



How to Pay the Bills?

A survey of public attitudes to electricity tariff reform in Rajasthan

GSI REPORT



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Executive Summary

Electricity distribution utilities in India are currently unable to cover the cost of their operations from the sale of electricity. This report follows and complements the recent report by the International Institute for Sustainable Development, *Financial Sustainability of Rajasthan's Electricity Sector* (Garg, Sanchez, & Bridle, 2016), which describes how the structural gap between revenues and expenditures has led to increasing dependence on fiscal transfers from the government, in the form of cash, loans and bonds.

The absence of cost recovery has serious implications for the financial health of the electricity sector. It undermines efforts to maintain investments in transmission and distribution systems, and to therefore expand rural electrification, deliver reliable power and support the development of renewable energy. Tariff reform is key to solving these issues. However, there are considerable well-documented political barriers to increasing electricity tariffs. Given that the problem is essentially political in nature rather than technical, political economy approaches have a key role to play in identifying opportunities for reform.

This report presents new data on the attitudes of electricity consumers towards tariff reform in the State of Rajasthan, India. It is intended to support policy-makers in their efforts to tackle the financial deficits of distribution companies (discoms). Specifically, the report presents the findings of a household survey that sheds light on the awareness and views of different socioeconomic and geographical groups regarding electricity subsidies and electricity tariff reform.

The survey was conducted across four districts of Rajasthan that are supplied by two discoms, with a sample of 1,000 households. The main variables examined are: i) the perception of consumers regarding welfare losses from unreliable power supply; ii) attitudes to trade-offs between higher electricity prices and improved power service provision; iii) knowledge of the existence and level of current electricity subsidies; and iv) attitudes towards potential electricity tariff reforms aimed at greater cost recovery within the distribution sector.

Four key findings emerged from the survey.

- 1. There is significant lack of awareness of the existence and size of electricity subsidies:** Only around half of the consumers were aware that electricity prices are subsidized, with those that are aware displaying relatively limited knowledge of the scale of these subsidies.
- 2. Subsidy reform is a tough sell:** A large number of respondents considered electricity subsidies to be a valid use of public money and see a significant role for government in making power affordable, while also viewing price reform that seeks to enhance discom cost recovery as largely unreasonable. This was, however, not a universal response, with significantly more openness towards reform among certain groups, especially more urban and educated households.
- 3. Higher power prices would have significant negative impacts on households:** According to respondents, electricity tends to be one of the largest components of household expenditure, meaning that, all things being equal, higher power prices would likely have significant negative welfare impacts for many households. Eighty per cent of respondents indicated that small price increases would imply cutting critical expenditure from their budgets.
- 4. There exists some willingness among households to pay for more reliable power supply:** While a majority of respondents indicated that they would not be willing to pay higher power prices in exchange for better power service provision, a sizeable minority (30 per cent)



of households claimed they would be willing to do so. At the same time, close to 70 per cent of respondents indicated that power outages had a noticeable impact on their daily productivity and output.

The analysis that follows delves in to these findings, and others, in considerable detail. However, there are several key implications for the notion of pricing reform that emerge clearly from the findings, and which are also examined in depth later. Key policy implications include:

- Communication (through government and its allies in reform) that raises awareness among households—and especially rural households—about the existence and scale of electricity subsidies, the serious developmental trade-offs they require and that the regressivity of their distribution will be critical in enhancing support for reform, without being a “silver bullet” itself.
- Electricity tariff reform is likely to meet least resistance (and be best targeted) in urban areas, especially Jaipur, where the ability to pay higher prices and understand the rationale for reform is currently more developed. There are a number of ways to undertake targeted reform, which should be considered.
- Higher power prices are likely to have significant welfare impacts on households, and especially poor households. Price reform should be coupled with clear and well-publicized mitigation measures (energy-efficiency schemes, short-term direct benefit transfers etc.), ideally built on existing programs, that both ease the transition to higher prices and, importantly, build support for the process of reform. In the same way, price reform should take place in a gradual, phased manner in order to lessen impacts on households.
- As price reform takes place, energy policy-makers and discom executives need to focus on improving the quality of power service provision. A significant proportion of households will be more accepting of reform if this is accompanied by a commitment to, and observed improvement in, the reliability of power supply.





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Acronyms and Abbreviations

AT&C	Aggregate Technical and Commercial
Crore	10 million
DBT	Direct Benefit Transfer
Discom	distribution company
FY	Fiscal Year
GDP	Gross domestic product
IDCG	Insight Development Consulting Group
IISD	International Institute for Sustainable Development
INR	Indian Rupees
Lakh	100,000
LED	Light Emitting Diode
PFC	Power Finance Corporation
UDAY	Ujwal Discom Assurance Yojana
UJALA	Unnat Jyoti by Affordable LEDs for All
USD	US dollar



1.0 Introduction

According to Nguyen, Bridle, and Wooders (2014), a power sector is considered financially sustainable if it is able to provide adequate and reliable supply and make investments to meet future demand, while generating revenues to cover costs and operating according to environmental and social norms.

India's distribution sectors rely largely on the end-user tariff structures charged by state-based distribution companies (discoms), which are governed by state power market regulators. While the situation differs somewhat from state to state, the functioning of this system has deteriorated over time—largely as a result of low power prices—into a series of sub-optimal institutional equilibria characterized by systemically deficient cost recovery; large and rapidly growing distribution sector losses and liabilities; the need for persistent state government bail-outs of discoms; and attendant problems for supply reliability, timely investment and renewables roll-out.

State-based market regulators nominally set end-user tariffs in India on a cost-plus basis, with defined lifeline tariffs for small electricity consumers designed to be largely offset by higher prices paid by industrial and commercial users. Owing to strong political pressure, however, regulators have generally failed to allow prices to rise with, and reflect, power production costs over time. Industrial and commercial users are indeed charged under incremental block tariff structures. However, the bulk of agricultural and residential power consumers in India—the great majority of users, and including large and wealthy users—are often charged negligible tariffs or provided free, unmetred power.

As a result of this system of electricity subsidies (as well as the existence of large aggregate technical and commercial losses), discoms India-wide have accumulated losses of over INR 3 lakh crore (USD 45 billion, or 2.5 per cent of India's GDP) and lose an estimated INR 80,000 crore (USD 13 billion) each year. These losses in turn have important developmental implications, as state governments are required to systematically pour huge quantities of scarce public finance into supporting discoms. There are also important sustainability implications around clean energy penetration and grid modernization. The State of Rajasthan, which is the focus of this paper, ranks worst in terms of discom debt among all states in India. Currently, discoms in Rajasthan have a total debt of INR 80,500 crore (USD 12 billion), which accounts for close to one fifth of India's total discom debt.

