Briceno-Garmendia and Shkaratan (2011); and IMF staff estimates.

<sup>1</sup> Latest year available, 2001-2008.

Underinvestment in power is, in part, related to subsidies for electricity consumption that have been largely borne by power utilities and prevented cost recovery. As described in Chapter 1, this has been a disincentive for new private sector investment. Insufficient cost recovery has also reduced the capacity of state-owned utilities to properly maintain plants and equipment

**Figure 20. Sub-Saharan Africa: Cost Factor for Residential Tariffs, Compared to Other Regions<sup>1</sup>**



Source: AICD (2010); Briceno-Garmendia and Shkaratan (2011); and IMF staff estimates.  
<sup>1</sup> Latest year available, 2001-2008.

and has left virtually no resources to expand operations and adequately address growing demand.

The objective of this chapter is to draw policy lessons from power sector reforms in Africa. These typically aim at multiple objectives: reducing budgetary costs of energy subsidies; increasing energy supply to meet excess demand; expanding access to foster inclusive economic growth; and making energy more affordable.

Although tariff changes grab headlines, addressing the problem of underinvestment is also heavily dependent on other reforms in the sector. Indeed, given that tariffs are already high in SSA, improving cost recovery for power providers will need to lean more heavily on reducing costs and improving efficiency. The extent of SSA's power crisis demands tackling several policy and institutional challenges to improve the sector's performance and financing. Such challenges include (1) strengthening sector planning; (2) reenergizing reform of public utilities to enhance their technical and operational efficiency; (3) improving access; and (4) expanding regional trade in power. A holistic approach to electricity sector reform, as applied in countries like Kenya and Uganda, can result in important payoffs in terms of increased power supply, expanded access, and enhanced financial sustainability of electricity enterprises (Box 2).

These challenges are all interrelated and must be dealt with simultaneously. Instead, some countries have had piecemeal approaches or fallen into a trap



of false trade-offs, for example, between cost recovery (i.e., the need to increase tariffs) and affordability (i.e., the need to expand access to all). The utilities and the authorities can take several actions to lower subsidy costs and enhance cost recovery while promoting access and enhancing sector efficiency. We explore these actions in the following sections.

### Box 2: Energy Reforms Pay Off in Kenya and Uganda

In early 2000s, both Kenya and Uganda implemented a multitude of reforms aimed at improving performance of the power sector.

- In Kenya, reform efforts culminated in a new energy policy in 2004, substantial increase in power tariffs in 2005 to reflect long-run marginal costs, introduction of an automatic pass-through mechanism to adjust tariffs for changes in fuel costs, and reconstitution of the Electricity Regulatory Commission.
- In Uganda, electricity sector reform included the passage of a new Electricity Act (1999); the establishment of a regulatory agency (2000); and the unbundling of the power utility (2001) and concessioning of its parts (2003–05). In 2006, power tariffs were almost doubled, raising the average effective tariff to US\$.018 per kWh to reflect long-run marginal costs of power.

In both countries, the reforms led to improvements in the electricity sector. Since mid-2000s, power generation increased steadily, distribution losses declined, and the number of customers served by grid-supplied power increased substantially.

- Power supply increased. The private sector's involvement in power generation combined with increased tariffs led to a substantial boost in power supply (see table). In the posttariff increase period, average annual increase in power supply in Kenya was over 5 percent and in Uganda over 9 percent.
- Distributional efficiency improved. Distribution losses of power have steadily fallen and bill collection rates improved. In Kenya, line losses declined from 18 percent in 2005 to 16 percent in 2011, and the collection rates increased from 85 percent of total power bills in 2005 to 99 percent in 2011. Efficiency gains were even stronger in Uganda: distribution losses declined from 38 percent in 2005 to about 27 percent in 2011, and collection rates increased from 80 percent of total power bills in 2005 to 95 percent in 2011.
- Access to grid-supplied power expanded. After limited progress early on, the number of customers with access to grid-supplied power in Uganda increased by 41 percent between 2006 and 2011. In Kenya, access increased by nearly 140 percent between 2005 and 2011.

**Box 2: (continued)**

- Progress on reducing quasi-fiscal costs was mixed. In Kenya, tariff increases in 2005 combined with the automatic price adjustment mechanism, and improved efficiency helped eliminate quasi-fiscal costs by 2009. In Uganda, notwithstanding efficiency gains, the quasi-fiscal deficit of power sector increased steady until 2011 because of higher fuel costs and lack of adjustments in power tariffs. In January 2012, however, tariffs were raised to the cost recovery levels and a pass-through mechanism to adjust tariffs in response to variation in generation costs is being developed.

**Table 1. Uganda and Kenya: Post-Reform Performance of Power Sector**

	2005	2006	2011	2012 <sup>c</sup>	Improvement since reforms <sup>1</sup>	
					Cumulative change (Percent)	Average annual change (Percent)
<b>Uganda</b>						
Electricity supplied (GWh)	1,741	1,503	2,387	2,477	59	9.3
Electricity billed (GWh)	1,075	990	1,732	1,886	75	11.2
Distribution losses (percent of total power)	38.3	34.1	27.5	n.a.	-20	-4.4
Collection rate (percent of total bills)	80.0	84.0	95.3	n.a.	13	2.5
Number of customers (in thousands)	292	298	420	459	41	6.8
Of which: industrial customers (in thousand)	n.a.	1.0	1.8	2.1	82	12.0
Quasi-fiscal costs (percent of GDP)	1.6	1.9	2.6	0.7	...	...
<b>Kenya</b>						
Electricity supplied (GWh)	5347	5697	7303	n.a.	37	5.2
Electricity billed (GWh)	4379	4580	6123	n.a.	40	5.6
Distribution losses (percent of total power)	18.1	19.6	16.2	n.a.	-11	-3.9
Number of customers (in thousands)	735	802	1753	n.a.	139	14.5
Quasi-fiscal costs (percent of GDP)	0.6	0.6	0 <sup>2</sup>	n.a.	...	...

Sources: For Uganda, Electricity Regulatory Agency's Electricity Sector Performance Report (2012) and Ministry of Energy's Energy and Mineral Sector Performance Report (2011). For Kenya, National Energy Policy (2012).

<sup>1</sup>For Kenya, the changes are calculated between 2005 (major reform year) and 2011; for Uganda, the changes are calculated between 2006 (major reform year) and 2011.

<sup>2</sup>Data is for 2009.

It is important to note that each country is different, and the appropriate reforms will be a function of the country's characteristics. For countries with much higher costs owing, for example, to geography, small thermal systems, or small population size, reforms may need to focus on regional solutions. For example, in Burkina Faso, the authorities plan to focus their investment on transmission to increase network capacity through imports. If the main issue is the extent of technical or commercial losses (e.g., Ghana or Sierra Leone), actions should target the engineering and commercial aspects of service delivery. If the main issue is exposure to weather shocks (if the country relies heavily on hydropower, e.g., Uganda), then “reenergizing” power pools would certainly figure prominently in any strategy to bring production costs down—or reduce outages. Also, any country relying on hydropower will have to invest in transmission to allow heavy seasonal power loads to be efficiently routed through the system.

## **Power Planning and Institutional Structure**

### **Power Planning**

Power planning is essential for successful reforms in the electricity sector, notably, lower costs and enhanced access and service quality. Much reform in SSA's power sector has been piecemeal, lacking a comprehensive plan. Power planning is the process of projecting the yearly energy balance of a country in the medium to long term to optimize the development of the sector. In a nutshell, power planning explores least-cost options to meet projected demand. The planning process enables policymakers to focus on bringing down the long-run marginal cost via the cheapest option, be it domestic or external (e.g., participation in power pools). For most SSA countries, a critical issue is to identify economies of scale.

Effective planning involves strategic decisions in a number of areas. Important decisions cover (1) the domestic production mix (fuel oil, coal, hydro, etc.); (2) private sector participation in generation, which depends on pricing policy and regulatory capacity; (3) load planning: harnessing supply during the rainy season and providing alternative supply during the dry season; (4) financial planning: quantifying financing gaps and identifying the mix of financing, including donors; (5) off-grid options for expanding access in areas where expansion of the grid is prohibitively costly; and (6) regional solutions, including participation in power pools or enhancing integration in regional markets.

### **Institutional Arrangements**

The choice of institutional organization should be one that creates incentives to enhance efficiency, given the country's specific conditions.

The focus of early electricity reforms in SSA was on unbundling and privatization, but this has not been a panacea.<sup>14</sup> Unbundling has the advantages of separating the natural monopolies in transmission and distribution from the naturally competitive stage of energy generation. But unbundling vertically integrated energy utilities only makes economic sense for countries large enough to support multiple generators operating at an efficient scale, which excludes most countries in SSA (Besant-Jones, 2006).<sup>15</sup>

Thus, a strong case can be made for a hybrid model. Countries with excess energy demand—a standard condition in SSA—should consider increasing installed capacity by removing the monopoly power from generation and creating incentives for private participation. In fact, hybrid power markets—with the incumbent state-owned utility acting as the single buyer of electricity from Independent Power Producers (IPPs)—have become the most common industry structure in SSA.<sup>16</sup> This approach is appealing particularly for LICs and fragile states, where the institutional and organizational changes required by unbundling would stretch thin local capacities. A key issue in hybrid markets is how to foster competition and manage system growth. The prevailing single-purchaser model could be revised to allow more flexibility for IPPs to sell directly to large customers as well as to the national utility.

## **Enhancing Efficiency, Reducing Costs, and Raising Revenue**

Enhancing the efficiency of utilities should be a priority, preferably to be contemplated before tariffs are increased. As described in Chapter 1, electricity companies in SSA typically present huge inefficiencies, both in terms of technical and commercial losses (see below). In the median utility, payment is received for only half of all electricity generated (Eberhard and others, 2008). The main message is that utilities should define action plans focused on achieving sustainable quality in electricity supply, reducing losses, and increasing collection rates.

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<sup>14</sup> Uganda unbundled generation, transmission, and distribution. Kenya separated generation (KenGen) from transmission and distribution (KPLC). Ghana has unbundled transmission and has a separate distribution company. Nigeria has technically unbundled, but has not yet separated entities from the umbrella holding company.

<sup>15</sup> Thirty-three out of 48 countries have a total installed capacity of less than 500MW, and 11 have an installed capacity of less than 100 MW.

<sup>16</sup> Almost half of medium- to long-term power sector transactions in SSA involving the power sector are IPPs.

### **Improving Operational Efficiency**

A priority action for electricity utilities is to put in place information management systems (IMS) to facilitate management of business operations and monitoring the performance of electricity companies. IMS are used by several state-owned electricity companies in SSA, with Kenya Power and Lighting Company (KPLC) taking the lead.<sup>17</sup> There are no significant technical or commercial barriers to the introduction of IMS. The main barrier arises from the strong reluctance of managers and staff of monopolistic utilities. A lack of transparency in management and operations is the main factor allowing corruption and operational inefficiencies (e.g., overstaffing).

Tariff regulation can be designed to establish incentives to improve efficiency of public and private electricity distribution companies. Given the already high tariffs in SSA, it is important to ensure that tariff increases are not used to cover up and perpetuate inefficient business practices. Multiyear tariffs can be based on revenue inclusive of an allowance for losses. If the company manages to operate with lower losses than allowed in the formula, it keeps the difference as an additional profit until the next tariff review.<sup>18</sup> If the company fails to achieve the loss reduction, the gap between the allowed and the actual losses has to be covered by the company. This system has been used extensively by reforming countries in Latin America and the Caribbean and was extremely effective in Argentina, Chile, and El Salvador (Antmann, 2009). Several countries in sub-Saharan Africa, such as Cameroon, Uganda, and Kenya, have also adopted such a regulatory regime.

### **Reducing Costs and Demand Management**

Technical and commercial losses, which are important components of costs, are usually under the control of the management of utilities. Technical losses are an engineering issue and consist mainly of power dissipating through transmission and distribution lines, transformers, and measurement systems. Commercial losses are caused by theft, nonpayment, and errors in accounting and record keeping. Thus, they mainly result in loss of revenue (see below).

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<sup>17</sup> IMS are used by the following state-owned electricity companies: KPLC in Kenya (CMS, IRMS, ERP); ZESCO in Zambia (CMS, IRMS, ERP); ZETDC in Zimbabwe (CMS, IRMS); UMEME in Uganda (CMS, IRMS); EEPKO in Ethiopia (CMS); and EAS Sonel in Cameroon (CMS). EMD in Mozambique may install IMSs in 2013.

<sup>18</sup> In a state-owned enterprise, managers could receive a portion of the additional profits.

Technical losses are difficult to address without adequate and centrally monitorable energy mapping—i.e., the measurement of the energy flows in the system. Although IMS are an integral part of mapping energy use, in undermaintained and underinvested systems or when new investments come on board, mapping might require new investments. These investments tend to enjoy high internal rates of return and enhance service quality, including by reducing loan shedding. The improvement in service quality saves money to businesses and households and establishes a customer base with a stake in the improved efficiency of the utility.

An integral part of any strategy to reduce operation costs is demand management to maximize efficiency in electricity supply. Promotion of energy-saving solutions for consumers can have a significant positive effect. For example, utilities in SSA are providing free compact fluorescent bulbs (CFLs), which have helped reduce demand and costs in Cape Verde, Ethiopia, Malawi, Uganda, and Rwanda.<sup>19</sup> Also, nongrid options often can provide cheaper and faster alternative solutions to expanding access through grid expansions (see below). The human geography of SSA, with large percentages of the population living in rural areas—often in small settlements—makes universal access through grid expansion prohibitively expensive. However, for nongrid options to succeed, they need to be integrated in power planning, and a supportive regulatory environment for small-scale off-grid operators must be established.

### **Enhancing Revenue**

A revenue recovery and protection plan (RRP) should be a primary tool to improve the utility's financials. The plan should first target “high-value” large customers, ensuring that all the energy consumed by this segment is metered, billed, and collected in a sustainable manner.<sup>20</sup> The RRP requires investment in metering and communication devices and in software to process and analyze the data and, importantly, the creation of a specialized unit within the utility to manage the project, staffed with skilled personnel with high integrity.<sup>21</sup> The systems and procedures developed for “high-value” customers

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<sup>19</sup> To partially meet a sharp demand increase related to rapid economic growth and the ongoing electrification program, Ethiopia distributed 5.3 million CFLs. While one CFL cost \$0.83, it saved \$3.5 per month to the sector. When half of the CFLs were distributed, the load reduction was about 80 MW (equivalent to total capacity in Sierra Leone and a multiple of Liberia's capacity). The electricity utility CEET in Togo started in 2012 the distribution of 400,000 CFLs to 100,000 households on a pilot basis.

<sup>20</sup> This group would comprise all consumers supplied by high- and medium-voltage lines and the largest consumers connected to low voltage. The group usually comprises large industrial and commercial enterprises, particularly mining, and state-owned enterprises and public institutions.

<sup>21</sup> This approach is akin to the focus on large taxpayers through the creation of a Large Taxpayer Unit, to increase tax collection and drive tax administration reform.

should then be adapted and gradually extended to medium- and low-value customers (Antmann, 2009). In this context, prepaid electricity has proven a useful tool to promote payment discipline and improve collection rates in low-income customer segments (e.g., Nigeria, Kenya, Uganda, Senegal).

At low capacity, particularly in fragile states, bill collection could be outsourced as a concession.<sup>22</sup> Collection is a distinct function from metering and billing, and utility companies may not be particularly equipped for it. For example, the National Power Authority of Sierra Leone issued a concession to a local commercial bank, resulting in higher collection rates in 2011 and avoiding the hiring of collection staff.

## Tariff Design, Changes, and Targeting

Tariff design often has to meet competing objectives. Sound pricing of power is critical to meeting the huge investment needs of the sector. At the same time, policymakers need to ensure they meet equity and affordability objectives. Marrying all these goals is challenging, and few countries have been able to achieve all these objectives simultaneously. Chad, Mozambique, Rwanda, and Uganda have done well on cost recovery but poorly on affordability and equity, while South Africa, the Democratic Republic of Congo, Tanzania, and Zambia have fared well on the social objectives but have not been able to achieve cost recovery (Briceño-Garmendia and Shkaratan, 2011). Nevertheless, other country experiences, such as the progress in Kenya, indicate that it is possible to make substantial progress in both cost recovery and affordability.

There is considerable scope to achieve subsidy savings without compromising targeting. The most common electricity tariff regime is based on consumption (increasing block tariffs or IBTs), where consumers face higher unit prices on higher blocks of consumption.<sup>23</sup> However, IBT regimes have been implemented with a variety of flaws. In many cases, they tend to be highly regressive because consumption in the first block is subsidized even for those with higher total consumption and income. In addition, although in some countries the size of the first—or lifeline—block seems reasonable given subsistence consumption (e.g., 15 kWh in Uganda), in others it would appear very large (e.g., 300 kWh in Ghana and Zambia) (Briceño-Garmendia and Shkaratan, 2011). In some countries, block prices increase too slowly with higher volumes. Thus, cost recovery is compromised even for higher blocks,

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<sup>22</sup> Metering and billing should remain functions of the utility. Where billing is too costly, for example, in poor areas with no metering, transaction costs can be reduced by assuming a minimum level of consumption per household (i.e., a fixed volume under a lifeline band).

<sup>23</sup> Pricing for nonresidential consumers is typically based on linear tariffs, and the regime is more complicated than for residential consumers and includes fixed, demand, and volume charges.

and better-off households benefit from the subsidies. Some countries also duplicate the lifeline block with social tariffs. A more efficient and progressive design is the volume-differentiated tariff (VDT) where consumption above a threshold leads to a higher price on all consumption. The VDT is an effective method to efficiently target lifeline blocks, thus reducing costs associated with subsidy schemes for the poorest (e.g., Cape Verde). This requires progress in metering, which remains an important challenge in most SSA countries. Regardless of pricing mechanism, correct calibration of block sizes and associated price levels requires a good knowledge of consumption patterns derived from Household Expenditure Surveys. More broadly, there are alternatives to consumption-based targeting that perform considerably better, such as geographic targeting (e.g., Liberia) or means testing.

More recently, emphasis has moved from subsidizing tariffs to subsidizing connections. Surveys show that prohibitive connection costs (e.g., around \$1,000 in Liberia) are the main factor preventing people from accessing grids. Meanwhile, “willingness to pay” analysis confirms that households are often willing to pay for electricity, because they would be saving the expense of alternative and less convenient energy sources (e.g., Ethiopia). Subsidization can take different forms, including interest-free loans (e.g., Kenya) or deferred payments by installments (e.g., Liberia), broadly matching the savings from switching from expensive energy sources to the grid.<sup>24</sup> In fact, expanding the customer base in areas close to the main lines can make financial sense for utilities, because it may improve the ratio of paying to nonpaying customers with limited infrastructure investment (e.g., Liberia, Kenya).

Other issues in tariff design merit attention. Special pricing of power to commercial and industrial consumers is important given they often account for one half or more of revenue. Special tariffs are sometimes provided to large electricity users, such as large industrial and mining customers, and are not reflected in the general tariff structure, or even in estimates of the subsidy (e.g., Copperbelt Energy Corporation in Zambia). Originally intended to guarantee minimum demand to support the development of large power projects, they now impose a significant fiscal cost given competing demands, some from more competitive enterprises.

## **Access**

Only 30 percent of the population in SSA is connected to the grid (International Finance Corporation, 2012). Africa is thus home to the world’s largest off-grid population: approximately 590 million people and more than

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<sup>24</sup> The interest-free loan contributed to doubling the customer base in Kenya from 800,000 to 1,600,000 in the five years since 2006.



10 million microenterprises have no connection to their national electric grid (International Energy Agency, 2011). Power plans must thus deal with the unavoidable: universal access to the grid is decades away for most countries in SSA. Large and dispersed rural populations make grid expansion costs prohibitive. But coverage in urban areas is also limited, particularly in poor neighborhoods, often because of affordability issues.

