



# Rethinking Electricity Tariffs and Subsidies in Pakistan

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Policy Note

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## Abbreviations

ADB	Asian Development Bank
AEDB	Alternative Energy Development Board
BISP	Benazir Income Support Program
CHASHNUPP	Chashma Nuclear Power Plant
CPPA	Central Power Purchasing Agency
DISCO	distribution company
ED	Excise Duty
FATA	Federally Administered Tribal Areas
FBS	Federal Bureau of Statistics
GDP	gross domestic product
GENCO	generation company
GOP	government of Pakistan
GST	general sales tax
HDIP	Hydrocarbon Development Institute of Pakistan
IBT	incremental block tariff
IPP	independent power producer
KANUPP	Karachi Nuclear Power Plant
KESC	Karachi Electricity Supply Company
kWh	kilowatt hours
MWP	Ministry of Water and Power
NEPRA	National Electric Power Regulatory Authority
NEPRA	National Electrical Power Regulatory Authority
NTDC	National Transmission and Dispatch Company
NYSE	New York Stock Exchange
PBP	PEPCO Business Plan
PEPCO	Pakistan Electric Power Company
PPIB	Private Power Infrastructure Board
PSIA	Poverty and Social Impact Analysis
PSLM	Pakistan Social and Living Standards Measurement Survey
Rs	rupee
T&D	Transmission and Distribution
TDS	tariff differential subsidy
TFC	term finance certificates
TOU	time of use
tWh	terawatt hours
WAPDA	Water and Power Development Authority

## Contents

1	Executive Summary.....	1
2	Introduction .....	3
3	Overview of Pakistan’s Electricity Sector.....	4
4	Fiscal Burden of Subsidy .....	11
5	Benefit Analysis.....	13
6	Scenario Analysis.....	16
7	Transition Paths—The Political Economy of Policy Changes .....	18
8	Summary of Findings and Policy Implications.....	19
	References .....	22
	Annexes.....	23
	Annex 1—Technical Notes on Benefits Analysis Methodology .....	23
	Annex 2—Industry Governance and Structure .....	25
	Annex 3—Electricity Supply and Demand .....	27
	Annex 4—Electricity Tariff Setting Process.....	28
	Annex 5—Slab Benefits Tariff Reform .....	29

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## 1 Executive Summary

The global oil crisis of 2008 increased the fiscal burden of maintaining generous subsidies that have existed for decades. More recently, these subsidies have been the driving force of ever more precarious fiscal imbalances. In response, the government of Pakistan increased electricity tariffs significantly in nominal terms, but a challenge of such adjustments is how to minimize their impact on the poor and vulnerable. Using household survey data, this report studies the distributional and fiscal implications of the recent tariff adjustments, more specifically adjustments between March 2008 and March 2011, to inform policy dialogue on the provision and targeting of electricity subsidies.

The analysis shows that given the current cost of electricity supply, the March 2011 tariff structure would improve the benefit incidence of electricity subsidies for residential users and reduce fiscal burden significantly in comparison to March 2008. For example, our estimations suggest the share of electricity subsidies for the richest 20 percent of the population declined from nearly 40 percent in March 2008 to 29 percent in March 2011. Despite this improvement, the richest households remain the greatest beneficiaries of the subsidies. Also, while the fiscal burden of electricity subsidies increased in nominal terms during the same time period, it declined by almost 60 percent in real terms.

However, the analysis also reveals the fragile nature of the above improvements. For example, despite the improvement in benefit incidence, the biggest beneficiaries of the electricity subsidies would still be the richest 20 percent of population. Also, even under the March 2011 tariff structure, we estimate that over 90 percent of residential electricity consumers are net subsidy recipients; or in other words, less than 10 percent of consumers pay more than the cost-recovery level.

More importantly, the significant improvement in benefit incidence and fiscal implications can be largely attributed to a reduction in real cost of supply as a result of reduction in oil prices since March 2008. According to our scenario analyses, if the average cost returned to the March 2008 level in real terms, almost all the improvements in benefit incidence and fiscal burden would be lost.

The results of the benefits incidence and scenario analyses have a number of policy implications for the fiscal burden of subsidies, and their ability to protect the poor and vulnerable efficiently.

First, in the short run, these results underpin the importance of proper implementation of the fuel price adjustment policy, in place since August 2009. With oil prices now resurging, and the fiscal burden and benefits incidence so dependent on cost of supply, continuing these adjustments will help prevent deterioration in fiscal burden of the subsidies.

Second, beyond fuel price adjustments, it is more important to move tariff rates further toward the cost-recovery level, along with revisions on tariff structure. Despite multiple increases in tariff rates since March 2008, the March 2011 tariff structure was still far from a cost-recovery level. As global oil

prices resurge, more drastic and timely tariff adjustments will be necessary to make significant improvements in the fiscal and distributional implications of electricity subsidies.

One option to achieve this could be revisions of the tariff structure. With less than 10 percent of electricity consumers facing marginal tariff rates higher than the average cost of electricity supply, it may be possible to simplify the tariff structure (for example, to three or four slabs instead of five) and reevaluate existing slab thresholds so that more consumers are within a cost-recovery slab. Special attention will be needed to understand how the poor might be protected from such changes; some poor households consume a relatively large amount of electricity, for example, we estimate that approximate 25 percent of the poorest quintile consume more than 100 kilowatt hours [kWh] per month.

Third, related to the tariff structure, the Rs 75 minimum charge for lifeline users needs careful reconsideration. Because of the minimum charges, the average cost of electricity for many lifeline users is far higher than other users, even though their marginal rate is the lowest. Having a lifeline tariff is ineffective alongside the Rs 75 minimum charge.

Fourth, given their poor targeting performance, we suggest electricity subsidies should be reevaluated as a means for providing social protection. Despite improvements in the distribution of subsidy benefits, rich households still receive a disproportionate share. Alternative policy instruments such as a targeted conditional cash transfer program will likely be more efficient in protecting the poor. In this situation, a package of policy instruments could be considered, including the gradual transition from subsidies to conditional cash transfers. Recent experiences in the region, such as in the Islamic Republic of Iran, could provide good examples for Pakistan.

Finally, it is important to recognize this analysis focuses on the distributional and fiscal implications of the recent tariff adjustments, and does not include a thorough analysis on political feasibility. We recognize that the political economy realities of the power sector in Pakistan—where electricity subsidies have become a social norm—make any adjustment on tariffs extremely difficult. The government will need to consider especially carefully potential public unrest resulting from continuing blackouts, versus public unrest from rising tariffs, and the key role that well-planned transition paths and public communication programs could have in mitigating such unrest. This is not the first report to flag the critical nature of the energy sector or the possible technical solutions. While this report offers a refreshed analysis with the latest data available, it is only one piece of the much broader analysis necessary to identify and design politically feasible and implementable policy changes.

## 2 Introduction

Pakistan's electricity sector is in crisis: extended periods of blackouts persisted in 2010<sup>1</sup> and circular debt is increasing (see Box 1). Despite investments in generation capacity, electricity demand continues to exceed supply,<sup>2</sup> with blackouts as long as 8–10 hours per day in cities and sometimes double that in rural areas, and is widely recognized as a severe obstacle to growth and poverty reduction. In November 2010, the government was forced to rent the world's largest power ship to boost generation capacity.<sup>3</sup> Meanwhile, the government of Pakistan's (GOP) inability to finance its commitment to fund subsidies, inefficiencies of the sector entities including low collections, delays in determination and notifications, and increased cost of fuel imports contribute to an increasingly severe circular debt problem.

While significant reforms including tariff increases have been implemented, further adjustments are needed to stem the electricity crisis. This policy note presents two analyses based on the latest tariffs available (from March 2011), with the specific objective of informing forthcoming policy discussions on revising the tariff structure: i) an analysis of the fiscal burden and how this should change given recent tariff changes, and ii) a benefits incidence analysis to understand how efficient subsidies are as a mechanism for protecting poor households.

### Box 1: Intercorporate Debt (Circular Debt)

Circular debt is created in the power sector when end-customers (both public and private) do not fully pay their electricity bills to distribution companies and the GOP is not able to fully furnish its commitment to fund subsidies paid to distribution companies. As a result, the distribution companies are unable to pay their power purchase cost to CPPA/single-buyer, who is in turn unable to fulfill its obligation to power generation companies. And the power generation companies (public sector generating companies [GENCOs], Karachi Electricity Supply Company [KESC], and independent power producers [IPPs]) fail to pay fuel suppliers. The fuel suppliers in turn default on their payment to refineries, gas producers, and international fuel suppliers.

The term 'circular debt' is based on the fact that the two gas utilities, Pakistan State Oil, and major oil and gas producers are also in government ownership. Because the government is partially responsible, we are cautious to use the term 'circular debt,' as it is commonly known; we think the term 'intercorporate debt' is more accurate in this sense.

According to the Ministry of Finance, net intercorporate debt on April 16, 2010, was Rs 115 billion (US\$1.34 billion), down from Rs 216 billion (US\$2.5 billion) on June 30, 2009, due to federal government support in the form of subsidy and payment of FATA arrears.

In addition to inefficient revenue collection and the high dependence on imported oil (and associated price volatility in 2009 and 2010), the system of electricity subsidies in particular is a major cause of the intercorporate debt issue. This includes the inability for distribution companies (DISCOs) to pass on the cost of electricity to customers, along with an inability of the government to pay the tariff differential subsidy (TDS), the difference between the applied tariff and the determined tariff) in a timely manner.

<sup>1</sup> Examples from local media: <http://www.dawn.com/2010/12/26/12-hour-loadshedding-belies-pepco-claim.html> and <http://tribune.com.pk/story/57959/electricity-shortage-14-hours-in-the-dark/>.

