Policy Brief

HOUSEHOLD ENERGY POVERTY IN PAKISTAN

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INTRODUCTION

The Government of Pakistan has initiated significant energy sector reforms, including electricity tariff reform, that directly impact the household welfare of the country. As a result of these reforms, the government has started curtailing the electricity subsidies, gradually increasing end-consumer electricity prices. However, changing the policy to raise the subsidized electricity tariff is not easy as tariff reforms have a profound economic and social impact, especially on poor households.

However, the welfare impact of the recent upsurge of electricity tariffs due to the gradual elimination of subsidies has not yet been gauged in any study. This study thus analyzes the impact of subsidized tariff changes of electricity on the welfare of households. More specifically, the present study attempts to find the crowding-out effect of increased electricity tariff on household budgetary allocation of resources at various income levels. The study also aims to measure the compensation required by the households to mitigate the income effect of rising electricity tariffs on households' welfare. Because of the existing caveats in the secondary datasets, the study conducts a primary survey of Karachi city as a case study to obtain an in-depth information on the energy situation.

METHODOLOGY

Crowding out Effect of Electricity Expenditure and Its Implications on Household Resource Allocation in Pakistan

The first specific objective of the study is to estimate the crowding-out effect of increased electricity expenditure and its impact on intra-household resource allocation through the estimation of the

conditional demand function. More specifically, we endeavor to analyze the difference in the affordability of electricity between the periods of low and high tariff rates. For achieving these objectives, the study employs HIES 2013-14 and 2018-19, assuming the fact that electricity tariffs are relatively low in 2013-14 as compared to 2018-19.

For explaining the crowding out effect of electricity expenditure and its impact on intra household resource allocation, conditional demand function, as suggested by Pollak (1969), is estimated. In the context of current study, crowding out effect of electricity expenditure entails reduced consumption of goods and services because of increasing cost of electricity consumption.

Electricity Tariff Reforms and Household Welfare Analysis for Karachi City

Second objective is achieved by following a sequence of steps that begin by understanding the slab and tariff structure applied for residential electricity consumption and eventually leads to the welfare impact. As a first step, electricity units consumed by each household are estimated, which are based on the electricity expenditures of households. To estimate the compensation for the additional income that a household spent on electricity consumption, current and previous tariff structures are used. Assuming the household consumption patterns remains consistent, the compensation is measured for individual households in accordance with the slab they ended-up consuming in. Once the compensation is estimated, poverty head counts before and after compensation are measured using both national and international threshold. Finally, the welfare effect of rising electricity tariffs is reflected by the difference in the two head counts. It mentions those who move below poverty line because of increased electricity prices.

Karachi: A City of Light

It has been noticed that there are certain limitations in the use of HIES data. Hence, considering the caveats in the secondary data, the study conducted a primary survey of Karachi, named, “City of Light”, as a case study for obtaining the in-depth information on energy situation. This study thus aims to form a rigorous analytical basis for energy policy making in Pakistan.

ANALYSIS AND DISCUSSION

Crowding out Effect of Increased Electricity Tariff and its Implications on Household Resource Allocation

Results of this section reveal statistically significant differences in expenditure allocations for most of the expenditure categories. For instance, after the increase in tariff, low-income households, on average allocated less on health, transport, communication, recreation, education, housing & fuel. More or less similar pattern is observed for middle income households. High income households also altered their budgets except for transport and restaurants. These results show a nontrivial difference in the composition of budgetary expenditures of households during the low tariff period compared to the high tariff period. Therefore, on the one hand, the indirect effects of increased electricity prices compelled the poor households to cut their spending on commodities other than necessities. While on the other hand, it raises the cost of different food and non-food items, which increase the expenditure of poor households on essentials.

Results show that for low-income households, Rs.1000 increase in electricity expenditure is accompanied by a 1.24 percentage point decrease in food expenditure. For the middle-income group, electricity expenditure crowded out most of the expenditure categories but with relatively slighter percentage points. Whereas, for the high-income class, Rs. 1000 increase in electricity expenditure leads to 0.28 and 0.33 percentage points decrease in health and transport expenditures. Health expenditures are crowded out at all income levels. The most important point found is that the size of crowding in and crowding out effects are greater for poor households.

Findings reveal that the displacements due to electricity expenditure occur for commodities that constitute human capital investments, like food and nutrition, health etc., thus having severe implications on households' well-being. Crowding out of food and beverages consumption might have implications for children's physical and intellectual growth and the nutritional deficiency in mothers, notably, for lower-income households. Electricity tariff reforms, with the nonexistence of adequate health compensation, insurance or other public provision of finances, could lead to welfare loss, particularly among poor households. Hence, inadequate measures by the Government could adversely affect human capital investments crucial for long-term prosperity.

Electricity Tariff Reforms and Household Welfare Analysis for Karachi City

Given the energy threshold and electricity units' estimates, energy poverty for 2015-16 and 2018-19 is calculated. Interestingly, results shows that the population below the energy poverty threshold in 2015-16 was 29.3 per cent while it decreased to 23.5 per cent in 2018-19, despite the increase in tariff.

Whereas, table 1 shows the estimated proportion of poorest households living below poverty line by employing standard thresholds and equivalency scales.