This loss-making equilibrium, in Rajasthan and elsewhere, may be sub-optimal, but it is resilient, reflecting the strength of political opposition to pricing reform. Elected officials and policy-makers are anxious to avoid higher tariffs (and therefore the potential for greater cross-subsidization) for industrial and commercial users—who, in general, already pay high power prices even when compared internationally—for competitiveness and local development reasons. At the same time, they are equally anxious to avoid higher tariffs for the poor and agricultural households that make up a very large proportion of India's population and who will be most adversely affected by higher power prices (especially given the importance of power to water pumping and irrigation).

As a result, an impasse has developed on electricity pricing systems and subsidies in certain states, and policy-makers and experts are often resigned when it comes to identifying innovative policy solutions to this impasse. The negative implications of the current power pricing systems, however, are important enough to warrant the use of novel approaches that seek to shift the current equilibrium. Given the gridlocked and highly politicized context described above, the outside provision of technical reform plans is likely to be of limited use. Instead, novel political economy approaches that reveal new and granular data, analysis and information may be helpful for policy-makers in identifying policy trade-offs and unlocking potential “least-cost” and politically feasible opportunities for reform.



As such, this paper presents the results—and policy implications—of a survey of 1,000 households in Rajasthan, which attempts to understand the perceptions, expectations and attitudes of electricity consumers in the state regarding electricity pricing and the notion of electricity tariff reform in order to identify space for potential policy change.





2.0 Survey Methodology

India's electricity sector consists of private and state-owned energy generators that sell electricity directly to government, as well as privately owned discoms, power trading companies or power exchanges that are responsible for the retail of electricity to end-consumers. The transmission grid is operated by a mix of privately and state-owned companies. The revenues of discoms are dependent on tariff structures that are regulated at the state level, and which are legally designed to reflect supply costs. In practice, however, tariffs are not generally sufficiently high to allow for cost recovery by discoms.

A household survey, designed jointly by Insight Development Consulting Group (IDCG) and the International Institute for Sustainable Development (IISD), was conducted across four different districts of Rajasthan in December 2015. The survey considered areas supplied by two different distribution discoms, with a total sample size of 1,000 respondents, selected according to the criteria outlined below. This was done to ensure that the survey was representative of Rajasthan's demographic mix and to avoid basic measurement errors.

The survey aimed to illicit responses from respondents on the following issues:

- i) The perception of consumers regarding welfare losses from unreliable power supply, and willingness to pay for greater supply reliability.
- ii) Knowledge of the existence and scale of current electricity subsidies.
- iii) Views and attitudes towards potential electricity tariff reforms aimed at greater cost recovery within the distribution sector.

IDCG identified four districts to be surveyed, covering rural and urban locations and a range of representative income categories. The survey questions were developed by IISD with inputs from IDCG. The survey was pilot tested and finalized with minor changes based on the results of piloting.

The sample was selected via stratified multi-stage sampling, in order to be representative of the state's electricity consumer mix. Three main criteria were taken into account to ensure a fair and representative sample:

- Selection of discoms: the geographical area covered by each, so as to include the largest and smallest areas.
- Selection of districts: electrification rates and population density, so as to include the highest and lowest combines rates of these.
- Selection of consumers: to ensure diversity in their places of habitation and economic status.

2.1 SELECTION OF DISCOMS

Households in Rajasthan are supplied with electricity by three state-owned discoms: Jaipur Discom, Ajmer Discom and Jodhpur Discom. For the purposes of the survey, two discoms were selected that reflect the extremes of area coverage, density of population and households supplied. As Jaipur and Jodhpur discoms have the smallest and largest areas of coverage, respectively, these were chosen for analysis. Details on comparative analysis of geographical area and population served by these discoms are presented in Table A1 of Annex 1.



2.2 SELECTION OF DISTRICTS

Two districts from each of the selected discoms’ coverage areas were chosen for analysis. In order to select districts that allow for an adequate representation of the state’s consumer mix, a composite index was developed comprising the following parameters:

- Percentage of electrified households in the district (domestic electrification rate).
- Population density of the district.

The districts with the highest and lowest scores on the composite index were Dausa and Jaipur from Jaipur Discom and Hanumangarh and Jaisalmer from Jodhpur Discom. The ranking of districts in Jodhpur and Jaipur discoms according to the composite index described above is presented in Table A2 and Table A3 of Annex 1.

2.3 COMPOSITION OF HOUSEHOLDS PER DISTRICT

According to the sampling design, in each selected district the total number of respondents to be covered was equal (i.e., 250 respondents per district comprising both rural and urban consumers). To draw the district sample in a rational, proportionate and representative manner, population proportion sampling methodology was used (see Table A5 of Annex 1). This methodology considered two parameters:

- Percentage of population by place of residence (i.e., urban versus rural areas).
- Percentage of population by economic status.

The means of sampling household by place of residence is presented in Table A4 of Annex 1. Survey respondents were selected randomly considering the profile of selected districts in terms of urban-rural mix and income distribution. Figure 1 and Figure 2 depict the composition of the survey sample for levels of income and for location of residence, respectively.

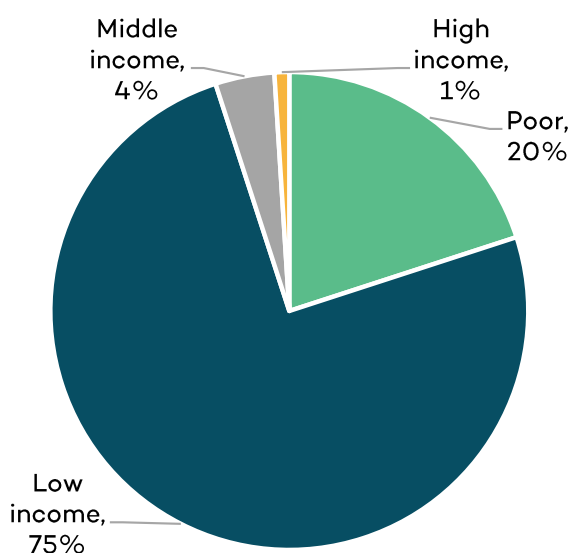


FIGURE 1:
SAMPLE COMPOSITION PER INCOME LEVEL
(TOTAL SAMPLE BASE OF 1,000 HOUSEHOLDS)

