

Residential Electricity Subsidies in Pakistan

Targeting, Welfare Impacts, and Options for Reform

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Abstract

This paper examines the economic and social implications of the current system of residential electricity subsidies in Pakistan, and assesses the potential to improve the system's outcomes through alternative targeting and program design. The analysis is multi-disciplinary in nature, drawing on national household survey data, electric company data on household electricity consumption, a welfare database, and a specially commissioned qualitative assessment of household and service provider attitudes and experiences. Affordability

is only one of many concerns among electricity users, with reliability of supply and customer service being arguably more important. The analysis finds that targeting could be improved considerably by allocating subsidies according to proxy-means test scores using an existing national proxy-means test database. Providing a flat credit rather than a price subsidy could also alleviate certain governance concerns. The paper concludes with some guidance on how to carry out these reforms based on international experience.

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I. Introduction

The cost of residential electricity subsidies in Pakistan constituted around 0.8 percent of GDP in 2014–15, about the same as total expenditure on the health sector. At times in the past decade, electricity subsidies have cost the government more than 2 percent of GDP, contributing to the national debt and weakening the country’s external position. As part of its energy sector reforms, the Government of Pakistan has in recent years made efforts to reform electricity subsidies, contributing to reducing their budgetary cost to around 0.4 percent of GDP in 2015–16. This reduction has been achieved partly through cuts to subsidies on the highest-volume residential consumers (as well as commercial and industrial users), helped by declining costs of energy worldwide. However, any future hikes in international energy prices would need to be passed on to the consumer, with adverse consequences for poverty, or absorbed by the government as new debt.

There is a growing body of international evidence demonstrating that energy subsidies have been some of the most regressive and costly fiscal policies, particularly for the developing world (World Bank, OECD & OPEC 2010). In 2015, global subsidies reached US\$5.3 trillion, or 6.5 percent of global GDP (Coady et al. 2015a). While subsidies are often introduced with the intention of reducing poverty, redistributing wealth in resource-rich economies, protecting consumers against large price swings, or promoting access to energy, they are an inefficient tool for achieving these purposes. Energy subsidies put significant pressure on a country’s fiscal balances, consuming public funds that could otherwise be used for more effective programs. These subsidies also tend to be regressive, disproportionately benefiting the better-off. They discourage investments in renewable energy and promote overconsumption of energy and investment in energy-intensive heavy industries. Recognizing this, many countries around the world are now rolling back or eliminating energy subsidies (Clements et al., 2013a).

Despite cuts to tariffs on heavy users, electricity subsidies in Pakistan continue to be poorly targeted. Residential consumers in Pakistan are charged electricity tariffs based on monthly electricity consumption, with the most generous subsidies provided to households with low and moderate usage. The effectiveness of this targeting mechanism as a social protection policy relies on the premise that *measured* electricity use is closely related to household welfare. But as we show in this paper, the correlation between measured electricity consumption and household welfare in Pakistan is relatively weak, meaning that electricity subsidies continue to benefit the richest households disproportionately. Even after the recent reforms, the group receiving the greatest share of electricity subsidy expenditure remains the richest 20 percent of the population. The average subsidy for the richest 20 percent of households is 40 percent higher than the average subsidy for the poorest 20 percent of households. Moreover, there is a strong seasonality of electricity consumption, with both rich and poor households consuming more in the summer months. This pushes even the poorest households into higher-tariff slabs, increasing their bills substantially. Conversely, many richer households ‘drop’ into the more heavily subsidized and lifeline slabs during the winter months.

Based on qualitative research commissioned for this paper, we find that in spite of the subsidies, low- and lower-middle income households in Pakistan struggle to afford their basic electricity needs. Some households reported being forced to reduce expenditure on food, health and childcare in order to afford electricity bills. Such coping mechanisms particularly affect women, who are the main consumers of electricity at the household level. Aside from affordability, residential electricity users are most concerned about the reliability of supply and quality of customer service. Electricity is central to the lives of modern Pakistani households, and their lives are disrupted by long hours of load shedding common in recent years. The stress of coping with the high cost and low reliability of electricity is taking a toll on family life, health, education, and economic activities. Low-income households—in particular urban slum residents and beneficiaries of the country's main welfare program—mentioned resorting to illegal electricity connections because they could not afford to pay their bills. In addition, the qualitative research revealed a general lack of trust in electricity service providers and a poor perception of governance in the sector.

Households need support to manage rising and volatile energy costs, but assistance can be designed in a way that is less distortionary to prices and incentives, and more effectively targeted to the poor than the existing price-based subsidies. Pakistan has state-of-the-art targeting and registration mechanisms available to deliver better targeted assistance. A national proxy means test (PMT) database developed for the Benazir Income Support Program could be used to target assistance to households based on their welfare. An alternative would be to use exclusion filters like land or vehicle ownership, or tax records. Targeting subsidies would help ensure that assistance goes to those households that most need it, while excluding the richest consumers would save considerable resources. Providing bill credits in place of price-based subsidies would make billing simpler and provide equal assistance to all targeted households. Other forms of assistance can help encourage consumers to use the formal electricity supply, cutting down on non-technical losses in the sector. The qualitative analysis, for instance, identified a need for more flexible payment options, and points to a waiver of late payment fees for the poorer households as a way of helping to keep them connected. Measures such as connection fee waivers and amnesty on *kunda* users could also help attract more consumers back into the formal system.

Experience from subsidy reform episodes worldwide stresses the importance of developing an effective communication plan from the beginning (Clements et al. 2013a). The qualitative research findings revealed that many lower-income households are unaware that there are electricity subsidies, and do not understand the need for tariffs to increase. There is a perception that prices are already 'too high', and this encourages the use of illegal connections. To ensure the reform is publicly accepted, it is crucial to develop a communication strategy to increase public awareness about subsidies, the planned reform, and measures to make electricity more affordable for those most in need. Consumers might be more convinced to pay higher prices for electricity if there are credible expectations of improvement in the reliability of the electricity supply in the medium term. The government should also address (and ideally mitigate) known governance and accountability issues in the sector in order to convince the public that the reform is worthwhile. For instance, grievance redress mechanisms related to connection and bill payment could be strengthened and better publicized.

II. Country Background and International Experience with Energy Subsidy Reforms

Pakistan's power sector faces significant challenges in terms of capacity, governance and financial sustainability. Residential and industrial electricity consumers have been profoundly affected by routine power outages, or 'load shedding', whereby the electricity supply is periodically cut off in certain areas to ration supply during peak periods. In recent years load shedding has averaged 8 to 10 hours a day in some areas of the country, constraining production and employment (IMF, 2013a). In order to address these challenges, the Government of Pakistan has embarked on substantial reforms of the power sector. Pakistan's National Power Policy, approved in June 2013, envisages that "Pakistan will develop the most efficient and consumer centric power generation, transmission and distribution system that meets the needs of its population and boosts its economy in a sustainable and affordable manner" (Government of Pakistan 2013). As part of its energy sector reforms, in October 2013 the Government of Pakistan increased residential electricity tariffs to higher-volume consumers and eliminated subsidies on commercial and industrial supply.

The Government of Pakistan provides several subsidies to residential electricity consumers, the largest being the Tariff Differential Subsidy (TDS), which following the reforms in 2012-13 (FY13) comprised 96 percent of electricity subsidies. The TDS is the difference between the electricity tariff (plus certain surcharges) paid by consumers and the 'allowable costs' of electricity utilities determined by the regulator, NEPRA. The TDS enables the government to maintain an identical tariff structure for households across the country and to provide subsidies to some consumers. Residential electricity subsidies in Pakistan are based on the monthly electricity usage of each customer. The tariff structure is based on 'slabs' of monthly household consumption, with the unit cost of electricity increasing from one slab to the next as shown in Table 1.² A highly concessional 'lifeline tariff' is provided to households that use less than 50 kilowatt hours (kWh) per month.³ The lifeline tariff is intended to protect the poor by allowing them to afford a minimum amount of electricity. However, the benefit of the lifeline tariff is curtailed by a minimum monthly charge of Rs 75, meaning the subsidized rate is effectively only paid by consumers with consumption between 38 and 50 kWh in a given month.

In October 2013, the government increased tariffs for slabs above 200 kWh per month (thereby splitting the second slab in two) and changed the method of calculating bills. Whereas before households paid for their first 100 units at the 1-100 kWh/month slab rate, the next 200 at the 101-300 kWh/month tariff, and so on, households now pay the unit rate for the slab immediately below their total monthly consumption for all electricity up to that

² The description here relates to the standard tariff. There is also a 'time of use' tariff for the 1.4 percent of households with electronic meters (as of June 30, 2015), which charges flat peak and off-peak rates for all units consumed.

³ In the FY16 notifications, yet to become effective, the lifeline is to be restricted to households based on sanctioned load and average consumption.

slab's upper bound, and the unit rate on the subsequent slab for the remainder. For example, a household consuming 350 kWh/month pays the 200-300 kWh slab tariff rate for the first 300 kWh used and the 301-700 kWh tariff for the remaining 50 kWh used. Given an average cost of supply of around Rs 12 in 2015-16, the top two slabs are no longer subsidized, but due to the 201-300 slab subsidy some households consuming over 300 kWh/month still get a small subsidy.

Despite the recent tariff adjustments, electricity subsidies remain poorly targeted and provide limited support to vulnerable households. In a previous World Bank study, it was illustrated that electricity consumption is weakly related to overall welfare in Pakistan, and therefore richer households still benefit disproportionately from subsidies (Walker et. al. 2014). Meanwhile, poor households struggle to afford higher electricity costs and resort to coping mechanisms that negatively impact their overall well-being. Around one-third of households, the majority of which are poor or living in remote areas, remain unconnected to the grid and instead use more expensive or less efficient energy sources. Since energy subsidies are poorly targeted, it is natural to ask whether there might be more efficient and equitable means of making energy affordable. In doing so, however, one must consider the direct and indirect impacts on household welfare, through higher prices for electricity, alternative energy, and indirectly on other goods and services. International experience with energy subsidy reforms emphasizes the importance of compensation to protect poorer households against adverse impacts of subsidy reforms, and raise public acceptance of reforms. The choice of compensation method depends on the country's economic and political circumstances. When undertaking such reforms, it is important to consider the availability of existing social programs, administrative capacity, fiscal soundness of the budgets, as well as the political context (Yemtsov et al., forthcoming). Such compensatory measures should be tailored to the likely impact of the reform on a variety of different groups.

Box 1: Indonesia's subsidy reform experience

Indonesia is one of the flagship examples of successful subsidy reform. In 2005, the increase in international oil prices gave way to ambitious subsidy reforms, which proceeded in two stages (Clements et. al., 2013). In March 2005, the government raised gasoline and diesel prices by 33 and 27 percent respectively. Kerosene, being the least regressive of the subsidized goods, was initially left unchanged. In the second round of reform later that year, all fuel prices were increased, and kerosene prices almost doubled as a result. Had there not been a proper compensation plan, it is estimated that these price hikes (particularly of kerosene) would have caused the poverty headcount index to rise by 5.6 percentage points (Yemtsov et al., forthcoming). To mitigate such drastic impacts on the poor and near-poor households, the government introduced a two-pronged compensation package, reallocating a significant share of the savings from the subsidy reform towards social protection. A temporary (two-year) unconditional cash transfer introduced in conjunction with the reforms, *Subsidi Langsung Tunai*, was provided to the poorest 35 percent of the population (well above the 16 percent poverty line), in order to protect the near-poor and minimize political unrest (Beaton and Lontoh, 2010). What was then the world's largest UCT program proved to be largely successful in reaching the poor; the poorest quintile received 21 percent of the benefits, while the second, third and fourth quintiles received a total of 40 percent. The compensation package also included education, health and rural infrastructure programs for the poor (which were introduced later).