Table 1: Percentage of income Poor Population in Karachi

	National Equivalency Scale	OECD Equivalency Scale
	HC international Poverty Line $ 1.25= Rs 170.11	
Uncompensated HH Income	37.74	3.82
Compensated HH Income	33.08	3.20
Change in Poverty	4.67	0.63
	HC national Poverty Line Rs 125.87	
Uncompensated HH Income	14.52	1.14
Compensated HH Income	12.49	0.92
Change in Poverty	2.03	0.22

Source: Authors' Estimation using HIES 2018-19

It has been estimated that if the compensation had been provided to the poor households, all the poverty estimates reported in the third and seventh row of table 1 would be declined. Considering only the national equalization scale, about 4.7 per cent of the poor population would be pulled above the international poverty threshold. In contrast, around 2 per cent of the poor population would be able to escape the national CBN poverty threshold. These estimates, however, indicate the impact of electricity tariff increase in inflating income poverty in Karachi city on the one hand while describing the significance of compensatory mechanism in reducing poverty on the other. It is thus concluded that whatever threshold is being used as a policy tool, impact of electricity reforms could be mitigated only through more comprehensive and long-lasting compensatory mechanism.

Findings of Survey, "Karachi: The City of Light"

Findings of this section are as follows:

- Most of the households consume in the middle slabs, i.e. 32 percent in the 5th slab (301-700), 26 percent of households in 4th slab (201-300) and 19 percent in the third slab.
- Lifeline tariff slab is nearly ineffective in Pakistan as meagre 2.57 percent of households are consuming in lifeline slab.
- The highest proportion of the households of Karachi, i.e. 32 percent, on average consume only 425 units of electricity per month. This is followed by an average consumption of 256 units by 26% of households.
- On average, households consume more than 700 kWh per month pay about three times more than the households that end-up consuming just below 700 kWh.
- Another significant feature is that the government and other charges like TVL fees, fuel adjustment charges etc. constitute significant proportion of total bills.
- Most significant information revealed is that the fuel adjustment charges for the lifeline slab is more than the total amount spent on units consumed, whereas, government charges also constitute significant proportion. This information reveals that on one hand, lifeline slab is believed to be the most protected and subsidized but on the other hand, various additional charges significantly increase the total electricity bill.
- Results revealed that households consuming less than 300 kWh units, on average, are worsened off under the ToU tariff structure. Such households are now bound to pay more than two times higher.
- Empirical estimation shows the negative and statistically significant impact of electricity tariff on households' food expenditures. It is found that one rupee increases in electricity tariff, on average, leads to decrease household's monthly food expenditures by 0.5%.
- Findings of energy literacy index shows that residents of not a single town in Karachi are literate enough about tariff structure, tariff rates and other aspects of electricity.
- Index values show that citizens' behavior towards energy use could be improved by educating them.
- In contrast, Satisfaction index value found for each town is around 0.5 that shows the moderate level of satisfaction towards K-Electric services.

POLICY IMPLICATION

On the basis of findings of the study, various policy options could be considered. For instance, to safeguard the poorest, it is recommended to estimate socio-economic impacts on a regular basis before the scheduled price hike, thus providing targeted financial and social support programs. In this regard, existing programs like BISP or EHSAS support programs could be scaled up, or new ones could also be initiated for ensuring food security and other necessities of life, like, healthcare, clothing, education etc. It has also been learned from the experience of other countries that successful implementation of reforms was accompanied by compensation packages for poor and increased service quality and reliability for households paying higher prices.

On the basis of findings from primary survey " Karachi: The City of Light", it is recommended that although electricity charges are still subsidized for low consumption households, proportion of additional costs should also be curtailed to diminish the adverse effects on the poor.

The empirical estimation from primary data substantiated the earlier section's findings that the tariff's impact has reduced household welfare. An increase in electricity tariff reduces the households' expenditures on other commodity items, like, food & beverages, clothing, transport, recreational activities and communication.

This study considers that educating the general public about sustainable energy consumption habits is imperative. Considering this as an essential instrument, this study encompasses these crucial modules in the recent energy survey, thus understanding households' cognitive and behavioural aspects in energy use. Including these aspects in policy design will enable individuals to make appropriate choices in energy use. Results show that the general public of Karachi is not informed about the current electricity sector reforms. Similarly, efficiency in end-use also needs to be improved. In this regard, literacy programs at high- school levels or through advertisements on social media could be initiated. Although, in the past, public service messages for saving electricity were communicated through television advertisements. The same policy should be continued to make individuals energy literate. Energy-efficient appliances should also be promoted to improve electricity affordability, particularly among middle and high-income households. Without any government interference, households can respond to a rise in price either by switching towards more energy-efficient appliances or adopting habits of efficient electricity utilisation. These kinds of efficiency programs would bring sustainable change in society. These measures are thus believed to

provide a buffer against the adverse impact of price rise, particularly on middle and higher-income households.

Analysis of this study shows that the government is determined to gradually phase out electricity subsidies at a high pace. In this regard, it is recommended to publicize the upcoming rise in price among the general public as not all the individuals in the country are literate enough to anticipate the impact. However, unexpected rises in price aggravate anger among individuals and could obstruct these reform processes' smooth implementation and completion.