Over the last decade, several countries have established special-purpose agencies and funds for rural electrification. On average, greater progress in access in rural areas has been made in countries with rural electrification agencies, especially if supported by dedicated funds.<sup>25</sup> Countries with higher urban populations also tend to have higher levels of rural electrification, because urban populations tend to subsidize rural electrification.

Several SSA countries have implemented rural electrification programs to enhance access outside the main cities (e.g., Mali, Box 3; Kenya, Ethiopia, Liberia, Rwanda, Uganda). Given SSA's demographics, expanding the grid to rural areas would be prohibitive. However, greater access to power is still a key to human and economic development in rural areas. Thus, several countries have set up program and institutions providing alternative solutions to power supply.

### **Box 3. Mali: Rural Electrification Program Succeeds in Expanding Access**

Mali succeeded in increasing rural electrification through off-grid solutions and private sector participation. In rural areas of Mali, only around 13 percent of the population could access electricity in 2009. Most rural households thus meet their lighting and small power needs with kerosene, dry cells, and car batteries. More than 80 percent of Malians use wood or charcoal for cooking and heating. These sources of energy cost about \$1.5/kWh, more than 10 times the price from the grid. To address these problems, the government established a rural electrification agency and a Rural Electrification Fund aimed at providing partial start-up capital for private operators of mini-grids. The project fostered local private sector participation. As of May 15, 2010, 43,311 off-grid connections for households and public lighting provided electricity to about 650,000 people. In addition, about 803 public institutions, including 172 schools and 139 health centers, received off-grid access. With the installation of multifunctional platforms by local operators in 64 communities, resulting in 7,200 connections as

<sup>25</sup> Half the 40 countries in the World Bank's Africa Infrastructure Country Diagnostic (AICD) sample have rural electrification agencies, and more than two-thirds have rural electrification funds (Eberhard and others, 2011).

<sup>26</sup> Multifunctional platforms appear in Togo's latest draft Poverty Reduction Strategy Paper (PRSP).

**Box 3. (Continued)**

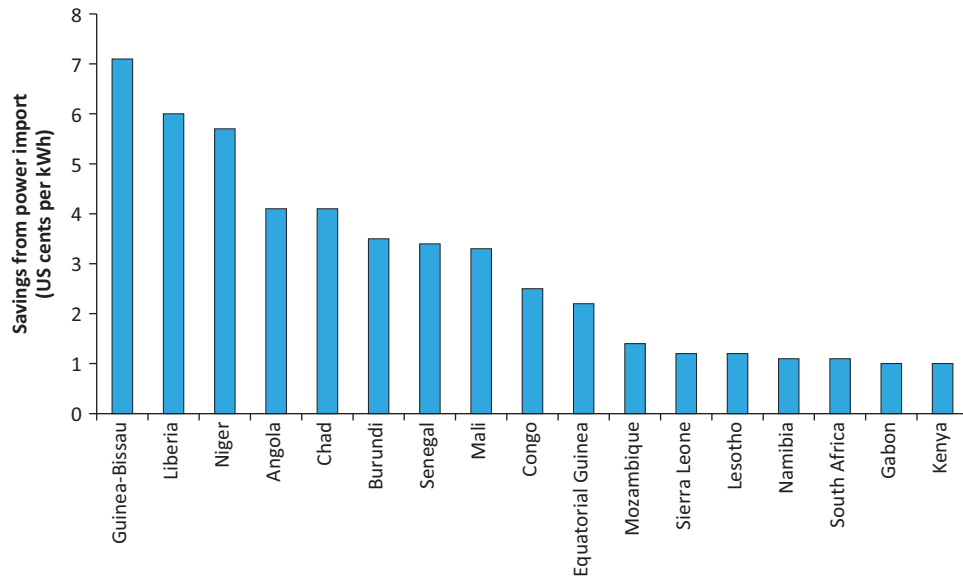
of mid-2011, numerous business opportunities were created. The platforms are diesel motors that combine electricity production with other services such as milling, husking, pumping water, charging batteries, running lights, and powering tools.<sup>26</sup> The electrification program also fostered the use of renewable energy: in six years, more than 7,926 households and 500 institutions were connected to solar systems (Eberhard and others, 2011; World Bank, various years).

**Regional Electricity Trade**

Cross-border trade in power has the potential to considerably reduce the cost of energy supply (Figure 21). Depending on the country and its neighbors, the cost of kWh could be reduced from US\$0.01 to US\$0.07 by importing power at prices below the domestic cost of production. However, the gains from trade could be much larger, because exporting countries could exploit economies of scale and importing countries could abandon expensive small-scale options.

The potential for trade is large, because resources for energy generation are unevenly distributed. Oil and gas reserves are in the Gulf of Guinea and

**Figure 21. Sub-Saharan Africa: Potential Savings from Cross-Border Power Trade**



Source: Foster and Briceño-Garmendia (2010).

Sudan, Ethiopia, Chad, Mozambique, Namibia, and Tanzania; hydropower mostly in the Democratic Republic of the Congo and Ethiopia; coal deposits in South Africa; geothermal energy in Kenya, Ethiopia, and Djibouti; and wind power potential in Southern Africa.

However, the 43 countries participating in the four African power pools have generated less trade than initially hoped.<sup>27</sup> Although a limiting factor has been that few African countries have excess supply to trade, power pools could be more successful with increased investments in grid interconnections, a legal framework for cross-border electricity exchange, and mechanisms for dispute resolution.

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<sup>27</sup> The membership of the power pools is as follows (date of establishment in parenthesis). Southern Africa Power Pool (1995): Angola, Botswana, the Democratic Republic of the Congo, Lesotho, Mozambique, Malawi, Namibia, South Africa, Zambia, and Zimbabwe. Nile Basin-East African Power Pool (2005): Burundi, Djibouti, Egypt, Ethiopia, Sudan, Rwanda, Kenya, Tanzania, and Uganda. West African Power Pool (2000): Benin, Burkina Faso, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo, Central African Power Pool (2003): Cameroon, Central African Republic, Chad, Republic of Congo, Equatorial Guinea, and Gabon.

## Lessons Learned from Attempts to Reform Energy Subsidies<sup>28</sup>

Although the economics make a compelling case for subsidy reform, experience shows that political constraints have often prevented or derailed reform. Understanding the political economy behind stalled reform becomes critical for maximizing the probability of a successful reform strategy. Governments themselves may be resistant to change, given that subsidies are highly visible and broad based. Where there is commitment, challenges arise from the entrenched interests of those benefiting from the status quo. Moreover, the political feasibility of reform is shaped by an environment where electricity services are poor, social programs to compensate for subsidy removal are weak, and governments may lack credibility on the effective use of subsidy savings. Despite these challenges, some countries have made a lot of progress in managing the political challenges of reform.

This section draws lessons from the case studies on electricity and fuel reform experiences described in the supplement to this paper, with a focus on laying out elements for a successful subsidy reform. It also draws on fuel subsidy reforms in Senegal (Laan, Beaton, and Presta, 2010), India (Shenoy, 2010), Indonesia (Beaton and Lontoh, 2010) and Brazil (de Oliveira and Laan, 2010). This section, therefore, starts with a brief review of reasons behind the prevalence of energy subsidies and the difficulties of removing them. The main lessons of the case studies follow.

### Why Are Energy Subsidies So Attractive and Difficult to Remove?

The prevalence of fuel and electricity subsidies can be linked to a variety of reasons, some of which are common to both petroleum-importing and -exporting countries:

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<sup>28</sup> Prepared by Trevor Alleyne and Christian Josz.

- *A desire to avoid the transmission of price spikes to the domestic economy.* This can be an understandable response to sharp increases in world petroleum prices deemed to be temporary. Evidence shows, however, that shocks to petroleum prices and petroleum products can be quite persistent. Therefore, fuel subsidies can become long lasting.
- *Energy subsidies are a readily available fiscal tool or instrument, requiring little administrative capacity.* Subsidies afford governments the ability to provide relatively easily a highly visible benefit for all its citizens. This is particularly the case in low-income countries, where other mechanisms of providing (targeted) social welfare benefits to the population may be limited; and, given short time horizons, governments may lack the incentive to develop the capacity to design and administer other more efficient (and equitable) means of providing benefits.
- *A desire to expand the population's access to energy products.* This would be particularly the case with electricity, which, as examined in the previous sections, can be quite costly to produce in SSA. This argument has also been used to lock in large-scale energy projects (e.g., Zambia, Cameroon).
- *Energy subsidies offer a way to avoid addressing key structural problems in energy companies, particularly state-owned ones.* Admittedly, structural and governance problems, both in electricity companies and fuel refineries, take time to be tackled, making transfers from the government an easy fix that in many cases tends to be protracted.

Fuel subsidies are especially prevalent in oil-exporting countries. While the rationale behind these subsidies can be similar to that of oil-importing countries, oil-exporting countries have more resources to finance them. In fact, and in contrast to oil-importing countries that may encounter severe financing problems when international oil prices are high, the governments of oil-exporting countries tend to have ample oil revenue to finance the subsidy. The availability of financing, compounded by the lower institutional quality empirically observed in oil-exporting countries (International Monetary Fund [IMF], 2012a), would explain a higher reliance on government-financed energy subsidies. In addition, energy subsidies in oil-exporting countries are sometimes the result of a desire to establish resource-based industries (with higher value added). The subsidies would allow them to kick-start those industries or make them competitive in an environment of high energy (mostly fuel) prices.

Once in place, subsidies are difficult to remove. As discussed in Chapter 1, although benefits are skewed mainly to the rich, the poor also receive significant benefits; so the removal of energy subsidies, without any support system to replace them, may not be politically feasible. In addition, the longer

the subsidy has existed, the more entrenched the opposition to reducing it, especially if the benefits of the subsidy have been capitalized, for example, adoption of energy-intensive technologies and equipment, or purchase of cars, taxis, refrigerators, and televisions. As a result, in many cases, it is the urban middle class, represented by influential trade unions, that often voices the strongest opposition to the removal of subsidies. In low-income countries, these groups are likely to have significantly less income than their counterparts in more advanced countries and hence are less able to maintain consumption of the energy-intensive items once subsidies are removed.

Policymakers have also raised concerns about a possible loss of competitiveness in the short run if energy subsidies are reduced. Concerns about a possible loss of competitiveness tend to be particularly relevant for electricity usage. Electricity prices are already quite high in SSA, increasing the costs of domestic production relative to imported products. Therefore, further increases in electricity prices would exacerbate this disadvantage. Temporary assistance to energy-intensive traded sectors may be required to allow a transition to a more energy-efficient input mix, as was done in Iran (Guillaume, Zyteck, and Farzin, 2011). More fundamentally, however, subsidy reform must not only focus on raising tariffs but also on ensuring that supply and quality of service are improved. Indeed, the fear of tariff hikes may be overblown, because consumer surveys in a number of countries indicate a willingness to pay higher tariffs for better service, especially when the higher tariffs might still be lower than the costs of self-generation of power incurred by many consumers. The link between fuel subsidies and competitiveness is more tenuous. As mentioned earlier, fuel subsidies could create artificial competitive advantages that would disappear if fuel prices fall. As argued in Chapter 1, in the medium term, subsidy reform can help to boost competitiveness by freeing up resources for productive investment and eliminating distortions in price signals.

Policymakers have also worried about the impact of subsidy reform on inflation. The extent to which higher energy costs result in a persistently higher price level will depend on the strength of “second-round” effects on wages and the prices of other inputs. These second-round effects can be contained with appropriate monetary and fiscal policies that help anchor inflationary expectations. Subsidy reform helps support an appropriate fiscal policy response by reducing budget deficits and helping contain demand pressures on prices.

In petroleum-exporting countries, the task of removing fuel subsidies has proven especially difficult. There is often an expectation by the population that it should consume petroleum products at below international market prices (even where refined products are imported) as a form of distributing the oil wealth. In addition, as oil-exporting countries in SSA have lower

institutional quality levels relative to other countries in the region and in the world, their citizens might not have much confidence that the government will wisely use savings from subsidy reform. When Niger became a producer of refined fuel products in 2012, it set the fuel prices below international levels. The ex-refinery prices for domestic consumption were fixed for the first six months of operation of the new refinery and were supposed to be linked to international prices after that period, but the prices were not changed.

A number of reasons make the subsidy issue so knotty. First, it is difficult to convey to the public the rationale for products to be sold at their opportunity cost and not their cost of production. However, as argued in IMF (2012b), oil assets, when extracted, ought to be converted into another asset (real, human, or financial). In this process, to make as many resources as possible available for investment, oil revenue should be maximized, which would include selling oil at market prices. The decision to subsidize oil or oil products ought to be made separately, with the costs made explicit in the budget and evaluated just like all other expenditures, and should be de-linked from whether or not the country is an oil producer. Second, in many cases, the subsidy is implicit, absorbed in the revenue of the state oil company, and thus the subsidy costs are not well understood by the population. Third, on the side of the government, the subsidy costs, although potentially high, are usually affordable.

## **A Strategy for Energy Subsidy Reform**

Despite the difficulties encountered, the experiences of various sub-Saharan countries point to key actions that appear to be necessary for a successful reform. In designing the reform strategy, detailed research and consultation with stakeholders have been crucial. At the implementation stage of the reform, appropriate timing, a sound public communications strategy, and well-targeted compensating measures facilitated public acceptance of reforms. Finally, although many countries have experienced difficulty in sustaining reforms, a number of actions and reforms can help ensure the durability of energy reforms.

### **Undertake Comprehensive Research**

The implications of energy subsidies are typically not well known, particularly by the general public. As argued by Victor (2009), subsidies survive in part because the groups that bear their burden are unaware of the cost they are paying. Moreover, a lack of information makes it difficult to pursue an informed debate. Developing a reform plan requires being able to explain the rationale for presumably taking away a benefit that has been enjoyed by a significant and politically powerful segment of the population. To properly

make the case for reform, research will be important to determine the cost of subsidy, including the nonfiscal costs; how benefits are distributed; and the likely effects of removal. Household income and expenditure surveys and national accounts data should be critical information sources, as well as willingness-to-pay analyses (particularly for electricity consumption). In Uganda, a World Bank report noted that average coping costs for intermittent power supply (i.e., including the costs of self-generation) as well as residential consumers' willingness to pay for improved service was quite high, providing reform planners with valuable information on the public's possible tolerance for tariff increases. The results of the research should be disseminated publicly to improve understanding of the rationale for reform.

Availability of information on size, distributional incidence, and economic impact of energy subsidies has an impact on reform prospects. In Ghana, the government commissioned an independent poverty and social impact analysis (PSIA) to assess the winners and losers from subsidies and subsidy removal in 2005. This was an important foundation for persuasively communicating the necessity for reform and for designing policies to reduce impacts of higher fuel prices on the poor. By contrast, in Nigeria, the National Assembly did not support the removal of the gasoline subsidy in December 2011, claiming a lack of firm data underpinning the size and incidence of subsidies. In addition, lack of information on the state of the refining industry and on the management of the fuel subsidy mechanism made it difficult for the government to persuasively refute the argument that government investment in refineries and/or stopping subsidy abuse was preferable to removing subsidies. Despite many attempts at reforming fuel subsidies, Indonesia's objectives in reforming them are not clearly laid out in any one source. In Niger, little was known about the size and distributional impact of fuel subsidies until the authorities published estimates of the fiscal cost of fuel subsidies in the 2010 budget and the IMF Fiscal Affairs Department conducted a PSIA.

Transparency on the size of energy subsidies is particularly helpful to kick-start any reform. In Nigeria, the government used the fact that fuel subsidies (4.7 percent of GDP in 2011) exceeded federal capital expenditure to call for reform. In Niger, the realization that oil tax revenue shrank from 1.0 percent of GDP in 2005 to 0.3 percent of GDP in 2010 contributed to triggering reform. In Ghana, the large size of the debt of the state-owned refinery (7 percent of GDP at the end of 2002) led the government to raise fuel prices in 2003, and the large size of the fuel subsidies in 2004 (2.2 percent of GDP, more than the budget of the Ministry of Health) led the government to further raise fuel prices in 2005. In India, the publication of a study revealing that around 40 percent of the subsidized kerosene (with a fiscal cost of \$3.5 billion) was diverted to the black market and did not reach the intended recipients forced the government to take action.



### **Consult a Broad Range of Stakeholders**

In planning a reform, it is important to identify main stakeholders and interest groups, and develop strategies to address their concerns. Close consultation with main stakeholders, inviting them to participate in the formulation of the subsidy reform strategy, could help build consensus for reform. In Namibia, the National Energy Council, chaired by the Minister of Mines and Energy, established the National Deregulation Task Force in 1996 to examine fuel price deregulation through a broadly consultative process, culminating in the publication of the White Paper on Energy Policy in 1998. In Niger, the authorities also opted for a consensual approach, co-opting all relevant stakeholders. They established the *Comité du Différé* to discuss the best way to approach the reforms and their subsequent implementation. In Kenya, consultation with unions allowed the electricity reform process to proceed without the retrenchment of staff in the utilities. In addition, early in the reform process, tariff increases required intense negotiations with large consumers, whose cooperation was secured only with the commitment by the government to use extra funds to expand electricity supply.

### **Timing: Establishing a Timetable and Deciding When to Launch the Reform**

Various factors need to be taken into account in deciding the pace and timing of a subsidy reform. If subsidies are large or if subsidies have been in place for a long time, a phasing in of reforms is likely to be more palatable and provoke less intense negative reaction. In these circumstances, a gradual approach may be necessary to (1) allow firms that have invested in relatively energy-intensive technologies time to adjust; and (2) avoid a sharp increase in prices, to better manage inflation expectations. A gradual approach would also tend to be preferred the less developed the available instruments for delivering mitigating measures to the most needy; or the worse the government's track record on spending quality (hence the need for time to build credibility). For electricity, the complex nature of the reform process requires that it be gradual. In Kenya, subsidies were eliminated over the course of about 7–8 years through a combination of tariff increases, improvements in collections, and reductions in technical losses. Similarly, in Uganda, the reform process has been underway since 2001. In Namibia, fuel subsidies started to be scaled back in a gradual manner over several years beginning in 2001, a full three years after the adoption of a consensual white paper on deregulating fuel prices. Moreover, the reform was introduced when oil prices were stable and low, giving consumers and government space to adjust in a relatively shock-free environment. In Brazil, the government pursued a gradual approach to the removal of subsidies during the 1990s to minimize opposition from the interest groups that had benefitted from the policies. The phased removal of subsidies followed a political agenda, with the first products to lose subsidies

(asphalt, lubricants, gasoline for airplanes) generally used by politically weak stakeholders, and the politically more difficult subsidies (for liquid fuels used for transport and by industry) removed last.

The credibility of the government, its policies, and its commitments are critical for a reform's timing. Fast-paced reform is preferable where a country has sufficient credibility (e.g., Ghana's 2005 fuel price adjustment). Where government is strong or soon after elections, a big bang approach with a large initial adjustment may be feasible. In cases of serious credibility shortcomings, it would be advisable to initiate programs to improve governance, spending quality, and public financial management in advance of subsidy reform. Similarly, in an environment of frequent power supply disruptions, the government needs to find ways of improving performance ahead of the tariff increases. In the initial stages, better service for current customers should take precedence over expanding the network through an inefficient state utility, which could lead to even weaker supply. In Nigeria, where the federal government traditionally suffers from a large credibility gap, the attempted one-step fuel price deregulation in January 2012, initially raising prices by 115 percent, had to be scaled back following widespread protests. On the other hand, an increase in electricity tariffs in that same year, which has followed an improvement in service quality, went through without any major public reaction.