Cash transfers are often introduced or augmented as a means of replacing or at least temporarily mitigating the adverse effects of subsidy reform. Untargeted cash transfers are

sometimes used in oil-exporting countries (for example in the Islamic Republic of Iran), with all households at least in principle able to access the compensation. Targeted cash transfers, on the other hand, remain one of the most preferred safety net tools available for energy subsidy reform. The experience of Indonesia (see Box 1) illustrates that targeted cash transfers can reduce the population's opposition to subsidy reform, and help assist those most in need. In Pakistan, the largest cash transfer program is the Benazir Income Support Programme (BISP), a targeted program which reaches over 5 million households. The monthly payment to beneficiaries has been increased by 50% since 2013, likely offsetting the bulk of the adverse impact of the 2013 subsidy reform (Walker et al., 2014).

III. Distributional Incidence of Electricity Subsidies

We begin by examining the incidence of subsidies using household survey data, updating findings from an earlier survey presented in Walker et al. (2014). Figure 1 shows how the current residential tariff structure concentrates subsidies on households with low to moderate monthly electricity consumption. However, the incidence of these subsidies depends on the patterns of consumption by welfare level.

To examine this relationship, we use data from the 2013-14 Pakistan Survey of Living Standards (PSLM) to construct total monthly household consumption per capita for each household (a measure of welfare). Figure 2 shows the breakdown of monthly electricity consumption by slab for each decile of household per capita expenditure. While there is a clear difference in consumption across deciles, the graph shows that the vast majority of households except in the top decile consume less than 300 kWh/month, and therefore continue to benefit from subsidies even after the 2013 reforms. However, since the total subsidy provided to households with moderate consumption (between around 150 and 300 kWh/month) is greater than that for households below 150 kWh/month, the bulk of subsidies still goes to better-off households. One potential shortcoming of the above analysis is that the survey asks about total electricity consumption over the preceding month. Self-reports may be inaccurate, or may include expenditure on other forms of electrical power such as batteries or uninterrupted power supplies. In order to corroborate these findings, we now examine actual billing data.

Data on monthly electricity consumption, along with other household details, were obtained for 325,926 households from three electricity distribution companies (DISCos): Gujranwala Electric Power Company (GEPCO), Faisalabad Electric Supply Company (FESCO) and Islamabad Electric Supply Company (IESCO).⁴ These DISCos together serve almost 38 percent of Pakistan's residential electricity consumers.⁵ The three DISCos also cover a significant share of northern Pakistan and include a mix of semi-urban, rural and urban areas. For this analysis IESCO, FESCO and GEPCO each provided a 10-15 percent random

⁴ Other DISCos were approached for inclusion in the analysis, but data could not be sourced with the right specifications in time for this study.

⁵ For a breakdown of billing data please refer to the Appendix.

sample of household monthly electricity billing records for the period July 2013 to June 2014 (the same period during which the PSLM data were collected).⁶

The DISCO databases have a record of basic household characteristics and monthly electricity consumption, but they do not have any information on the household's welfare level. To obtain a good proxy for welfare level, we merged the billing data with the National Socio-Economic Registry (NSER), a near-census of households in Pakistan conducted in 2011. The NSER has data for 27 million households in Pakistan on occupation of the head, household size, assets and dwelling characteristics. The government collected and used these variables to create a proxy means test (PMT) score for each household for targeting of BISP.⁷ The National Database and Registration Authority (NADRA), which manages the NSER, generously agreed to merge the two databases for us, using the citizen's national identity card number (CNIC) as a common identifier.⁸

As well as looking for direct matches between CNICs in the two databases, NADRA also used its 'family folder' system to look for family links between CNICs in each database as illustrated in Figure 3. Around 45 percent of the 325,926 records in the DISCO database were successfully matched to the NSER data. This seems low, but is actually quite impressive considering the NSER database was put together in 2011, and many households that did not have a CNIC in 2011 may have since obtained one and recorded it in the DISCO database. Another major reason why records did not match was that many CNICs in the billing data were missing or invalid. As robustness check, we compared the matched and unmatched samples and found that they did not differ substantially (see Appendix Table A2). We are therefore relatively confident that the omission of these households does not skew the results of the analysis. Even though we have data on each month of the year July 2013 to June 2014, meter readers are often unable to read each meter every month, so billing data are often estimated in these months and balanced at the end of the year or when the meter is next read. To avoid introducing this measurement error into the analysis, in this section we report *average* monthly consumption over the year.

Table 2 summarizes basic characteristics of the data by quintile. Again we see an increasing but very weak relationship between welfare level and electricity usage. We use quintiles of the PMT as the measure of welfare rather than per capita consumption.⁹ It can be seen immediately that electricity consumption is relatively similar across the population and is weakly correlated with poverty.

⁶ Data provided for each household included the identity card number of the bill holder, name and address, father/guardian name, kWh consumed per month for 2013-14 (FY14), connected load (in kWh), phase, and number of air conditioners.

⁷ The PMT score is designed to correlate closely with household per capita expenditure, enabling one to rank all households in the country roughly from poorest to richest. It is based on 23 variables related to household structure, dwelling characteristics, education, occupational status and assets.

⁸ The Citizen's National ID Card Number (CNIC) is a national unique identification number provided to adult citizens. Further details on the matching process are provided in the Appendix, part A.

⁹ The cutoff PMT scores for each quintile are as follows: Poorest Quintile = 0 to 22, Lower-Middle Quintile = 22 to 29.7, Middle Quintile = 29.7 to 37.4, Upper-Middle Quintile = 37.4 to 46.4, Richest Quintile = 46.4 to 95.17.

Figure 4 replicates the results of the PSLM data analysis presented in Figure 2. There are some key differences in the results. Most notably, household electricity use is considerably lower according to the billing data. Around 30 percent of the poorest two deciles consumed less than 50 kWh/month (the lifeline slab) according to the billing data, compared to less than 10 percent in the PSLM data. Again, this may be due to reporting of other electricity expenses (such as batteries) in the household survey measure. Despite the generally lower consumption levels, however, the pattern across the welfare distribution is similar: electricity consumption rises gradually with welfare, but almost all households still consume less than 300 kWh/month and therefore benefit from subsidies. This graph also implies that the subsidy cuts in 2013 likely had a direct impact on only a small proportion of households, since the tariff increases were restricted to slabs above 200 kWh/month.

Figure 5 shows that the distribution of subsidies is disproportionately in favor of the richest households, with the top 20 percent of households receiving about 24 percent of the total subsidy. It can also be seen that the 50-100 and 100-200 kWh/month slabs account for the majority of subsidies: any substantial cuts to subsidies will need to be focused on these slabs, and this would adversely impact the majority of lower and middle-income households.

The current subsidy system does not take into account natural intra-year variation in electricity consumption. Given Pakistan's warm summer climate and cool winters, electricity expenditures vary widely by season (Figure 6). Even poor households that qualify for the lifeline in the winter (Q3) move into higher slabs during the summer (Q1 & Q4). In the winter, around 13 percent of rich households qualify for the lifeline subsidy. These findings indicate that a static subsidy scheme throughout the year is failing to protect the poor, and provides an unnecessary benefit to the richest households in the winter months, when electricity affordability is less of a concern.

Robustness Checks

Low match rate

Our analysis is predicated on the assumption that the PMT scores matched to the billing data tell us about the patterns of electricity consumption and welfare at the national level. However, only 45 percent of DISCO records could be matched with the PMT score through the NSER.¹⁰ A relatively small share of records could not be matched due to errors in the CNICs records in the DISCO database. The majority of the unmatched households could not be found in the NSER survey data, however, likely because those families did not have a CNIC at the time of the survey in 2010. The survey is currently in the process of being updated, however, meaning that in future the match rate is likely to be significantly higher.

¹⁰ The unmatched 55% will have similar socioeconomic breakdown or might be skewed towards the better off households as records of the initial NSER survey shows that most refusals came from better off households. The K-density plot shows the variance in PMT across the matched sample (see Appendix, part E).

To check for biases in the matched sample, we compared the average consumption for both the matched and unmatched sample using a simple t-test, and found no significant difference between the two samples.¹¹

Tenant households

It is common in Pakistan for the name on the electricity bill to be that of the owner of the house, even if the property is rented by another family. If this is the case, it is likely that the better-off landlord's PMT score is matched against the poorer tenant's actual electricity consumption, perhaps contributing to the low recorded consumption among wealthy households.

To determine whether this affects the results of the study, we look at the extent of rentership in the study area. The PSLM 2013-14 data indicate that in rural areas, 93 percent of families own their house, while in urban households, home ownership was around 72 percent. However, this cannot explain a large part of the findings since the service areas of the three DISCOs are predominantly semi-urban and rural. A district-wise representation of the billing data sample can also be found in the Appendix.

Representativeness of the billing data

The PSLM data examined in Part I are nationally representative. The billing data sample is fully random, but comes from only three non-randomly selected DISCOs. How might the analysis differ if the other DISCOs were included? First, we note that the three DISCOs covered in this analysis comprise 38% of all households. Being better-off districts, we would expect to see higher electricity consumption among this sample overall. This would imply that nationwide there would be proportionately less households above the 300 kWh/month level, reinforcing the above analysis. There is no reason to expect the consumption patterns across quintiles to differ significantly given the large sample.

Multiple connections

The final potential concern is that households may have multiple connections, spreading their consumption across meters and thereby understating their total consumption. Approximately 83 percent of the matched sample has a single meter connection (that is, the bill payer's CNIC appeared only once in the database), 6 percent have 2 or 3 meters, and 11 percent have more than 3 meters (see Appendix, part A). For the analysis we removed all households with duplicate observations, since it is not clear whether this reflects an effort on the part of households to evade higher tariffs or is simply an error in the CNIC records. However, even if wealthier households are using multiple meters, they qualify (illegally) for subsidies despite having higher overall electricity consumption. Thus this would not affect our finding that the bulk of subsidies go to non-poor households.

¹¹ Results are available upon request.

IV. Social and Gender Impacts of Energy Subsidies and Reform

To examine issues related to energy access and affordability for low- and lower middle-income households, and to inform the design of subsidy reforms in a politically and welfare-sensitive way, a qualitative study was commissioned and supervised by the World Bank and carried out by a local research firm. The study took place in three provinces of Pakistan in May and June 2015. The firm conducted focus group discussions (FGDs) with 400 participants from six districts, stratified by income group (low-income and lower middle income), gender, and location (urban and rural).¹² In addition, FGDs were held with BISP beneficiaries and *katchi abadi* (slum) residents. All participants had an electricity connection (either legal or illegal). In all, 44 FGDs took place, each with 8-10 participants. The discussions covered a range of topics related to energy usage, affordability and service quality, and explored attitudes toward subsidy reforms and compensation. Following each FGD, an individual participant was randomly selected to participate in an ethnographic interview (EI) to discuss the issues in more detail. Finally, the study included 12 interviews with BISP officers and energy company representatives, in order to get a government perspective on the issues raised. Further details on the methodology and survey instrument are provided in the Appendix (part F).

Energy Use and Spending Patterns

Electricity is central to the lives of households and households use a variety of electrical appliances. Nearly all households mentioned using electricity for lighting. While the type of electrical appliances used by households depends on welfare level and location, nearly all participants indicated that they use electric fans in their homes. Most BISP beneficiaries and *katchi abadi* residents (the poorest groups interviewed) reported using washing machines, fridges, irons, TVs and mobile phone chargers. Lower middle-income households reported using a variety of electrical appliances, including personal computers, evaporative coolers, juicers, vacuum cleaners and sewing machines. More than half of the research participants mentioned using electric pumps to fill household water tanks. Although these water pumps consume a limited amount of electricity, the household water supply is interrupted if load shedding occurs when tanks are empty. Respondents engaged in farming also mentioned using electric pumps for tube-well irrigation. While farmers have relatively higher electricity use on average for this reason, households residing in rural areas use slightly less electricity on average than their urban counterparts due to lower rates of appliance use (Figure 7). This is not just due to lower living standards: during the summer months, rural families can sleep outside at night, and thereby avoid the need for electric cooling.