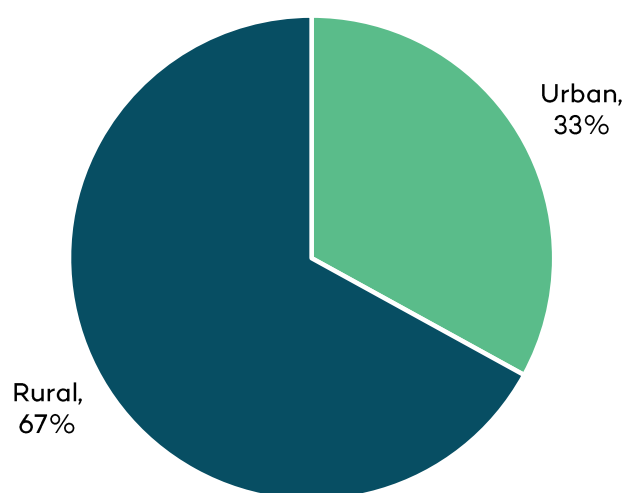


FIGURE 2:
SAMPLE COMPOSITION PER AREA
(TOTAL SAMPLE BASE OF 1,000 HOUSEHOLDS)



3.0 Key Findings

This section provides an overview of the main findings of the survey. The survey results indicate a variable—however broad—lack of awareness among respondents about the existence of subsidies, the real cost of power supply and how the costs of supply are covered. In general, households believe electricity-related fiscal transfers to discoms are a legitimate use of public money; they are not convinced that electricity prices should be raised to cover discom costs; and they feel that price increases would have significant impacts on their budgets. While most households are not willing to pay higher power prices for improved supply reliability, a significant minority is willing to do so. Indeed, while general opposition to reform is high, there are opportunities for policy-makers in this regard, which are examined in detail in Sections 3.3 and 3.4.

3.1 A LACK OF AWARENESS OF THE EXISTENCE AND SIZE OF ELECTRICITY SUBSIDIES

Knowledge of the cost of subsidies is a key enabling factor for reform. Tariff increases are likely to be hard to justify if consumers are not aware of discoms' financial deficits, the developmental trade-offs these imply in terms of public finance and the impacts of the status quo on reliability of power supply and rural electrification. An empirical study involving regression analysis of the survey data (Bringéus & Karlsson, 2016) found a clear positive relationship between awareness of the existence of subsidies and support for price reform. In turn, less informed individuals are more likely to oppose pricing reforms.

Definitions are important here. Regular fiscal transfers to discoms appear in financial reporting and are an important part of their revenue. However, these transfers only partially cover the gap between cost and revenue (see Figure 3). The remainder of the gap is covered by periodic debt issues, loans and other payments, including the Ujwal Discom Assurance Yojana (UDAY) program—a program that converts utility debt into government bonds (Ministry of Power, Coal and New & Renewable Energy, 2015). However, in the long term, one fiscal transfer or another will ultimately cover any consistent gap between costs and revenues if discoms are to remain solvent. For this reason, the gap between discoms' costs and revenues may be considered as a proxy for the size of ongoing fiscal liabilities.

Loans and bonds to discoms in Rajasthan more than doubled between fiscal year (FY) 2010 and FY 2014, while interest costs currently account for a significant portion of total operating costs. The rising gulf between revenues and expenditures has led to increasing dependence on fiscal transfers from the state Government of Rajasthan, which increased by 269 per cent between FY 2007 and FY 2013 (PFC, 2015).

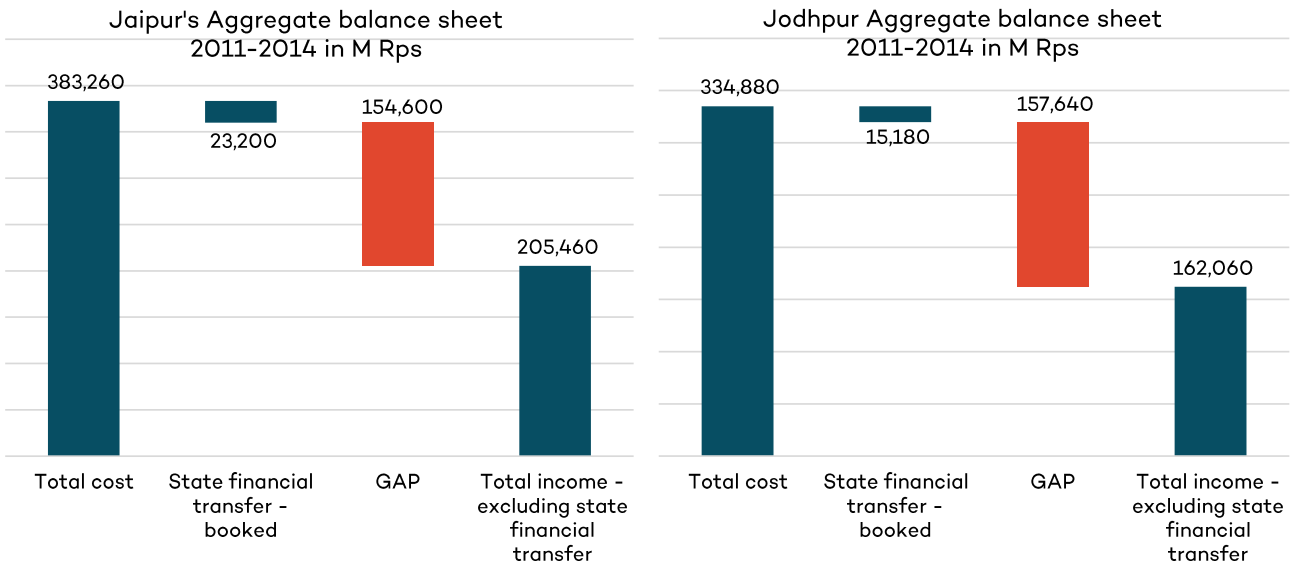


FIGURE 3: DISCOMS' FINANCIALS, AGGREGATED NUMBERS 2011 TO 2014 (INR MILLIONS)

Source: PFC (2013, 2015)

3.1.1 LACK OF KNOWLEDGE OF ELECTRICITY SUBSIDIES

The survey found that citizens are generally not aware of the current financial status of discoms. Results show that around half of consumers are aware of the existence of electricity subsidies, but knowledge of the size of these subsidies is limited. Knowledge of subsidies varies by level of education, and there is a significant difference in the level of knowledge by region.