Financing constraints and changes in external conditions can also play a role in the timing of the reform. A gradual approach may not be feasible or advisable if the costs are unmanageable. Similarly, power crises or mounting quasi-fiscal costs can provide the impetus for reform (e.g., in Kenya). A number of countries, faced with the untenable costs of subsidies in 2007–08, were forced to raise prices, regardless of protests. By contrast, there have been examples where countries have taken advantage of other opportune moments, such as a period of low international prices, to push ahead with rapid reform. In late 2008 when international prices had collapsed, Vietnam introduced market-based pricing, while Ethiopia eliminated fuel subsidies.

### **Launch an Intensive and Extensive Public Communication Campaign**

A comprehensive public information campaign well ahead of the implementation of the removal of energy subsidies is needed to clearly explain the rationale and objectives of the reform. It is important to be able to address concerns of key interest groups; detail the planned use of the savings; and outline mitigating measures. Beyond the narrow fiscal implications of subsidy reform, the broader positive impacts on growth, productivity, and increased public resources for physical and human capital formation should be emphasized.

- In Nigeria, the communication campaign in 2011/12 included public statements by the president; presentations in budget documents

highlighting the cost of fuel subsidies and the need to mitigate the impact of fuel price increases, including through priority spending (rehabilitation of existing refineries and building of new ones); and the Subsidy Reinvestment and Empowerment (SURE) program (Box 4). A brochure on SURE was widely distributed. It summarized the government's case for subsidy removal; the resources that would accrue to federal, state, and local governments; and the social safety nets and critical infrastructure projects on which the federal government would spend its resources. However, information on the SURE program was released only about six weeks before the subsidy reform. In addition, while the SURE program outlined a detailed list of federal infrastructure and social programs to be funded by subsidy savings, the state and local governments, which would receive approximately half of the subsidy savings, were silent on the intended use.

- In Ghana, the communication campaign in 2005 included the State of the Nation address to parliament, radio broadcasts of the same message by the minister of finance, advertisements in national papers comparing Ghanaian prices with its West African neighbors, interviews with government and trade-union officials, and the posting on the internet of the PSIA providing an independent confirmation that the policy to reform fuel subsidies was in the best interests of the citizens of Ghana.
- In Niger, the government conducted public information campaigns on radio and TV stations in 2010, highlighting the regressive nature of fuel subsidies and the priority social spending on which savings from fuel subsidy reform would be spent.

In electricity subsidy reform, the authorities should emphasize that the goal of reducing subsidies is to facilitate an increase in supply and expansion of access. Thus, the communication strategy should place the tariff adjustment or cost recovery issue in a wider context of how government plans to address various problems in the power sector, including costly generation, inefficiencies of state utilities, corruption, etc. At the same time, consumers need to be convinced that these reforms, geared to improving financial viability of state utilities, will lead to better electricity services and access. Finally, media and public education campaigns that educate on billing, collection, and energy saving could help mitigate the impact of the price increases.

- In Uganda, the government's communication campaign surrounding the 2012 electricity tariff adjustment was very effective, pointing out that it could no longer afford costs of more than 1 percent of GDP to subsidize electricity to which only 12 percent of the country had access. Some newspapers agreed that the tariff hike was a pro-poor measure,

especially because lifeline tariffs were to be maintained. In addition, while the chairman of the Uganda Manufacturers Association pointed out that the new tariff would automatically increase production costs, he also acknowledged that the new tariffs would be bearable if power supply was reliable (i.e., validating the earlier research about willingness to pay).

#### **Box 4. Increased Fiscal Space from Energy Reform and Its Uses**

The fiscal space resulting from the reduction of energy subsidies can help improve the overall fiscal position, but also can be mobilized to introduce more productive, efficient, and equitable government spending. Two oil-exporting countries, Nigeria and Iran, offer alternative approaches. The former relies on using the fiscal space more effectively through productive public spending aimed at building, physical and human capital, while the latter focuses on replacing subsidies with (more efficient and equitable) universal transfers.

**Nigeria.** The main plank in the 2012 fuel subsidy reform was the Subsidy Reinvestment and Empowerment (SURE) Program. The SURE envisages channeling the federal government's share of the savings from the fuel subsidy reduction into a combination of programs to stimulate the economy and alleviate poverty through critical infrastructure and safety net projects. The infrastructure projects financed by SURE are being selected in line with the government's Vision 2020 development strategy in the power, roads, transportation, water, and downstream petroleum sectors. The social safety net programs to mitigate the impact of subsidy removal on the poor identified by SURE are focused in the areas of urban mass transit, maternal and child health services, public works, and vocational training. In 2012, the SURE program facilitated the completion of a major north-south national railway project and improved maternal and child care services in 500 primary health care centers.

**Iran.** The main objective of the 2010 fuel subsidy reform was to replace price subsidies with across-the-board cash transfers for households as a means of distributing some of the country's oil wealth to its citizens, while reducing incentives for excessive energy consumption and smuggling. Bank accounts were opened for most citizens prior to the reform and compensating cash transfers deposited into these accounts prior to the implementation of price increases. About 80 percent of the revenue from the elimination of the subsidy was redistributed this way. The decision not to target these transfers was to avoid triggering public discontent among the biggest energy users. The remaining balance of the subsidy savings was to be set aside to provide support for enterprise restructuring with a view to reducing their energy intensity. Seven thousand energy-dependent enterprises were selected to receive some form of targeted assistance to restructure their operations.

### **Improve Enterprise Efficiency**

Successful subsidy reform, especially in the electricity sector, will be heavily dependent on enhancing the efficiency of state enterprises. This includes strengthening firms' governance, improving demand management and revenue collection, and better exploitation of scale economies. Performance targets and incentives (e.g., improved revenue collection, reduced power outages) should be set to increase accountability of managers of state enterprises. In Kenya and Uganda, reducing line losses and increasing collection rates were instrumental in eliminating quasi-fiscal deficits and helped reduce the need for higher tariff increases. In Cape Verde, the electricity power company is allowed to keep resources from overperformance, which can then be used for investment. Introducing competition by permitting independent private producers to be involved in electricity generation can strengthen sector performance.

### **Develop Mitigating Measures**

Measures to mitigate the impact of energy price increases for the poor are critical to building support for subsidy reform. A conditional cash transfer targeted to the most needy income groups appears to be the most appropriate instrument. However, this may not be feasible in the short run because of a lack of bureaucratic/administrative capacity. In the power area, a central element of protecting the poor must be better targeting of lifeline- and volume-differentiated tariffs, and mechanisms to assist lower-income customers to finance connection costs.

- In Namibia, even though fuel prices track international prices, cross-subsidies in transport and distribution costs equalize fuel prices between cities and rural areas where most poor people live.
- In Niger, following negotiations with civil society organizations and the transport sector, the government provided a direct subsidy to the transport sector in 2010 to mitigate the impact of fuel price increases on the poor, at a fraction (0.1 percent of GDP) of the cost of the fuel subsidies (0.7 percent of GDP).
- In Ghana, fuel price increases in 2005 caused much less social tensions than previous increases thanks to mitigating measures including cross-subsidies in favor of kerosene and liquefied natural gas (LNG), the fuels consumed most by the poorest income groups; an increase in the daily minimum wage; a price ceiling on public transport fares; elimination of school fees for primary and secondary education; and other measures.

**Box 5. Mitigating Measures—Other Countries' Experiences**

Gabon increased gasoline and diesel prices by 26 percent in March 2007.

- National Social Guarantee Fund cash payments to the poor were resumed, while conducting a new and improved census of lower-income households.
- Assistance to single mothers via the existing program in the Ministry for the Family was increased, as was funding for a microcredit program targeting disadvantaged women in rural areas.
- Households with monthly electricity and water bills of less than the expenditure thresholds for subscribers who already received the social rates were eligible for free electricity and water up to a limited quantity.
- School enrollment fees were waived for pupils enrolled in public schools and school text books given free of charge to all primary school pupils.
- PRSP investments related to the expansion of rural health services, electrification, and drinking water supply were accelerated.
- The mass public transport network in Libreville was expanded (27 buses).

Mozambique increased fuel prices by 38 percent in 2008.

- Budgetary allocations to a range of social protection programs were increased substantially (Direct Social Support, Social Benefits Through Work, Income Generation and Community Development).
- The level of cash benefits received by beneficiaries of the Food Subsidy Program was increased, with the minimum benefit increasing from 70 MT to 100 MT and the maximum benefit from 140 MT to 300 MT.
- The number of branches of the National Institute for Social Protection was increased from 19 to 30 to expand the program.

Source: IMF Fiscal Affairs Department, Technical Assistance Reports on Fuel Subsidy Reform.

- In Nigeria, the government kept the price of kerosene unchanged when it increased fuel prices in January 2012, and the SURE program included the expansion of several social safety net programs, such as maternal and child health services, cash for public works, women and youth employment programs, vocational training, and urban mass transit schemes.
- Lifeline (below cost) tariffs for electricity consumption exist in both Kenya and Uganda. In Kenya, the lifeline tariff, which applies to households consuming less than 50 kWh a month, is cross-subsidized by rates imposed on larger consumers. In Uganda, the lifeline tariff applies to poor domestic consumers for power consumption up to 15 kWh a month. Kenya also introduced measures to expand access, such as a rural electrification program and a revolving fund for deferred connection fee payments (financed by donor funds).

Box 5 contains examples of mitigating measures implemented in other selected countries when governments increased fuel prices as part of their plans to reform fuel subsidies.

Cross-subsidization of energy products or other mechanisms that imply substantially different subsidies (or taxes) across products should be approached with caution. As discussed above, this policy has some merits for electricity. The case of fuel products is more complex. Many countries that instituted subsidy reforms did retain subsidies on fuel products principally consumed by the poor, for example, kerosene and LNG. However, different levels of subsidization/taxation across fuel products create incentives for fraudulent fuel adulteration or other unintended consequences. In Ghana, mixing subsidized kerosene and liquefied natural gas with transport fuels became common practice when the price of subsidized kerosene fell significantly below that of diesel, creating shortages of kerosene. In Brazil, during the 1970s and 1980s, the LNG subsidy stimulated its use in industry and transport sectors as well as for heating swimming pools and saunas, even though such uses were prohibited. By artificially reducing prices for LNG and diesel, at some point Brazil became a net exporter of gasoline and a large importer of diesel and LNG.

### **Develop Mechanisms to Promote Durability of Reform**

The experience of countries undertaking energy subsidy reform demonstrates that reforms can be fragile, even when all the key actions discussed above have been followed. In Ghana, the 2005 reform successfully eliminated gasoline subsidies, but when oil prices soared in 2007 and 2008, the government abandoned its policy of adjusting domestic to international prices and froze

its price ceilings between May and November 2008. Energy prices became a campaign issue during the 2008 elections and the then opposition having won the election, fulfilled its election promise by reducing fuel taxes, bringing fuel prices significantly below levels in neighboring countries. When Niger became a fuel producer in 2011, it reduced fuel prices below international levels.

The durability of the reform will be enhanced by the development of a more efficient social safety net framework and by demonstrating clear progress toward achieving the announced goals of the subsidy reform. Unfortunately, achieving these objectives may not be possible in the short run. However, a number of policies can help to improve the prospects for the durability of the reform during this transition period.

*Monitor and disseminate information on the use of subsidy savings.* In Nigeria, a commission has been established, including representatives from the civil society, to monitor and audit the amount of savings generated by the gasoline subsidy reduction and its use to advance the targeted projects of the SURE program.

*Be transparent in accounting for subsidy costs.* Where subsidies are not fully eliminated, maintain transparency on their costs. In Niger and Mali, the authorities have introduced an explicit accounting of fuel subsidies in the budget. Moreover, it would be important to establish a ceiling on the possible size of the subsidy to reduce fiscal risks.

*Implement an automatic price adjustment mechanism.* If full deregulation of prices is not feasible in the short run, energy prices should be determined by transparent price formulas and an adjustment mechanism to changes in international fuel prices. Ghana published the price formula for determining fuel prices, including the weights of the individual components (e.g., cost of crude, refiner's margin, excise duty, etc.). Appendix 2 discusses in more detail the various technical issues that ought to be considered in formulating a fuel-price adjustment mechanism. It may be useful to incorporate some smoothing mechanism to mitigate the impact of very sharp increases in international prices that might trigger calls for the reintroduction of subsidies.

*Depoliticize the price setting framework by establishing an independent authority to manage energy pricing.* In Tanzania, the creation of a specialized regulatory entity, not only to issue licenses and technical regulations (e.g., on the quality requirements of fuel products), but also to keep the public constantly informed about prices and to review the proper functioning of the market (e.g., to investigate concerns about potential price collusion practices) seems to have played an important role in sustaining fuel subsidy reforms. In South Africa, prices are adjusted on a monthly basis according to a transparent automatic formula based on international prices, freight, insurance, and



other costs, as well as exchange rate movements. Price information is regularly published on the Department of Energy website, and no political interference is apparent in the frequency and parameters of adjustment (Kojima, Matthews, and Sexsmith, 2010). In Kenya, the independent Energy Regulatory Commission (ERC) regulates electricity tariffs, publishes tariff adjustment calculations on its website, issues licenses, and sets performance targets for KPLC (e.g., revenue collection, average waiting period for new connections, system losses). According to the World Bank (2010b), the negotiations for tariff-setting and power purchase agreements are transparent; and the regulatory framework in the sector is robust and resistant to political interference. Ghana established a semi-independent National Petroleum Authority to administer the pricing framework. However, although this system worked well for a number of years, it did not survive the populist pressure for the reintroduction of subsidies that reemerged at the time of the sharp rise in fuel prices in 2007–08. That experience shows that, notwithstanding the implementation of appropriate supporting mechanisms, the key ingredient for a successful subsidy reform is an unwavering political will, that is, the price-setting regime and independent regulatory authority will be only as robust as the political will behind them.

## Appendix 1: Survey of Fuel and Electricity Subsidies in Sub-Saharan Africa<sup>29</sup>

This appendix summarizes the results of a survey on fuel and electricity subsidies in sub-Saharan African (SSA) countries based on the responses to a questionnaire circulated to International Monetary Fund (IMF) country desks in June 2012. The questionnaire comprised information on subsidies, price-setting policies, market structure, contingent liabilities, and recent trends for petroleum products and for the electricity sector. The appendix focuses on the quantitative aspects of the questionnaire, which covered 35 countries (about 80 percent of the countries in the African Department at the IMF). Overall, the survey data indicate that fuel and electricity subsidies are pervasive in the region, with important economic and social implications.

### Overview

*Price-setting policies.* Figure A1 depicts the prevalence of three different categories of price-setting policies among SSA countries for petroleum products (left-hand-side panel) and electricity (right-hand-side panel). Most countries in SSA implement some form of administered pricing mechanism for electricity and fuel, most frequently ad hoc nonautomatic price setting schemes (dark red countries). It is important to note that even if the de jure pricing policy is based on an automatic formula (countries in yellow), in practice, these automatic mechanisms are frequently suspended in difficult times. Furthermore, it appears that policymakers are more reluctant to adopt market-based pricing policies for electricity. Even countries with liberalized markets for petroleum products such as South Africa and Uganda (green on left-hand-side panel) still opted to set electricity prices administratively.

*Explicit subsidies to petroleum products and energy in Sub-Saharan Africa.* Figure A2 shows the prevalence of explicit subsidies for petroleum products (left-hand-side) and for electricity (right-hand-side). Subsidies for petroleum products are pervasive, with 21 countries (60 percent of the sample) adopting some form of explicit subsidy. Several countries subsidize specific products such as kerosene and liquefied natural gas (LNG), which are perceived to be disproportionately used by poorer segments of the population. Similarly, over 60 percent of the countries for which responses were available adopted policies to explicitly subsidize electricity prices.

This classification is largely based on country desks' responses to the questionnaire and reflects desk assessments on price-setting policies. When

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<sup>29</sup> Prepared by Antonio C. David and Brian Moon.

**Appendix Table 1. Sub-Saharan Africa: Post-tax subsidies for petroleum products and quasi-fiscal deficits of power sector  
(Percent of GDP)**

Country	Estimated Subsidies for Petroleum products				Electricity
	2012 Estimates based on price benchmark method <sup>1</sup>	2011 Estimates based on price pass-through method <sup>2</sup>	2011 Estimates based on price benchmark method <sup>3</sup>	Of which: 2011 Estimates for Externality Costs <sup>4</sup>	Quasi-fiscal deficit for power sector <sup>5</sup>
Angola	4.0	1.5	2.5	0.8	1.2
Benin	0.9	4.3	0.2	0.0	1.8
Botswana	0.9	1.5	0.9	0.5	0.4
Burkina Faso	0.2	5.6	0.3	0.1	1.2
Burundi	0.7	0.3	0.0	0.0	n.a.
Cameroon	2.8	4.2	2.5	0.3	2.7
Cape Verde	0.2	3.0	0.0	0.0	2.9
Central African Republic	-0.1	3.6	0.0	0.0	n.a.
Chad	1.7	6.3	0.0	0.0	0.3
Comoros	0.6	n.a.	n.a.	n.a.	n.a.
Congo, Dem. Rep.	0.8	0.9	0.0	0.0	2.8
Congo, Republic of	2.1	1.5	2.1	0.6	1.1
Côte d'Ivoire	0.7	0.9	0.0	0.0	2.3
Equatorial Guinea	1.2	3.2	1.9	1.2	n.a.
Eritrea	n.a.	n.a.	n.a.	n.a.	n.a.
Ethiopia	1.6	1.1	0.6	0.1	1.5
Gabon	1.6	2.1	0.7	0.3	n.a.
Gambia, The	1.2	3.9	0.0	0.0	n.a.
Ghana	3.2	0.9	1.9	0.9	2.3
Guinea	0.5	-0.2	0.0	0.0	n.a.
Guinea-Bissau	0.1	1.5	0.0	0.0	n.a.
Kenya	0.8	3.3	0.5	0.1	0.8
Lesotho	0.7	-0.6	0.0	0.0	1.1
Liberia	n.a.	-0.2	0.0	0.0	n.a.
Madagascar	0.7	6.2	0.4	0.1	1.4
Malawi	-2.5	0.6	0.1	0.0	2.2
Mali	0.5	3.8	0.2	0.0	2.4
Mauritius	-1.0	1.1	0.0	0.0	n.a.
Mozambique	0.0	2.2	0.2	0.1	7.2
Namibia	-0.6	-0.7	0.0	0.0	0.8
Niger	0.4	0.6	0.2	0.0	0.6

**Appendix Table 1. (Continued)**

Country	Estimated Subsidies for Petroleum products				Electricity
	2012 Estimates based on price benchmark method <sup>1</sup>	2011 Estimates based on price pass-through method <sup>2</sup>	2011 Estimates based on price benchmark method <sup>3</sup>	Of which: 2011 Estimates for Externality Costs <sup>4</sup>	Quasi-fiscal deficit for power sector <sup>5</sup>
Nigeria	3.4	4.2	2.0	0.5	1.5
Rwanda	0.0	1.1	0.0	0.0	0.5
Sao Tome and Principe	1.8	4.3	0.6	0.1	n.a.
Senegal	-1.1	4.9	0.0	0.0	2.5
Seychelles	-0.7	n.a.	0.0	0.0	n.a.
Sierra Leone	1.2	2.8	0.5	0.1	3.5
South Africa	-0.2	-1.0	1.1	0.5	0.5
Swaziland	-0.5	-0.9	0.0	0.0	n.a.
Tanzania	0.1	1.6	0.0	0.0	1.7
Togo	0.8	3.9	0.7	0.0	n.a.
Uganda	0.2	3.3	0.0	0.0	2.3
Zambia	0.2	1.1	0.0	0.0	3.4
Zimbabwe	3.3	n.a.	n.a.	n.a.	11.0
Sub-Saharan Africa	1.4	1.5	1.2	0.4	1.4
Median	0.7	1.6	0.1	0.0	1.7
Unweighted mean	0.8	2.2	0.5	0.2	2.2
Oil exporters	3.2	3.2	2.0	0.5	1.5
Median	1.9	2.7	2.0	0.4	1.4
Unweighted mean	2.2	3.0	1.5	0.5	1.5
Oil importers	0.3	0.4	0.8	0.3	
Median	0.4	1.5	0.0	0.0	1.8
Unweighted mean	0.4	2.0	0.3	0.1	2.4

Sources: Staff calculations.