<sup>2</sup> A difference that peaked at 5,000MW in summer of 2010—see Annex 3.

<sup>3</sup> See <http://www.dawn.com/2010/11/22/turkish-ship-to-provide-electricity-to-karachi-raja-ashraf.html>.

### 3 Overview of Pakistan’s Electricity Sector

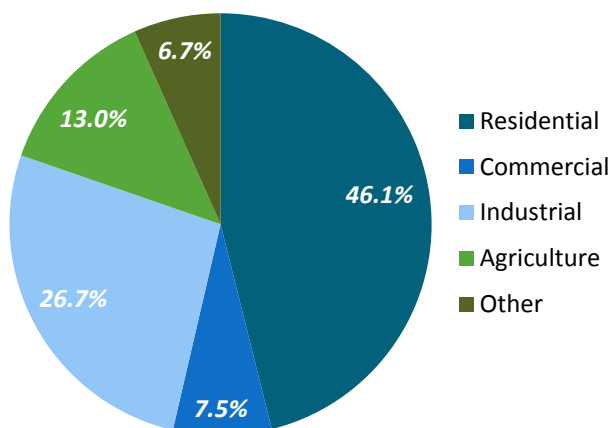
This section provides an overview of some of the key elements of the electricity sector in Pakistan as they relate to the benefits incidence analysis. Additional background information on the electricity sector can be found in the annexes of this report.

#### The residential sector is the most significant for electricity consumption

**Figure 1**

**Pakistan Electricity Consumption by Sector (FY10, Public Utilities Only)**

Source: Pakistan Energy Yearbook 2010.



This paper focuses on electricity consumed by residential households, the most significant sector for electricity consumption in Pakistan. Residential consumption accounted for almost 50 percent of electricity consumption in FY10 (Figure 1).

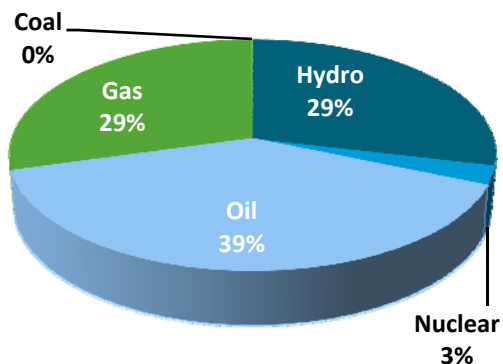
#### Oil has replaced natural gas as the key source of energy for electricity

Over two-thirds of electricity production<sup>4</sup> in FY10 came from fossil fuels, mostly from oil. Around 30 percent came from hydropower, and 3 percent from nuclear power (Figure 2). There has been a major shift toward oil fuel

and away from lower-cost domestic natural gas (Figure 3). Pakistan's oil sector (22 MTOE [million tons of oil equivalent]) is small compared to global oil supplies of 85 million barrels (BBL)/day (4,300 MTOE), meaning Pakistan has had to import significant quantities of the oil needed for electricity generation.

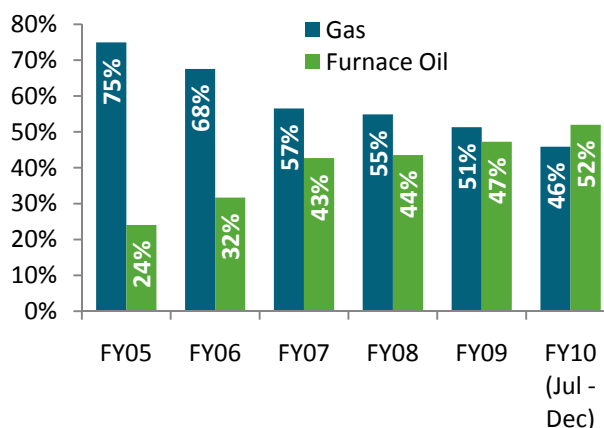
**Figure 2**

**Electricity Generation, FY10**



**Figure 3**

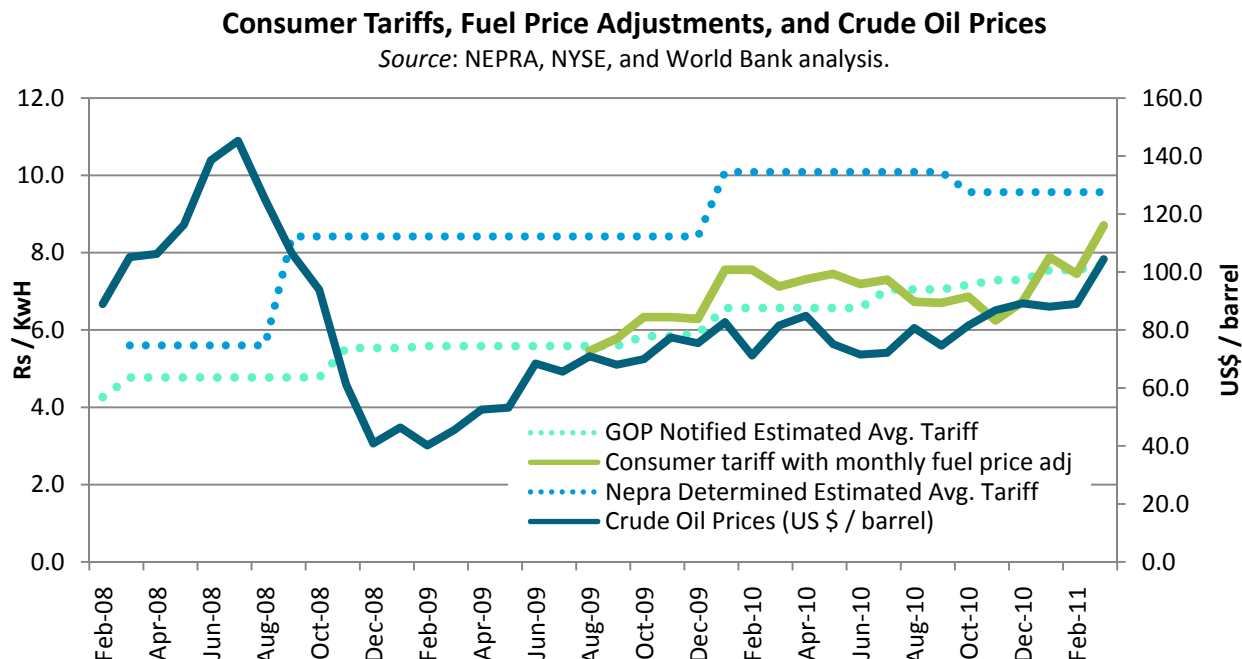
**Fuel Mix in Thermal generation**



<sup>4</sup> 95.6 terrawatt hours (TWh) in FY10, up from 91.8 TWh in FY09 (Pakistan Energy Yearbook 2010, HDIP)

This shift has happened at the same time as a period of volatile oil prices (Figure 4). As concern rises over increasing oil prices, one of the key issues we explore in this paper is the impact on the benefits incidence and fiscal burden if oil prices were to return to 2008 levels.

**Figure 4**



With crude oil production limited to 64,948 barrels per day (equivalent to 0.065 million barrels per day)<sup>5</sup> and low refining capacity, imports of crude oil and oil products accounted for 83 percent of oil supplies during FY10. The high dependence on imported oil for electricity production places considerable strain on the economy by raising the external current account deficit and worsening the country's balance of payments position (compared to domestic gas and hydropower). This is despite huge potential in (significantly lower-cost) hydropower: current generating capacity is 6,500 MW, although a recent study by the Asian Development Bank (ADB) estimates this could be as high as 54,000 MW.<sup>6</sup> Moreover, hydropower used to hold a much larger share of the energy mix: in 1985, hydropower accounted for 52 percent of power, compared to 29 percent in FY10.

#### **Brief description of electricity tariff structure in Pakistan**

For residential customers, Pakistan's electricity tariff adopts an incremental block tariff (IBT) structure, where a unit price increases in the amount of electricity use. There are many rationales for the IBT in Pakistan, but the main one is to protect lifeline (or extremely small) users.<sup>7</sup> For example, as of March 2008, an electricity user was charged Rs 1.4 per kilowatt hour up to 50 kWh per month. Above this

<sup>5</sup> Pakistan Energy Yearbook 2010, Table 2.2.

<sup>6</sup> Integrated Energy Sector Recovery Report and Plan, October 2010, ADB (<http://www.adb.org/documents/reports/energy-recovery-report/default.asp?p=pakpubs&p=pakmain>).

<sup>7</sup> Another is that it enables cross-subsidization between high-volume customers and low-volume customers, although this will be limited in Pakistan given the low volume of consumption in the higher slabs (see Figure 6).



amount, the user faced a charge of Rs 3.08 per kilowatt hour for the first 100 kWh per month; then Rs 4.08 until 300 kWh; then Rs 6.53 until 700 kWh; and finally Rs 7.79 for use above that level (see Table 1). There is also a minimum charge of Rs 75 for a single-phase connection and Rs 150 for a 3-phase connection applied to all customers (including lifeline customers).<sup>8</sup>

**Table 1**

**Electricity Tariff Structure for Residential Users, Nominal Prices (March 2008 and March 2011)**

kWh/month	Notified consumer tariffs (Rs/kWh)		
	March 08	March 11	% increase
Up to 50	1.40	1.87	34
0–100	3.08	4.45	44
101–300	4.08	6.73	65
301–700	6.53	10.65	66
Above 700	7.79	13.29	74
<b>Average cost of electricity supply (Rs/kWh)</b>			
	8.21	9.57	

**Source:** Pakistan Electric Power Company (PEPCO).

**Note:** The March 2011 tariff notification also imposes a 2 percent surcharge levied on all consumers/consumer categories except for residential consumption up to 300 kWh. In May, this surcharge was raised to 4 percent and aims to minimize the fiscal burden of subsidies.