Figure 4 illustrates respondents' knowledge as to how the distribution sector covers its costs. A sizeable minority (32 per cent) of households surveyed believed that discoms cover their costs entirely by customer revenues, while over half (54 per cent) thought that costs are recovered partly through customer revenues and partly from the government support—indicating awareness of the existence of subsidies. While the proposition needs to be tested, those who lack knowledge about cost-recovery or believe that customer revenues are largely used to cover costs may be more willing to consider electricity price reform as necessary if they are aware that large and poorly targeted government payments are crucial to the ongoing solvency of power distributors.

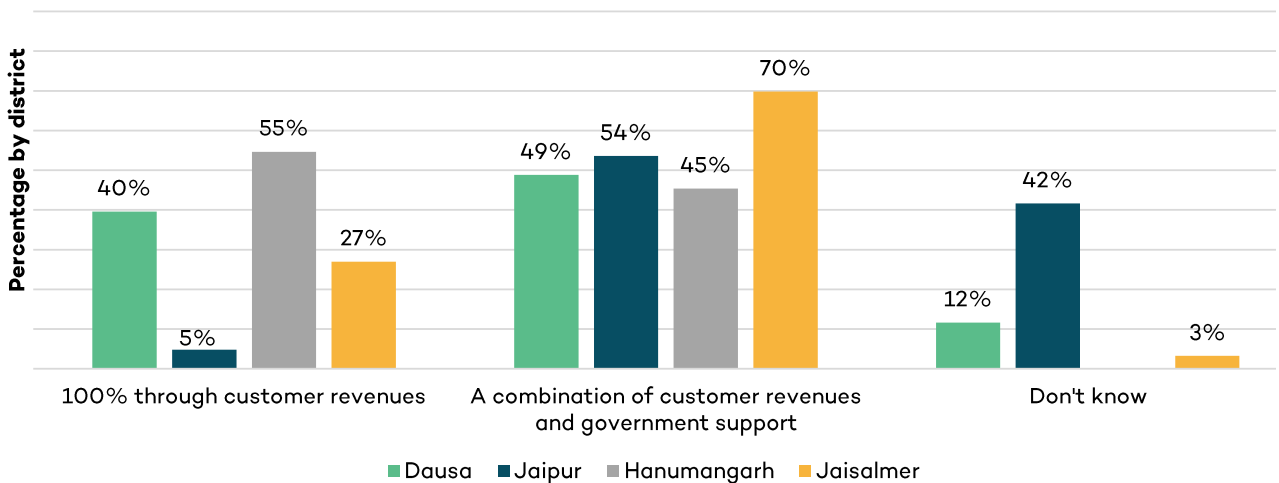


FIGURE 4: HOW DOES THE ELECTRICITY COMPANY COVER ITS COST?



Results per district show that consumers in Jaisalmer seem to be generally among the most well informed (70 per cent of its population is aware that the government financially supports the electricity sector), whereas respondents in Hanumangarh demonstrated lowest levels of awareness. Both Jaisalmer and Hanumangarh are supplied by the Jodhpur discom, suggesting that the discom by which consumers are supplied is not a factor in driving awareness. Across the state, knowledge of the means of cost recovery for discoms did not diverge significantly from rural to urban regions.

The survey also investigated the extent to which respondents know about the scale or level of government support to the distribution sector. Of the 55 per cent of respondents who answered that discoms’ costs are covered by a combination of government transfers and customer revenues, 44 per cent believe that the government provides for less than 20 per cent of the total discom costs. This result is consistent with the government’s direct transfers to discoms, but not government support in the form of state bonds and other bail-outs. As shown in Figure 5, total government support covers around 50 per cent of discoms’ operating costs, a fact understood by 25 per cent of respondents. A sizeable minority of respondents (22 per cent) believes that government covers almost three quarters of discoms’ cost.

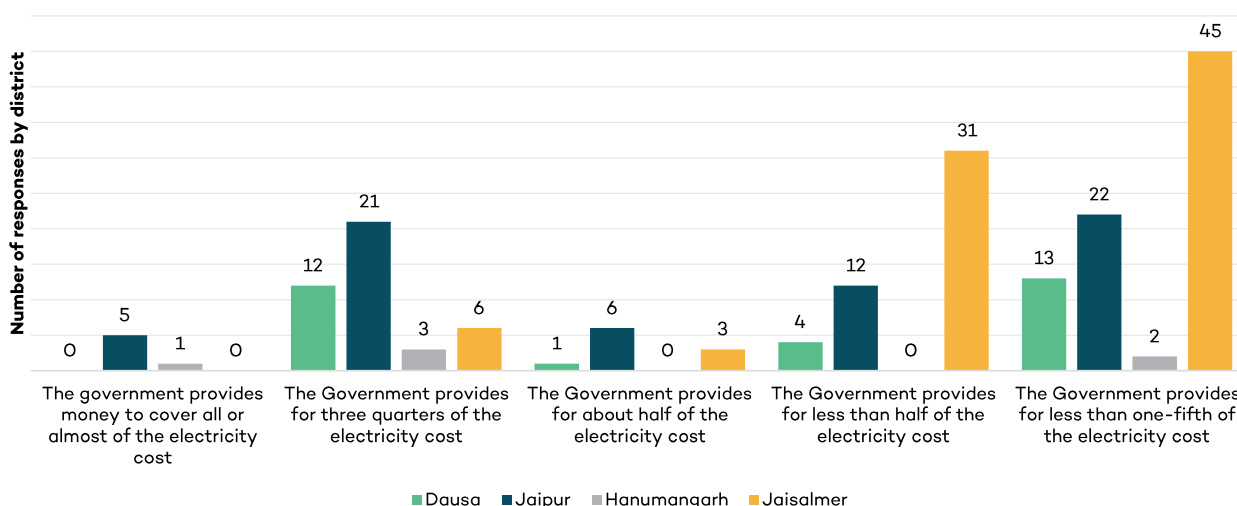


FIGURE 5: HOW DOES THE ELECTRICITY COMPANY COVER COSTS IN SUPPLYING ELECTRICITY?