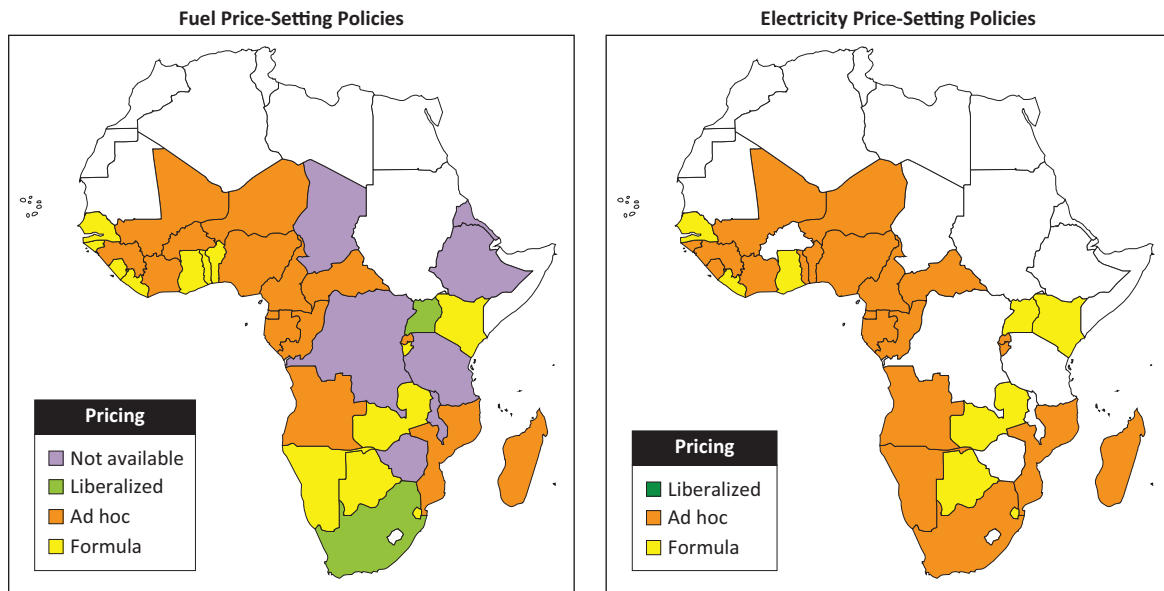
<sup>1</sup> In the price benchmark method, fuel subsidy (tax) per liter is obtained by subtracting the relevant cost-recovery benchmark price from the domestic retail price. Benchmark prices are computed by adding CIF fuel import prices, national margins and costs (e.g., transportation, distribution) and indirect taxes (VAT and excise taxes). For more details, see Box 1.

<sup>2</sup> In pass-through method, subsidies are estimated by comparing the changes in domestic retail prices against the changes in international prices over a specific period. Box 1 provides more details about this measurement method, see Box 1.

<sup>3,4</sup> International Monetary Fund (2013) discusses these estimates.

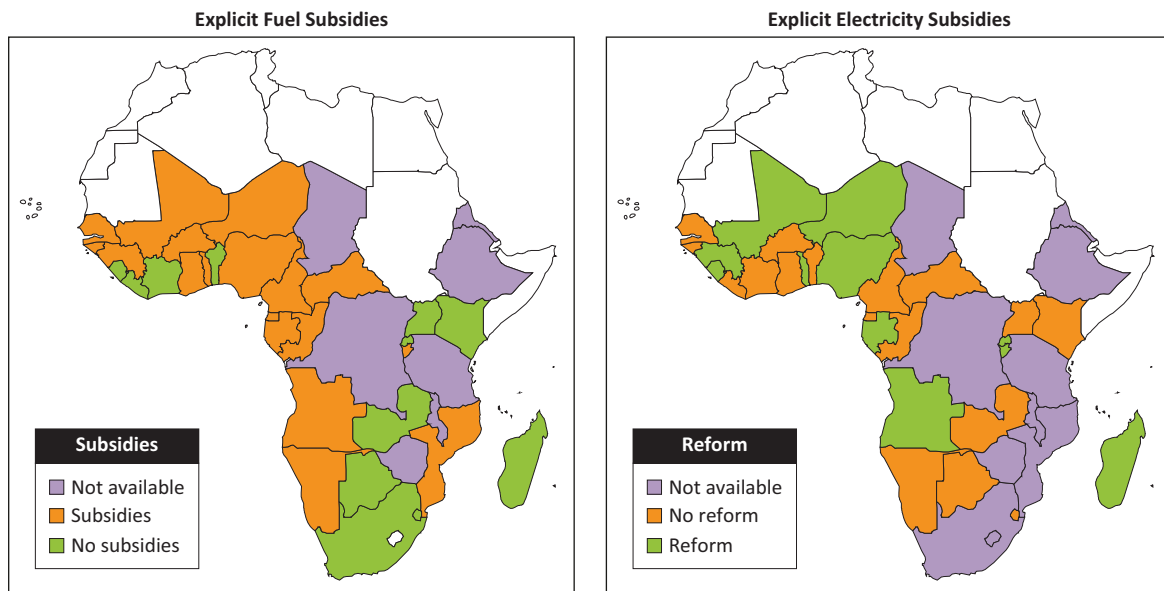
<sup>5</sup> The quasi-fiscal deficit is defined as “the difference between the actual revenue charged and collected at regulated electricity prices and the revenue required to fully cover the operating costs of production and capital depreciation.” Box 1 provides more details on the measurement methodology.

Figure A1. Prevalence of Price-Setting Policies, June 2012



Source: Author's calculations based on IMF African Department desk survey.

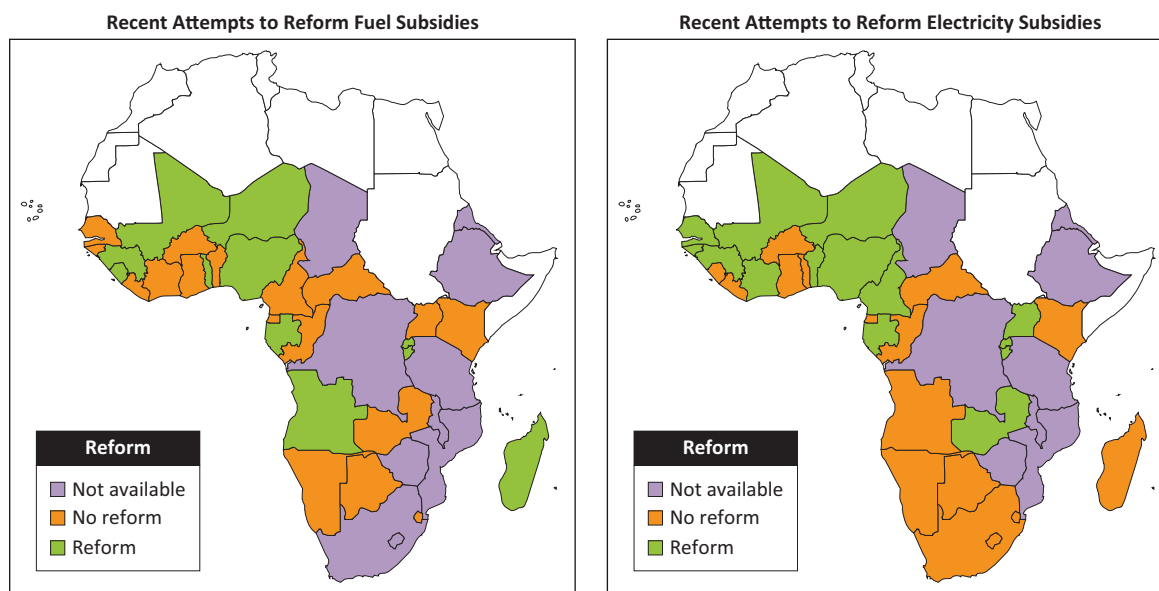
Figure A2. Prevalence of Explicit Subsidies, June 2012



Source: Author's calculations based on IMF African Department desk survey.

it was explicitly stated that the de facto price setting regime was ad hoc (despite the presence of a de jure automatic formula), this information is reflected in the figure.

Figure A3. Recent Attempts at Energy Subsidy Reform



Source: Author's calculations based on IMF African Department desk survey.

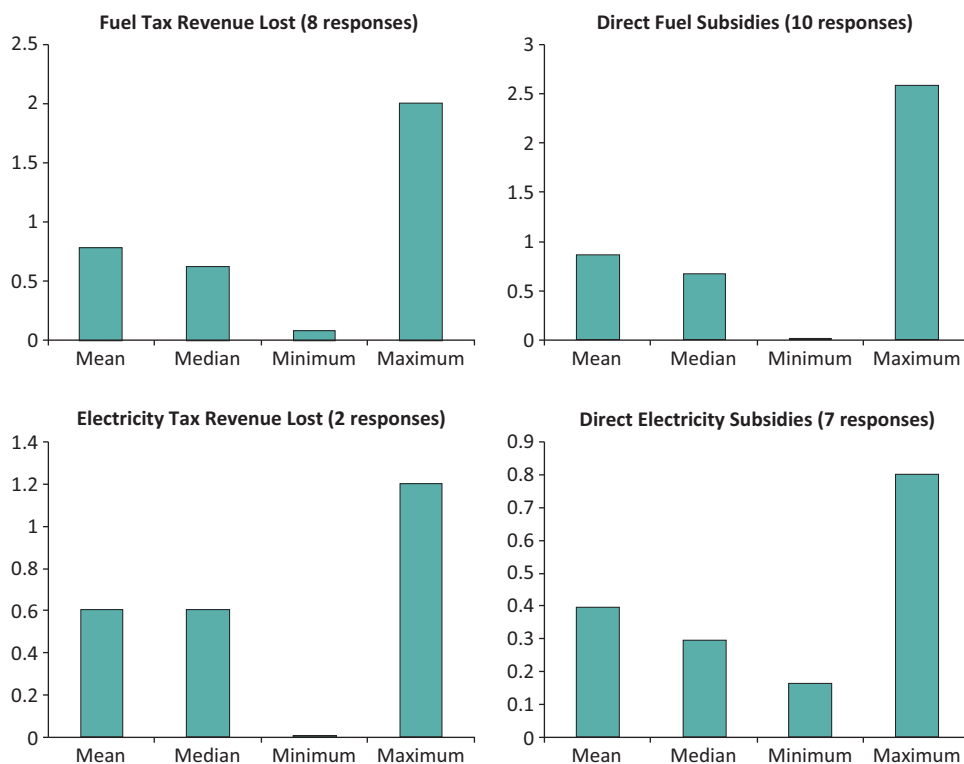
*Recent reform efforts.* The survey suggests that the authorities have been actively engaged in energy sector reform in recent years (Figure A3). About 14 countries (out of 31 responses) have recently attempted to reform fuel subsidies. These efforts consisted mostly of changes to pricing formulas in order to increase the pass-through of international prices and reduce subsidies. The Nigerian reform efforts have been widely presented in the international media, but new formulas also were introduced in 2011 in Niger and Rwanda, among other countries.<sup>30</sup> Twelve countries (out of 26 responses) have recently attempted to undertake reforms to reduce electricity subsidies. Uganda is particularly notable for introducing an automatic adjustment for electricity tariffs in early 2012 that effectively eliminated subsidies going forward.

## Quantifying Fuel and Electricity Subsidies

Given the reluctance of policymakers to allow market forces to operate in energy markets, it is crucial to attempt to quantify the economic impact of regulatory policies. The survey aimed at gathering detailed information to

<sup>30</sup> In Niger, new distortions are emerging as the country becomes an oil producer, while fuel subsidies are considered to have been effectively eliminated with the introduction of the new formula in Rwanda.

Figure A4. Fuel and Electricity Subsidies in Percent of GDP



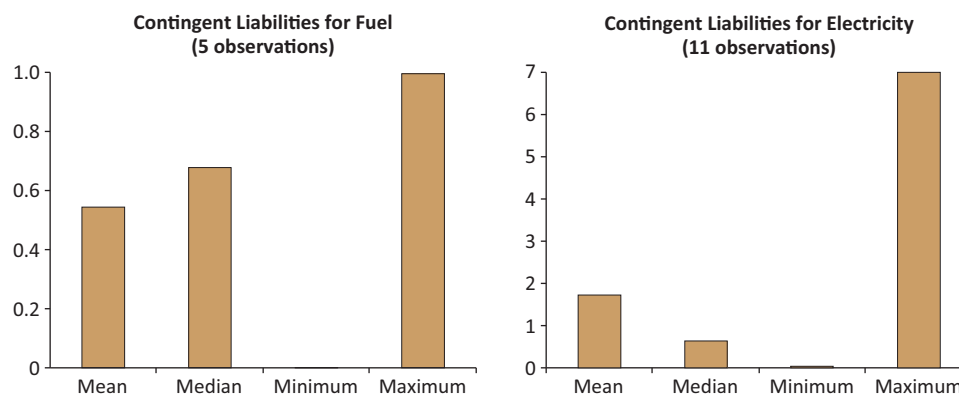
Source: Author's calculations based on IMF African Department desk survey. Latest available information used, which might span different periods from 2009 to 2012.

quantify different subsidy categories, but data availability considerably limited the scope of the analysis.

For petroleum products, it was only possible to obtain a meaningful number of responses for estimates of tax revenue losses (when subsidies imply foregone taxes on products) and for overall direct subsidies (i.e., an aggregate of budgetary and off-budget transfers). These estimates are depicted in the upper panels of Figure A4. On average, both types of subsidies are about 1 percent of GDP. Nevertheless, there is significant variation across countries, because lost revenue is close to 2 percent of GDP in Sierra Leone, and direct subsidies can surpass 2.5 percent of GDP (Cameroon).

Data availability issues are even more pronounced for the electricity sector. Only two estimates of lost tax revenue were obtained (more than 1 percent of GDP in Côte d'Ivoire). The average estimate for direct electricity subsidies (for which a relatively larger sample was available) was 0.4 percent of GDP, but reached as high as 0.8 percent (Mali).

Figure A5. Estimated Contingent Liabilities in Percent of GDP



Source: Author's calculations based on IMF African Department desk survey. Latest available information used, which might span different periods from 2009 to 2012.

## Quantifying Contingent Liabilities

In addition to the direct costs discussed above, policy interventions in energy markets might also entail contingent liabilities for the central government linked to debt, arrears, or operating losses of state-owned enterprises involved in refining, generating, importing, and distributing fuel and electricity. The survey responses on this issue were very limited (at most three observations per fuel category, and between five and seven for electricity). For this reason, an aggregate measure of contingent liabilities was built to present the cumulative debt, arrears, and operating losses for relevant state-owned enterprises.

As far as petroleum products are concerned, responses for five countries were received. On average, contingent liabilities amounted to 0.5 percent of GDP, reaching up to 1 percent of GDP for a number of countries (namely, Ghana, Republic of Congo, and Burkina Faso). For the electricity sector, contingent liabilities were relatively higher, amounting to 1.7 percent of GDP on average and surpassing 7 percent in Senegal.<sup>31</sup>

## Conclusions

Despite significant reforms efforts in recent years, fuel and electricity subsidies are still pervasive in sub-Saharan Africa. A survey of 35 countries suggests that direct and indirect costs of these policies are significant. While

<sup>31</sup> This includes the stock of liabilities of SENELEC amounting to CFA franc 341 billion at end-2011, in addition to SENELEC payment arrears amounting to CFA franc 157 billion as of end-March 2012.



limitations in data availability do not allow for precise estimates, the survey results suggest that fuel subsidies typically amount to 1 percent of GDP in countries that set fuel prices, whereas direct electricity subsidies tend to be less than 0.5 percent of GDP. Contingent liabilities tend to exceed 0.6 percent of GDP (median values) for both fuel and electricity, although in some cases the build-up of liabilities has been much more significant.

## Appendix 2 Good Practices in Retail Fuel Price-Setting Mechanisms<sup>32</sup>

The most sustainable schemes for domestic pricing of petroleum products would be either full liberalization or transparent and simple automatic adjustment mechanisms for administered prices. Coady and others (2010) provide an excellent overview of international policies in this area. A fully liberalized regime would require adequate regulation to ensure the prevalence of competitive practices, which might be difficult in the case of low-income countries where regulatory capacity is weak and the size of the market is small. In general, a prerequisite for a successful liberalization of domestic prices is to strengthen regulatory frameworks to inhibit anticompetitive behavior that would be harmful to consumers. Therefore, although full liberalization is the first best option, a country's history and institutional context might make it reasonable to have a simple automatic mechanism in place to administer prices over the short and medium terms. The discussion below focuses on that option.

A simple, transparent, and automatic pricing mechanism would ease the administrative burden of price regulations. Price adjustment formulas should be based on actual costs of supply, including transport, storage, and other costs incurred assuming efficient operations (for a discussion see, for example, Coady and Karpowicz, 2009). Cost estimates should be updated at regular intervals to reflect changes in market prices for inputs. The use of smoothing mechanisms can make the implementation of an automatic pricing mechanism more palatable for both consumers and policymakers by avoiding sharp price adjustments.

Price adjustment mechanisms should also include a desired level of taxes on petroleum products. Several factors can determine the level of taxes, including overall revenue requirements of the government and efficiency and equity considerations (Coady and others, 2010; Gillingham, Lacoche, and Manning, 2008). Fuel taxation is considered a relatively efficient source of revenue because the price elasticity of fuel demand is low. Furthermore, fuel consumption entails negative externalities, such as traffic congestion and environmental pollution, providing an additional rationale for taxation. There might also be equity concerns when setting a desired level of taxation, such that taxes should be lower on products that represent a relatively high share in total consumption of the poorest households (typically kerosene is seen as relatively more important for poorer households).

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<sup>32</sup> Prepared by Antonio C. David.

Price adjustments to changes in international prices should be automatic and frequent to limit distortions and fiscal costs. Pass-through of changes in international prices is important to avoid distortions in relative prices, provide adequate incentives for fuel consumption, and avoid cross-border spillovers (David, El-Harak, Mills, and Ocampos, 2012). Incorporating a smoothing rule in the automatic pricing mechanism can help to avoid large price variations deemed undesirable by policymakers. Commonly used smoothing mechanisms include the following:

- Pricing based on a *moving average* of past international/import prices;
- *Price bands* imposing a cap on maximum price adjustments allowed at any given time (for example  $\pm 5$  percent of the prevailing price in a given month); and
- *Price adjustment triggers* (e.g., the retail price is adjusted whenever the price given by the adjustment mechanism exceeds the prevailing price by 5 percent).