<sup>8</sup> Time-of-use (TOU) tariffs constitute a small portion, and although the deadline to replace TOU meters for sanctioned loads above 5 kW is June 30, residential consumers are not a top priority for the meter replacement program by the DISCOs.

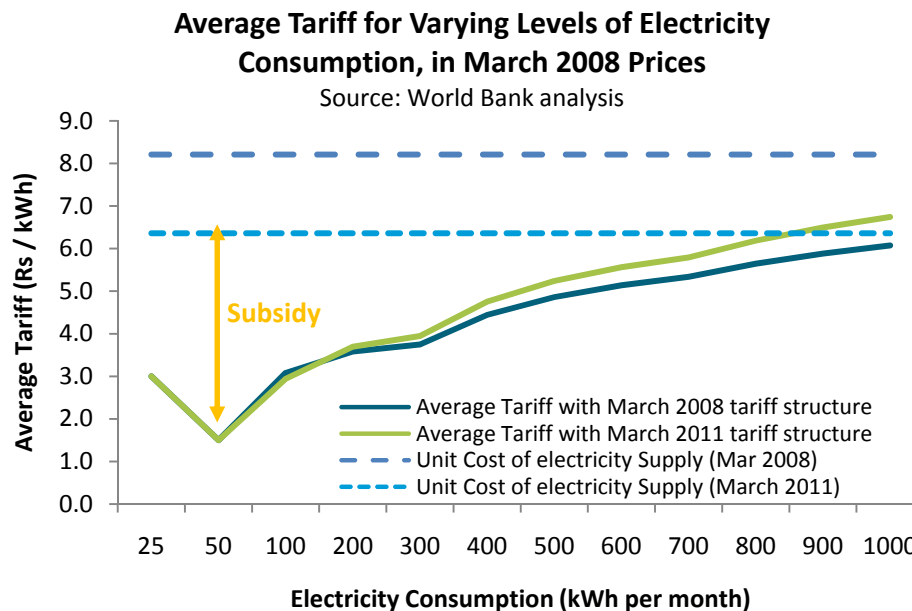
**Figure 5**

Figure 5 illustrates the average tariff at different levels of electricity consumption, and how this has changed in real terms between March 2008 and March 2011. Note that while tariffs have increased across all slabs in nominal terms, they have changed in real terms only at the highest levels of consumption. This means that the tariff structure has generally become more progressive, as higher levels of consumption have become more expensive.<sup>9</sup>

It also means that notwithstanding the nominal increases, there have been no real increases in the electricity tariff for approximately 96 percent of all electricity consumed by households (60 percent consumed in the 1–100 kWh/month block and 36 percent consumed in the 101–300 kWh/month block, see Figure 6).<sup>10</sup>

### **Cost of electricity supply**

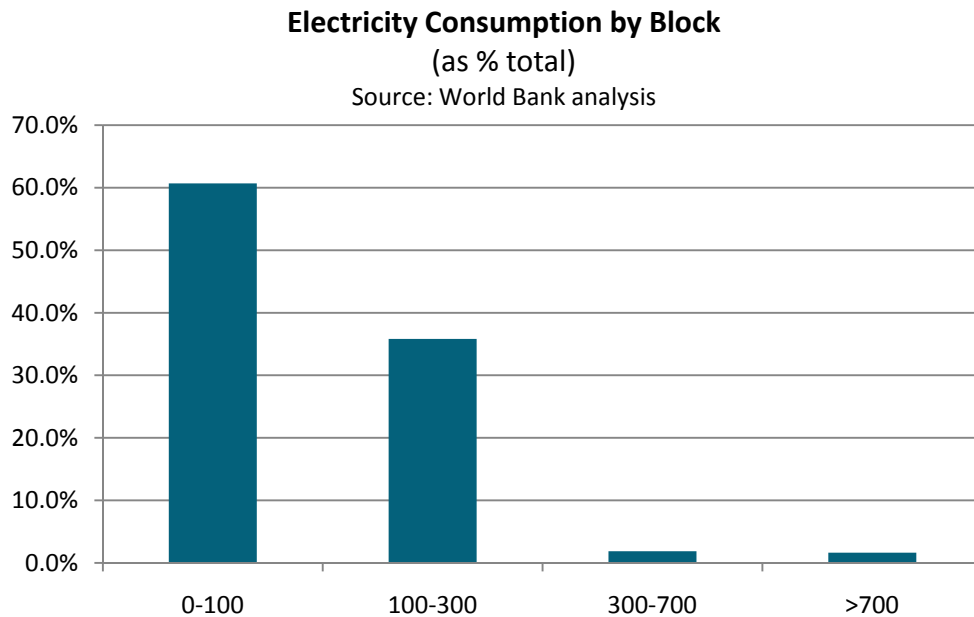
The difference between the average cost of supply and the unit price of supply represents a level of subsidy. For this reason, the average cost of supply is a critical component in the estimation of subsidies and a benefits analysis. For this analysis, we use Pakistan Electric Power Company (PEPCO) data for our cost of supply. **This includes generation cost as well as distribution margin.**

The average cost of electricity supply for both industrial and residential users in March 2008 was Rs 8.21 per kilowatt hour, and Rs 9.57 per kilowatt hour by March 2011.<sup>11</sup> However, *in real terms*, the cost of electricity supply fell to Rs 6.36 per kilowatt hour. We estimate the subsidy for the average consumer is Rs 2.90 per unit of electricity consumed under the March 2011 tariff structure.

<sup>9</sup> See Annex 5 for a description of the March 2011 slab benefits tariff reform.

<sup>10</sup> Based on estimates from PSLM consumption data, may differ from supply data

<sup>11</sup> It is unclear how these costs would change with new generation capacity.

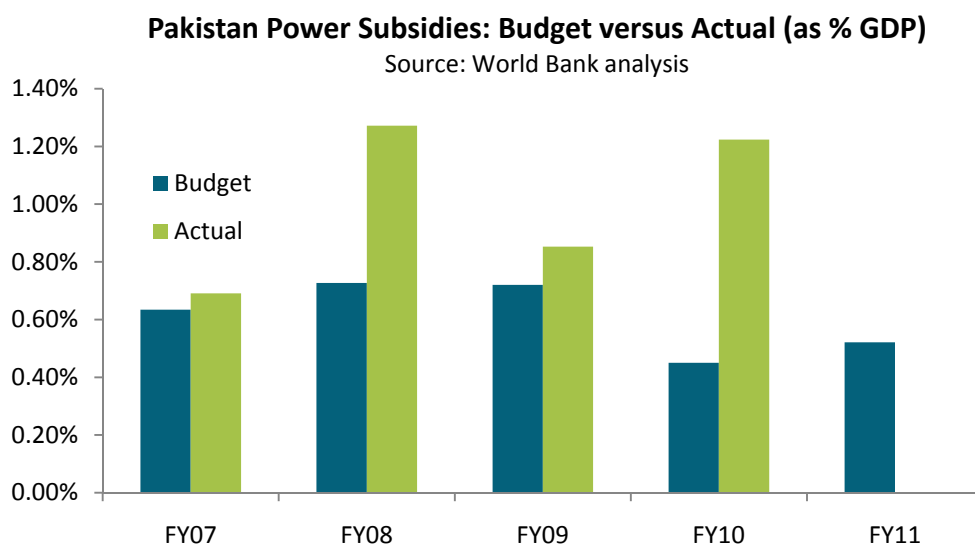
**Figure 6****Cross-subsidization**

In March 2008, unit prices for all slabs were lower than the average cost, which implies that all levels of electricity consumption yielded a subsidy. This means there was no cross-subsidization taking place between high-volume and low-volume customers in March 2008 (often seen in other contexts of IBT).

As noted above, this changed by March 2011, with the price of electricity now greater than the cost of supply in the two highest slabs. However, this does not reduce the fiscal burden significantly: as Figure 6 illustrates, the extent of cross-subsidization is minimal due to the low volume consumed at the higher slabs. We estimate that only 4 percent of total electricity consumption in 2008 was from the top two slabs.

**Subsidy contributions to the fiscal deficit**

The rising cost of electricity generation, along with the high technical and commercial losses of DISCOs, meant notified tariffs were not able to cover costs. In turn, the fiscal difficulties faced by the government in covering this difference have been a growing source of financial strain.

**Figure 7**

The cost of the electricity subsidy totaled Rs 180 billion in FY10, or 1.2 percent of gross domestic product (GDP), significantly higher than the 0.5 percent of GDP included in the budget (see Figure 7). Over the last five years, the actual cost of subsidies has been greater than budgeted, although the actual cost as a percentage of GDP has varied.

There are a number of explanations for this continual overspend, most of which are the result of underlying policy choices that have not been followed or implemented. As an example, the initial projected gap for FY10 was Rs 110 billion (July 2009 PEPCO Business Plan), of which Rs 55 billion was budgeted as tariff differential subsidy and the remaining was to be covered through quarterly increases of 6 percent, 12 percent and 6 percent, applicable at the beginning of second, third, and fourth quarters, respectively. In addition, variation in fuel price and mix were to be covered through monthly adjustments. Despite an approximate 6 percent increase in October, and an approximate 12 percent further increase in January, and notification of monthly fuel price adjustments by NEPRA (the National Electrical Power Regulatory Authority)<sup>12</sup> tariff differential subsidies jumped to Rs 188 billion.<sup>13</sup> Factors that contributed to this difference include:

- i) Additional gas (assumed while estimating financial gap) was not provided to the power sector and its exclusion from NEPRA Determinations raised the level of determined tariffs.

<sup>12</sup> See Annex 2 for an overview of the governance structure of Pakistan's power sector.