3.1.2 EDUCATION MATTERS

Respondents’ levels of education had a clear impact on their knowledge of the existence and scale of electricity subsidies. For example, 70 per cent of respondents who understood that discom costs were borne by both governments and consumers had either middle- or higher-level schooling. Figure 6 illustrates how knowledge of the nature of electricity subsidies varies according to respondents’ levels of education, with the size of spheres indicating a relatively large or small number of households that responded in this way.

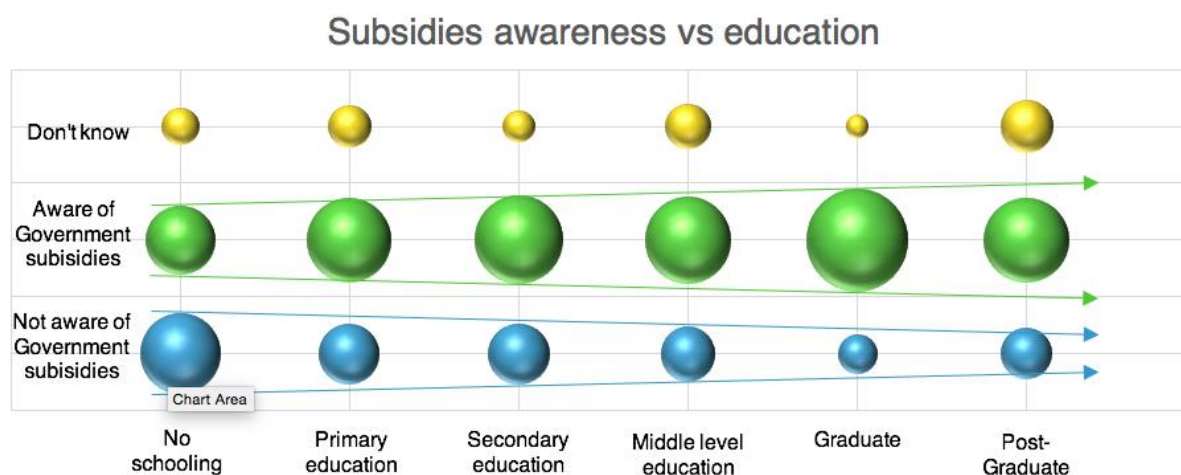


FIGURE 6: GOVERNMENT SUPPORT TO UTILITY COMPANY PER LEVEL OF EDUCATION

In general, government outreach and communications to raise awareness of the true cost of electricity subsidies, coupled with increased transparency of the role of government support to the sector, is likely, at least at the margin, to help to convince citizens in Rajasthan that reform is needed. A current lack of knowledge in this regard might indicate that at least part of the opposition to reform (see Section 3.2 below) may be related to a widespread lack of awareness regarding the key trade-offs involved with the subsidization of electricity prices.

3.2 SUBSIDY REFORM IS A TOUGH SELL – BUT NOT NECESSARILY FOR ALL GROUPS

Policy-makers are unlikely to pursue policies that are unpopular with the public. To enable reform to take place, policy-makers face the difficult task of changing consumers' perceptions regarding the necessity and acceptability of reforms that are unpopular. In Rajasthan, large numbers of respondents currently see electricity subsidies as a proper use of public money and envisage a large role for government in financially supporting discoms. The majority of those surveyed viewed price increases as unreasonable and did not expect prices to rise in the near future despite several years of unchanged tariffs. Having said that, many respondents were unsure whether subsidies were justified, and there does exist some support for reform among certain consumers.

3.2.1 ARE SUBSIDIES A GOOD USE OF PUBLIC MONEY?

Figure 7 depicts consumers' attitudes when asked whether they believe that electricity subsidies are a good use of public money. Of all responses, 46 per cent agree with this notion, many from Jaisalmer and Dausa. Just 16 per cent of total respondents (most of them from Jaipur) answered that subsidies are not a good use of public funds. The remaining 38 per cent (a large number, mostly from Hanumangarh, Jaipur and Dausa) were unsure whether subsidies to discoms represent appropriate expenditure or not.

The survey also investigated the reasons for which consumers do or do not consider electricity subsidies a good use of public money. Almost all the respondents in favour of subsidies (98 per cent) argued that they are necessary to “lessen the economic burden.” As the following sections show, electricity costs are reported to be a large part of household expenditure. A large majority of those who felt that subsidies are not a good use of public money (representing 2 per cent of the total survey sample) stated their opposition is due to a belief that they personally were not receiving subsidies, or not receiving enough. Only 4 per cent of those respondents opposed subsidies due to the fact that these are not equitably or fairly distributed.

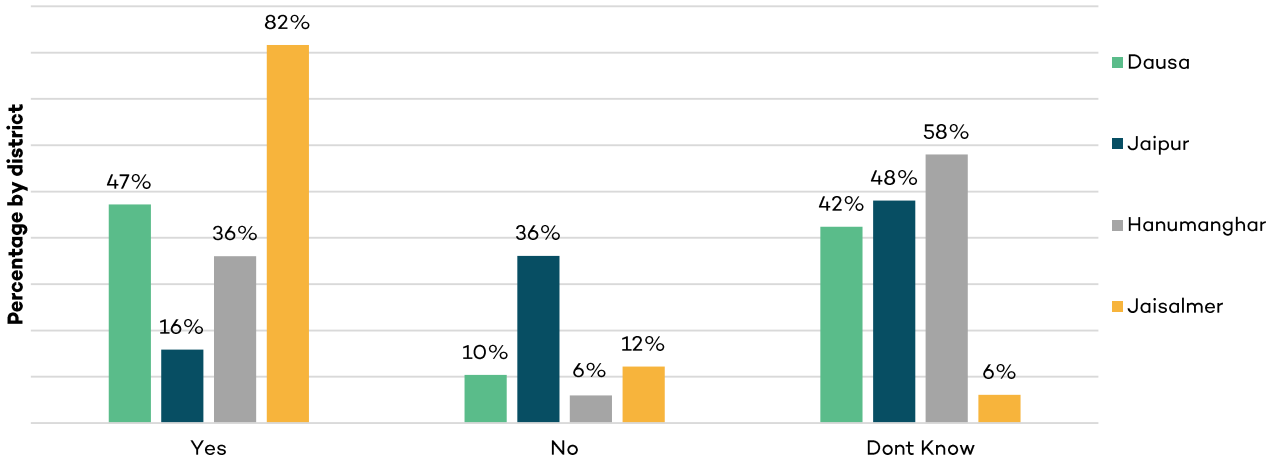


FIGURE 7: ARE CURRENT SUBSIDIES A PROPER UTILIZATION OF PUBLIC MONEY?