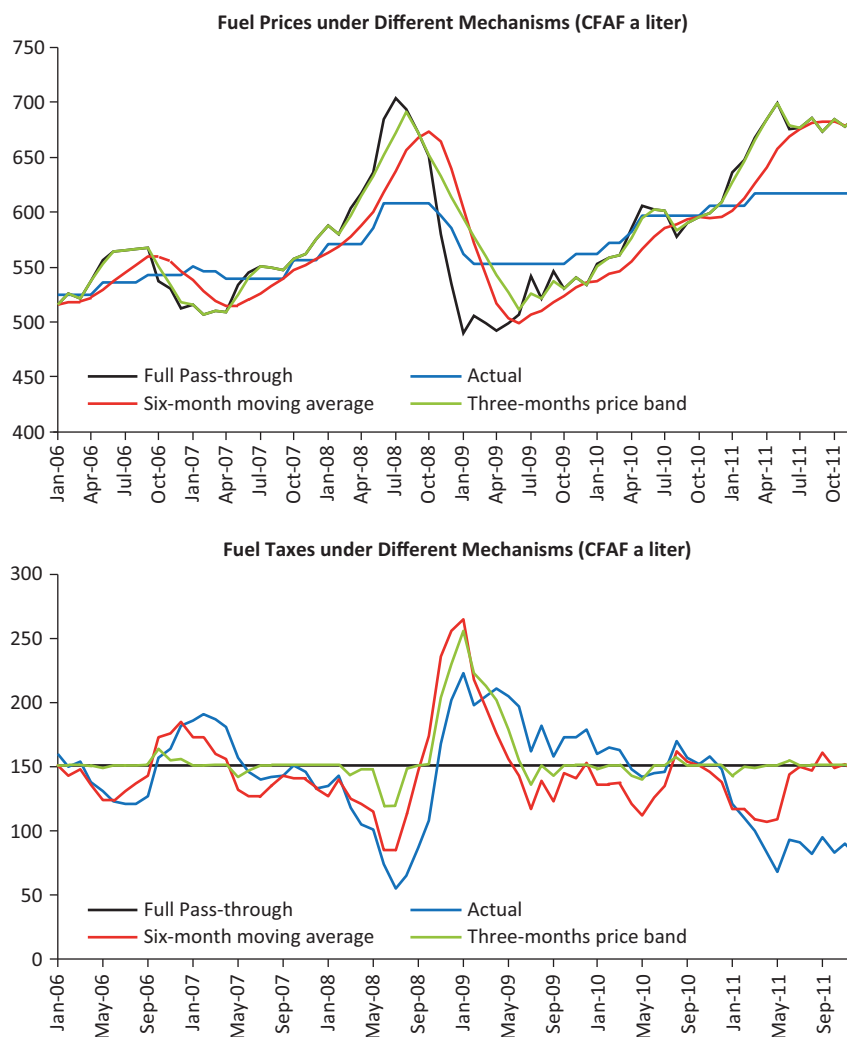
Important trade-offs should be considered when choosing an appropriate price smoothing mechanism. Most notably, excessive smoothing leading to low pass-through (by, for example, implementing adjustments based on long moving averages) increases the volatility of net fiscal revenue linked to petroleum products and may lead to the build-up of liabilities to oil importers and distributors. Simulations performed by the IMF's Fiscal Affairs Department for 2006 through 2011 show that narrower price bands ( $\pm 3$  percent) provide the best results (relative to other smoothing mechanisms) in terms of reducing retail price volatility while stabilizing fiscal revenue and mitigating fiscal costs (see Tuladhar and Eyraud, 2010, for an application to Togo; and Figure A6 for Mali). Nevertheless, in a context of prolonged increases in international fuel prices, all smoothing mechanisms will have adverse effects on net revenue.

In practice, automatic price adjustment mechanisms are subject to significant implementation risks. Several African countries have adopted, at some point, automatic formulas for adjusting petroleum product prices, but these mechanisms are frequently suspended or not fully implemented for extended periods, particularly as international prices increase. Recent examples of countries that suspended automatic price adjustment mechanisms include Mozambique, Togo, and Zambia.

The governance structure of the institutions in charge of implementing the price formula is also an important element of the pricing policy. The pricing formula should be insulated from political influence, perhaps by delegating its implementation to an independent body that includes representatives from

the different stakeholders (importers, distributors, transporters, among others) and with appropriate disclosure to the public. South Africa has adopted an institutional setting that contains some (but not all) of these features (Kojima, Matthews, and Sexsmith, 2010).

**Figure A6. Mali: Simulations of the Impact of Alternative Pricing Mechanisms, 2006–2011**



Source: Belhocine (2012).

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**Supplement**

**Case Studies on Energy Subsidy Reform in  
Sub-Saharan Africa: Experiences and Lessons**

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## Case Studies in Fuel Subsidy Reform

### Ghana<sup>33</sup>

#### Context

Ghana is a country of over 24 million people, rich in natural resources, including arable land and minerals (Table 1). Ghana has recently discovered offshore oil reserves, and 2011 was the first full year of production. Although Ghana's oil reserves are relatively small on a global scale—with production from the current Jubilee field expected to peak at 120,000 barrels a day—there is considerable upside potential from new discoveries. Moreover, Ghana is in the process of building up infrastructure for the commercial use of its gas reserves, with potentially significant benefits in terms of reducing energy costs and developing downstream industries.

Since 2004, deregulation has allowed oil marketing companies to enter the market for importing and distributing crude oil and petroleum products. Until that time, the Tema Oil Refinery (TOR) had a monopoly on the production and importing of refined products. Since then, deregulation has allowed oil marketing companies to enter the market for importing and distributing crude oil and petroleum products. Under the current system, a pricing formula exists for all petroleum products. The current price-adjustment mechanism is the result of 2005 reforms, although it has not always worked as originally envisaged. The National Petroleum Agency (NPA), also established in 2005, reviews fuel prices twice a month. It provides recommendations to the minister of energy on adjustments to cost-recovery levels, based on a backward-looking formula incorporating changes in world fuel prices in the preceding two weeks.

The decision to adjust pump prices is at the discretion of the executive. If price increases are warranted but not implemented, the cost of subsidies is

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<sup>33</sup> Prepared by Geneviève Verdier, African Department.

**Table 1. Ghana: Key Macroeconomic Indicators, 2000–2011**

	2000	2003	2008	2010	2011
GDP per capita (\$US)	400	563	1,266	1,358	1,580
Real GDP growth (percent)	4.2	5.1	8.4	8.0	14.4
Inflation (percent)	25.2	26.7	16.5	10.7	8.7
Overall fiscal balance, cash (percent of GDP)	–6.7	–3.3	–8.5	–7.2	–4.1
Public debt (in percent of GDP)	123.3	82.8	33.6	46.3	43.4
Current account balance (percent of GDP)	–6.6	0.1	–11.9	–8.4	–9.2
Oil imports (percent of GDP)	–7.1	–5.0	–8.3	–6.9	–8.3
Oil exports (percent of GDP)	0.0	0.0	0.0	0.0	7.2
Oil consumption per capita (liters)	n.a.	91.1	91.4	98.7	110.7
Poverty headcount ratio at \$1.25 a day (PPP) (percent of population)	39	n.a.	30	n.a.	n.a.

Sources: International Energy Agency; *World Development Indicators*, World Bank; and *World Economic Outlook*, IMF.

in principle borne by the budget. However, in the past, TOR carried the cost of the subsidy, and underpricing of petroleum products saddled TOR with large losses that spilled over into the financial sector as nonperforming loans. The government was forced ultimately to clear TOR's arrears to the banking sector at a large budgetary cost. Since October 2010, a hedging scheme using call options also has provided some temporary protection against upward movements in oil prices. The government purchases monthly call options that generate revenue in the event of upside shocks to global oil prices; this revenue is used to cover temporary delays in adjusting domestic petroleum product prices to cost-recovery levels (IMF, 2011).

### Experience with Fuel Price Adjustments

The past decade has been marked by several attempts to deregulate fuel prices in Ghana (Figure 1).

- In 2001, a 91 percent adjustment of petroleum pump prices was driven in part by the desire to restore TOR's financial health. Delays in adjusting petroleum prices during 2000 led to large accumulated losses for the state-owned public energy company, which reached 7 percent of GDP (IMF, 2001). The reform was soon abandoned, however, in the face of rising world prices and a depreciating currency. TOR's losses were largely absorbed by the state-owned Ghana Commercial Bank, whose solvency was threatened.
- In early 2003, recognizing the unsustainable financial position of both TOR and Ghana Commercial Bank, the government renewed

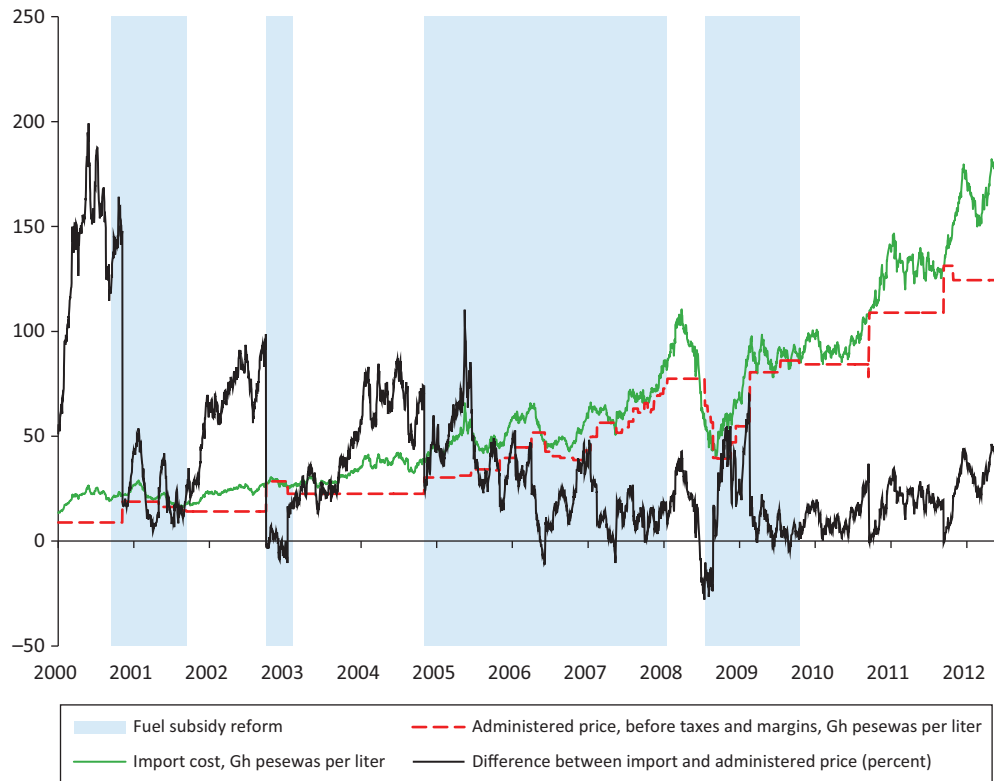
its commitment to cost-recovery pricing with a 90 percent increase in pump prices. Facing widespread opposition to the price increase, the government partially reversed the price increase in the run-up to the 2004 elections and it abandoned cost-recovery adjustments until 2005. In 2004, the subsidies to TOR reached 2.2 percent of GDP, and the company continued to borrow from Ghana Commercial Bank to finance its operations (IMF, 2005).

The deregulation of petroleum product pricing in 2005 was accompanied by strategic measures meant to ensure broad popular support for the reform. The strategy was supported by research, communication, and programs to mitigate the impact on the most vulnerable groups:

- *Research.* A poverty and social impact assessment (PSIA) studying the impact of fuel subsidy removal revealed that the program was poorly targeted, with the rich receiving the lion’s share of the benefits (Coady and Newhouse, 2006).

**Figure 1. Ghana: Fuel Price Developments, 2000–2012**

The 2005 reforms ushered in a period of market-based fuel pricing. Since 2010, however, political considerations have interfered with this process.



Sources: National Petroleum Agency (Ghana); and IMF staff estimates.



- *Communication.* The government engaged in a widespread communications campaign, including public addresses by the president and the minister of finance, explaining the reform's benefits. The results of the PSIA were made public and discussed in a dialogue with various stakeholders, including trade unions. The government also explained how resources freed from subsidizing energy products would partly be reallocated to social priorities (Global Subsidies Initiative, 2006).
- *Assistance to the poor.* The government introduced a number of programs aimed at mitigating the effect on the most vulnerable, including the elimination of fees for state-run primary and secondary schools; an increase in public-transport buses; a price ceiling on public-transport fares; more funding for health care in poor areas; an increase in the minimum wage; and investment in electrification in rural areas.

The administration of the publicly released price-adjustment formula was transferred to the newly established National Petroleum Agency (NPA). The delegation of regulatory powers to the NPA was meant to isolate the decision to adjust prices from political intervention. Prices were adjusted by an average of 50 percent, and the government remained committed to regular adjustment for several years. In the wake of the 2007–08 global fuel and food crisis and in the run-up to the 2008 elections, however, automatic adjustment was temporarily suspended.

The NPA remains the main regulatory agency and publishes the price adjustments required for cost recovery on a biweekly basis. When an upward price adjustment has been required in recent years, the shortfall has often been covered by the budget or more recently by hedging profits. This has resulted in infrequent and large price adjustments, when hedging profits were exhausted and the fiscal burden became too onerous. Prices were adjusted twice in 2011, by 30 percent in January and 15 percent in December. Prices have not been adjusted in 2012 (with the exception of a small downward adjustment early in the year), and the gap between domestic and global oil prices, exacerbated by a depreciating currency, has increased substantially (IMF, 2012a, 2012b).

### **Mitigating Measures**

Following the 2005 fuel price reform, the government introduced a number of programs aimed at mitigating its effect on the most vulnerable. (See bullet on “Assistance to the poor” above).

## Lessons

A number of lessons can be drawn from Ghana's experience in the past decade:

The durability of reform depends crucially on political will and the independence of regulatory agencies from political interference. Without these conditions, it is difficult to maintain an independent regulatory agency. The NPA is not free to adjust prices without the consent of the executive: it has adjusted prices only three times (once downward) since January 2011. Although democratically elected governments have stronger mandates to implement difficult reforms, commitment to automatic adjustment often falters in the run-up to elections.

A constant dialogue with stakeholders and civil society at large about the cost of subsidies is necessary to maintain commitment to the reform. Recent attempts at adjusting prices have not been accompanied by an extensive public information campaign similar to the 2005 effort. Price increases have been irregular, difficult to anticipate, and usually announced shortly before being implemented. This can result in strong opposition by various stakeholders, including powerful trade unions, and can undermine the government's effort. The 2005 campaign was also successful because it engaged civil society and powerfully demonstrated the cost of fuel subsidies by sharing the results of the PSIA.

Supportive research and analysis are important for convincing the public of the benefits of reforms. During the 2005 reform, the PSIA was crucial in demonstrating the costs of subsidies. It also outlined that fuel subsidies were a poor policy measure in the fight against poverty: in Ghana, less than 2.3 percent of outlays on fuel subsidies benefitted the poor.

Visible mitigating measures increase the likelihood of success. Although fuel subsidies are ill targeted, they are a direct transfer to most if not all citizens, their benefits are immediate and easy to understand compared to other social programs, and the individual cost of their removal is swift and substantial—particularly for the poor who have no income cushion, unless they receive alternative compensation. A key element of a successful reform is, therefore, the efficient and visible reallocation of the resources saved through the removal of fuel subsidies to programs with immediate benefits to the most vulnerable. An expansion of cash transfers through the Livelihood Empowerment against Poverty (LEAP) program and additional spending on health and education subsidies would be good candidates.<sup>34</sup>

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<sup>34</sup> LEAP is among the most well-targeted safety net programs; on the other hand, poorly targeted fuel subsidies reached weekly levels in August 2012 that matched LEAP's annual budget (World Bank [2012]).

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## Namibia<sup>35</sup>

### Context

Namibia is one of sub-Saharan Africa's richest countries, with a relatively stable macroeconomic environment (Table 2). Income inequality and unemployment are very high, however. Mineral exports, transfers from the Southern African Customs Union, and prudent fiscal policy in the past have helped the Namibian government sustain economic growth, while maintaining fiscal and current account surpluses. Inflation in Namibia is closely linked to South Africa's inflation (its currency is pegged to the South African rand) and has remained within single digits since reaching a peak of 11.9 percent in August 2008 driven by a surge in international oil prices. The Namibian economy is sensitive to changes in international fuel prices owing to the relative importance of energy-intensive industries such as fishing and mining.

Namibia is characterized by political stability and a relatively well-functioning democracy. The ruling political party is dominant and has won elections with large majorities since independence in 1990. Labor unionization is fairly high, and the largest trade union federation, the National Union of Namibian Workers, is a strong political ally of the ruling party.

Namibia has a wide range of formal publicly funded social welfare programs. Social security, welfare, and housing spending averaged 5 percent of GDP in 2005–11. The government's income support grants include a universal social pension system for the elderly and the disabled, a variety of grants for children, labor-based work programs, and shelter and housing programs. Despite some weaknesses of inclusion and exclusion errors, anecdotal evidence suggests that Namibia has a well-targeted social safety system.

The downstream market for liquid fuels in Namibia is administered through acts of parliament that set out clear parameters to calculate fuel prices. According to the acts, the prices of petrol and diesel are regulated, whereas the prices of all other petroleum products are determined by market forces. The country has no refining capacity and imports its refined fuels mainly from South Africa through the port of Walvis Bay. The Ministry of Mines and Energy (MME) regulates the industry while the Namibian Petroleum Corporation (Namcor), a state-owned enterprise, acts as an operational arm of the government in the market. There are five private companies involved in the marketing of petroleum products, namely BP, Caltex Oil, Engen, Shell, and Total. Each private company supplies its own network of distribution outlets, but all share import and storage facilities at Walvis Bay. In 1999,

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<sup>35</sup> Prepared by Farayi Gwenhamo, African Department.

**Table 2. Namibia: Key Macroeconomic Indicators, 2000–2011**

	2000	2003	2008	2010	2011
GDP per capita (\$US)	2140	2608	4276	5244	5828
GDP growth (percent)	4.1	4.3	3.4	6.6	4.9
Inflation (percent)	9.3	7.2	10.4	4.5	5.8
Overall fiscal balance (percent of GDP) <sup>1</sup>	–0.9	–6.1	2.4	–4.2	–11.3
Public debt (percent of GDP) <sup>1</sup>	20.4	26.4	18.2	16.2	27.4
Current account balance (percent of GDP)	7.9	6.1	2.8	0.3	–1.7
Oil Imports (percent of GDP)	3.5	4.5	2.4	5.3	5.9
Oil exports (percent of GDP)	0.0	0.0	0.0	0.0	0.0
Oil consumption per capita (liters)	n.a.	491.5	596.2	731.0	812.9
Poverty headcount ratio at \$1.25 a day (PPP) (percent of population)	n.a.	31.9	n.a.	n.a.	n.a.

Sources: International Energy Agency; *World Development Indicators*, World Bank; and *World Economic Outlook*, IMF.

<sup>1</sup> Figures are for the fiscal year, which begins April 1.

Namcor was mandated by the government to import 50 percent of Namibia's petroleum leaving the other 50 percent for private companies. That share was recently reduced because of Namcor's operational difficulties.

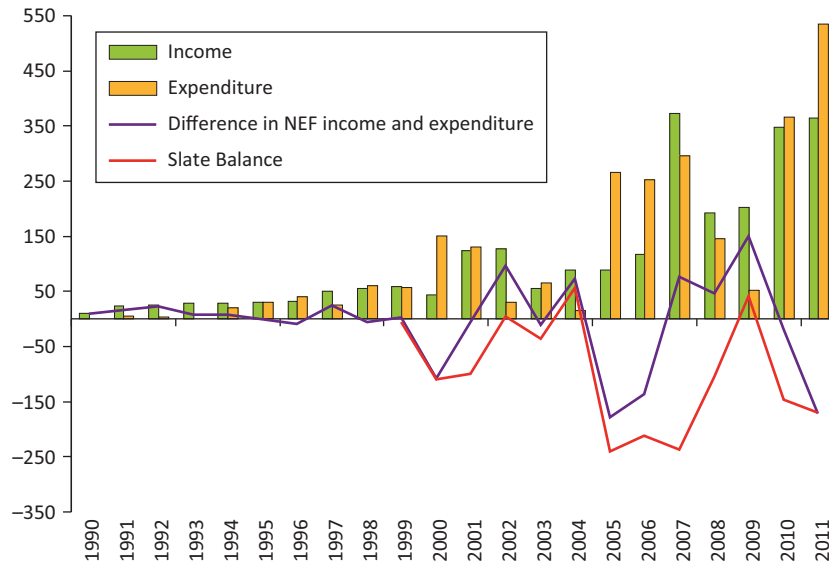
Price setting of fuel pump prices for diesel and petrol is based on a formula with three components. The three components are the basic fuel price, based on the international spot price; domestic fuel levies and taxes; and the so-called slate account, which is essentially used to smooth volatility in local pump prices. The slate account, monitored by the MME, is a notional record used to keep track of the degree of under or overrecovery by fuel-importing private companies. However, the price formula is not completely automatic, as the MME has some discretion on how much pass-through to allow with underrecoveries absorbed by the slate account.