¹² The average monthly income of participants varies based on province and location. Overall, the reported average monthly income of low-income respondents was between Rs 13,050 and Rs 14,675, representing the first and second quintiles according to 2011-2012 PSLM. The average monthly income of lower middle income participants ranged between Rs 19,700 and Rs 22,000, corresponding to the 3rd and 4th quintiles according to 2011-2012 PSLM/HIES.

As observed in the previous section, household electricity expenditure is seasonal: more electricity is used and the per-unit cost is higher during the summer months (May to September) due to the use of electric fans and coolers. Due to the hot summer weather in Pakistan, people take showers more frequently and need to wash and iron their clothes more often at these times. This results in higher use of water pumps, washing machines and irons. Participants also mentioned using fridges more often during the summer. Ramadan, which has taken place during the summer for the past few years, also increases the consumption of electricity. Households stated that they use energy-intensive food processors and juicers more during Ramadan to prepare for *sehri* and *iftar*.¹³ Another reason is that work and school hours are shorter during Ramadan, meaning men and children are at home for more of the day, increasing the use of fans, lights, and other electric appliances.

Consumption of energy is highest during the weekends and evenings. Most respondents mentioned doing household chores in the evenings and on weekends. Male household members often come home at midday on Fridays to prepare for prayers. Consumption is higher during the weekends due to the presence of working adults and school children. On Sundays women use washing machines and iron more preparing school uniforms for their children.

Women and men have different electricity use behaviors. Women are the main consumers of electricity at the household level, being traditionally responsible for performing household chores and therefore the primary users of electric appliances such as washing machines, irons, refrigerators and food processors. The women interviewed were frequently involved in household budgeting, and appeared to be more aware than male respondents of how to use energy efficiently.

Despite struggling with higher energy prices, most households make it a priority to pay their electricity bills on time to avoid surcharges. Most respondents mentioned that poverty and unexpected shocks are the main reasons for nonpayment of electricity bills. Households expressed empathy towards those who are unable to pay their bills; however, the majority of research participants disapproved of illegal electricity use and believed that it was contributing to higher overall tariffs and poor electricity service.

Coping with Increasing Energy Costs

High energy costs diminish the physical and psychological well-being of households. Figure 8 summarizes the main coping methods by socioeconomic group. Both low-income and lower middle-income households reported reducing spending on food to pay their electricity bills. *Katchi abadi* residents, BISP beneficiaries and low-income households mentioned reducing the number of meals consumed, eating chutney, onions, chilies and roti (flat bread) more frequently, and cutting out meat and other proteins. These households also expressed that they could not cut further their already minimized spending on basic needs such as food.

¹³ *Sehri* is an Islamic term referring to the meal consumed by Muslims before fasting during Ramadan. *Iftar* is one of the religious observances of Ramadan and is often done as a community, with people gathering to break their fast together.

Lower middle-income households, on the other hand, reported switching to lower-quality foods. Low-income households also reported cutting spending on childcare and education (e.g. sending children to public schools, and economizing on school uniforms and equipment). This group of respondents also reported reducing health expenses by avoiding doctor visits. Some rural households also reported selling livestock in order to pay their bills. These results are consistent with the findings of a household budgeting study conducted by the Sustainable Development Policy Institute (SDPI, 2014). Finally, social isolation is an indirect result of higher energy prices: some households reported having to stay away from social gatherings such as weddings due to a lack of money to pay for the necessary clothing and gifts.

Households actively reduce their energy usage to manage their electricity costs. Both low-income and lower middle income respondents mentioned that they switch off lights in unused spaces, staying in one room with all family members to use fewer lights and fans, sleeping in courtyards in rural areas, wash clothes by hand, and use electrical appliances sparingly. Women are more affected by such measures as their workload increases due to decreased use of electric appliances such as washing machines. Households also appear to invest in energy saving appliances: 68 percent of lower middle-income households reported purchasing energy saver bulbs and more efficient appliances. Respondents engaged in farming emphasized the potential savings from switching to alternative energy sources such as solar power.

Paying bills in installments is another coping mechanism mentioned by FGD participants.

Box 2: Ethnographic Interview I

General information about the household

The respondent lives in the village of Timargarh in Lower Dir, KPK, with his extended family of ten. For the last 35 years he has worked as a driver. His house is partially constructed and has four rooms. His wife takes care of all the household chores. Both of his children are deaf, and he pays their medical expenses out of his limited income. He has a separate *kunda* electricity connection in addition to a functioning legal connection.

Expenditures on energy sources

Electricity is mainly used in his home for lighting, and for appliances including fans, a fridge and an iron. The respondent stated that his electricity bills are usually delivered in the last week of the month at the local mosque. The amount varies from Rs. 200 to Rs. 1,000 per month.

Coping mechanisms

The respondent supplements his driver's income with wages from agricultural work. In order to reduce electricity expenditures, his family makes an effort to turn off all extra lights and to minimize use of the fridge during the winter months.

Some respondents reported that they would not prefer to pay their bills in installments as it creates additional stress on household members. When they pay in installments, they constantly worry about whether they will be able to pay on time. Respondents also saw this method as unattractive, reporting that it sometimes required bribery of officials. Borrowing money is also employed as a coping strategy by some respondents. Around a third of low-income respondents mentioned borrowing money from their relatives to pay high bills. The

respondents see borrowing money as a last resort coping strategy since this puts considerable stress on households and negatively affects family relations.

Despite the sensitivity of the topic, a small share of households conceded that they resorted to illegal electricity (the *kunda* system) because they could no longer cope with increasing electricity costs. Users of the *kunda* system pay a small amount to the linemen every month to prevent them from cutting their illegal connection. Some respondents mentioned that they started using the *kunda* system after their electricity was disconnected due to nonpayment of bills. According to Faisal and Eatazz (2014), per capita income and the consumer price of electricity are key determinants of electricity theft. A small number of lower middle-income households also mentioned using the *kunda* system intermittently. These respondents have legal connections but use the *kunda* system for high electricity consuming appliances. Respondents also mentioned that they share meters with their neighbors, as they cannot afford to have a separate meter. Respondents who share meters pay less. However, they lack control over the total electricity consumption and the bill amount and, therefore, are less inclined to save electricity. Also, households who share a meter are less likely to qualify for subsidies.

Experiences with Service Quality and Energy Sector Officials

Load shedding

The most common concern cited by research participants was not the cost of electricity, however, but rather the reliability of the service. Respondents from all groups expressed dissatisfaction with officials and with the long hours of unscheduled load shedding. Long hours of load shedding and electricity outages have had adverse impacts on the economic, physical and social well-being of citizens.¹⁴ Respondents from various occupation groups such as shop owners, factory workers, and tailors mentioned that due to load shedding their income levels have dropped. Most of the respondents complained that due to load shedding they are unable to use water pumps to get water; due to lack of electric light their children cannot study in the evening; and a lack of fans and coolers means they cannot get regular sleep during the summer. The psychological well-being of participants is also negatively affected by load shedding: some reported that they cannot relax in their homes and that they feel angry due to the unavailability of electricity.

As the main consumers of electricity at the household level, women are more affected by load shedding and by the household's efforts to manage electricity expenses. Nearly all women participants stated that due to long and unpredictable hours of load shedding, they could not use appliances such as washing machines, irons, vacuum cleaners, and electric cooking appliances. Instead, they perform household chores manually, which increases their workload and reduces time that can be spent on educational or income-generating activities. Female respondents also mentioned that income-generating opportunities such as stitching

¹⁴ In the summer of 2015, a heat wave in the country killed more than 1,300 people, and 65,000 people suffered heat stroke. Long hours of power outages were a factor (Imtiaz and ur-Rehman, 2015).

and embroidery and housekeeping were negatively affected by the unreliable electricity service. Female respondents are also adversely affected by the stress of sleep-deprived husbands and children in the summer months.

In the absence of electricity, respondents switch to alternative sources such as electrically charged lights and candles. Candles were the most common alternative lighting source, used by 65 percent of BISP beneficiaries and 44 percent of *katchi abadi* residents. Overall, 72 percent of respondents reported using electrically charged battery lights. These carry costs too: households spent Rs. 200 to Rs. 250 on average each month on candles, while a battery operated light cost Rs. 250. A small number of lower middle-income households mentioned using an Uninterrupted Power Supply (UPS) during load shedding hours. The price of UPS devices ranges from Rs. 10,000 to Rs. 60,000.

Billing system

The second most important problem reported by respondents was a pervasive lack of trust in the billing system, with 80 percent of respondents complaining that their electricity bill amounts do not reflect their actual use (Figure 9). As a male BISP beneficiary in Nawabshah, Sindh, stated, “with so much load shedding, why is the bill so high? They are not reading the meter properly.” Such perceptions are in part due to the widespread practice of bill estimation: due to short staffing, meter readers do not visit every house monthly but rather ‘estimate’ usage and make an ex-post adjustment. This may be a source of confusion to consumers. On the other hand, some respondents claimed that meter readers inflated their bills deliberately. The fact that many households’ bills are delivered to communal places such as mosques also contributes to the participants’ skepticism that the distribution company genuinely reads their meters. Unreliable service contributes to the perception of inflated bills. With less hours of electricity service, consumers expect lower bills. When bills rise (probably due to price increases), there is a perception among consumers that the utility company is cheating. Electricity company representatives also emphasized the difficulties they face with meter reading due to staff shortages and difficulty in accessing some localities. Meanwhile, the government is taking some measures such as taking photos of meters for billing, to build trust between service providers and consumers.

Governance

A majority of participants complained about the attitude of electricity company officials, perceiving them as rude and unresponsive. Around 81 percent of respondents stated that corruption was a significant problem in their interactions with service providers. In the words of a low-income male interviewee service providers are “forcing everyone to commit sins by paying bribes.” Meter readers, the primary point of contact between the consumers and electricity providers, were perceived as corrupt by 44 percent of urban respondents and 29 percent of rural respondents, while 32 percent of urban respondents and 37 percent of rural respondents complained about their rude attitude. Bribery of an official was reported by 65 percent of respondents, either to overcome issues related to overbilling, resolve technical problems, or in some cases to get an illegal electricity connection. The general perception among the participants was that without bribes no problem would be solved.

There was also general dissatisfaction with the ineffective and untimely response of service providers to technical problems such as transformer breakdowns. All respondents were aware of the electricity company's complaint offices, and many male respondents had visited them at least once. However, a substantial number of respondents reported having given up on their complaints after visiting the office. We also spoke to both DISCO officials, and they explained that conditions for good service and accurate billing were made difficult by resource constraints, especially short-staffing.

Social Assistance

Energy affordability assistance is arguably part of the social safety net. If subsidies are not helping households to afford basic electricity needs without resorting to harmful coping mechanisms, improved assistance should be developed in the context of the country's broader safety net policy. BISP, Pakistan's largest safety net scheme, is an antipoverty initiative covering over 5 million households and providing monthly cash transfers as well as other support. Despite its size, BISP is targeted only to the poorest 15-20 percent of households in Pakistan. We specifically interviewed BISP beneficiaries and non-beneficiaries about the program in order to explore what role it could play in any alternative energy affordability policy.