When asked about how discoms should cover their costs (see Figure 8), a large majority of respondents stated that government had a role to play in this regard; an unsurprising result given attitudes to the value of subsidies as public spending discussed above. Only 2 per cent of household respondents believed that discom costs should be fully recouped through sales to customers, the default position for utilities in many other countries. By contrast in Rajasthan, 90 per cent felt that costs should be covered with some assistance from government.

Within this large majority, 60 per cent of respondents said that costs should be recouped through a balanced combination of customer revenues and government support, 16 per cent said this should be achieved mostly through customer revenue (with some government support), and a quarter (24 per cent) said it should be achieved mostly through government financing. Districts displayed significant differences in attitudes to discom cost recovery, with results consistent with the geographic differences in understanding of the size, existence and nature of electricity subsidies (see previous section). Furthermore, of those who do not know how discoms cover their costs, 90 per cent responded that there should be government intervention in this regard.

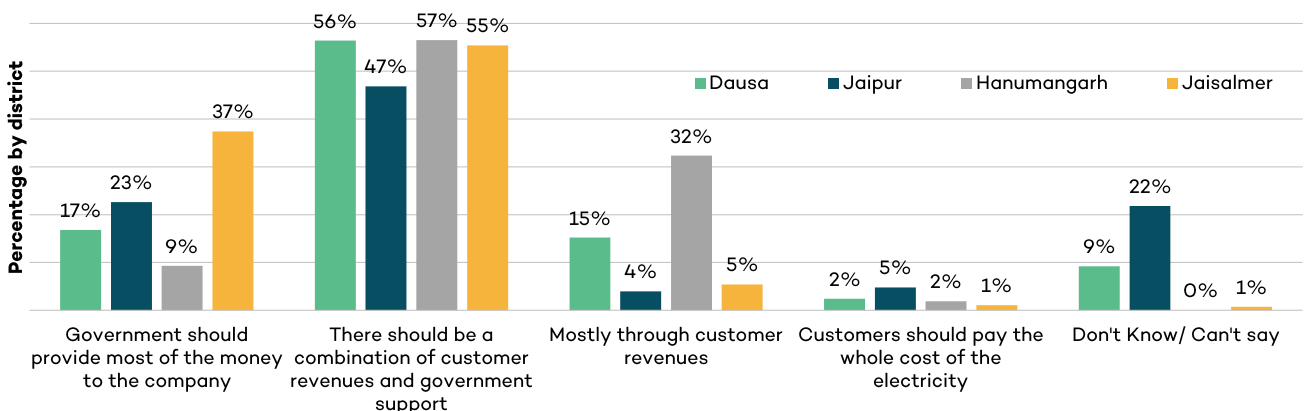


FIGURE 8: HOW SHOULD THE ELECTRICITY COMPANY COVER ITS COST IN SUPPLYING ELECTRICITY?



3.2.2 THE LEVEL OF OPPOSITION TO PRICE INCREASES

To further gauge appetite for tariff reform, respondents were asked whether price rises were acceptable or reasonable in order to better cover discoms’ costs. Eighty percent of respondents felt that any increase in tariffs to this end would be either unreasonable or highly unreasonable, although the strength of this negative response was different from district to district. For example, while in Hanumangarh 99 per cent of respondents felt any price increase would be at least somewhat unreasonable, 40 per cent of respondents in Jaipur believed that it is “reasonable” or “somewhat reasonable” to increase prices to cover discom costs. Figure 9 shows responses to this question per district, in absolute numbers.

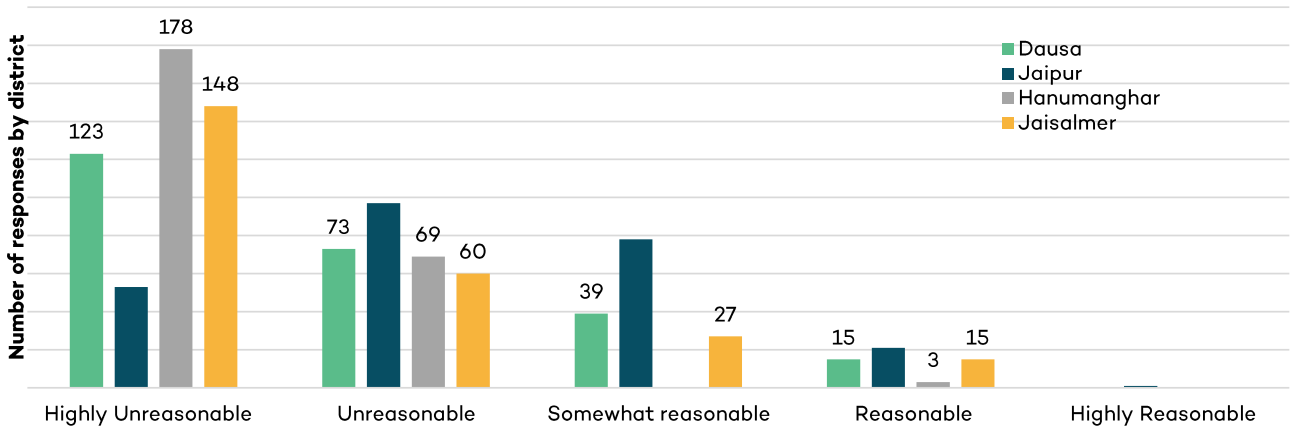


FIGURE 9: HOW WOULD YOU CONSIDER A PRICE RISE TO COVER DISCOMS ’COSTS?

Hesitation regarding price increases was also demonstrated when respondents were asked about their expectations of price reform, shown in Figure 10. Over 60 per cent of the total respondents were not expecting any increase in electricity prices in the next two years, despite—or perhaps because of—the fact that tariffs have been largely stable for the last five years. Regional differences in this regard are important: 77 per cent of those surveyed in Hanumangarh expected no change to prices compared with 48 per cent served by Jaipur distribution (in the districts of Dausa and Jaipur). A majority (65 per cent) of those who did expect higher electricity prices expected tariffs to rise by less than 10 per cent. Levels of education also influenced respondents’ answers—for example, 65 per cent of those with high school education or above recognized that prices are likely to rise at least somewhat over time.