<sup>13</sup> Ministry of Water and Power January 2011 presentation.

- ii) Delay in determination and notification also had financial implications.
- iii) NEPRA Determinations included carryover cost of Rs 51 billion not factored into the initial estimate (this emerged as a result of delay in determination and notifications).
- iv) Monthly adjustments did not include the impact of T&D losses on the power purchase price, which was transferred to quarterly determinations.
- v) All of the above factors raised the determined rates. Consumer-end tariffs, on the other hand, remained below the stipulated levels.

The government has allocated a subsidy of Rs 87 billion in the budget for FY11 that includes Rs 40 billion for interest payment on the Terms Financing Certificate (TFC), Rs 10 billion for and Rs30 billion for tariff differential subsidies.<sup>14</sup> However, it is expected the cost of subsidies in FY11 will be at least as high as the Rs 180 billion in FY10 (including TFC, FATA, and others).

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<sup>14</sup> Breakdown of subsidy recipient, for example, residential versus commercial, is unavailable.

## 4 Fiscal Burden of Subsidy

As discussed above, the subsidy provided by the government has created a significant fiscal burden. We estimate how this burden should change with the March 2011 tariff structure relative to March 2008 for a given level of consumption, and disaggregate the change by the three adjustments described in Box 2.

### **Box 2: Key Changes in Tariffs and Subsidies**

Between March 2008 and March 2011, there have been three major changes to tariffs and subsidies:

- **Tariff increases:** The government has increased tariffs for all slabs, especially at the higher levels of usage. The unit price increased by 34 percent for the first slab and by around 65 percent for the third, fourth, and fifth slabs as of March 2011 (Table 1). As a result, the unit prices for the fourth and fifth slabs are now higher than the average cost estimate.

Related to this is the **introduction of fuel price adjustments:** tariff increases were implemented to adjust for changes in fuel prices. This has helped to shelter the government from fuel price shocks. This has meant that the tariff that consumers pay is different from government notified tariffs since August 2009 (Figure 5).

- **General sales tax (GST)<sup>1</sup> exemptions removed:** As of 2008, the effective rate of GST for electricity consumption was zero. GST was charged on electricity consumption, but a 100 percent exemption meant it was reimbursed. The exemption was terminated in FY09, except for lifeline and 1–100 unit customers. The same status still continues, that is, 1–100 unit customers are exempted from GST, but the rate the GST was charged has been increased to 17 percent for FY11. This reduced the net subsidy further.
- **The cost of electricity supply** has fallen in real terms (see Figure 5), mainly due to the impact of lower oil prices compared to March 2008 (Figure 4). As we describe below, this has a major impact on the cost and distribution of benefits in of the subsidies paid by the government.

Note, in December 2010, NEPRA also proposed a change to the tariff structure by reducing slab benefits. This would mean customers only benefit from two slabs (see Annex 5 for description). This proposal was not approved by the government (decided in March 2011).

The new tariff structure along with the return of GST to electricity bills mean that the overall subsidy being paid by the government has dramatically decreased. We estimate total subsidies paid would be reduced by almost 60 percent by March 2011 compared to March 2008, if all tariff reform measures were properly implemented and consumption remained constant.

**Figure 8<sup>15</sup>****The Real Fiscal Burden of Subsidy Decreased after March 2008**

Source: World Bank analysis

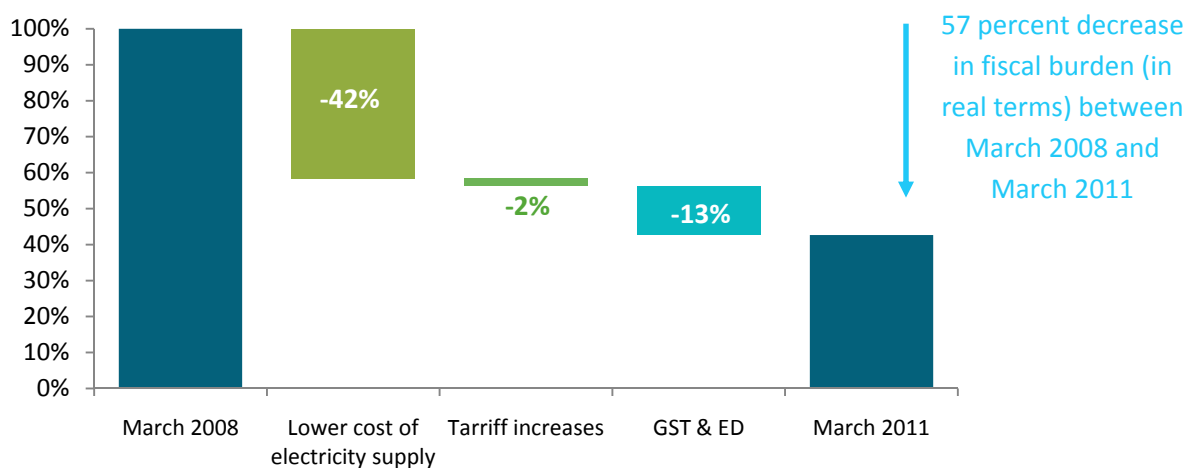


Figure 8 illustrates how this reduction is disaggregated between the three major changes highlighted in Box 2. The majority of the reduced burden is achieved through the reduction in real cost of production. The lower cost of production in real terms relative to March 2008 is primarily driven by lower oil prices (Figure 4). Tariff increases and the slab reform (yet to be notified by the government) account for a relatively small proportion of the reduction, and the removal of GST exemptions accounts for approximately one quarter of the reduced burden.

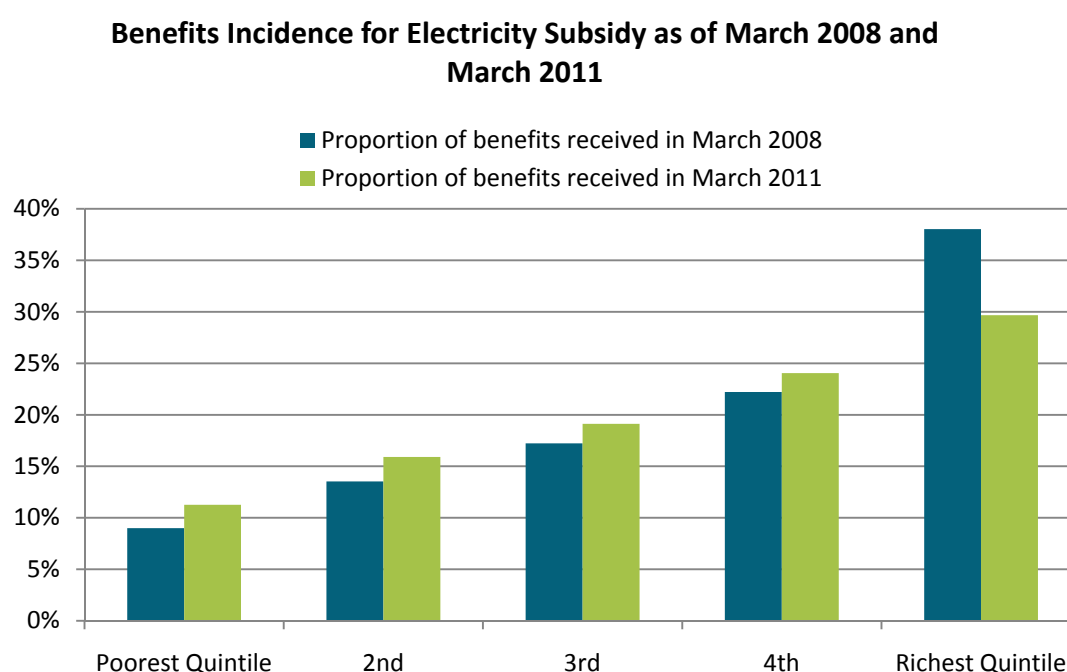
This result is not consistent with forecasts that subsidies will remain at Rs 180 billion in FY11. There are a number of possible explanations for this. First, our analysis is in real terms. When inflation adjusted, the actual FY11 number will be substantially lower than Rs 180 billion. In real terms, the cost of subsidy in March 2008 prices could be as low as Rs 120 billion. Second, our result is based on applying the proposed tariff structure to March 2008 consumption levels, while consumption has actually increased (Annex 3), and perhaps more than the 10–15 percent forecasted by NEPRA. Third, our analysis is based on the proposed tariff reforms, which have not come into effect and would help to reduce the fiscal burden. Fourth, it is not clear whether the reported Rs 180 billion forecast for the total spending for the electricity sector includes not only subsidies but also other expenses, like distribution costs and industrial uses.

<sup>15</sup> GST = General Sales Tax and ED = Excise Duty

## 5 Benefit Analysis

One of the main arguments for providing subsidies is the social protection they provide for poor households. Given the high cost of providing these subsidies and the fiscal burden it is placing on the government, it is especially important to understand how the benefits are distributed among different income quintiles to assess the efficiency in targeting poor households. A benefits incidence analysis allows us to estimate how the benefits provided through subsidies are distributed among different income groups in Pakistan. The key objectives of this analysis are: i) to understand how well the subsidy is targeted to the intended beneficiaries and ii) how much leakage there is from these intended beneficiaries to others.

**Figure 9**



**Source:** World Bank staff estimations using PSLM 2007/08 with the tariff structure in Table 1; Federal Bureau of Statistics (FBS).

**Note:** March 2011 adjusted for inflation, using March 2008 as a baseline. The inflation rate is calculated from monthly general Consumer Price Index figures available in the FBS, and both tariff rates and average costs are converted to those at March 2008 prices by it. See methodology on real price adjustment in Annex 1.