Respondents overall demonstrated a high level of awareness of BISP. Low-income households in particular were aware of BISP's eligibility criteria and application requirements, since most had participated in the 2010 NSER survey (from which most BISP beneficiaries were selected). BISP beneficiaries consider the cash assistance an essential element of their income that helps them afford their utility bills. Around 70 percent of BISP beneficiaries interviewed perceived the application procedure and the amount of money received as fair.

Box 3: In-Depth Interviews with Service Providers

According to a meter reading supervisor at PESCO, in Lower Dir district of KPK, meter readers face challenges during meter reading and bill distribution due to a shortage of field workers and difficulty reaching remote areas. Due to the limited number of staff, the company could not deliver bills on time to such areas. This has consequences for the customers:

"Just two or three days have been given to us for the distribution of bills. Because of the limited time frame we cannot reach bills to all people, and thus some people get their bills after the due date for bill payment. As a result they have to pay extra surcharge and fines." (Meter reader supervisor, Lower Dir, KPK)

The supervisor also emphasized that there is a tension between meter readers and communities. He said that there have been instances in which consumers threatened meter readers over higher bills.

A sub-division officer at PESCO observed that meter readers are often accused of unfair readings. He mentioned that the manual meter reading system needs to be replaced with a new system. According to sub-division officers in his area, there are more than 30,000 customers, but his staff checks only 6,000 to 7,000 meters a month. The remaining households receive estimated bills.

A considerable number of non-BISP beneficiaries in the low-income group, on the other hand, felt that they should have been selected and reported concerns about the clarity and fairness of BISP selection procedures. These respondents expressed their desire for additional support mechanisms that could help them with their energy expenses.

We asked respondents to choose their preferred energy affordability policy from three options: (i) increasing the BISP cash transfer; (ii) implementing targeted concessional pricing for the poor; and (iii) providing grants for energy saving measures. The most common response (with 87 percent support) was targeted concessional pricing for the poor. There was a prevailing perception among the research participants that well-off households get cheaper electricity, which should be addressed through credible and impartial targeting of assistance. Respondents agreed that adding an amount to BISP would help vulnerable households with their electricity expenses; however, there was a broad feeling that the benefit would not help many needy low and lower middle-income households that are excluded from the scheme.

Box 4: Ethnographic Interview II

General information about the household

There are eight members in the household. The respondent's husband is the main earner in the household and he works as a farmer. They live in a house in the countryside and have a separate meter. They mainly use electricity for lighting, running fans and electrical appliances such as the fridge. They are not receiving any social assistance.

Expenditures on energy sources

The respondent stated that at times the electricity bill seems too high. She believes that the high electricity bill is not plausible given excessive load shedding for several hours daily.

Coping mechanisms

High electricity bills cause the household a great deal of stress. Due to inflation it is difficult to manage household expenses including food and the children's education. The family tries to reduce food and clothing related expenses to pay their electricity bills. They also try to stay in one room to save energy and tend to sleep outside at night to avoid using fans. Despite these measures, they receive high electricity bills and are unable to pay. The respondent also added that friends and relatives had their own expenses and no one will lend them money.

Attitudes toward energy reforms

The respondent has general knowledge about reforms, and has noted the gradual increase in electricity tariffs over the last five years. She does not have any interaction with WAPDA and mostly her husband deals with such matters. The respondent did not know the location of the electricity complaint office, nor the process of lodging complaints. She believes that it is government's responsibility to fix tariffs according to people's economic status.

Awareness and Acceptance of Energy Reforms

Finally, we asked participants about the planned reforms to subsidies, and under what terms they would accept price increases. In general, respondents were unaware that there were electricity subsidies, especially given that electricity prices have increased in the last few years. Women were more aware of price increases than their male counterparts as they are heavily affected by efforts to afford electricity. However, women were less informed about the reasons for energy sector reforms. They expressed a belief that the increase in prices is associated with poor government policies and governance issues in the sector. Consumer attitudes towards reforms are also influenced by their trust in energy sector institutions and their interactions with electricity service providers.

Box 5: Ethnographic Interview III

General information about the household

There are eight members in the respondent's household. They live in a semi-structured house in a village. The respondent's husband works at a hotel, while she manages the household. They have six children, and all of them are school age. The household shares an electricity connection with relatives, and the monthly bill is divided equally.

Expenditures on energy sources

The household spends Rs. 300 to 700 per month on electricity and Rs. 200 to 300 each month on alternative energy sources such as candles. The family collects its electricity bills from the local village mosque, and the men pay the bills. The respondent tries her best to pay the bills on time given the bill is shared with her relatives. If there are any delays in payment, her relatives pressure her and this leads to tension.

Coping mechanisms

The respondent generally pays her bill on time. There was only one time when she had to take a Rs. 300 loan from her sister to pay her bill. However, her husband is sick, and even small bills are difficult to afford. Any increase in cost of electricity would affect the monthly budget. It is not easy for her to send her children to school since the family struggles to afford food.

Social assistance

The respondent's family has received Rs. 1,500 monthly from BISP for the last three years, and this has been very useful in helping her afford her electricity costs. Her household uses the BISP cash mainly for food and the children's education. She has also managed to put aside some money for emergencies.

Attitudes toward energy reforms

The respondent stated that she does not have sufficient knowledge regarding the reforms in the energy sector. In her opinion, the government is responsible for making such decisions. However, she was aware that the price of electricity had been increasing.

Participants perceive future price increases as unjustified without improvements in service reliability and quality. Most of the respondents—in particular, BISP beneficiaries and *katchi abadi* residents—mentioned that they could not bear further increases in electricity tariffs. Upon further probing, interviewees agreed that price increases would be acceptable only if bills are made credible, load shedding is reduced and governance issues are addressed. However, the majority of households voiced their skepticism during the discussions as they doubt that such improvements will ever happen. This contrasts with findings from the SDPI study, in which 63 percent of respondents indicated that they would be willing to accept a Rs. 100-500 increase in their utility bills if they were provided 24 hours of uninterrupted service. When asked whether they would be willing to pay an increase greater than Rs. 500, only 19 percent of respondents agreed. SDPI reported that all respondents would accept an increase in electricity charges if it was guaranteed that there would be no load shedding in the future (SDPI, 2014).

V. Policy Recommendations

Moving beyond general price subsidies

As we have demonstrated throughout this paper, the existing price-based subsidy fails to protect low and middle-income households from high electricity costs while disproportionately benefiting rich households. Price-based subsidies will only favor the poor

if recorded electricity consumption is closely tied to overall welfare. This is evidently not true in the case of Pakistan—either because electricity usage patterns are similar across households, or because the current system of metering does not accurately capture consumption. Seasonal fluctuations further distort the functioning of subsidies, exposing poor households to higher per-unit costs for electricity in the summer, when their consumption is highest, and providing unwarranted assistance to rich households in the winter months. To address these drawbacks with the present system, in this section we look at how targeting can be improved, and how to make energy affordable while encouraging users to stay within the formal system.

Improved targeting

It is evident from the electricity consumption analysis that price-based subsidies are not an effective means of targeting assistance to the households that need it the most. Pakistan already has a demonstrably better targeting mechanism. The NSER contains ‘poverty scores’ for almost all households in the country, effectively ranking them from poorest to richest. The registry, indexed by CNIC number, is already used for targeting in over 30 programs in Pakistan. The NSER allows the government to select any subgroup of the population based on their welfare level; therefore assistance could be directed to any subgroup of the population.

The matching exercise conducted for this paper was in effect a preliminary test of the applicability of this targeting mechanism to electricity subsidies. Using the CNIC records in the DISCO billing databases, NADRA was able to match poverty scores to almost half of the 350,000 households. The match rate is impressive given that the NSER was constructed in 2010 and many households did not have a CNIC at the time. A higher match rate could be achieved if the NSER is updated, an exercise which the Government of Pakistan is currently undertaking. To be sure that records can be matched, households could be required to report in person to the DISCO office with their national ID card and a recent electricity bill. They would identify themselves using the biometrics stored in the card, and the CNIC number would be used to look up their poverty score and make an instant determination of eligibility for assistance.¹⁵ For renters, a tenant would be entitled to claim a subsidy even if the bill is in the name of a landlord, but the subsidy would be limited to one per family, with families encouraged to re-register at their new address if they move. NADRA could provide the technical support to implement such a targeting system through DISCO offices or another government post. To limit subsidies to one per family, a central database of beneficiaries would need to be developed.

A simpler alternative, which might work well if the objective is to eliminate the richest households only, would be to apply exclusion filters to determine eligibility. For example, households with registered land, payers of income tax, holders of bank accounts, and so on, could be identified by CNIC and excluded from the benefit. Further analysis would be needed

¹⁵ NADRA has the capacity to access the NSER database in real time, and the CNIC is equipped with biometric identification capabilities.

to better understand which households would be excluded, and whether there would be any deserving households unduly impacted by this approach.

With any targeting mechanism, it is important to have a very clear process of application, review, appeal, and final eligibility determination. This touches on two issues in particular: the need for a grievance redress mechanism; and the need for a carefully designed communications policy. Both issues are discussed in further detail below.

Affordability measures

The existing subsidy structure could be maintained for eligible households only; ineligible households could be charged the NEPRA-determined tariff or another cost-neutral pricing formula. However, such a system would not be fully equitable, and would not deal with the seasonality issue. An alternative approach would be to replace subsidies with a *bill credit*, charging all households a cost-recovery tariff and applying a monthly credit to the bills of eligible households. The credit could be set at an amount equivalent to basic electricity needs, with the household paying for usage above this level. The amount of the credit would thereby vary with tariffs. The credit would serve as a visible ‘subsidy’ from the government, in contrast to the more opaque implicit price subsidies provided currently. To address the seasonality issue, any unused portion of the credit could be rolled over to subsequent months (with some cap), so that households not using all of their credit in the winter could save the remainder for the summer months.

We also recommend that the government consider more flexible options for payment of bills. Our qualitative analysis found that poorer households are vulnerable to unexpected shocks, such as illness, that may make paying electricity bills difficult. Some reported that they were disconnected as a result, and turned to the *kunda* system. Allowing flexible repayment would reduce pressures on customers to bribe officials or move to *kunda*. It would also help very poor households to smooth their consumption and avoid resorting to selling assets or going into debt. Households could be provided with a low-interest repayment option, or given a longer period of time to repay their bill. Penalties for late payment could also be waived for households in the target group. Such policies would need to be designed carefully to avoid moral hazard issues, but would be a way of recognizing the vulnerability of poorer households to rising energy costs.

One of the main limitations of the above forms of assistance is that they exclude households who are not formally customers of the DISCOs—a group that includes many of the poorest and most physically isolated households in Pakistan. These ‘unconnected’ households can be broken into three groups: (i) households living outside the service area; (ii) households living in service areas but not (formally) connected to the grid; and (iii) households connected to the grid through an illegal connection (such as *kunda*). For households outside the service area, there is no straightforward solution other than gradual expansion of coverage. In the meantime, the government may consider providing other forms of assistance to these households to help them cover their energy costs. For those inside the service area, some could be encouraged to connect to the grid by offering a waiver of the connection fee. For those who are connected illegally, an amnesty and waiver of reconnection fee could be provided for a limited time to entice these customers to resume

an official account, while the bill credit and more flexible payment options proposed above would help them pay their bills and stay connected.

Ensuring the success of the reform

International experience illustrates how countries that succeeded in reforming subsidies did so by addressing issues of concern to the public through a clear communications campaign, and through careful sequencing of the reform.

Packaging the reform

The qualitative analysis shows that consumers are primarily concerned about affordability, reliability of supply, and issues related to transparency and accountability. To convince the public, the reform should address each of these issues with a clear plan of action and timeline for results. Affordability can be addressed in the near term by introducing more generous compensation mechanisms targeted to a subset of the population that genuinely needs assistance. In the longer term, affordability and reliability of supply can be improved through investment in infrastructure and better governance. Concrete actions can also be taken to improve transparency and accountability, especially relating to the billing system and resolution of grievances.