### Experience with Fuel-Price Adjustments

According to the MME, the original motivations for deregulating fuel prices in Namibia were to eliminate fuel subsidies (paid out of the National Energy Fund [NEF]) and to respond more efficiently to changes in international oil prices. Several problems associated with the managed petroleum and petrol-product scheme may have motivated the reforms (Amavilah, 1999). First, the NEF compensation scheme came with fiscal costs amounting to about N\$170 million between 1990 and 1996, about 0.2 percent of GDP (Figure 2). Although the fiscal costs paid out of the NEF seem small in percent of GDP, they do not include transfers that may have been paid directly to Namcor, or quasi-fiscal costs arising from losses incurred by the company. Namcor sometimes receives

**Figure 2. Namibia: National Energy Fund and Slate Account, 1990–2011 (N\$ million)**

*Resources devoted to smoothing out fuel prices experienced sharp swings over time.*



Source: Bank of Namibia, *Quarterly Bulletin*, March 2005.

direct transfers from the government because it does not participate in the slate program and is therefore not compensated for underrecovery through the slate account. The subsidies may also have reduced incentives for petroleum firms to improve their efficiency to help offset their losses.

After the adoption of the new price mechanism, the slate account is supposed to be balanced through price adjustments. In particular, the price adjustment formula should adjust prices so that the value of the cumulative slate balances is kept within a predetermined level of N\$3 million. In practice however, balancing the slate account has sometimes involved transfers from the budget to the NEF and then to the slate account (see Figure 2). The wholesale prices of all petrol grades and diesel are published in a government gazette at each price adjustment. Tax revenue data are published in budget documents.

The MME used a structured, balanced, and consultative approach to price deregulation and subsidy removal. The National Energy Council, chaired by the minister of mines and energy, established the National Deregulation Task Force in 1996 to examine fuel-price deregulation through a consultative process. This culminated in the publication of the White Paper on Energy Policy in 1998 (Namibia, 1998), articulating, among other issues, the importance of keeping targeted subsidies to remote areas, deregulating gradually, and enhancing transparency in government fuel-tax revenue. The fuel price mechanism with quarterly price reviews was adopted in 1997.

NEF expenditures to cover subsidies only started to decline after 2001. That was a full three years after the release of the White Paper on Energy Policy, an indication that the implementation of fuel subsidy removal takes time. In addition, as shown by the slate balance in Figure 2, close to full cost recovery by private firms only came after 2001.

Domestic fuel prices in Namibia increased steadily from 2003 onward and more than doubled from early 2007 to a peak in July 2008. In response to the 2007–08 fuel-price shocks, the authorities replaced the quarterly fuel price adjustments with monthly fuel-price reviews to increase pass-through. However, the MME did not allow retail prices to rise as fast as world prices, transferring funds from the NEF to the private petroleum firms to compensate them for keeping prices below cost recovery and thus subsidizing users, including the powerful interest group of taxi drivers. However, in July 2008, the MME announced that the NEF had come under financial pressure owing to underrecoveries and was no longer in a position to cushion increasing fuel prices.

Overall, although fuel prices have generally moved in line with international oil prices, the government has from time to time accommodated pressures to limit the full pass-through of changes in international prices. In the 2006–07 budget, the government made a one-off budgetary provision of N\$206 million (0.4 percent of GDP) to offset the NEF's accumulated losses. The government also faces contingent liabilities arising from Namcor's operational losses. In 2009, Namcor had operational losses of N\$257 million, prompting the government to award it a N\$100 million grant and a bailout package to the tune of N\$260 million (0.5 percent of GDP) as well as a portion (7.6 cents a liter) of the existing fuel levy to help boost the state-owned oil corporation's finances. In February 2011, Namcor lost its mandate to supply 50 percent of Namibia's total fuel requirements because of operational difficulties.

### **Mitigating Measures**

The fuel-price smoothing mechanism has been complemented by several mitigating measures to address the increases in fuel prices. Unlike its SACU counterparts, Namibia did not experience violent protests in response to rising fuel and food prices, although taxi drivers complained when fuel prices increased. This might be partly explained by the MME's fuel-price smoothing mechanism and other mitigating measures that were put in place in 2008 to address poverty and alleviate the temporary impact of high fuel and food prices. Mitigating measures included a zero-rate value-added tax on selected food items, rebate facilities for food importers, and a food distribution program to feed the most vulnerable. In addition, rural pump prices are subsidized as part of the socioeconomic policy of the government. This is

achieved by subsidizing transportation costs to remote areas to ensure that the pump price in remote areas is not inflated by retailers' transport costs. Claims on actual road deliveries are submitted by the oil companies to the MME for reimbursement from the NEF.

### Lessons

Comprehensive planning and gradual implementation were key to success. The Namibian authorities undertook comprehensive planning, which included broad consultation with civil society, culminating in a comprehensive reform plan that retained a targeted subsidy for remote areas.

Reforms were implemented gradually. This allowed enough time for consensus building between the government and various stakeholders.

Price adjustments that employed smoothing mechanisms helped prevent social unrest. The reform established a quarterly (later monthly) price adjustment mechanism in line with changes in international prices but incorporating a price-smoothing mechanism to avoid sharp price adjustments. This, along with the introduction of other mitigating measures, allowed Namibia to manage the large price shocks of 2008 and 2011 without social unrest.

Depoliticization of the price adjustment mechanism has been made difficult by legal obligations to the state-owned energy company. The legally stipulated participation of the state petroleum company in the importation and supply of petroleum products seems to have prevented a full depoliticization of the price adjustment mechanism (i.e., allowing prolonged underrecoveries). This in turn has resulted in large losses for the company that have had to be covered by fiscal transfers. This suggests the need to carefully design price smoothing mechanisms.

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## Niger<sup>36</sup>

### Context

Niger is a large and land-locked country that is extremely vulnerable to external shocks, mostly to climatic conditions and commodity prices (Table 3). In the past decade, growth has been slowly gathering momentum, though it has also suffered important setbacks. Niger's medium-term growth potential is linked to the expansion occurring in the oil and mining (uranium) sectors. The country recently became a fuel exporter, and uranium production is expected to double in the near future with the coming onstream of an important mine currently under development. In addition, the country has the potential to become a crude oil exporter, with five new oil production sharing agreements just signed. A new pipeline to link Niger with the Chad-Cameroon pipeline is planned.

Niger ranks at the bottom of the United Nations Development Programme's Human Development Index, with per capita GDP in PPP terms of US\$720 in 2010, one of the lowest in the world. Niger's government is highly centralized. The current authorities have been in power since April 2011, following a one-year transition to democracy after a February 2010 coup d'état. Since then, the political situation has been stable, although according to the World Bank (2012), there is a risk of political fragility "*where failure of the Government to deliver tangible results could result quickly in the loss of popular support and a political stalemate.*"

With the start of operations of its new oil refinery (SORAZ), fuel imports have come nearly to a halt since early 2012. Niger was an oil importer until end-2011. Its market size is small, with annual domestic consumption of about 7,000 barrels a day. The state-owned company SONIDEP has a monopoly on imports and distribution. The new refinery is expected to reach a maximum capacity of 20,000 barrels per day of fuel including gasoline, diesel, and liquefied petroleum gas (LPG). About one-third of the petroleum products produced by SORAZ feeds the domestic market, with the rest exported. SONIDEP is in charge of marketing the petroleum products.

This case study focuses on the period until end-2011, the period in which Niger was an oil importer. It builds on IMF technical assistance support provided to Niger in 2001 to elaborate a pricing formula akin to a full pass-through rule for the automatic adjustment of the price of imported petroleum products. In 2010, a note was prepared by the IMF Fiscal Affairs Department to support the authorities in their intention to eliminate the

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<sup>36</sup> Prepared by Clara Mira, African Department.

Table 3. Niger: Key Macroeconomic Indicators

	2000	2003	2008	2010	2011
GDP per capita (\$US)	155.0	223.8	361.0	363.6	420.7
Real GDP growth (percent)	-2.6	7.1	9.6	10.7	2.2
Inflation (percent)	2.9	-1.8	10.5	0.9	2.9
Overall fiscal balance (percent of GDP)	-3.8	-2.8	1.5	-2.4	-3.0
Public debt (percent of GDP)	118.8	90.1	21.0	23.7	29.2
Current account balance (percent of GDP)	-6.7	-7.5	-13.0	-19.9	-24.7
Oil imports (percent of GDP)	4.0	2.4	3.8	4.7	4.7
Oil exports (percent of GDP)	0.0	0.0	0.0	0.0	0.0
Oil consumption per capita (liters)	n.a.	n.a.	36.4	33.1	34.3
Poverty headcount ratio at \$1.25 a day (PPP) (percent of population)	n.a.	n.a.	43.6	n.a.	n.a.

Sources: International Energy Agency; World Bank, *World Development Indicators*; and IMF, *World Economic Outlook*.

posttax fuel subsidies, in the context of discussions with the IMF to prepare an assessment letter.

### Experience with Fuel Price Adjustments

According to the formula established with the help of technical assistance from the IMF in 2001, automatic pass-through of international prices would be achieved through a flexible, transparent, and automatic mechanism. The retail price would be adjusted monthly whenever the change in international prices was above CFAF 5. Otherwise, the price at the pump would not change and taxes would counteract the increase or decrease in prices. The pricing formula included fuel import costs (CIF import price at the port); estimated costs and margins of importing and distributing fuel to domestic consumers (storage and distribution margins); and net fuel taxes (ad valorem customs and value-added taxes and specific excise taxes). A multisectoral body was envisaged to be statutorily in charge of applying the formula; however, this body was never created.

As international prices started to increase in 2005, an explicit subsidy component was introduced in the formula. The subsidy was initially used to smooth domestic prices. Then, as international import prices increased rapidly and steadily up to mid-2008, the subsidy component rose to keep domestic retail prices fixed for extended periods. The increase in international prices and the depreciation of the euro resulted in a significant increase in the subsidies in 2010. Because fuel prices were substantially lower in Niger than in

some neighboring countries, increased smuggling contributed to a strong rise in fuel imports.

Changes in import prices without corresponding pass-through to retail prices resulted in a reduction of government tax revenue from fuels. The net fiscal contribution of fuel taxes decreased from 1 percent of GDP in 2005 to 0.6 percent in 2009 and to 0.3 percent in 2010. The cost of the subsidy on petroleum products amounted to more than 1 percent of GDP. Although this pattern applies to all products, the tax decline in gasoline was more pronounced, going from a peak of 0.8 percent of GDP in 2005 to 0.3 percent of GDP in 2009. Net taxes on diesel also declined from 0.3 percent of GDP in 2005 to 0.2 percent of GDP in 2009. The net tax on kerosene was continuously negative over this period, although the fiscal cost of this measure has been limited, as the share of kerosene consumption is fairly low.

As the subsidy reached unsustainable levels, the authorities decided to start implementing a strategy to gradually phase out subsidies. The size of the subsidy, together with its very regressive distributional impact, was a critical factor in the authorities' decision to eliminate it. Indeed, the population groups that benefited more from the subsidy were the higher income groups, who consumed more gasoline. While this is particularly the case in gasoline consumption, it is less so in the cases of kerosene and lamp oil, which are more widely consumed by lower-income groups. Fuel prices were increased by 12 percent in mid-2010 (Figures 3 and 4).<sup>37</sup>

The agreed reform contained two steps. First, international oil price variations would be passed through to domestic prices starting in June 2011. Second, the existing subsidy would be gradually unwound over the following 12 to 18 months. Fuel prices were increased by about 8 percent in mid-2011. As a result, the subsidy was significantly reduced, though not completely eliminated, and the total amount devoted to fuel subsidies in 2011 was kept below the 2010 level (1.1 percent of GDP).

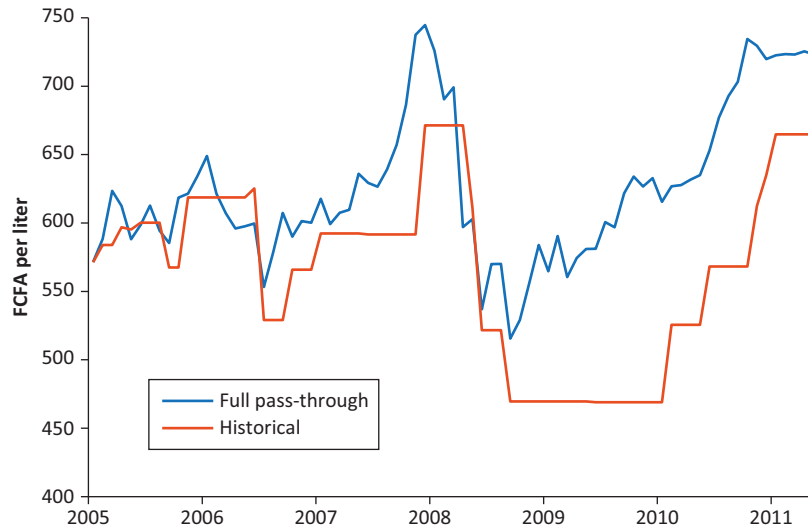
Country-specific circumstances and the political situation played key roles in the design and pace of the reform. First, the imminent start of domestic fuel production introduced urgency in the phasing out of the subsidies. The authorities thought that it would be politically unacceptable to increase prices exactly when domestic production was starting. In fact, the society was expecting the opposite. Second, the initial reforms (in late 2010 and early 2011) were implemented by a transitional government that believed it had less legitimacy to embark on such a sensitive reform process.

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<sup>37</sup> This is calculated as a weighted average of the prices of gasoline, kerosene, and diesel. Full pass-through includes import prices, taxes and margins in the formula. In both cases, price increases were considered preconditions for the IMF to issue an assessment letter, and to proceed with the ECF-supported program review.

**Figure 3. Niger: Fuel Price Developments, 2005–2011 (FCA franc per liter)**

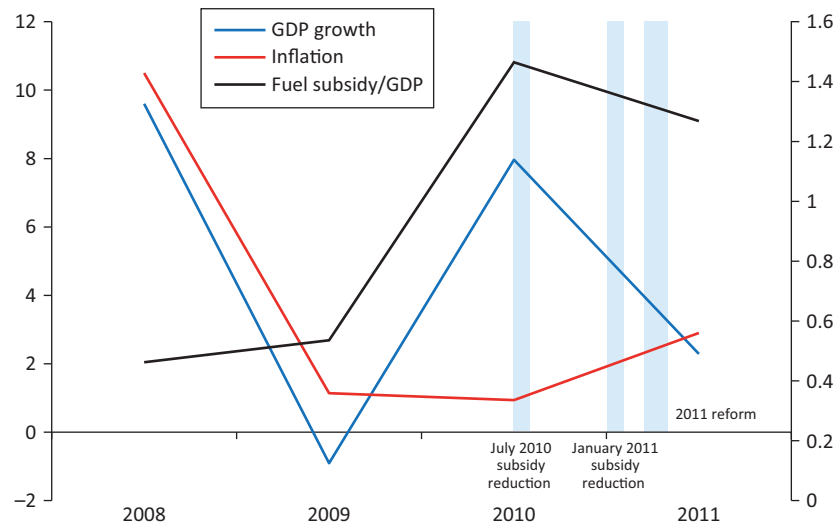
*Fuel prices have tended to lag international prices.*



Sources: Country authorities; and IMF Fiscal Affairs Department data.

**Figure 4. Niger: Macroeconomic Developments and Energy Subsidy Reforms, 2008–2011 (percent of GDP or rate)**

*Niger has tried to rein in on fuel subsidies in the context of volatile macroeconomic performance.*



Source: IMF staff estimates.

To increase public awareness about the dimension of the problem, for the first time the budget explicitly reflected the costs of the subsidy. This helped create an appropriate environment for the subsidy's elimination. In addition, and to help overcome vested interests and gain support from the civil society,

the government introduced public information campaigns pointing out the regressive nature of the subsidies and linking the savings from petroleum price increases to priority social spending.

The authorities opted for a consensual approach to the reform, incorporating all relevant shareholders. They established a committee (the “*Comité du Différé*”) to discuss the best way to approach the reforms and their subsequent implementation. In this context, dialogue and consensus building were key elements in the positive outcome of the process.

As a result of the reform, retail prices started increasing in June 2011, and continued to increase through August 2011, remaining fixed again from September until the end of the year. Indeed, the monthly cost of the subsidy reached nearly CFA franc 4 billion in May 2011, and was reduced to half of that from August onward. The authorities decided to stop the price increases in September because they believed the prices were then aligned with prices in the region.

However, prices were set below international prices once Niger started producing fuel domestically. As a result of an agreement between the authorities and the foreign investor in the petroleum sector, SORAZ started selling its fuel products at CFA franc 336 a liter for gasoline, and CFA franc 340 a liter for diesel, which are below the international prices. The prices were fixed for the first six months of operation of the refinery, with refined products’ prices set by a formula linked to world market prices after that period. Nonetheless, the prices did not change. More recently, an agreement has been reached between the government and the transportation trade unions aimed at developing proposals to further lower retail fuel prices. As a result, the fuel tax (*taxe intérieure sur les produits pétroliers, TIPP*) will be reduced from 15 percent to 12 percent starting in 2013.

The overlap of the subsidy reform with the start of fuel/oil production makes Niger a very special case. As a result, it is difficult to assess at this stage how durable the fuel subsidy reform would have been if domestic production had not started at the same time.

### **Mitigating Measures**

The more recent fuel price reform was accompanied by mitigating measures to protect the poorest segments of the population from increases in transportations costs. Following negotiations with the civil society and private sector operators, a direct subsidy to the transport sector was introduced (*tickets modérateurs*), because this sector was the most affected by the increase and the poorer people were the ones who used more public transport.

The costs of the subsidy policy were still reduced significantly because the costs of the mitigating measures (less than 0.1 percent of GDP) were significantly lower than the subsidy itself. The discontinuation of the subsidy on fuel products created room for a 19 percent increase in social spending in the 2012 budget compared to 2011, with particular emphasis on investment in education. The public wage bill was increased to accommodate the recruitment of 4,000 teachers in early 2012.

## **Lessons**

The extent of the fuel subsidy problem must be understood. Determining the distributional incidence of the subsidies can also help to ensure commitment to the reform.

Promoting an understanding of the issues by society as a whole is important. Being transparent about the costs of the subsidy by an explicit budget line proved very useful in Niger.

Planning an adequate public information campaign also played a crucial role in ensuring the support of the society for reform. In Niger, there were debates on TV and radio about this issue.

Adopting a participative approach to decision-making was also useful, particularly through the establishment of an ad-hoc and inclusive committee.

Sufficient time to explain, negotiate, and implement the reform must be allowed. Building reform momentum, stakeholders' consensus, and social support requires time. In Niger, ensuring that all stakeholders were on board and agreed with the main elements of the reform took about six months.

Engaging partners can help to ensure that there is sufficient information about the problem and put pressure to launch the reform process. A delicate equilibrium needs to be reached between encouragement and ownership of the reform process.

Ensuring that mitigating measures reach the most affected groups is crucial. These measures can take the form of targeted subsidies based on a detailed analysis of which would be the most affected vulnerable groups.

It must be recognized that fuel subsidy reform becomes more complicated when a country becomes an oil exporter. At such times, it might be more difficult to resist civil society's the expectations and pressures from the civil society to significantly lower pump prices.