Figure 9 summarizes the preliminary results of the benefit incidence analysis for March 2008 and March 2011. Although Pakistan's tariff structure provides a low price to small users, poor households (HHs) are not the biggest beneficiaries of the electricity subsidy. It is clear that the biggest beneficiaries from the subsidy were the richest 20 percent of population in both March 2008 and March 2011. The poorest HHs on the other hand, one of the main targets of the IBT structure, only receive approximately 10 percent of the subsidies paid by the government.

It is also clear that after controlling for inflation, the cumulative impact of the three major changes in tariff and subsidies over 2008–11 had a sizeable impact on the benefit incidence, which affected richest

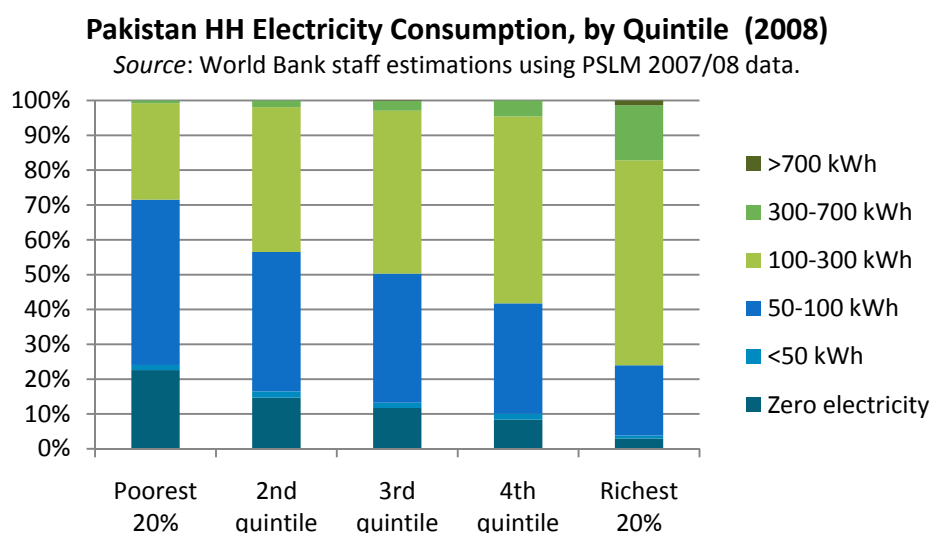


20 percent of the population the most. According to our estimates, the share of benefits to the richest 20 percent of population was 38 percent of total subsidy in March 2008, but declined to 30 percent in March 2011. This reduction in the benefit to the richest 20 percent of the population was distributed among HHs in all other lower income quintiles, each receiving a 2–3 percent increase in their share of the benefits. For example, the benefit incidence of the poorest 20 percent of the population was 9 percent in March 2008 and increased slightly to 11.3 percent by March 2011.

**This means that the electricity IBT remains a relatively inefficient method to protect poor HHs.** Despite the changes discussed, the majority of the subsidies still go to the richest 40 percent of HHs in Pakistan. To be sure, the subsidies received by poor HHs will offer some degree of protection, but for the government, this comes at a cost of transferring significant resources to richer HHs that arguably do not need the same degree of protection. The question then emerges: Why is the poor’s benefit incidence so limited even if the government adopts the IBT? There may be a number of explanations.

One explanation is an ineffective lifeline tariff. The minimum charge of Rs 75 and the low cut-off point for lifeline users (50 kWh per month) mean that it is very difficult for low-income HHs to benefit from the lifeline tariff. For example, a household consuming 10 kWh per month, using March 2011 prices, might expect to be charged Rs 18.7, but end up being charged Rs 75 because of the minimum charge rule. Effectively, their average tariff becomes Rs 7.5 per kWh (almost the same rate as the 100–300 slab). Indeed, using the March 2011 tariff, it is only at consumption of 40 kWh that the charge is greater than Rs 75, meaning only HHs that consume between 40 and 50 kWh will benefit from the lifeline tariff.

**Figure 10**



The second and related explanation is that the tariff structure doesn’t match the consumption behavior of poor HHs. Over 50 percent of the poorest HHs in Pakistan with an electricity connection consume between 50 and 100 kWh per month (see Figure 10). This means that having a lifeline tariff for less than 50 kWh of consumption is an ineffective way of protecting the poorest HHs.

Thirdly, the slab benefit structure means that all HHs, including rich HHs, receive significant subsidies for the first 300 kWh of electricity consumption, not just poor HHs. Given that rich HHs typically consume more electricity, there will always be a significant proportion of the cost of subsidies that will go to rich HHs, so long as the price paid by the customer for electricity below 300 kWh is less than the cost of supply. The proposed slab benefit reform will help address this issue in part, but more needs to be done to efficiently target the poor. For example, 300 kWh is a relatively high level of electricity consumption; Figure 10 illustrates that relatively few HHs consume more than this. Further analysis could improve the slab boundary definition to optimize cross-subsidization.

A fourth explanation could be that household electricity consumption is not highly correlated with household expenditure per capita (or per adult equivalent). This limited correlation is related to the fact that poor HHs tend to be larger than rich ones. As a result, even if each member from a poor household consumes less electricity than each member of a rich HH, the total HH electricity consumption of poor HHs can be as large as that of rich HHs. In other words, the difference in HH size reduces correlation between HH expenditure per capita and HH electricity consumption. Also, the distribution of electricity consumption is very similar between the poorest three quintiles. Even for the third quintile, more than 10 percent of the population consumes less than 100 kWh per month. Meanwhile, over 50 percent of rich HHs consume 100–300 kWh, meaning they receive a subsidy because the tariff for this slab is still lower than the cost of supply.

Finally, this result is true for many IBT systems, or indeed any subsidy delivered indirectly (another example is subsidies delivered through reduced price of food staples), because it removes the discretion from the HH on what they should spend the subsidy on, and in addition creates leakages. Nonetheless, the IBT system remains popular for its simplicity, ease of application, and low cost of administration.

## 6 Scenario Analysis

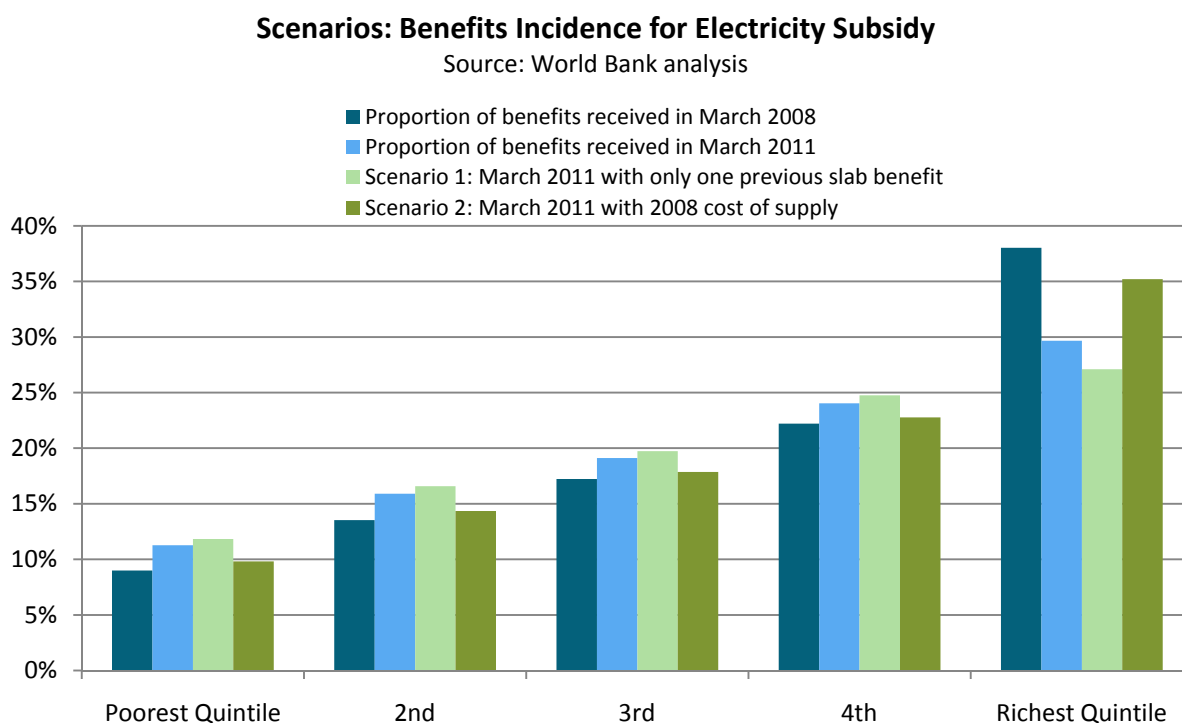
In this section, we briefly forecast the impact of two scenarios: cost of electricity supply increasing to 2008 levels, and the proposed policy of only one previous slab benefit being implemented. Figure 11 illustrates that the main contributor to the reduced fiscal burden is reduction of the cost of supply. We analyze the scenario where fuel prices rise to those seen in 2008 and assume that the fuel price adjustment policy was not properly implemented. We also analyze the proposed policy change to reduce slab benefits (mentioned in Box 2 and described in more detail in Annex 5) to understand how much benefit such a policy could provide.

### Main contributor: Reduction in costs of supplying electricity

The average cost in March 2011 was 23 percent less than that of March 2008. But recently, global oil prices have increased significantly (see Figure 4) and the fear of another round of the global oil crisis is rising. Since Pakistan relies heavily on oil and gas for electricity generation, the global oil price increase will raise the cost of generating electricity.

The results are summarized in Figure 11. It shows that if the average cost returned to the March 2008 level, almost all improvements in benefit incidence would be lost. In other words, most of improvements in benefit incidence can be attributed to cost reduction. Similarly, we also know from Figure 8 that the reductions in the real fiscal burden would be significantly eroded were the cost of electricity to rise to 2008 levels.