Consumers do not trust the accuracy of their bills, and perceive corruption in their interactions with service providers. Investment in capacity to read meters and clearer presentation of the bills themselves is a known priority, and the government has already taken action in this regard. Households also report feeling unable to assert their rights as consumers. DISCOs in Pakistan have customer service mechanisms in place, including dedicated customer service centers, websites for lodging complaints, call centers and SMS services (Table 3). These mechanisms could be strengthened to effectively and rapidly respond to queries and complaints. The government could encourage DISCOs to experiment with these techniques by rewarding the best performers and publicizing their approaches.

The government could also put in place or strengthen grievance redress mechanisms (GRMs) and provide training to staff to address consumer concerns in a manner that builds trust. A GRM will be essential to manage the transition away from universal subsidies, and to deal with appeals to selection decisions under a new targeting method. Box 6 provides an example of how the GRM could be designed. Multiple implementation partners may need to play a role in redressing grievances: identity verification grievances handled by NADRA, billing data grievances by DISCOs, and eligibility/targeting grievances by BISP.

To further strengthen citizen engagement, a ‘social compact’ approach could be adopted. A social compact is a formal arrangement in which the views of citizens are sought at regular forums at the local level, and actively incorporated in policy making. The social compact approach aims to increase mutual trust and accountability between service providers and consumers through stakeholder consultations and participatory monitoring. The social compact approach was implemented in two provinces in Southeastern Anatolia, Turkey—the region with the highest nonpayment rates in the country. Stakeholder committees representing consumers and the electricity company were established. These committees

developed a joint plan to address payment, service quality, and communication issues. The electricity company agreed to institutionalize this plan and improve its grievance redress mechanism. In return, citizens were expected to increase payment rates. This approach may likewise be a good way of increasing trust and mutual accountability between service providers and consumers in Pakistan, especially in areas where illegal electricity use is common. Indeed, Karachi Electric has already had successful experience applying such an approach in some of its service areas.

Box 6: Example of a Successful GRM: The Pakistan Flood Emergency Cash Transfer Project

The cash transfer program for the Pakistan Flood Emergency project had a very successful grievance redress mechanism (GRM). The GRM included facilitation centers with grievance redress counters. It also included a public information campaign on the grievance redress process. Television, radio, print, and word-of-mouth were used as part of the communication strategy. In addition to facilitation centers, complaints could be registered by text messages, phone and calls. The project successfully mobilized different organizations to address different types of grievances, for example NADRA centers handled grievances related to incorrect personal details and local authorities dealt cases of eligibility/targeting grievances. Hotlines were created to handle cases of incorrect personal details. The local authorities checked whether the applicant is based in a flood-affected area and if they have already received the benefit. Another channel of communication was through local influential leaders who could verify the applicants' status as flood affectees. The district authorities supervised the review process and the eligibility statuses were submitted to the Provincial Disaster Management Authority (PDMA). The final step involved NADRA entering the decisions into case management systems and clearing the households enrolled at the facilitation centers. For the payment grievances, the partner commercial banks operated through offices and dedicated hotlines. Grievances related to maladministration and unaddressed complaints were handled by the District Administration or NADRA. The GRM successfully handled grievances and has been cited as one of the most effective GRMs for emergency projects in Pakistan. The example shows that an effective GRM is one that is efficient on multiple fronts and where each organization effectively handles grievances both individually and as part of the collective effort.

Source: Rao, 2014.

Communication and Sequencing

Lack of awareness and misinformation can be one of the biggest barriers to subsidy reform. A study by the IMF indicated that in 22 cases of reform, lack of a communication plan was the biggest cause of failure (Clements et al., 2013b). Information campaigns have underpinned the success of reforms in a number of countries, including Armenia (*ibid*), Indonesia (World Bank, 2011), the Islamic Republic of Iran (IMF, 2013b) and Uganda (Sdralevich et al., 2014). In the case of Pakistan, the information campaign should both make the case for the reform, and educate eligible households about how to apply for the new benefits. The campaign could include public addresses by senior government officials, media campaigns, focused outreach activities, and inclusion of civil society and other stakeholders. The communication agenda should continue throughout the reform process, and should be launched before the reforms begin. The communication strategy should take into account the interests of various stakeholder groups (World Bank, 2015). Beyond the traditional media, interpersonal channels could be tapped, such as community influencers, mosques, representatives of the local Union Councils, and community outreach. This may be more effective in reaching poorer households: a recent survey found that among BISP

beneficiaries, 58 percent relied on mosque announcements for information, 47 percent relied on TV, and only 10 percent mentioned radio or newspaper (Mott McDonald, 2014).

VI. Conclusion

Although electricity subsidies were introduced as a form of social safety net in Pakistan, the analysis of household survey and billing data in this paper demonstrates that they continue to be regressively targeted, and that many poor households remain exposed to high bills especially in the summer months. Subsidies are often introduced in the name of helping the poor, but implemented in isolation from other social protection programs, mainly due to the mapping of implementation responsibilities within government. Going forward, subsidies and their reforms should be part of the broader dialogue on social protection in Pakistan, and considered as one of a set of antipoverty interventions.

The qualitative assessment findings indicate that electricity is central to the lives of low-income and lower middle income households and that households struggle with electricity costs and they resort to coping mechanisms such as reducing necessary expenses on food, health and child care to afford electricity bills. Low-income households, especially *katchi abadi* residents and BISP beneficiaries, use illegal electricity (called the *kunda* system) as a way to cope with increasing electricity costs. Despite efforts to improve service delivery, load shedding and electricity outages still negatively impact on households' economic and social well-being. Women are more affected by load shedding and by the household's efforts to manage electricity expenses because they are on average the main users of electrical appliances and spend more time in the home. The majority of consumers do not trust their bills, and believe that their bill amounts do not reflect their actual consumption. Almost none of the respondents were aware that the government provides electricity subsidies. Overall, the negative attitude of respondents toward the electricity service is a result of frustration with unreliable supply and perceptions of poor sector governance. Despite struggling to afford electricity, respondents appear willing to pay higher prices provided service quality improves and governance problems are addressed. However, most respondents are skeptical that such improvements will take place.

When governments undertake subsidy reforms, they have two main levers to help households adapt to higher prices: (i) compensating households for the price increase; and (ii) encouraging households to adjust their consumption patterns (Yemtsov et al., forthcoming). In this analysis we have focused on the former, and illustrated how Pakistan can better cushion the effect of energy price fluctuations on poor and economically vulnerable families by targeting compensation using the existing NSER database. However, a pilot would be needed to examine the cost-effectiveness of the approach given the costs of implementation.

References

- Beaton, C. and Lontoh, L. 2010. "Lessons learned from Indonesia's attempts to reform fossil-fuel subsidies," International institute for sustainable development (IISD). Trade, Investment and Climate change series.
- Clements, D.C., Benedict, J., Fabrizio, S., Gupta, S., Alleyne, T. and Sdralevich, C. A. 2013a. "Energy Subsidy Reform: Lessons and Implications." International Monetary Fund: Washington, DC.
- Clements, D.C., et. al, 2013b. "Case studies on energy subsidy reform: lessons and implications." International Monetary Fund: Washington, DC.
- Coady, D., Parry, I., Sears, L. and Shang, B. 2015a. "How Large Are Global Energy Subsidies?" IMF Working Paper WP/15/105, Washington, DC.
- Faisal, J. and Eatzaz, A. 2014. "An Empirical Study of Electricity Theft from Electricity Distribution Companies in Pakistan." Pakistan Development Review.
- Government of Pakistan, Ministry of Water and Power. 2013 "National Power Policy." Available at: <http://www.ppb.gov.pk/National%20Power%20Policy%202013.pdf>
- International Monetary Fund (IMF). 2013a. "Pakistan: Staff Report for The 2013 Article IV Consultation and Request for an Extended Arrangement Under the Extended Fund Facility." Available at: <https://www.imf.org/external/pubs/ft/scr/2013/cr13287.pdf>
- International Monetary Fund (IMF). 2013b. Energy Subsidy Reform: Lessons and Implications. Working Paper, January 28, 2013.
- Imtiaz, S. and ur-Rehman, Z. 2015. "Death Toll From Heat Wave in Karachi, Pakistan, Hits 1000." New York Times. June 2015. Available at: <http://www.nytimes.com/2015/06/26/world/asia/karachi-pakistan-heat-wave-deaths.html>
- Mott Macdonald. 2014. 'BISP Spot Check and Beneficiary Feedback- National Cash Transfer Programme', Volume 1.
- O'Leary, S., Cheema, I., Hunt, S., Carraro L. and Pellerano, L. 2011. 'Benazir Income Support Programme Program Evaluation, Baseline Survey Report.' Oxford Policy Management Institute, 2011.
- Rao, S. 2014. 'Grievance Redress Mechanisms in Pakistan.' GSDRC. <http://www.gsdrc.org/docs/open/hdq1117.pdf>
- Sdralevich, C., Sab, R., Zouhar, Y. and Albertin, G. 2014. Subsidy reform in the Middle East and North Africa: Recent progress and challenges ahead. International Monetary Fund: Washington, DC.

Sustainable Development Policy Institute. 2014. "Energy & Tax Reforms: Household Analysis from Pakistan." Islamabad: Sustainable Development Policy Institute.

Walker, T., Sahin, S., Saqib, M. and Mayer, K. 2014. "Reforming Electricity Subsidies in Pakistan: Measures to Protect the Poor." Washington, DC: World Bank.

The World Bank. 2011. Indonesia: Communications Strategy to Support Fuel Subsidy Reform and Ensuing Cash Transfer. Washington, DC: World Bank.

The World Bank. 2015. "Toward Gender-Informed Energy Subsidy Reforms: Findings from Qualitative Studies in Europe and Central Asia". Washington, DC: World Bank.

The World Bank, OECD & OPEC. 2010. "A roadmap for phasing out fossil fuel subsidies," The World Bank Group's contribution to the 2nd IEA, World Bank, OECD and OPEC Joint Report, prepared for submission to the G20 summit meeting in Seoul, 11-12 November 2010.

Yemtsov, R., et al. *Forthcoming*. "Social Safety Nets and Political Economy of Energy Subsidies Reform: A Guidebook for Practitioners". Social Protection Global Practice. The World Bank Group: Washington, DC.

Table 1: Residential electricity tariff schedules

Monthly consumption (kWh)	2012-13	2013-14	2014-15	2015-16
0-50*	1.87	2.00	2.00	2.00
1-100**	4.54	5.79	5.79	5.79
101-200		8.11	8.11	8.11
201-300	6.86	8.11	12.09	10.20
301-700		12.33	16.00	16.00
700+	10.65	15.07	18.00	18.00

Note: * Lifeline rate for consumers below 50kWh/month. See also footnote 2. ** Consumers above 50 kWh/month pay this rate for the first 100 units.