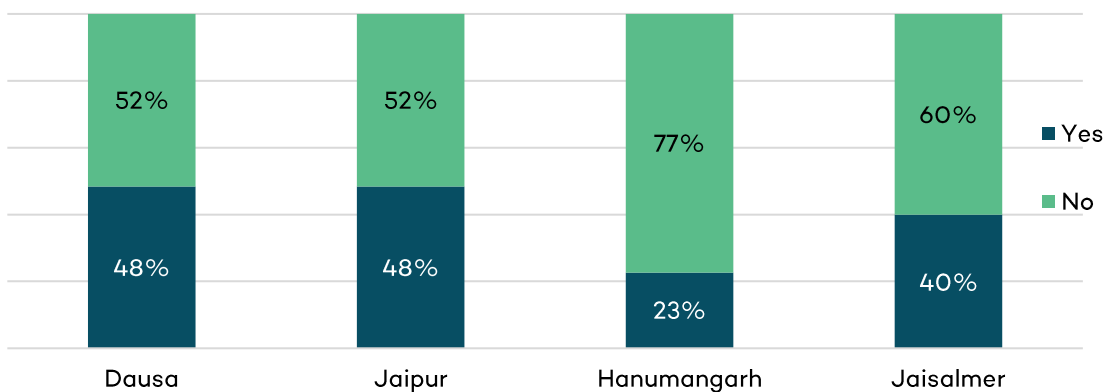


FIGURE 10: DO YOU EXPECT AN ELECTRICITY PRICE INCREASE? RESPONSES IN PERCENTAGE BY DISTRICT



3.2.3 OTHER FACTORS INFLUENCING THE RESULTS: URBANIZATION AND EDUCATION

In addition to the differences in response patterns discussed above from district to district, respondents’ views tended to differ between urban and rural locations and, as expected, by their level of education.

People living in cities and towns are likely to have better access to public services provided by the state, and therefore be more cognizant of the trade-offs and opportunity costs posed by the perpetuation of large, untargeted electricity subsidies. In contrast, those in rural areas people are likely to have more limited access to public services, with electricity subsidies representing one of the few direct benefits they receive from government (Bringéus & Karlsson, 2016).

Survey results show that the belief that electricity subsidies are a good use of public money is almost 20 percentage points (52 per cent versus 34 per cent) more prevalent in rural areas than in urban ones. Having said this, when it comes to whether discoms should in principle cover their costs through sales to consumers, or whether electricity tariff increases are acceptable or reasonable to help discoms cover their costs, no remarkable differences between urban and rural areas were observed.

Counterintuitively, the number of respondents who see electricity subsidies as a valid use of public money tended to increase with levels of education (see Figure 11), with those respondents who are unsure of this decreasing with levels of education. This suggests that communications in support of electricity tariff reform should focus on basic awareness-raising among less educated citizens, while convincing more educated citizens that the perpetuation of electricity subsidies runs contrary to developmental aspirations. In addition, a correlation was found between the expectation of price increase and the level of education of the respondents: the higher the education level, the higher the expectation of price increases.

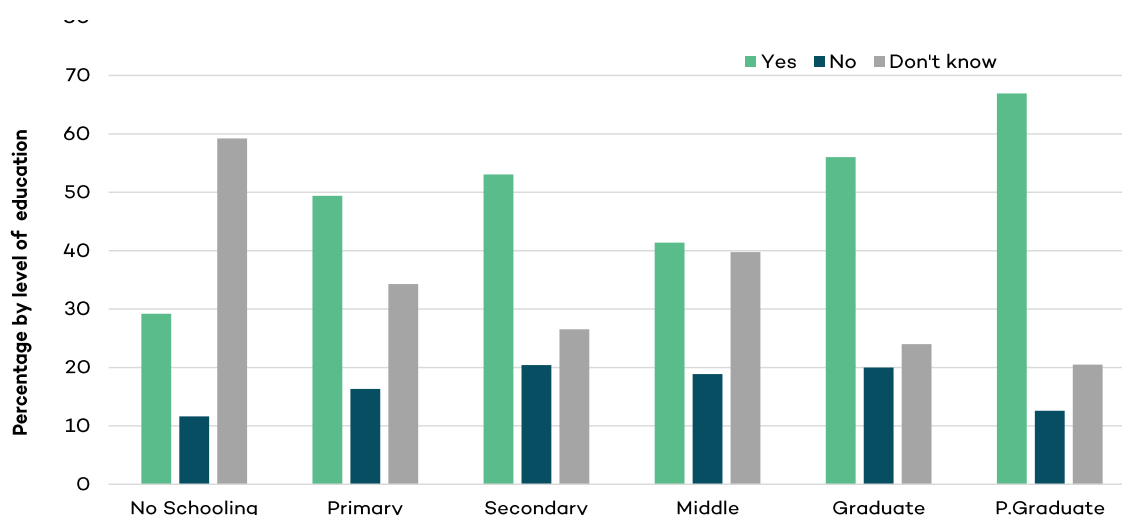


FIGURE 11: ARE ELECTRICITY SUBSIDIES GOOD USE OF PUBLIC MONEY?

The survey results showed that citizens in Rajasthan largely expect government to maintain electricity subsidies. Nevertheless, there are small windows of opportunity for reform, and pockets of support for the idea of greater cost recovery for discoms. These are largely to be found among citizens in urban areas, where public services are more easily accessed and populations may be more sensitive to developmental opportunity costs involved in the current allocation of public finance. In areas like Jaipur and Dausa, around half of consumers expect electricity tariffs to increase, and a sizeable minority (around 40 per cent) of consumers believe higher prices are reasonable or somewhat



reasonable. In order to undertake reform, the reasons for the support or acceptance of these groups should be better understood and subsequently reflected in communication to groups that are not yet convinced.

The role of education in determining attitudes towards tariff reform is mixed, with general consistency in the attitudes towards reform across levels of education (see Figure 11). The high numbers of people without entrenched opinions on this subject are, however, a potential opportunity for policy-makers. In districts such as Hanumangarh, large proportions of respondents offered no opinion on questions, for example, about the validity of electricity as a form of public expenditure (58 per cent of respondents in Hanumangarh answered “don’t know” to this question, see Figure 7). Again, awareness-raising among these groups about the necessity for reform offers a chance to shape consumers’ views towards the idea of reform itself.