**Figure 11**



### Proposed slabs benefit reform would help, but not significantly

We also analyze the impact of introducing the slab benefits discussed in Box 2 and Annex 5. The results illustrated in Figure 11 show that further gains in the benefits incidence are possible through this mechanism: the proportion of benefits going to the poor would increase to 12 percent and the richest 20 percent would receive less benefit. Our analysis of the fiscal burden suggests similarly modest improvements to the real fiscal burden of subsidies when implementing this policy: we found the fiscal burden would decrease a further 3 percent, significantly less than the 42 percent reduction resulting from fuel prices drops.

This improvement, achieved through implementation of the slab benefits reform, is less significant than the risk posed through fuel price s, suggesting the priority focus from a policy standpoint in comparing these scenarios alone should be on the cost of fuel.

### Caveats for the above analysis

The results of this benefits analysis and fiscal burden of subsidies analysis have a number of limitations we need to acknowledge:<sup>16</sup>

- **Limited to first-order effects:** Our analyses are based on 2007–08 electricity consumption data (PSLM 2007/08), which implies that changes in consumption patterns are assumed to be insignificant over a two-to-three year period. Admittedly, this is a strong assumption, but given that total electricity consumption did not change drastically (see Figure 13), it is not overly unrealistic. To improve the precision of the above analysis, it will be highly recommended if the same analysis is repeated by using newer data when they become available to have a more accurate estimate of second-order changes, including changes in consumption patterns.
- **Limitations in using household survey data to estimate electricity consumption:** Household survey data are often used to analyze the poverty and distributional impact of electricity tariff adjustments.<sup>17</sup> However, there are some limitations in this approach, and Pakistan is no exception. For example, there are some data irregularities in the PSLM expenditure data; for example, reported electricity expenditure that is not consistent with the tariff structure. This may be the result of misreporting (that is, survey data based on respondent recall rather than actual electricity bills) or other components in the electricity bill beyond consumption, for example, arrears. Such data irregularities are unavoidable when estimating consumption using expenditure data due to both sampling and nonsampling errors, although our cross-checks suggest these issues are not significant in the case of Pakistan. For example, in the case of IESCO (one of the key DISCOs in Pakistan), arrears payments as a percentage of total payments received were 6.8 percent for June 2008, a relatively small proportion of overall household electricity expenditure.

<sup>16</sup> See Annex 1 for a full description of the methodology, assumptions, and limitations.

<sup>17</sup> An approach that remains common within electricity poverty and social impact analysis; for example, see Tajikistan (IMF 2005, Coady), Lebanon (World Bank 2009), Serbia (World Bank 2010), and Albania (World Bank 2010)

## 7 Transition Paths—The Political Economy of Policy Changes

Our analysis is restricted to the distributional and fiscal implications of tariff changes, both of which are made possible through household survey analysis. It does not include a number of important analyses necessary before any policy decisions are taken by the government. Before discussing policy implications in the following section, this section very briefly makes the point that political economy considerations in particular are critical before policy decision are made. The nature of the policy implications we describe below would represent major changes in a system where subsidies have become the social norm, and could not be implemented without addressing the structures of economic and political power. Because it is such a contentious issue within Pakistan, the government will need to consider carefully the balance between potential public unrest as a result of continuing blackouts, versus the potential for public unrest for rising tariffs.

As part of this, transition paths are an especially important basic framework to consider as the winner and losers of specific reforms are identified. For example, it will be extremely difficult for the GOP to implement tariff increases or changes in the tariff structure without a significant increase in performance of the electricity sector (that is, reduced blackouts) to justify the increases and make them more palatable to the public. Even poor households may be willing to pay marginally higher tariffs if the power supply were reliable, and it could be that higher tariffs may actually generate less public outcry than an electricity supply that continues to deteriorate. Therefore, any tariff increases should be phased in alongside significant investment in the physical generating capacity in Pakistan and an effective public education and communications campaign to explain the complementary nature of the changes.

Similarly, moving to a cost-recovery approach and removing subsidies completely could be complemented with a cash transfer program. An example of how this can make policy changes more feasible is from neighboring Iran. Under its economic reform plan,<sup>18</sup> Iran recently replaced fuel and food subsidies with a cash transfer program. This was also complemented with a significant public education and communications program explaining the nature of the changes and what households in Iran could expect. The success of this policy reform could provide an important example to the government of Pakistan, who could adopt a similar approach and ensure a similar public communications program is used to link the cash transfers with the tariff increases.

Finally, the relationship between the consumption behavior of rich households and conservation and efficiency may be an important factor to consider. One of the tenets of the policy implications we highlight is that there are benefits of increasing tariffs, more for those who consume more and can reduce consumption. If the pricing signal leads to better management and use of electricity, it will reduce power generation needs, lower costs, and reduce the gap between supply and demand. International experiences (for example, Brazil and Chile) on special pricing for consumers during “power crisis” shortages could be useful for GOP to assess and tailor (as possible) their own pricing measures. Subsidizing 300 kWh consumers is contrary to promoting conservation and efficiency in a shortage situation.

<sup>18</sup> For more information, see [http://www.brookings.edu/opinions/2011/0303\\_iran\\_salehi\\_isfahani.aspx](http://www.brookings.edu/opinions/2011/0303_iran_salehi_isfahani.aspx).

## 8 Summary of Findings and Policy Implications

This paper studies the distributional and fiscal implications of recent electricity tariff adjustments. The government of Pakistan has revised the tariff structure significantly since March 2008. The analysis indicates that more than 90 percent of electricity consumption remains subsidized. The benefit incidence would improve significantly and the fiscal burden of total electricity subsidies for residential users would decline as much as 60 percent with the March 2011 tariff structure adjustments. For example, the share of subsidies for the richest 20 percent of population would decline from almost 40 percent to almost 30 percent.

However, decomposition of contributors for the subsidy reduction clearly indicates the main contributor is by far cost reduction, which accounts for more than 40 percent of the 60 percent reduction in the real fiscal burden. The contribution of tariff adjustments is just over 2 percent. This is worrisome particularly because oil prices are resurging and Pakistan's electricity generation still relies largely on oil and gas. Also, the benefit incidence would deteriorate significantly if the average cost increases.

These results suggest that further tariff adjustment will be necessary to reduce the fiscal burden of the electricity subsidies and improve the benefit incidence. Some of the key policy implications of this narrowly focused analysis follow. Because this is a poverty and social impact analysis, we pay special attention to the impact and policy implications as they relate to the poorest households.

- **First, proper implementation of the fuel price adjustment policy is crucial:** Since August 2009, GOP has had a monthly tariff adjustment to reflect changes in fuel prices. However, as some examples in this paper have highlighted, proper implementation of power sector policies has often been lacking or reversed. As fuel prices appear to be resurging, it is important for the government to remain committed to this policy to avoid deterioration of the real fiscal gains made over the last three years.
- **Second, move toward a cost-recovery approach:** Despite fuel prices adjustments, the electricity sector in Pakistan remains far from a cost-recovery level. With global oil prices resurging, the risk of the gains described above being eroded is high. Likewise, many middle- and high-income households receive subsidy benefits. This makes subsidies an inefficient mechanism to protect the poor and vulnerable. There are two approaches GOP could take to move toward cost recovery:
  - **Tariff increases:** Despite increases in nominal terms, tariffs have only increased in real terms for the top two slabs. More aggressive increases would help to make more significant gains in distributional impacts and reduce fiscal burden. Price signals could also help to reduce consumption, especially among richer households that may be more able to cut consumption, which could in turn help reduce overall electricity demand (price elasticity of demand is typically higher for richer households).
  - **Simplify tariff structure by removing slab benefits** so that households are charged the same rate for all units of electricity according to their level of consumption. The structure of the slabs can then be revised by raising the 100–300 kWh slab tariff to the

cost of supply (a more economically efficient approach), thus the cross-subsidy from the >300 kWh slab entirely goes to the <100kWh consumer. This would help target the poor in a way that does not rely on the natural fluctuations in cost that result from changes in fuel and other input costs and generation mix.

- **Reassess slab thresholds and/or reduce the number of slabs:** Only the top 4 percent of electricity consumers pay a price of electricity greater than cost, and this occurs in the top two slabs. It therefore makes sense to reassess the thresholds as they are currently defined. One option would be to merge the top two slabs and create a new threshold somewhere within the 100–300 slab. Exactly where a new threshold would be defined should be the outcome of further analysis of population consumption patterns. For example, 25 percent of households in the bottom quintile consume between 100 kWh and 300 kWh per month, so it is important to understand the extent to which the creation of a threshold would impact these households, analysis that is beyond the scope of this paper.
- **Third, better target the poor:** Two changes of the tariff structure may require reconsideration if subsidies are to be used as a means to protect the poor.
  - **Removing the Rs 75 minimum charge for lifeline users:** It is illogical to have a lifeline tariff with a minimum charge. As described in our analysis, the Rs 75 minimum charge (which exists to recover the cost of customer service) renders the lifeline tariff redundant as a means to protect poor households. If a policy objective is to protect the poor through a lifeline tariff, this minimum charge should be removed.
  - **Possibly extend lifeline tariff to 100 kWh per month:** Over 50 percent of the poorest 20 percent of the population consume between 50 and 100 kWh per month (Figure 10). To improve the targeting of a lifeline tariff, it should be targeted aligned with consumption patterns. According to our analysis, it would therefore make sense to extend the lifeline tariff to 100 kWh per month. Such a policy change would require further analysis of energy consumption of poor households to understand the electricity needed per appliance, and which appliances poor households typically need and use, to understand if 100 kWh is a fair threshold. Further analysis would also be required to understand the fiscal impact of reduced tariff collection for this group, and how this would be offset by possible increases in other slabs.
- **Fourth, the GOP may need to reconsider the role of electricity tariffs for social assistance.** Even with the tariff increases between 2008 and 2011, Pakistan’s richest households still receive a disproportionate share of the benefits from electricity subsidies. The richest 40 percent of households—who arguably do not need subsidy support—still receive over 50 percent of the subsidies. Even if further tariff adjustments are made, there is a limit in improving benefit incidence. According to the World Bank (2011), the benefit incidence of the Benazir Income Support Program (BISP) scorecard is significantly more efficient in targeting the poor than the electricity subsidies. So, marginal improvements in tariff adjustment will not be able to achieve

the same impact as the BISP scorecard can. It is true that if electricity subsidies are cut, poor and vulnerable households will suffer. But if the electricity subsidy cut is combined with a well-targeted conditional cash transfer program like BISP, it is possible to improve benefit incidence while reducing the fiscal distress. A more efficient allocation of resources would mean charging at least at cost, and then compensating poor households through a well-targeted cash transfer program. Choosing this approach will require careful thought. First, it will likely be more acceptable to the public if subsidies are phased out over time, for example, a 5-to-10-year period. Second, replacement of subsidies with a conditional cash transfer program would require a careful communications and public education program to ensure households understand how the policy changes will affect them and what cash transfers they can expect to receive in return.