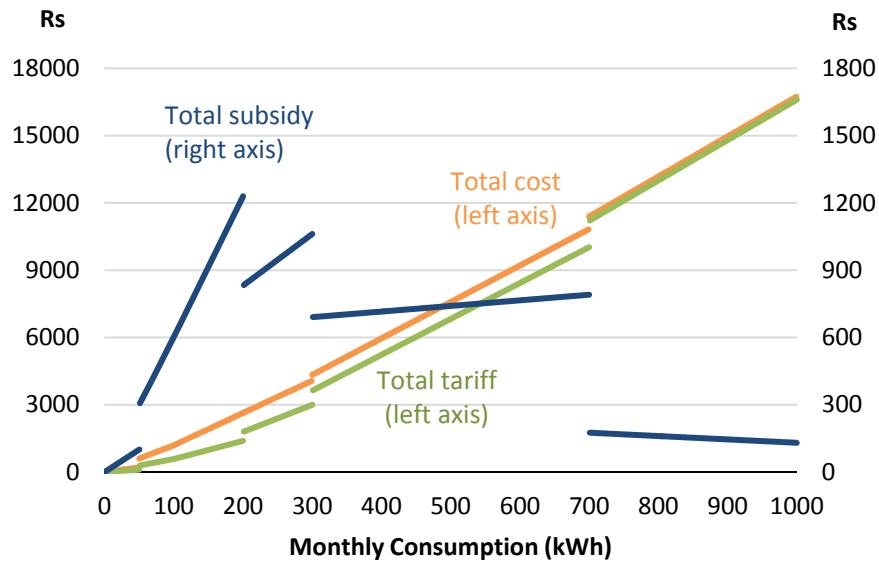
Table 2: Summary of household characteristics and electricity consumption by PMT quintile

Quintile of PMT distribution	Median household size	Median number of household members per room	Median electricity consumption (kWh/month)	Mean electricity consumption (kWh/month)
Poorest	7	6	81	92
Lower-Middle	6	4	94	101
Middle	5	3	102	110
Upper-Middle	4	2	100	109
Richest	5	2	118	133

Table 3: DISCO customer service mechanisms

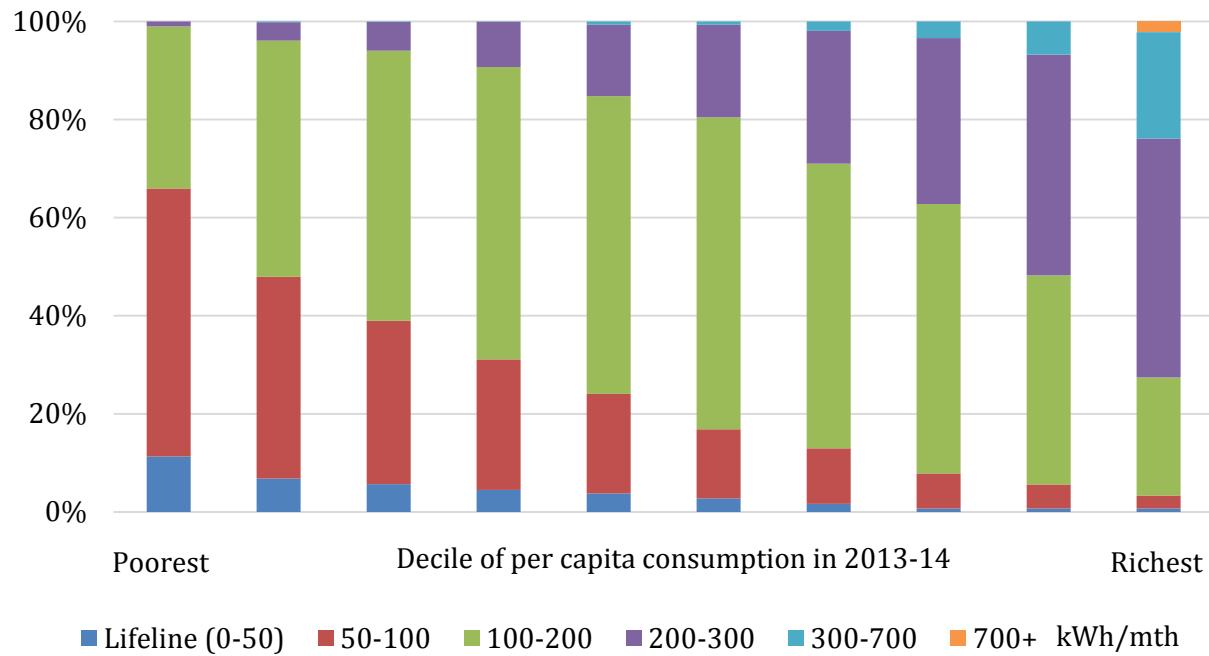
DISCO	Customer service center	Complaints on website	Call center	Complaints via SMS/Phone	Online bill payments
IESCO	✓	✓	✓		✓
LESCO	✓	✓		✓	✓
GEPCO	✓				
FESCO	✓		✓		✓
PESCO	✓	✓			
HESCO	✓		✓	✓	✓
MEPCO	✓		✓		
SEPCO	✓	✓		✓	✓
K-Electric	✓	✓	✓	✓	✓

Figure 1: Current price and subsidy structure for residential subsidies, 2014-15



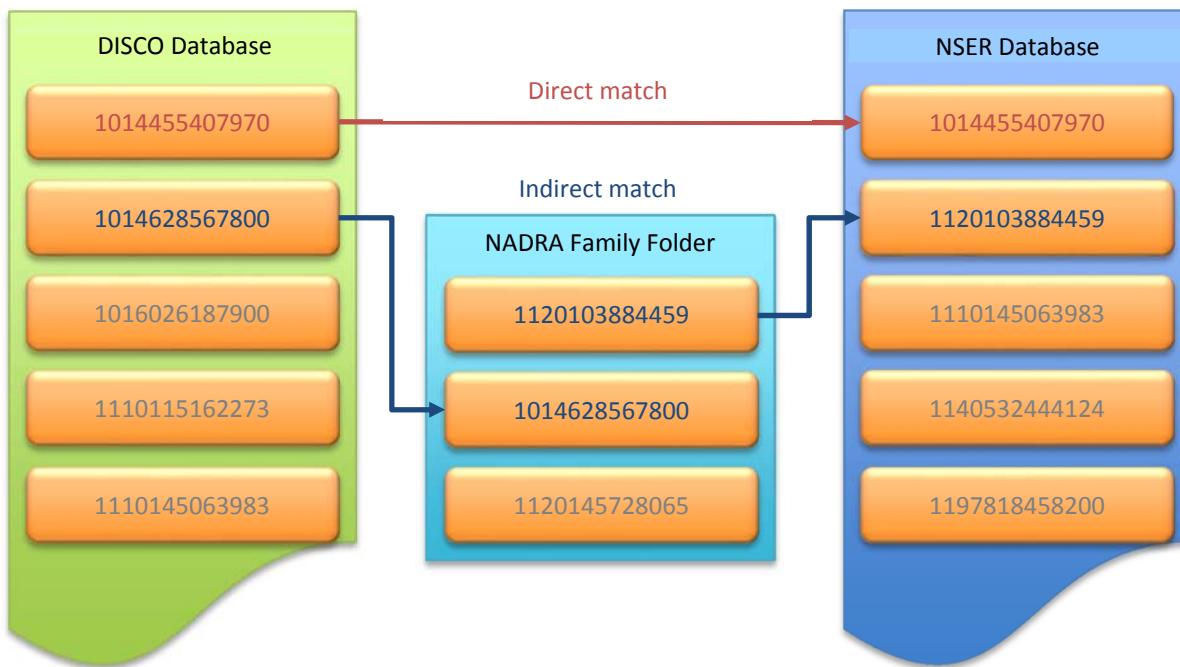
Note: Cost is the national average NEPRA-determined tariff for the slab.

**Figure 2: Residential electricity expenditure by decile of per-capita consumption
(Based on PSLM 2013-14 data)**



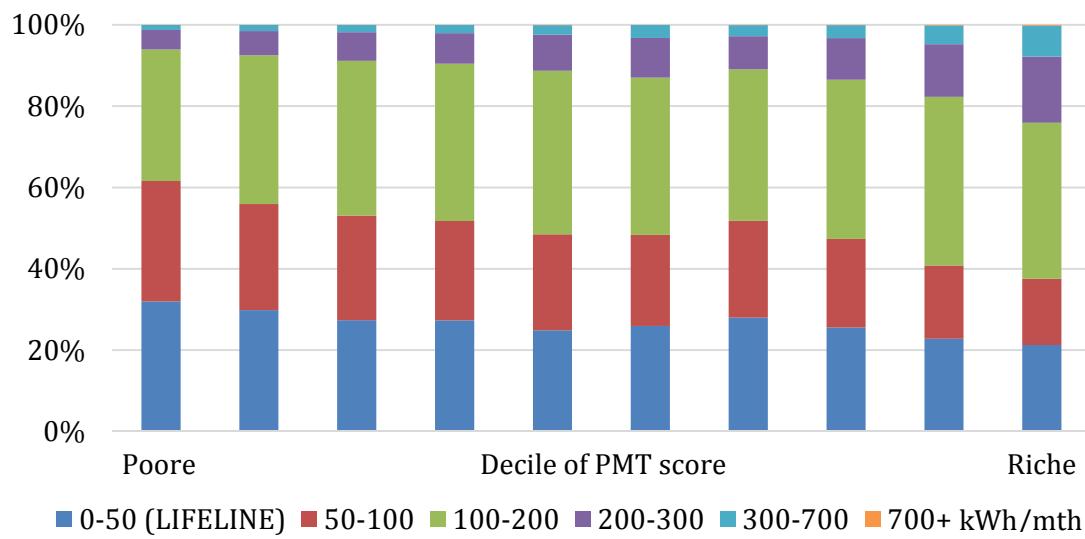
Source: Staff calculations based on PSLM 2013-14 data.

Figure 3: Illustration of matching process



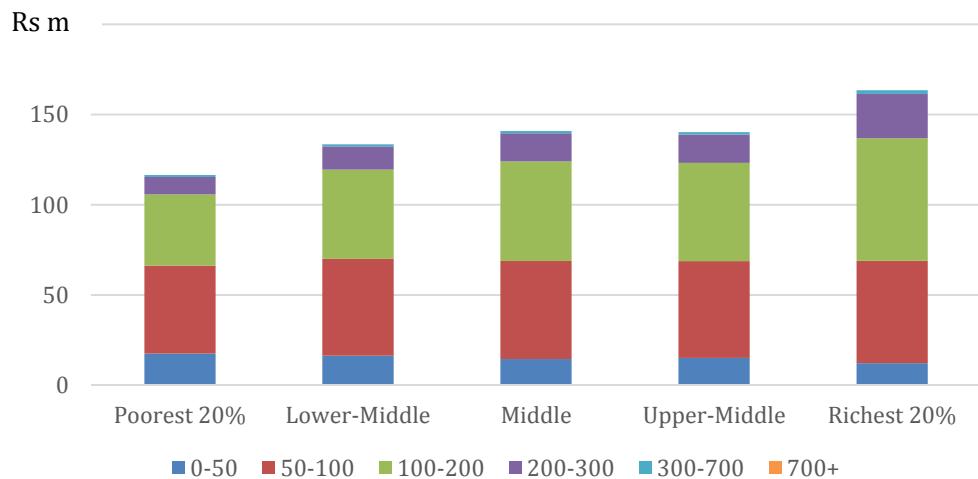
Note: Numbers for each record are the CNIC numbers for the bill-payer (DISCO database) and household head (NSER database), which can be reconciled as shown using the family folder (list of all CNICs of family members) as shown in the diagram.