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## Nigeria<sup>38</sup>

### Context

Nigeria is the world's fifth leading oil-exporting country (Table 4). The oil and gas sector accounts for around 25 percent of GDP, 75 percent of general government fiscal revenue, and over 95 percent of total exports. Nigeria's federalist fiscal relations are quite complex and driven by substantial (and constitutionally mandated) oil revenue-sharing among the federal government, 36 (oil-producing and non-oil-producing) states, and various local governments.

Nigeria has administratively set maximum prices for kerosene and gasoline and an indicative price for diesel. At the core of this system, which was established in 2003, is the Petroleum Products Pricing Regulatory Agency, which sets these prices every month. This agency applies import parity but is also expected to stabilize prices, which it does with the help of the Petroleum Support Fund (PSF). When total costs are below the maximum price, the marketer benefits from an "overrecovery;" if costs are above the maximum price, there is an "underrecovery." Any overrecoveries are paid into the PSF, supplementing the funds appropriated from the budget, while underrecoveries would be compensated from the PSF. The Petroleum Products Pricing Regulatory Agency posts product pricing templates for kerosene and gasoline on its website. They show the maximum prices but also the estimated costs of importing fuel—the so-called landing costs—and the costs of domestic distribution, decomposed into trading margins and fees, all of which are regulated.

Nigeria has subsidized kerosene and gasoline at a substantial cost to the government (Figure 5). Domestic fuel-price setting has never been responsive enough to changing international prices. Importers have typically been unable to recover costs, and so from the beginning the PSF never *received* payments, only *made* them. As the gap between the administered price and the import parity price increased, subsidy costs rose from 1.3 percent of GDP in 2006 to 4.1 percent of GDP in 2011 (Table 5). In 2011 the budget appropriation for the PSF was just 0.6 percent of GDP and funding for the subsidies came from Nigeria's oil stabilization fund (the Excess Crude Account). The price gap has encouraged widespread smuggling to neighboring countries and other abuses (e.g., overinvoicing of gasoline imports) that have contributed to the escalating costs.

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<sup>38</sup> Prepared by Anton Op de Beke, African Department.



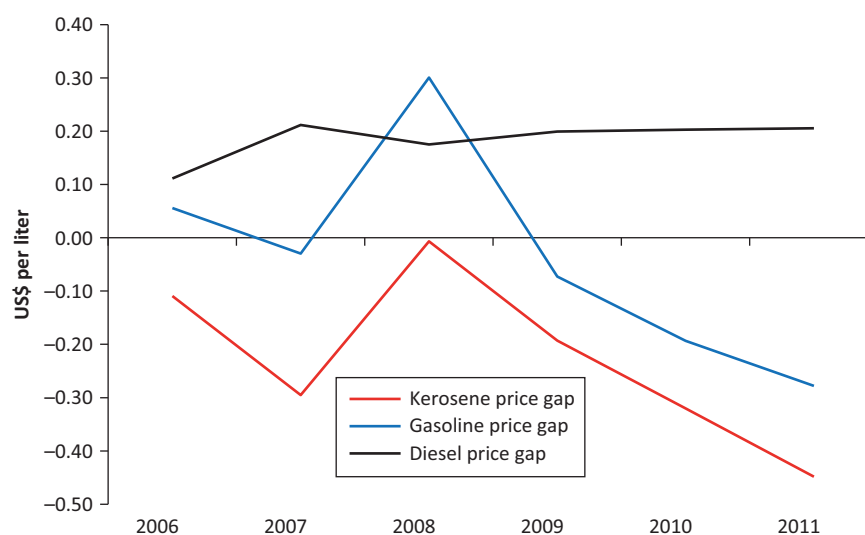
**Table 4. Nigeria: Key Macroeconomic Indicators**

	2000	2003	2008	2010	2011
GDP per capita (\$US)	390.0	524.3	1401.2	1465.1	1521.7
Real GDP growth (percent)	5.3	10.3	6.0	8.0	7.4
Inflation (percent)	6.9	14.0	11.6	13.7	10.8
Overall fiscal balance (percent of GDP)	12.4	-4.3	1.7	-4.2	0.1
Public debt (percent of GDP)	84.2	63.9	11.6	15.5	17.2
Current account balance (percent of GDP)	12.5	-5.9	14.1	5.9	3.6
Oil Imports (percent of GDP)	5.1	2.5	5.2	4.9	7.9
Oil exports (percent of GDP)	49.8	39.2	40.6	32.7	36.9
Fuel consumption per capita (liters)	n.a.	98.6	88.0	79.2	93.5
Poverty headcount ratio at \$1.25 a day (PPP) (percent of population)	n.a.	n.a.	n.a.	33.7	n.a.

Sources: International Energy Agency; World Bank, *World Development Indicators*; and IMF, *World Economic Outlook*.

**Figure 5. Nigeria: International and Domestic Fuel Prices, 2006–11  
(Difference between world price and domestic price, U.S. per liter)**

*Domestic fuel prices in Nigeria have recorded substantial gaps relative to international prices.*



Sources: IMF Fiscal Affairs Department and IMF African Department.

The subsidy regime has also been a disincentive to investment in domestic refining capacity. None of the 20 refinery licenses issued since 2000 have been used. Although Nigeria produces some 2.5 million barrels of oil a day, it is heavily dependent on the import of fuel products. Its four state-owned

**Table 5. Nigeria: Developments in Fuel Prices and Fuel Subsidies, 2006–12**

	2006	2007	2008	2009	2010	2011 Est.	2012 Proj.
Fuel Subsidy (billion Naira) <sup>1</sup>	251	290	637	399	797	1,761	1,570
Fuel Subsidy (percent of GDP) <sup>1</sup>	1.3	1.4	2.6	1.3	2.3	4.7	3.6
Fuel prices (Naira per liter)							
Diesel (deregulated)	81	90	118	94	112	152	144
Kerosene (subsidized)	50	50	50	50	50	50	50
Gasoline (subsidized)	65	70	70	65	65	65	97

Sources: Nigerian authorities and IMF staff calculations and projections.

refineries, operating sometimes at only about 20 percent of capacity and rarely above 40 percent, meet only about 20 percent of the domestic demand.

### Experience with Reform

In mid-2011 the government decided to radically curtail gasoline subsidies and waged a public campaign the rest of the year to convince the population. The debate on removal of fuel subsidies was initially supported by several state governors, who wanted to free up resources to be able to pay their civil servants the new minimum wage. This proposal was hotly debated in the press, by business and civil society groups, and it was debated in the National Assembly during the rest of the year, with the government strongly trying to make a convincing case. On January 1, 2012, the price of gasoline was raised to a cost-recovery level—a 117 percent increase. The price of kerosene, a cooking fuel used mainly by poorer households, was not changed. However, in response to intense social unrest, the government scaled back the price increase to 49 percent by mid-January. Evidently, despite six months of debate, the measure did not enjoy sufficient public support.

The main plank in the government's campaign for the subsidy removal was the Subsidy Reinvestment and Empowerment (SURE) Program. The SURE program was announced in November 2011. It was preceded by public statements by the president and budget documents (e.g., the 2012–15 Medium-Term Expenditure Framework and the Fiscal Strategy Paper) highlighting both the costs of the subsidies and the need to spend more on safety nets for the poor to mitigate the effects of the subsidy removal and on the construction of new refineries and the rehabilitation of existing ones. The SURE brochure summarized the government's case for subsidy removal (Box 1), spelled out how much the federal government and states and local governments stood to gain from the subsidy removal, and announced how the federal government would spend the money saved.

### Box 1. Nigeria: Rationale for Subsidy Removal

The government summarized its case for subsidy removal in the SURE brochure:

- Fixed prices have led to a huge unsustainable subsidy burden.
- Fuel subsidies do not reach intended beneficiaries, and they benefit mostly the rich.
- Subsidy administration has been beset with inefficiencies, leakages, and corruption.
- Subsidy costs have diverted resources away from investment in critical infrastructure.
- Subsidies have discouraged competition and stifled private investment in downstream petroleum.
- The huge price disparity has encouraged smuggling to neighboring countries.

According to the SURE brochure, savings from the removal of the fuel subsidy would be channeled into “a combination of programs to stimulate the economy and alleviate poverty through critical infrastructure and safety net projects.” Capital projects would be selected in line with the government’s Vision 20:2020 development strategy, in power, roads, transportation, water, and downstream petroleum. The potential impact of the subsidy removal on the poor would be mitigated “through properly targeted safety net programs.” The SURE brochure provided details on the various projects and programs to be undertaken, from the specific road segments to be built to the maternal and child health services to be upgraded.

The SURE program envisaged the creation of a specific subsidy savings fund to finance its spending initiatives. The fund itself and the specific spending programs would be overseen by an 18-person board, with a chairperson appointed by the president, and including only four government representatives and other members made up of respected individuals from a wide cross-section of civil society. The board would seek technical assistance from internationally reputed consulting firms, while an independent body would report to the board directly on implementation.<sup>39</sup>

The government’s attempts to win support for its subsidy reform met with strong opposition from powerful sectors of society. In early December 2011, the National Assembly came out against the removal of the gasoline subsidy, claiming that the measure was premature and not supported by firm data

<sup>39</sup> President Jonathan officially inaugurated the program on February 13, 2012, and appointed Dr. Christopher Kolade as Chair of the SURE Board.

underpinning the size and incidence of the subsidies. In response, the Ministry of Finance presented a Brief on Fuel Subsidies, laying out once again the case for removal, and supporting it with data on the explosive growth of the subsidies and comparing their costs with the government's capital expenditure and borrowing requirements (Okonjo-Iweala, 2011). In addition, several senior officials gave interviews and speeches during the last two weeks of December. However, trade unions were also voicing their strong opposition to the measure, echoing a widely held view that the proceeds from the subsidy removal would most likely go to fund wasteful government spending (including to corrupt politicians) rather than projects to benefit ordinary Nigerians (Okigbo and Enekebe, 2011). State governors who had generally supported the reform earlier were now silent. Throughout the period, the government had deliberately refrained from setting any date for the planned removal of subsidies.

The January 1, 2012, announcement came as a surprise and set off widespread protests across the country. On January 9, the two large union federations launched a national strike. Certain parts of the country experienced a near breakdown of law and order and there were a number of deaths related to violence and acts of intimidation associated with the strike. On January 15, the president announced that the January 1 price increase would be partly reversed and the new maximum retail price for gasoline would be N97 (US\$0.60) a liter, a 40 percent increase over its end-2011 level. However, he emphasized that the government would continue to pursue full deregulation of the downstream gasoline sector. The SURE program would go ahead but would be scaled back, in line with the reduced subsidy savings. The president also announced that the legal and regulatory regime for the petroleum industry would be "reviewed to address accountability issues and current lapses." Unions called off their strike that same day.

### **Mitigating Measures**

The SURE program outlined a variety of social safety net programs to mitigate the impact of removing the subsidy on the poor. The programs included:

- *Urban mass transit.* Increasing mass transit availability by facilitating the procurement of diesel-run vehicles (subsidized loans, reduced import tariffs, etc.) to established operators. In the first step of this program, the government intended to import 1,600 buses within months.
- *Maternal and child health services.* Expanding the conditional cash transfer program for pregnant women in rural areas; and upgrading facilities at clinics.

- *Public works.* Providing temporary employment to youth and women from the poorest populations in environmental projects and maintaining education and health facilities.
- *Vocational training.* Establishing vocational training centers across the country to tackle youth unemployment.

### Lessons

A well-thought-out public information and consultation campaign is crucial to the success of a reform. Although the government campaigned vigorously for removal of the subsidies, the measure was still highly controversial when it went into effect. The backlash had been predicted. The public communication campaign lasted only six months, and there was no broad popular consultation. The ministry of finance produced several short briefs to support its proposal, but these were issued several months into the campaign, and there was no comprehensive report.

The government must establish credibility for its promise that the proceeds from the removal of the subsidy will actually be used for the benefit of the broad population. Notwithstanding the laudable objectives of the SURE program and the plans for oversight by a highly reputable board of directors, the new administration had yet to establish that it truly would live up to commitments. On the contrary, it suffered from a very negative image of government held by the general public. As such, the subsidy reform was viewed very suspiciously, and the general public simply did not believe that the government would live up to its commitments.

Thorough research on the costs and beneficiaries of subsidies is important for bolstering the case for subsidy reform. The absence of good quantitative information on the state of Nigeria's refining industry and of the fuel subsidy mechanism itself allowed spurious arguments, often made by parties with vested interests, that government investment in the state-owned refineries and/or measures to stop abuse by marketers were preferable to removing the subsidies. In addition, the claim that subsidies mostly benefited the poor had been based on anecdotal evidence rather than on research based on household survey data.

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## CHAPTER

# 2

## Case Studies of Electricity Subsidy Reform

### Kenya<sup>40</sup>

#### Context

With an expanding economy (Table 6), Kenya has experienced a substantial increase in energy demand, estimated at 7 percent a year on average over the last six years (Ajodhia, Mulder, and Slot, 2012). Despite improvements in access rates and increases in capacity, electricity generation has not been able to keep up with the increase in demand, and power continues to be a constraint on growth. Kenya depends heavily on hydropower, which accounts for over 56 percent of installed capacity, for electricity generation; whereas thermal and geothermal energy sources account for 31 percent and 13 percent, respectively.

The Kenya Electricity Generating Company (KenGen) is the main player in the wholesale electricity market, accounting for 75 percent of installed capacity as of 2009. It sells power to the retail distributor under several power purchase agreements (PPAs). In addition, Kenya has five private Independent Power Producers (IPPs) that account for about 25 percent of installed capacity (World Bank, 2010). The Kenya Power and Lighting Company (KPLC) is responsible for transmission and distribution of electricity. Both KenGen and KPLC operate on a commercial basis and are listed in the Nairobi Stock Exchange. On the regulatory side, the independent Energy Regulatory Commission (ERC) regulates tariffs, issues licenses, and sets performance targets for KPLC (e.g., revenue collection, average waiting period for new connections, and system losses).

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<sup>40</sup> Prepared by Antonio David, African Department, with inputs from the IMF's Resident Representative Office Staff in Nairobi.

Table 6. Kenya: Key Macroeconomic Indicators

	1995	2000	2005	2009
Real GDP growth	4.0	2.5	6.1	4.1
CPI Inflation	8.9	8.0	11.1	6.7
Overall balance excluding grants (percent of GDP)	-0.8	-4.1	-4.7	-7.2
Total public debt (percent of GDP)	n.a.	53.1	45.1	44.8
Poverty headcount ratio at \$1.25 a day (PPP) (percent of population)	n.a.	n.a.	43.4	n.a.

Sources: World Bank, *World Development Indicators*; and IMF, *World Economic Outlook*.

### Experience with Reform

Reform efforts started in the mid-1990s with attempts to rationalize the sector by unbundling electricity generation from transmission and distribution and allowing for private-sector participation in the industry. The main objectives of the reform were to improve performance in the power sector, ensure the financial sustainability of the companies operating in the sector, and foster investment. Reform efforts culminated in the 2004 Energy Policy and the 2006 Energy Act. Substantial changes in the tariff structure first occurred in 2005, when revisions were introduced to reflect long-run marginal costs and automatically pass-through changes in fuel costs and exchange rate movements. Tariff reform has proved to be durable, but it is important to note that tariff increases occurred concomitantly with improvements in the quality of service. Furthermore, the reform process did not involve any retrenchment of staff in the utilities. The setting up of an Energy Tribunal to arbitrate on disputes between the ERC and stakeholders has been instrumental in creating a level playing field in the sector.

Tariffs are based on a formula that, in addition to the basic rate of charge, reflects long-run marginal costs and features a monthly automatic pass-through of generation-related fuel costs and adjustments for exchange rate movements. Furthermore, every six months the formula also takes into account adjustments for domestic inflation. Information on the calculation of tariff adjustments is readily available on the ERC's website. On the generation side, KenGen has long-term power purchase agreements with KPLC that determine prices and generally reflect underlying costs.

Moreover, residential electricity tariffs in Kenya are based on an increasing block tariff scheme (IBT), such that the unit price per kWh increases according to three defined blocks. The first block ranges from 0 up to 50 kWh per month at a rate of KSh. 2 per kWh. The second block ranges from 51 to 1,500 kWh per month at a rate of KSh. 8.10. Finally, the third block applies to households that consume more than 1,500 kWh per month



with a rate of 18.57 per KWh. Thus, the tariff rate charged to the highest block is over 828 percent higher than the rate applicable to the lowest one. Residential consumers also pay a fixed charge of Ksh. 120. Nonresidential consumers are charged different linear rates (which do not vary according to consumption levels) depending on their category (i.e., commercial, industrial, or government).

Earlier in the reform process, tariff increases faced significant difficulties and required intense negotiations, particularly with large consumers (Bacon, Ley, and Kojima, 2010). Key in securing the cooperation of the private sector was the commitment by the government that the additional cost of energy would help finance the development and expansion of domestic sources of renewable energy that would ultimately reduce the cost of power and strengthen competitiveness. Moreover, there was agreement among stakeholders that ensuring the financial soundness of KenGen and KPLC and setting up a tariff structure reflecting true costs were essential in order to attract foreign investors into the sector. Subsequently, owing to the negative impact of droughts in 2008 and 2009, a decision was taken to lower the value-added tax (VAT) rate on electricity from 16 percent to 12 percent.

Power pricing reforms in Kenya allowed tariffs to increase in line with costs from an estimated average of \$0.07 per kWh in 2000 to \$0.15 in 2006, and \$0.19 in 2009 (Table 7). The current electricity tariff structure for KPLC tariffs has been in place since July 2008. According to the World Bank (2010), currently the negotiations for tariff-setting and power purchase agreements are transparent; the regulatory framework in the sector is robust and resistant to political interference. However, planned increases in the basic tariff rate in June 2011 did not occur due to political economy constraints because the authorities believed the prevailing food and energy prices were already excessively high and some delays had been encountered in the implementation of new power generation projects.

**Table 7. Kenya: Key Power Sector Indicators**

	1995	2000	2005	2009
Access to electricity (percent of population)	11.791	13.102	n.a.	16.10
Electric power consumption (kWh per capita)	130.83	109.72	137.13	147.43
Electric power transmission and distribution losses (percent of output)	17.90	21.16	18.38	15.53
Electricity production (GWh)	3759	4098	5995	6875
Average tariff (\$/kWh)	n.a.	0.07	0.153	0.19

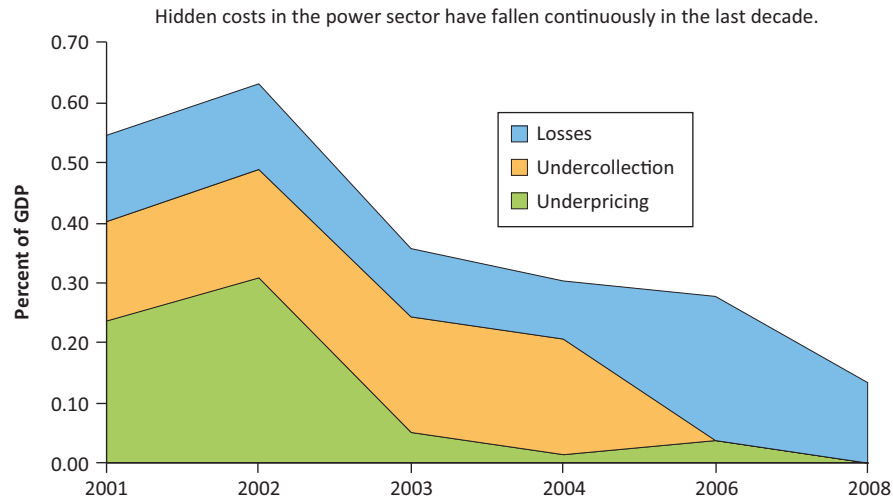
Sources: World Bank World Development Indicators, Africa Infrastructure Country Diagnostic (AICD) electricity database, Briceño-Garmendia and Shkaratan (2011a), World Bank (2010), and IMF staff estimates.