To conclude, the implications discussed in this section should be considered in the context of the narrow scope of the analysis. We focus on benefits incidence of subsidies in the electricity sector at the microlevel and their fiscal implications. We acknowledge the need for a broader, more comprehensive analysis of the electricity sector in Pakistan before any policy choices are made. This future analysis would include:

- i. A macroanalysis of the inefficiencies in the physical generation, distribution and transmission system, and collection rates. These may deliver significant gains of a similar or potentially greater magnitude than those proposed in this paper.
- ii. A thorough political economy and stakeholder analysis to identify the winner and losers of policy changes.
- iii. Go beyond residential electricity and include a wider analysis of nonresidential energy use.
- iv. Estimate the second-order effects of tariff changes.

Such analyses could be the topic of a further poverty and social impact analysis, and their results will likely change the list and prioritization of policy implications.



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## Annexes

### Annex 1—Technical Notes on Benefits Analysis Methodology

We estimate the HH subsidy using average cost of electricity supply data with the 2007/08 PSLM HH survey (through the reported HH electricity expenditure). This relies on making a number of assumptions, which are discussed in the following methodology:

The PSLM survey includes 15,509 HHs. Of this, 1,897 (12 percent) do not consume any electricity. We assume they do not receive any subsidy and drop them from the sample. For the remaining 13,612 HHs, we remove a further 1,611 observations (10.4 percent) whose reported electricity expenditure is not possible given the March 2008 tariff structure. For example, it is not possible to spend less than Rs 75 given the minimum charge rule in place. Unless a household spends exactly Rs 75, it is also not possible to spend less than Rs 157, because of the cost structure of the second slab, that is, 51 kWh \* 3.08 = Rs 157. We assume these observations are due to either reporting error, or that they are illegal users (and so shouldn't be counted as part of a subsidy analysis).

For the remaining 12,001 HHs, we estimated the March 2008 subsidy by subtracting the cost of electricity supply.

$$S = C - E$$

$$C = U * Q$$

$$Q = E / F$$

*S = subsidy*

*C = cost of supply*

*E = electricity expenditure*

*U = unit cost of supply<sup>19</sup>*

*Q = quantity of electricity consumed*

*F = tariff*

We estimate electricity consumption from expenditure data. PSLM 2007/08 data do not have electricity consumption, but do cover expenditures. As a result, we need to estimate electricity consumption by combining electricity expenditure and the tariff structure. The following procedure was carried out: First, from the tariff structure of March 2008, we calculated ranges of electricity expenditures that should belong to each slab. For example, if a HH's monthly electricity expenditure is Rs 50, their electricity consumption belongs to the first slab and the marginal tariff is Rs 1.4. Second, once we identify the slab that a HH belongs to, we apply the variable tariff for each segment of electricity consumption. For example, if a HH's monthly expenditure is Rs 1,500, then this HH belongs to the fourth slab and the HH's consumption is thus estimated as (1,500–1,124)/6.53 + 300.

<sup>19</sup> Note the figures used are Rs 8.21 per kWh for March 2008 and Rs 9.47 per kWh.

Note the GST was not removed from electricity expenditure because of the 100 percent GST subsidy in place FY07–08.

For this PSIA, we focus on the first-order effect of tariff changes. More specifically, given the only available consumption data are PSLM 2007/08, we assume that HHs do not change electricity consumption since 2007/08 despite the fact that the electricity tariff has been changed. It is likely that HHs do respond to revisions of the tariff structure by changing their electricity consumption; so we must update the analysis as soon as the next round of household survey data become available.

The IBT structure and average unit cost of electricity supply for March 2011 were applied to estimate March 2011 HH expenditure and cost of supply, respectively.

### **Real price adjustments**

We adjusted both IBT and unit cost of electricity supply for inflation to enable comparability by keeping March 2008. To do this, we applied the monthly inflation rate to the March 2011 and calculated backwards to March 2008. The nominal to real price reduction works out to be approximately 33 percent over this time period.<sup>20</sup>

To estimate the March 2011 subsidy, we applied a 17 percent GST for users consuming more than 100 kWh per month, and a 1.5 percent excise duty to March 2011 electricity expenditures to calculate net subsidy:

$$S_{2011} = C - E$$

$$N_{2011} = S - T$$

$N_{2011}$  = net subsidy

T = taxes

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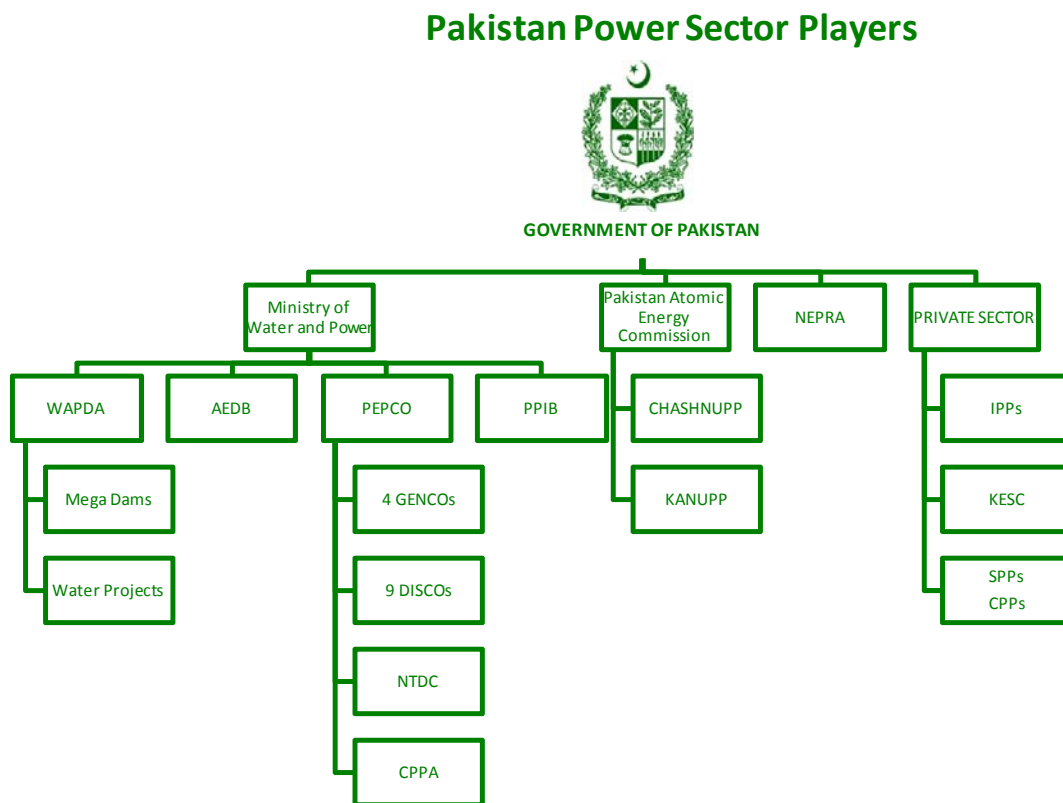
<sup>20</sup> See [http://www.statpak.gov.pk/depts/fbs/statistics/price\\_statistics/monthly\\_price\\_indices/mpi7/cpi\\_details.pdf](http://www.statpak.gov.pk/depts/fbs/statistics/price_statistics/monthly_price_indices/mpi7/cpi_details.pdf) (pages 14–16).

## Annex 2—Industry Governance and Structure

Pakistan's power sector has historically been served by two vertically integrated entities: the Pakistan Water and Power Development Authority (WAPDA), which was established in 1958 and provides service to the whole of Pakistan except Karachi and its environs, which are served by the Karachi Electric Supply Company (KESC), established in 1913.

WAPDA's Strategic Plan (Plan), approved by the GOP in 1992, provided the roadmap of the future structure of Pakistan power sector. The Plan envisaged staged transition from the monopoly operations of WAPDA to a competitive electricity market by requiring the GOP to restructure WAPDA into decentralized business units, with efficiency improvement as one of the primary goals.

**Figure A.1**



**Note:** AEDB=Alternative Energy Development Board, CHASHNUPP=Chashma Nuclear Power Plant, DISCO=distribution company, GENCO=generating company, IPP=independent power producer, KANUPP=Karachi Nuclear Power Plant, KESC=Karachi Electricity Supply Company, NEPRA=National Electrical Power Regulatory Authority, NTDC=National Transmission and Dispatch Company, PEPCO=Pakistan Electric Power Company, PPIB=Private Power Infrastructure Board, WAPDA=Water and Power Development Authority.