**Figure 4: Distribution of mean monthly electricity consumption of households in GEPCO, FESCO and IESCO service areas, 2013-14
(By PMT score decile and tariff slab)**



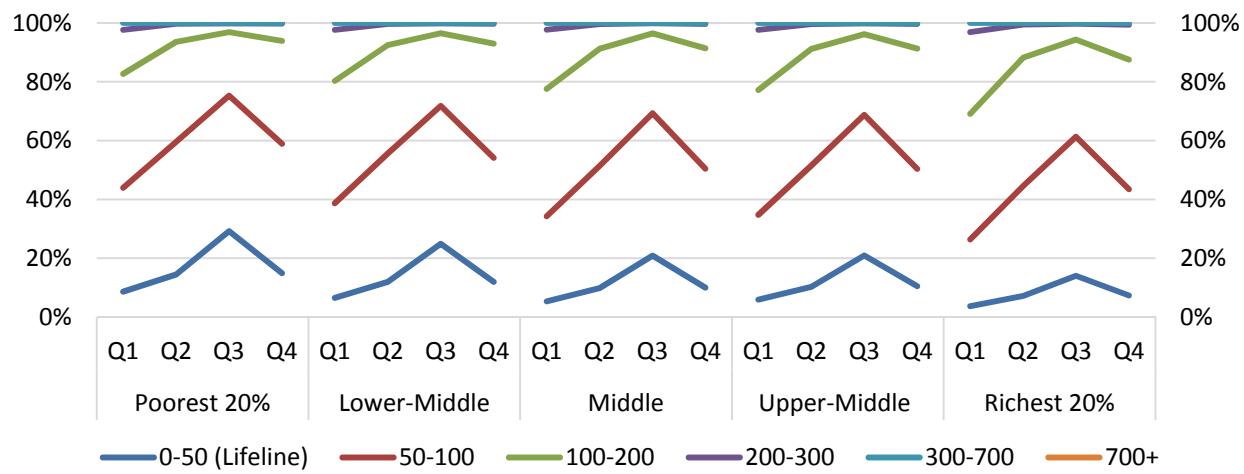
Source: Staff calculations based on matched data from GEPCO, FESCO and IESCO consumers for 2013-14.

**Figure 5: Distribution of subsidies, 2013-14
By slab and PMT quintile**



Source: Staff calculations based on matched data from GEPCO, FESCO and IESCO consumers for 2013-14.

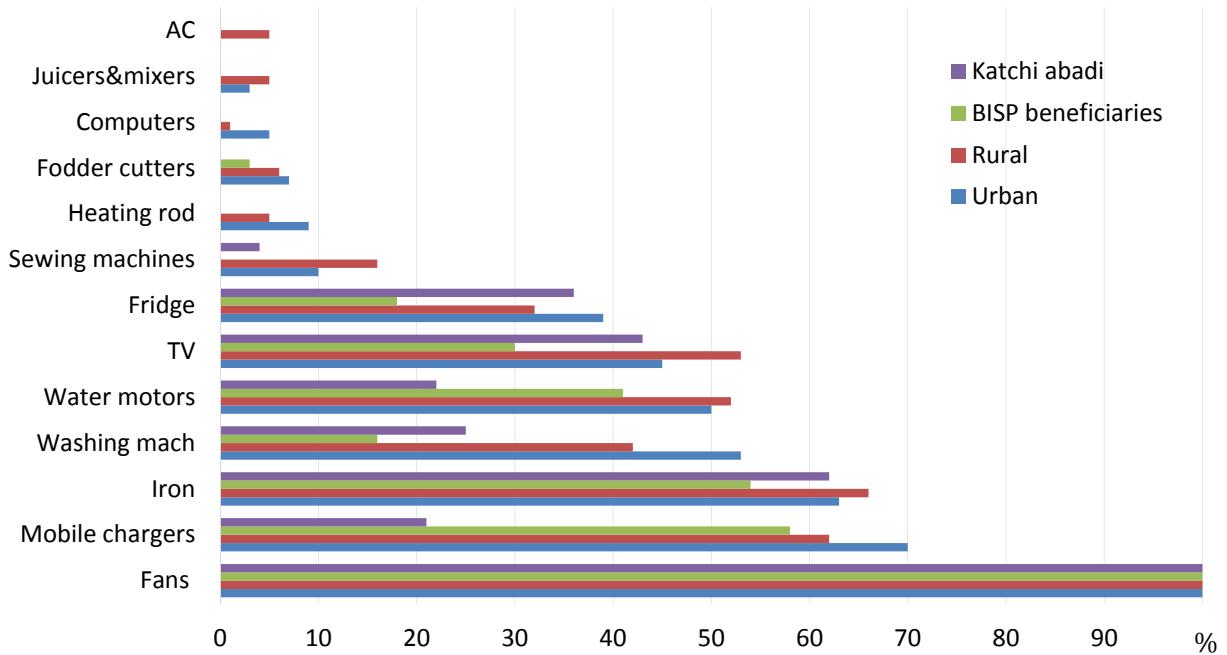
**Figure 6: Seasonal Variation in Electricity Consumption, 2013-14
By PMT quintile**



Source: Staff calculations based on matched data from GEPCO, FESCO and IESCO consumers for 2013-14.

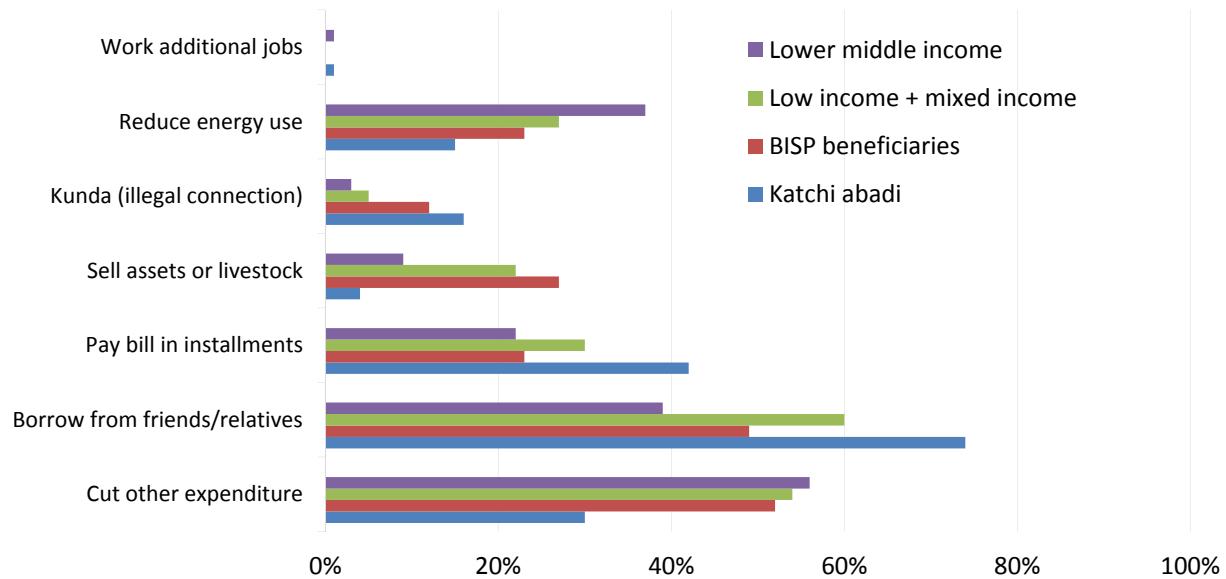
Note: Lines show cumulative share of households by quintile and quarter. Q1: July-September 2013, Q2: October-December 2013, Q3: January-March 2014, Q4: April-June 2014.

Figure 7: Electricity use by appliance and respondent type



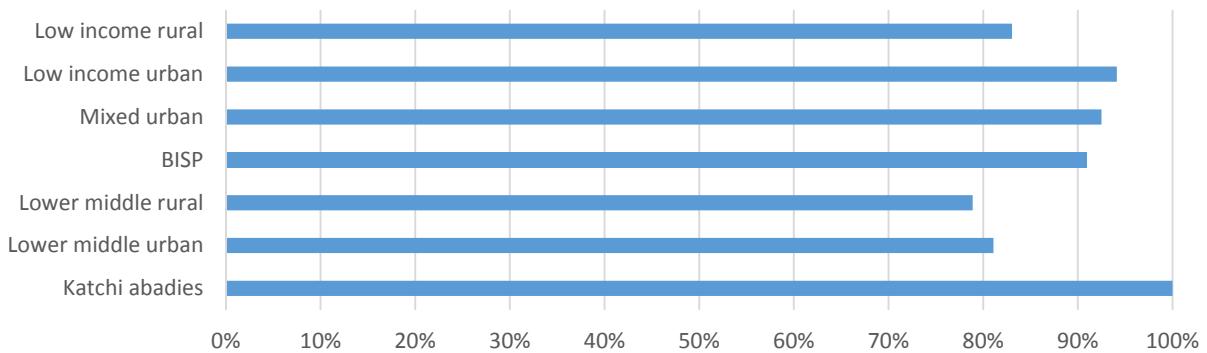
Source: Authors' calculations based on data collected on participants in qualitative study.

Figure 8: Coping mechanisms



Source: Authors' calculations based on data collected on participants in qualitative study.

Figure 9: Percentage of FGD participants perceiving their bills as inaccurate



Source: Authors' calculations based on data collected on participants in qualitative study.

Appendices

A. Details of the matching process for billing data analysis

Table A1: Domestic consumers in each of the DISCOs

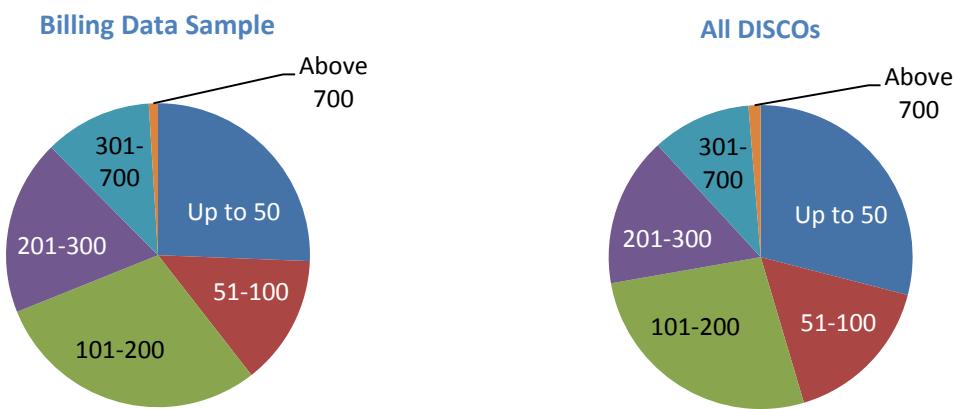
DISCO	Total customers	Share of national consumption
GEPCO	2,487,990	12.5
FESCO	3,004,486	15.1
IESCO	1,983,613	10.0
Total	7,476,089	37.6

Source: Ministry of Water and Power (June 2015)

Table A2: Success rate of matching consumption CNICs with poverty scores

DISCO	CNICs provided by DISCO	Matched to NSER	Not matched to NSER	Proportion matched (%)
GEPCO	132,388	60,653	71,735	45.8
IESCO	47,463	24,016	23,447	50.6
FESCO	146,075	61,410	84,665	42.0
Total	325,926	146,061	179,865	44.8

Figure A1: Domestic consumption patterns, 2013-14



The variables matched through CNIC with NSER records were:

1. Poverty score
2. Household composition (number of children, number of adults in the family)
3. Gender of CNIC holder

4. Age bracket of CNIC holder
5. Disability status of the household head
6. Employment status of the household head
7. Education level of the household head
8. Number of rooms
9. Electric appliances owned¹⁶
10. Livestock owned¹⁷

A query of the NSER database was run to match the CNICs in the billing data with the CNICs in the NSER database. The two-step matching process was designed to get the maximum number of CNICs from DISCOs matched with the NSER CNICs so that a poverty score is recorded for the analysis. The first step was to directly match the DISCO CNIC with the NSER database and the second step was to match the DISCO CNIC through a family member's '*alpha family*'¹⁸ in the NSER. This second step was designed to achieve maximum results from the matching process. NADRA matched the records by CNIC number, a common variable in both data sets. Around 45% of the CNICs were successfully matched with the PMT scores. FESCO, GEPCO and IESCO have updated consumer CNIC records. Each of these DISCOs has a different timeframe for updating their CNIC records; IESCO updates its records each year while FESCO & GEPCO last updated their records 2-3 years ago.