Durability of the reform depends crucially on political will. Without this, it is difficult to maintain an independent regulatory agency. The NPA is not free to adjust prices without the consent of the Executive. Although the government has committed to biweekly price adjustments to ensure cost recovery, this commitment often falters in the run-up to elections; the NPA has adjusted prices only three times (once downward) since January 2011.

As a result of tariff reform measures, the hidden costs of the power sector have decreased significantly in the 2000s, going from around 1.5 percent of GDP in 2001 to virtually zero by 2008 (Figure 6). In fact, the bulk of the reduction in costs is attributable to large decreases in underpricing, as tariffs were brought to cost-recovery levels, and reductions in undercollection through improvements in billing. Furthermore, by mid-2008, there were no explicit subsidies or fiscal transfers to power utilities.

Reforms are considered to have been largely successful with achievements that include rendering both the generation and distribution/transmission companies financially viable and increasing investment in generation capacity, including some private sector involvement. According to the World Bank (2010), reforms have resulted in significant operational improvements, including increases in revenue collection. The annual rate of new electricity connections increased from 43,000 in 2003/2004 to 200,000 in 2008/2009. Distribution losses in the power system also declined gradually from 21 percent in 2000 to 15.5 percent in 2009 (see Table 7). Revenue collection for KPLC improved from 81 percent in 2004 to 100 percent by 2006 (Foster and Briceño-Garmendia, 2010) before dropping back to about 98 percent,

**Figure 6. Kenya: Hidden Costs in the Power Sector, 2001–08**



Source: Briceño-Garmendia and Shkaratan (2011a).

according to the latest information provided by ERC. Labor productivity at KPLC (measured by the ratio of sales per employee or customers per employee) also improved substantially in 2004–09 (World Bank, 2010).

Despite significant progress, there still is a need to expand the power infrastructure to alleviate constraints on growth. The 2007 World Bank Enterprise Survey shows that more than 67 percent of firms in Kenya owned a generator and that power outages typically led to losses that amounted to 5 percent of annual sales for the firms surveyed.<sup>41</sup> Briceño-Garmendia and Shkaratan (2011a) present estimates that suggest that unreliable electricity supply reduces Kenya's GDP growth by 1.5 percent per year. Representatives from the Kenya Association of Manufacturers point out that power disruptions continue to affect their operations, despite a provision that prices charged by KPLC to its customers incorporate a requirement that system losses cannot exceed 15 percent.<sup>42</sup>

### **Mitigating Measures**

To address social objectives and affordability concerns, a number of measures have been adopted (World Bank, 2010; ERC website; Briceño-Garmendia and Shkaratan, 2011b). These include a rural electrification program that has helped increase the number of connections from 650,000 in 2003 to 2 million at present, a revolving fund for deferred connection fee payments (financed by donor funds), commercial bank loans for connection fees, and a “life-line” tariff (below costs) for households that consume less than 50 kWh a month, which is cross-subsidized by rates imposed on larger consumers.

The 50 kWh a month threshold is commonly used in Africa as a benchmark for the subsistence level of energy consumption. It is estimated to be affordable<sup>43</sup> for 99 percent of Kenyan households (Briceño-Garmendia and Shkaratan, 2011b). In addition, there are no cross-subsidies from urban to rural consumers, because tariffs are uniform across these areas.

Access continues to be a challenge, particularly in rural areas, where access rates are estimated at 4 percent in 2009 compared to 51 percent for urban locations. Briceño-Garmendia and Shkaratan (2011a) argue that Kenya

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<sup>41</sup> <http://www.enterprisesurveys.org/>.

<sup>42</sup> Members of the Kenya Association of Manufacturers account for approximately 60 percent of total industrial energy consumption.

<sup>43</sup> These authors define affordability as the percentage of households that are able to purchase a subsistence level of consumption of electricity of 50 kWh per month at the prevailing average effective tariff without spending more than 5 percent of their household budgets.

will need to double its current installed capacity over the next decade and will need to reinforce cross-border transmission links with neighboring countries to increase access to cheaper hydroelectric power and improve overall system security. Despite the scope to reduce energy costs through regional interconnections, exchanges across countries in the East Africa power pool are still small.

### **Lessons**

Successful electricity reform involves more than just tariff changes and takes time. The reform of the power sector in Kenya started in the mid-1990s and took more than 10 years to mature. Apart from a prudent tariff policy, improving the technical and administrative efficiency of state-owned companies was significant in eliminating hidden costs. The establishment of a relatively sound regulatory framework (including a regulator that is considered to be largely effective and independent) has also been vital to the durability of the reform process and has encouraged greater private sector participation in generation capacity.

Tariff increases were arguably made more acceptable because they were accompanied by improvements in the quality of service delivery and access. At the earlier stages of the reform process, authorities actively negotiated changes in tariffs with stakeholders demonstrating strong political commitment to addressing the challenges of the sector. At the moment, the transparent (with information regularly published on the ERC's website) automatic adjustments to changes in fuel costs, exchange rate movements, and inflation appear to be largely accepted by consumers. Nevertheless, political economy constraints have led to the postponement of a revision in the tariff structure scheduled for mid-2011.

The Kenyan experience also shows that with appropriate instruments, it is possible to reconcile tariff rates at cost recovery levels with affordability of services by poorer segments of the population. Estimates suggest most Kenyan households are able to afford basic electricity consumption at the effective tariff rate. In addition to the "lifeline" tariffs (cross-subsidized by large electricity consumers), authorities also implemented alternative mechanisms to alleviate the burden of connection fees, such as a revolving fund for deferred payments (financed by donors) and commercial bank loans.

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## Uganda<sup>44</sup>

### Context

Despite large potential for hydropower, Uganda has suffered for decades from power shortages. Uganda sustained high economic growth rates during the 1990s and 2000s, which contributed to rapid growth in energy demand (Table 8). The public utility Uganda Electricity Board (UEB) was not able to meet the growing demand partly because of weak financial conditions. Access to electricity was one of the lowest in sub-Saharan Africa, particularly in rural areas. Near exclusive dependence on hydropower before 2006 made Uganda vulnerable to weather shocks. Owing to financing constraints, the government was not able to provide adequate support to help UEB meet power demand and tap into the hydropower potential.

### Experience with Reform

Uganda initiated a comprehensive power sector reform program in 1999. After adopting a power sector restructuring and privatization strategy, a new Electricity Act was passed that aimed at creating an enabling environment for development of the power sector and for private sector participation. An independent regulatory agency, the Electricity Regulatory Authority (ERA), began operating in 2000. In 2001, UEB was unbundled into three separate entities: a generation company (the Uganda Electricity Generation Company Ltd., UEGCL), a transmission company (the Uganda Electricity Transmission Company Ltd., UETCL), and a distribution company (the Uganda Electricity Distribution Company Ltd., UEDCL). Given lack of access to electricity in rural areas, the Rural Electrification Agency (REA) was established in 2003.

Subsequently, separate private concessions were approved for the generation and distribution companies. In 2003, Eskom Uganda (a subsidiary of Eskom South Africa) was awarded a 20-year concession for the management of UEGCL's assets. In 2005, UMEME Ltd. was awarded a 20-year concession for the distribution company UEDCL, the first electricity distribution network concession in sub-Saharan Africa. The state-owned UETCL operates the high voltage transmission network and serves also as a bulk supplier to the distribution company. Because UETCL's bulk supply tariffs have been below cost-recovery levels, the government provided direct and indirect financial supports to UETCL.

The 2005–06 droughts led to an increased dependency on costly thermal power. Before the droughts, the power generation in Uganda was largely

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<sup>44</sup> Prepared by Mumtaz Hussain, African Department.

**Table 8. Uganda: Key Macroeconomic and Power Sector Indicators**

	2005	2007	2010
	<i>Macroeconomic Indicators</i>		
Real GDP growth (percent)	6.3	8.4	5.2
Inflation rate (percent)	10.7	4.4	4.2
Fiscal balance excl. grants (percent of GDP)	-7.6	-6	-7.3
	<i>Power Sector Indicators</i>		
Input energy (million kWh)	1846	1861	2456
Electricity consumed (million kWh)	1139	1204	1731
Distribution losses (percent)	38	35	30
Collection ratio (percent of all bills)	81	93	96
Effective tariff (U.S. cents/kWh)	9	18	16
Average revenue (U.S. cents/kWh)	8	17	n.a.
Average cost (U.S. cents/kWh)	13	23	26

Sources: Uganda Ministry of Energy and Mineral Development (2012a); Ranganathan, and Foster (2012); and IMF *World Economic Outlook* database.

**Table 9. Uganda: Explicit Power Subsidies and Cost of Thermal Generation**

	2006	2007	2008	2009	2010	2011
Explicit power subsidy						
US\$ million	60.11	51.28	87.56	112.87	151.05	174.80
percent of GDP	0.6	0.4	0.7	0.8	1.0	1.1
Thermal power (GWh)	370	539	590	896	1022	1029
percent of total energy	23.3	29.0	28.9	39.5	41.6	38.9
Average oil price per barrel (000 Ush)	131	132	210	132	173	253
percent change (y-o-y)		1	60	-37	32	46
Thermal power costs (in percent of GDP)	0.9	1.1	1.3	1.3	1.5	1.7

Sources: Uganda Ministry of Energy and Mineral Development (2012b); and IMF *World Economic Outlook* database.

Subsidy figures are for fiscal years, which start in July. Data for 2011 are preliminary.

hydrobased. To offset the power shortfall caused by the drought and to meet growing demand, the authorities contracted rental thermal plants, increasing the share of thermal power from about 7 percent in 2005 to about 39 percent in 2011 (Table 9). Despite increased thermal power, power cuts were common. According to a 2006 World Bank survey, about 45 percent of firms cited power as a major constraint to doing business. Despite relying on generators to self-supply for as much as 30 percent of their power, these firms lost 10 percent of their sales because of power cuts.

Explicit budgetary support for the power utility has risen steadily since 2005. The explicit subsidy comprised two mechanisms: direct budgetary support to UETCL (bulk supplier) and capacity payments to thermal power units. In FY 2010/11, direct subsidy costs represented 1.1 percent of GDP (See Table 9). The 2012 tariff increase eliminated explicit subsidy costs when the Bujagali hydrogeneration unit became fully operational in late 2012. With increased hydrogeneration capacity, the government will avoid purchase of expensive thermal power, though it will still need to make capacity payments to the IPPs.

Private concession of the distribution company has produced slow but steady improvements. First, distribution line losses have steadily fallen from 38 percent in 2005 to 28 percent in 2011. Similarly, the collection rate increased from 80 percent of total power bills in 2005 to 96 percent in 2011. To attain these improvements in the distribution system, UMEME invested US\$105 million by end-2010—more than envisaged in the contract (Uganda Ministry of Energy and Mineral Development, 2012). After little progress in 2005–08, UMEME increased the number of customers by more than 30 percent by 2009–10. The increased power supply is expected to boost further the access rate. Notwithstanding this progress, about one-third of electricity supplied is still not paid for, owing to distribution and transmission losses and noncollection of bills.

Once the latter losses are accounted for, the quasi-fiscal deficit of the power system has also increased over time.<sup>45</sup> The quasi-fiscal deficit (QFD) of the power sector would have amounted to 2.6 percent of Uganda's GDP in

**Table 10. Uganda: Quasi-Fiscal Deficit of the Power Sector**

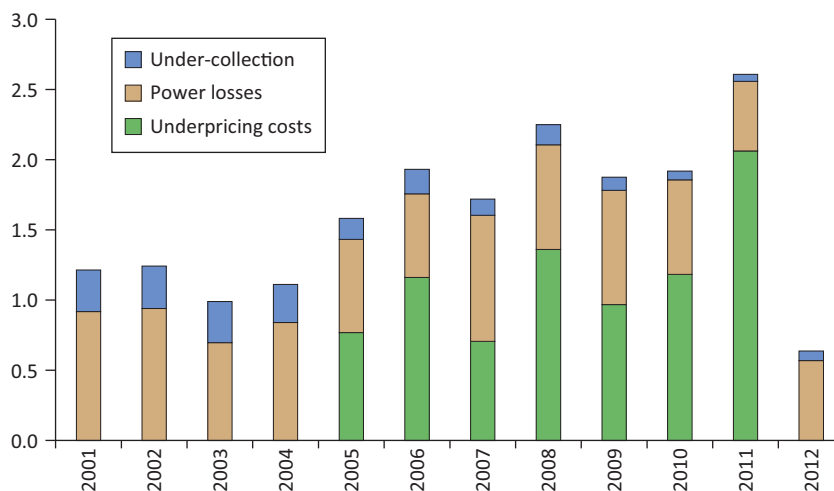
	2005–08		2009–11	
	In percent of costs <sup>1</sup>	In percent of GDP	In percent of costs <sup>1</sup>	In percent of GDP
QFD due to underpricing	32.8	1.0	40.1	1.4
QFD due to distribution losses (up to 10 percent)	6.7	0.2	6.0	0.2
QFD due to distribution losses (over 10 percent)	17.0	0.5	12.5	0.4
QFD due to undercollection	4.6	0.1	1.9	0.1
Total quasi-fiscal costs	61.1	1.9	60.5	2.1

Sources: Staff calculations based on data from the World Bank, World Economic Outlook, and country authorities.

<sup>1</sup> In percent of total cost of electricity production.

<sup>45</sup> The QFD of a power utility is defined as the difference between the actual revenue collected at regulated electricity prices and the revenue required to fully cover the operating costs of production and capital depreciation. This measurement of QFD captures both the explicit and implicit electricity costs arising from underpricing of electricity, nonpayment of utility bills, and excess line losses.



**Figure 7. Uganda: Quasi-fiscal costs of the power sector (in percent of GDP)**

Sources: IMF staff calculations.

2011—of which about 1.1 percent of GDP were explicit fiscal costs. The QFD continued to grow even after some progress in reducing inefficiencies, largely because of the rising gap between average effective tariff and average cost of electricity (Table 10). Growing demand also contributed to the QFD—consumption almost doubled between 2006 and 2011. In any case, QFDs in Uganda have been driven primarily by underpricing; in 2011 it accounted for about 80 percent of the QFD (Figure 7).

Uganda's long-run marginal costs can be substantially lower than the current average costs, but subject to substantial investments. By developing its hydropower potential the country can reduce costs from US\$0.166 to around US\$0.12 a kWh (Ranganathan and Foster, 2012). The Bujagali power project was the first step, while other major hydro projects are currently being finalized that could double the capacity in a few years.

Past attempts to bring power tariffs to cost-recovery levels were not enough to catch up with increasing costs. In June and November 2006, power tariffs were increased by about 35 and 41 percent, respectively (World Bank, 2011). These tariff hikes raised the average effective tariff to US\$0.18 a kWh. In 2007–09, no retail tariff adjustments took place, while generation costs kept rising mainly on account of rising fuel prices, delays in the commissioning of the Bujagali hydropower project, and the depreciating schilling.<sup>46</sup> In January 2010, retail power tariffs were modified to give some relief to household

<sup>46</sup> In addition, prices of fuel (mainly diesel) in Uganda are relatively high compared to other countries in East Africa—prices were, on average, 20–25 percent higher than those observed in Kenya in the past 10 years.

consumers. Retail effective tariffs only covered about two-thirds of the costs of power production in 2010 (World Bank, 2011).

To offset rising power costs and associated subsidies, the ERA approved a substantial increase in retail tariffs in January 2012. The average effective tariff was increased about 41 percent (or US\$0.05 a kWh). At the time of the hike, new tariffs were still below the cost-recovery levels, and they were expected to become in line with the cost recovery once the Bujagali hydropower project becomes fully operational in late 2012. The cross-subsidization from households to industrial consumers was also reduced significantly. The new tariff for these users was set at US\$0.128 a kWh—an increase of about 73 percent. The lifeline tariff remained unchanged. Following the latest tariff increase, Uganda's power tariffs are in line with other members of the East African Community (EAC).

Although the recent tariff hike was not without controversies and protests, the government's determination and effective communication have helped to sustain it. The government has run a strong communication campaign to explain the factors that led to the current tariff hike. It was noted that the price of diesel almost doubled since the last tariff increase in 2006 and that the government was subsidizing consumption as average tariffs remained below unit costs. Although the chairman of the Uganda Manufacturers Association pointed out that the new tariff would automatically increase production costs, he also acknowledged that the new tariffs would be bearable if power supply was reliable.

The extent of protests was limited. There were some protests in Kampala and a big political debate in parliament about the tariff hike. The government argued that there were simply no resources to continue subsidizing electricity for a small and relatively rich elite. Low access to power also helped because about 88 percent of the people without access to electricity were not interested in the protests. Some newspapers highlighted the fact that the subsidy accrues disproportionately to the rich and emphasized that the tariff hike would be actually a pro-poor policy decision. Importantly, the lifeline tariff was maintained.

Overall, a variety of factors helped to create an environment that allowed the authorities to raise power tariffs in early 2012:

- *The increasing and unsustainable fiscal costs of thermal power with rising fuel prices.* In recent years, the government repeatedly ran arrears in payments for thermal power. In 2011, the explicit fiscal subsidy reached more than 1.1 percent of GDP.
- *Poorly targeted electricity subsidies.* Before the recent tariff hike, large industrial consumers paid less than a quarter of the cost of producing

a kWh. These consumers accounted for 44 percent of total power consumption in 2010. Thus, almost two-thirds of the power subsidy accrued to a small group of industrial consumers. Among households, only 12 percent of Ugandans have access to the national power grid, while the rest rely on unsubsidized kerosene and firewood. The poor generally do not have access to the electricity grid, and the initial power connection costs (about US\$80) are prohibitive (Mwenda, 2012).

- *Evidence that both industrial and household consumers were willing to pay substantially more than the prevailing tariffs in 2010.* A World Bank report noted that the average coping cost for intermittent power supply was US\$0.30 a kWh (or US\$0.35 including fixed costs). For residential customers, the willingness to pay would be US\$0.498 kWh.
- *Investments in hydropower infrastructure* leading to a reduction in electricity provision costs over the medium and long term.
- *Limited access to power in Uganda.* As of 2010, only 12 percent of the population (under 4 percent of rural population) had access to power. This is less than half the rate observed on average in other low-income African countries.

### Mitigating Measures

The key explicit mitigating measure to power tariff reform is the lifeline tariff for low-income consumers. Uganda has a lifeline tariff for poor domestic consumers for power consumption up to 15 kWh a month. This lifeline tariff has remained unchanged at US\$ 100 per kWh.

### Lessons

The Ugandan case clearly shows that a key impediment to addressing inefficiencies in a power utility is lack of investments. Because UMEME made substantial investments, it was able to reduce distribution losses and improve collection, while increasing the access rate by about 50 percent in the last three years.

Poor financial performance of power utilities is not only caused by the government's desire to maintain low tariffs. Their performance is equally affected by high levels of distribution network losses and undercollection of bills. Therefore, increasing power tariffs alone will not be enough. Power tariffs should be set at economic levels but need to allow for a reasonable level of line losses. In addition, the utility's financial sustainability needs to be pursued through measures to improve efficiency. Regulatory policies can help provide utilities with appropriate incentives to improve efficiency.

Institutional reform of the power sector takes time (i.e., 5 to 10 years). Uganda started its reforms in 1999 and took more than 10 years to make progress obvious (in terms of access rates, efficiency measures, fiscal burden, etc.). The reforms led to establishment of a largely independent regulator with a relatively sound regulatory framework, greater private sector participation in electricity generation and distribution through concessions, and tariff policies that are expected to eliminate hidden costs by the end of 2013.

Tariff increases require a careful strategy for communication and implementation. The Ugandan government communicated well the cost of the power subsidy and its incidence to the public. A large portion of the media considered increasing tariffs a pro-poor measure.

Raising access to power is challenging. Targets for rural electrification had to be revised from 2010 to 2012. It is noted that the high cost of getting a new power connection is a major impediment to accessing power.

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