**Source:** World Bank diagram

In 1998, WAPDA split into two distinct entities: WAPDA and Pakistan Electric Power Company (PEPCO). **WAPDA's** new mandate is the development and operation of water resources, including hydropower. **PEPCO** is responsible for public sector thermal plants and for transmission and distribution companies.<sup>21</sup>

The government established the National Electric Power Regulatory Authority (NEPRA) in 1998. NEPRA is tasked with regulating all aspects of the sector, including tariff setting and ensuring the sector's long-term health and sustainability. See Figure A1 for an overview of the current structure of the power sector.

### **Public sector versus private sector**

Under the 1994 power policy, the government was conscious of the fact that the required investment could not be provided by the public sector alone. It restructured and opened the sector to private investment. The Private Power and Infrastructure Board (PIIB) was created to facilitate investment. As a result, over 3,000 MW of new private thermal power generation was constructed.

In 2003, hydropower was also opened to private investment. As part of its strategy to enhance energy security, the government also set up the Alternative Energy Development Board (AEDB) to encourage investment in alternate energy.

The government also embarked on a program of privatization, which has generally been slow in moving forward, but has had some successes. For example, two public sector power companies—KESC and the Kot Adu Power Company—have been transferred to private ownership.

By FY10, the private sector accounted for 46 percent of installed capacity and 49 percent of actual generation.

*“Load shedding has been routine and it is the extent of load shedding which is seen as the only measure of the performance of the electricity sector. The current situation is certainly the worst of all times”*

NEPRA, *State of the Industry Report 2010*

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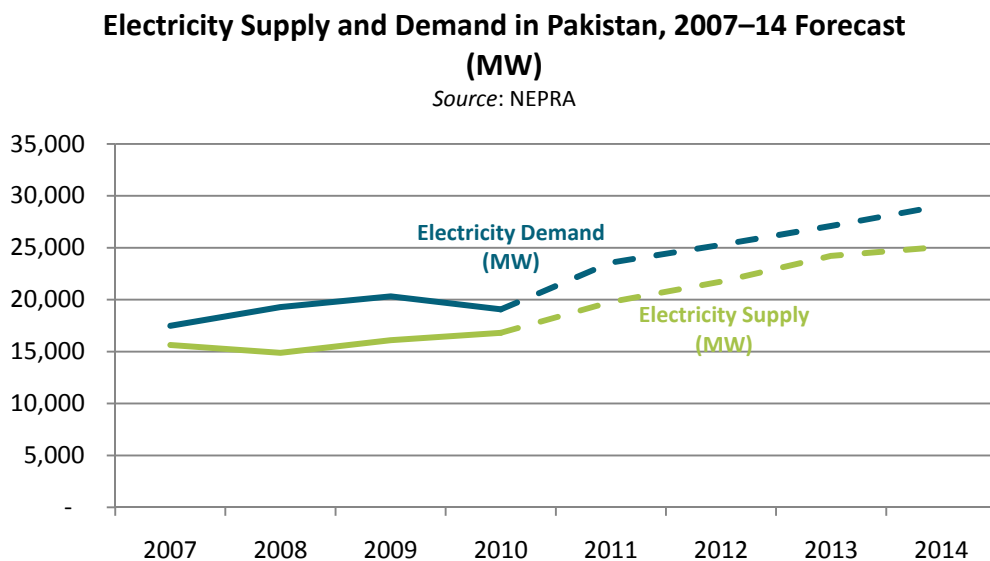
<sup>21</sup> It was announced in September 2010 that PEPCO would be disbanded (<http://news.dawn.com/wps/wcm/connect/dawn-content-library/dawn/the-newspaper/business/pm-okays-power-sector-reforms-pepco-to-be-disbanded-by-oct-31-990>), but the details of the new structure were still to be determined at the time of writing this paper (see [http://ftppapp.app.com.pk/en/index.php?option=com\\_content&task=view&id=126127&Itemid=1](http://ftppapp.app.com.pk/en/index.php?option=com_content&task=view&id=126127&Itemid=1) for more details).

### Annex 3—Electricity Supply and Demand

At the end of FY10 (June 30, 2010), the installed capacity for electricity in Pakistan was 21,593 MW. Due to inefficiencies, especially in thermal production (resulting from power plant age, auxiliary consumption, and fuel availability), actual available capacity was on average 17,743 MW in FY10. Considering the seasonal variation that affects hydrogeneration, net average generating capacity in FY11 is forecasted to vary from 14,959 MW in the winter to 18,036 MW in the summer.

According to NEPRA's estimates, this supply of electricity has consistently fallen short of demand by 2,000 – 4,000 MW in recent years, a trend NEPRA forecasts to persist (Figure A2) despite investments to increase generation capacity.<sup>22</sup> These shortages are disrupting the daily lives of Pakistani citizens and restraining opportunities for growth, employment creation, and social development.

**Figure A2**



The significant gap between supply and demand of electricity heightens the importance of reliable generation and the efficient allocation of pro-poor targeted subsidies.

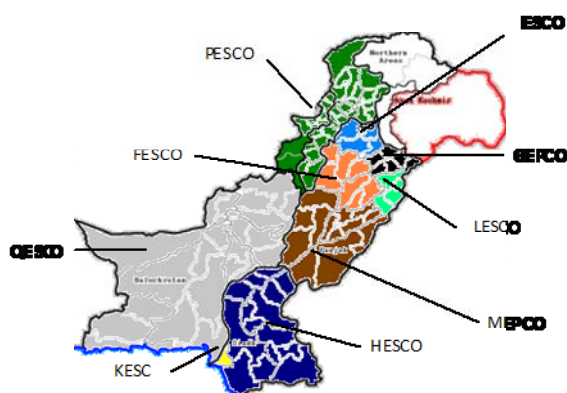
<sup>22</sup> *State of Industry Report 2010*, NEPRA,  
<http://nepra.org.pk/Publications/State%20of%20Industry%20Reports/State%20of%20Industry%20Report%202010.pdf>.

## Annex 4—Electricity Tariff Setting Process

At the upper level, there are two steps in Pakistan’s electricity tariff setting process:<sup>23</sup>

- First, **NEPRA determines detailed tariff schedules for the entire fiscal year based on tariff petitions submitted by the DISCOs.** NEPRA’s determinations are generally based on the cost of service to customers, and adjusted for distribution losses. This means the average tariff for bulk-level industrial customers should be generally lower than the average tariff for retail-level household customers, and that DISCOs with higher losses generally have higher tariffs. NEPRA notified monthly fuel cost adjustments to its annually determined tariffs from August 2009 to June 2010. These monthly adjustments were delayed since the ordinance which enabled them expired before the requisite legislation could be enacted. This is now being referred to the Ministry of Water and Power for notification, which has increased the processing lag.
- Second, the **government notifies tariffs to be charged by the DISCOs.** Two government policy priorities prevail in these tariff notifications and delineate subsidy policy: i) the same tariff is maintained for a given customer category across the country’s DISCOs (‘uniform tariffs’ policy) and ii) industrial and commercial customers cross-subsidize domestic and agricultural customers.<sup>24</sup>

**Figure A3. Service Areas of DISCO**



GOP tariffs have generally been lower than NEPRA-determined tariffs and the government commits to pay the difference between NEPRA-determined and government-notified tariffs as subsidies paid to the DISCOs (see map of DISCOs in Figure A3).

The government froze tariffs between November 2003 and February 2007 at 2003 levels despite NEPRA determination reflecting the increasing cost of generation. Subsequent tariff increases did not make up for the shortfall, while crude oil and gas prices globally hiked. Between FY04 and FY08, the price of imported furnace oil, which represents about one-third of the fuel mix for power generation, increased by 76 percent. Gas prices also increased by 78 percent compared to 2005 levels.

<sup>23</sup> As outlined in section 16 of the Tariff Standards and Procedures Rules

<http://nepra.org.pk/Legislation/Rules/Tariff%20Standards%20and%20Procedures%20Rules%201998.PDF>

<sup>24</sup> It is unclear the extent to which cross-subsidization occurs. For example, for the March 2011 tariff structure, the rate for above 700 units is the highest among all tariff categories. Further, the variable energy charge for the 301–700 unit residential slab is more than the B1 (small) and B2 (medium) industrial tariffs, meaning further analysis would be required to clarify the extent of cross-subsidization.

## Annex 5—Slab Benefits Tariff Reform

In December 2010, NEPRA completed the determination process for FY11 (period covering July 2010 to June 2011). One of the important proposals in these determinations was related to slab benefits: benefit of only one previous slab would be given to the customers, meaning consumption will be divided into a maximum of two slabs and their corresponding rates will apply. On the March 2011 notifications, the GOP did not approve these proposals, but we explain in more detail here what they would have meant.

In 2008, all users, irrespective of their final amount, were charged Rs 3.08 for the first 100 kWh. For example, a user with the final consumption of 800 kWh per month was charged Rs 3.08 kWh for the first 100 kWh. However, had the proposed slab benefits been approved, for users of the second or above slabs, only the rates of their slab and one slab lower can be applied. For instance, the users in the fifth slab are charged Rs 10.86 for the first 700 kWh and Rs 13.56 for the rest, while the users in the fourth slab are charged Rs 6.73 for the first 300 kWh and Rs 10.86 for the rest. Such a change increases the average tariff rate further (as Figure A4 illustrates).

The effect of this change on the average tariff is illustrated in Figure A4. The impact is most significant at the 300 and 700 kWh intervals. As Figure A4 illustrates, this can be considered a progressive reform, because the most significant increase occurred at the higher levels of consumption (see Figure 10, which illustrates how few poor households consume at these high levels).

**Figure A4**