Table A3: Frequency of CNICs in database

Column1	Sample	% of Sample
Total DISCO CNICs	381907	100
Single meters	317140	83
2 meters	17630	5
3 meters	4842	1
More than 3 meters	42289	11

¹⁶ Electric equipment: washing machine, refrigerator, AC, cooking range, microwave, geyser, cooking stove, cooking range, TV, air cooler and heater.

¹⁷ Livestock: Sheep, bull, cow, buffalo and goat

¹⁸ Alpha family is a term used by NADRA which includes parents and/or spouse and children of the person.

B. Distribution of Subsidy by Poverty Status

Table B1: Total subsidy by poverty group

Quintile of poverty score	Number of households	Subsidy received by slab						Total subsidy	Subsidy per HH
		0-50	50-100	100-200	200-300	300-700	700+		
First quintile	29214.0	17.5	48.8	39.4	9.7	1.0	-0.1	116.4	3983.1
Second quintile	29800.0	16.4	53.6	49.4	12.9	1.2	-0.1	133.4	4477.2
Third quintile	28641.0	14.5	54.3	55.1	15.7	1.3	-0.1	140.8	4915.6
Fourth quintile	29196.0	15.2	53.6	54.5	15.7	1.3	-0.1	140.2	4800.4
Fifth quintile	29209.0	12.2	56.8	67.9	24.6	2.0	-0.2	163.3	5590.6

Table B2: Consumption by quintile and slab

By quintile of poverty score	Number of households	Average electricity consumption (kWh/mth) for 2013-14						
		None	0-50	50-100	100-200	200-300	300-700	700+
<i>Subsidized</i>								
First quintile	29,214	566	8,854	7,980	9,873	1,540	386	15
Second quintile	29,800	546	7,998	7,338	11,224	2,127	551	16
Third quintile	28,641	546	7,143	6,462	11,082	2,609	783	16
Fourth quintile	29,196	562	7,672	6,533	10,939	2,624	844	22
Fifth quintile	29,209	508	6,323	4,935	11,468	4,176	1,741	58

Table B3: Average TDS in FY14

	0-50 (Lifeline)	50-100	100-200	200-300	300-700	700+
NEPRA Determined Tariff (PKR per unit)	4	11.8	14.39	14.39	16.25	17.85
GOP Notified Tariff (PKR per unit)	2	5.79	8.11	12.09	16	18
TDS (PKR per unit)	2	6.01	6.28	2.3	0.25	-0.15

Note: TDS = GOP Notified Tariff – NEPRA Determined Tariff

C. Sample Distribution by District

Table C1: District-wise representation in billing data sample

DISCO	District	Share of billing data sample (%)
IESCO	Attock	4
FESCO	Bhakkar	2
IESCO	Chakwal	1
FESCO	Faisalabad	14
GEPCO	Gujranwala	8
GEPCO	Gujrat	10
GEPCO	Hafizabad	2
IESCO	Islamabad	2
FESCO	Jhang	8
IESCO	Jhelum	1
FESCO	Khushab	2
GEPCO	Mandi Bahauddin	8
GEPCO	Narowal	4
IESCO	Rawalpindi	7
FESCO	Sargodha	5
GEPCO	Sialkot	7
FESCO	Toba Tek Singh	5
	Others	10
	Total	100

D. Home Ownership and Rental

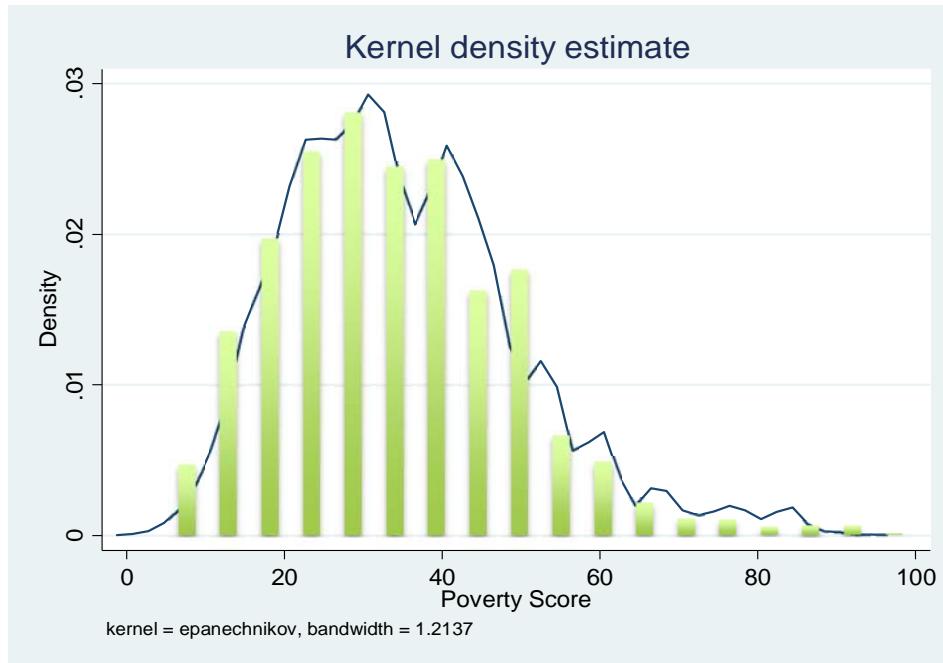
Owns home?	Rural	Urban	Total
Owner	92.5	72.0	84.7
Non-owner	7.5	28.0	15.3

Source: Authors' calculations based on PSLM 2013-14.

Notes: Rural population share is 62%, urban is 38%.

E. PMT distribution in billing data sample

Table E1: Comparison of billing data PMT distribution with population distribution



F. Further Details on the Qualitative Research

The qualitative research comprised 44 focus group discussions (FGDs), 16 follow-up ethnographic interviews (EIs) with a single participant from the focus group, and 12 in-depth interviews with key informants. The breakdown of FGD, EI, and IDI participants is described in Table F1.

Focus group discussions were conducted with 8-10 household heads or spouses, segregated by gender and stratified by socioeconomic status. The FGDs encouraged free discussion of the following topics:

1. Consumer behavior

- Electricity consumption patterns of households;
- The most stressful times with respect to electricity payments;
- The impact of electricity bills and tariff increases on household budgets;
- Methods households use to cope with tariff increases—for example, cutting back on other spending (and if so, what expenses are cut); and
- Gender-specific implications of an increase in electricity tariffs.

2. Perceptions of service quality

- Reliability and value for money of the electricity service;
- Consumer experiences interacting with electricity service providers; and
- Concerns relating to service providers (including clarity of tariff-setting processes, accountability, understanding of billing, and theft or nonpayment of bills).

3. Attitudes towards reform and compensation

- Awareness of, and attitudes towards, the government's electricity sector reform agenda;
- Conditions under which consumers would be willing to pay more for electricity and pay their bills on time;
- Elements that should be considered in communication efforts accompanying energy reforms; and
- Perceptions of the most effective measures to protect poor households against adverse impacts of energy tariff increases.

Ethnographic interviews focused on more specific information about households' energy costs and the ways in which they experience the impacts of tariff reforms.

In-depth interviews were conducted with key informants to gather their opinions on the same topics to validate, explain, and balance opinions expressed by households' energy consumers. Key informants interviewed included social assistance and energy company representatives.

Table F1: Qualitative Research Sample

Province	District	Locality	Village /Community Name	Gender	Socioeconomic Group	Ethnographic interview?	Service provider interview (IDI)
Khyber Pakhtunkhwa	Lower Dir	Urban	Quratara Mohalla, UC Timar Ghara	Male	Lower Middle Income		IDI with BISP Assistant Director
			Rahimabad- UC/Tehsil- Samanh Bagh	Female	Lower Middle Income		
			Shah Mohalla Shakhans- UC- Timer Gahara	Female	Katchi abadi	✓	IDI with lineman
		Rural	Rehmabad, UC Noora Khal	Male	Lower Income	✓	
			Nageer Payeen	Female	Lower Income		
	Manshera	Urban	Chennai- UC 3	Male	Lower Income		
			Neighbourhood No Ghaz 1	Female	Lower Income		
			City No- Nogai Nori, UC- 2	Male	Katchi abadi	✓	
		Rural	Shamdara	Male	Lower Middle Income		
			Behali, UC Manshera	Female	Lower Middle Income		IDI
			Behali, UC Manshera	Male	BISP	✓	
			Shamdara/Tehsil-Mansehra	Female	BISP	✓	IDI
Punjab	Lodhran	Urban	Mahmooda Abad, UC Gulab Pura	Male	Mixed Income	✓	
			Dunia Pur, UC Gulab Pura	Female	Mixed Income	✓	
			Shah Muhammad Qabristan-Eid Gah Mohallah-Duyina Pur	Female	Lower Middle Income		IDI
			Mohala Nokhal Wala	Female	Katchi abadi		
		Rural	Chak 231, Lodhran	Male	Lower Income		
			UC Gulab Pura Basti sal sadar	Female	Lower Income	✓	
			Chak No- 237/WB	Male	Lower Middle Income	✓	IDI
			Sal Sadar	Male	BISP		IDI
			Chak No. 237	Female	BISP		IDI with BISP Assistant Director
	Muafafgarh	Urban	Ward No 10 Mohalla Mochi wala	Male	Lower Income	✓	
			Basti Dewan Wala	Female	Lower Income		
			Darkhan Wala, UC Khan Garh	Female	Lower Middle Income	✓	
			Tibba Kareem Wala	Male	Katchi abadi		IDI with lineman
		Rural	Basti Kodaiwala, Tehsil Kot Uddo (UC Minha)	Male	Lower Middle Income		
			Village Ganga	Female	Lower Middle Income	✓	
			Basti Hayat Wala Moza Munha Sharif, Darkhan	Male	Lower Middle Income		

Table F1: Qualitative Research Sample (continued)

Province	District	Locality	Village /Community Name	Gender	Socioeconomic Group	Ethnographic interview?	Service provider interview (IDI)
Sindh	TM Khan	Urban	Mizar Barani Mohalla, UC 3	Male	Mixed Income		
			Gulshan Faiz Colony, UC 1	Female	Mixed Income	✓	IDI
			Pattar Goth, UC 1	Male	Lower Middle Income		
			Pattar Kot UC 1	Female	Lower Middle Income		
			Gulshan Faiz Colony, Mohalla Somra, UC 1	Male	Katchi abadi		IDI with Bait-ul-mal officer
		Rural	UC Allah-Yar Turk Village, Mula Katiyar and Jamal Shoro	Male	Lower Middle Income	✓	
			UC Syed Pur Village - Takar Mohala Memon	Female	Lower Middle Income		IDI
			Kamis Pur	Male	Lower Middle Income		
			Kamis Pur, District -Tando Muhammad Khan, Sindh	Female	Lower Middle Income		
	Nawabshah (Benazirabad)	Urban	Sachal Colony –Benazira abad	Male	Lower Middle Income		
			Imamia, UC 3, Nawabshah district	Female	Lower Middle Income		
			Mohammad Saleh Deraj	Female	Katchi abadi		
		Rural	Khair Shah	Male	Low Income		
			Benazirabad, Obhayo Mangsi UC-Marhabpur	Female	Low Income		
			Haji Jarrar UC Mehrapur	Male	BISP	✓	
			Khair Shah Solangi Mohalla	Female	BISP	✓	
Total					44	16	12