3.3 THE NEGATIVE IMPACTS OF HIGHER PRICES WOULD BE SIGNIFICANT FOR HOUSEHOLDS

It is clear that, in absolute terms, those who spend a large share of their income on electricity will benefit from electricity subsidies more than those who consume relatively little. According to survey results, electricity constitutes a large expenditure item for respondents, which may partly explain negative attitudes to the notion of pricing reform. Empirical analysis of survey data demonstrates a statistically significant relation between an increase in share of income spent on electricity consumption and an increase in the likelihood that respondents oppose reform (Bringéus & Karlsson, 2016).

According to the survey, respondents spend most of their household budget on food (31 per cent of total budget), education (22 per cent) and electricity (21 per cent), with total energy expenditure (including electricity, cooking fuel and others) making up 32 per cent of the household expenditure. Figure 12 shows the make-up of household budgets per district. Among the districts, expenditure on electricity ranges from 29 per cent of household expenditure in Hanumangarh to 15 per cent in Dausa. Note that 98 per cent of respondents live in their own homes and therefore rent costs are not included as part of their expenditure equations.

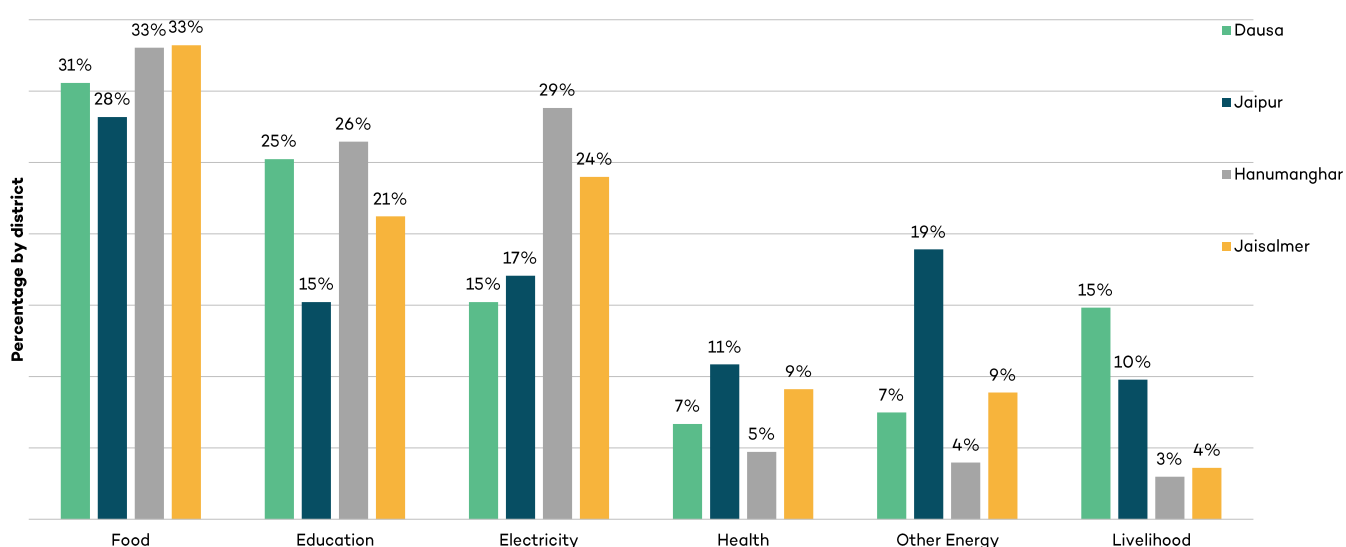


FIGURE 12: WHICH THREE OF THE FOLLOWING ARE MOST IMPORTANT FOR YOU TO MAINTAIN YOUR HOUSEHOLD BUDGET? THAT IS, WHICH THREE WOULD CAUSE MOST DIFFICULTY IF THE PRICE OF THESE WAS TO GO UP?



In order to evaluate sensitivity to price increases, consumers were asked about what level of electricity price increase they could realistically manage without cutting expenditure on critical consumption items (e.g., food, health costs, clothes, children’s education, etc.). The responses per district are represented in Figure 13. The survey respondents reported that any price increase would imply cutting critical expenditure for 80 per cent of respondents (and 97 per cent in Hanumangarh). Only 1 per cent of those surveyed reported that they were able to manage a price rise of more than 5 per cent (and only in Jaipur and Dausa), while no single respondent reported they could manage a price increase higher than 10 per cent. Most of the respondents who reported being able to afford small price increases reside in urban areas.¹

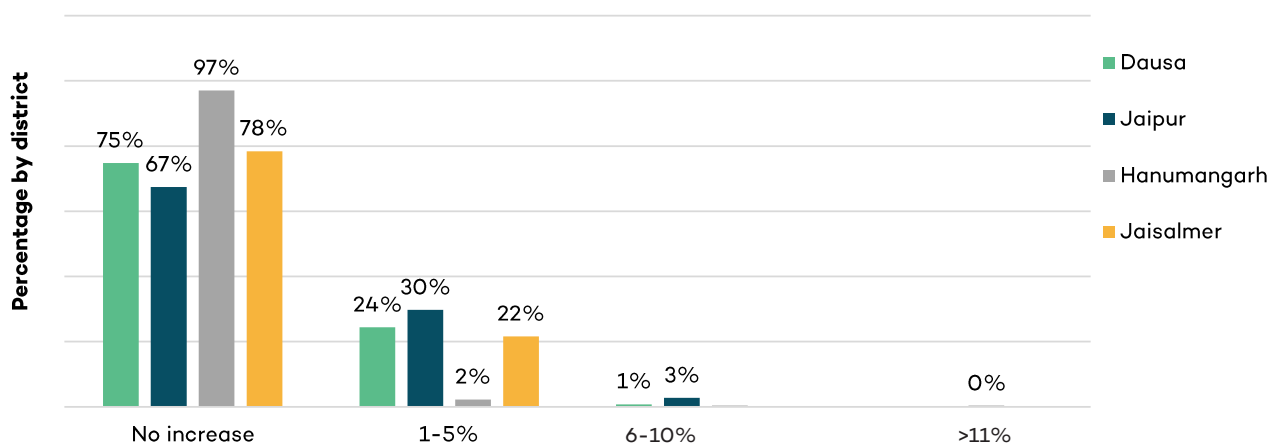


FIGURE 13: WHAT LEVEL OF PRICE INCREASE OF ELECTRICITY COULD YOU REALISTICALLY MANAGE WITHOUT CUTTING DOWN EXPENDITURE ON CRITICAL ITEMS (E.G., FOOD, HEALTH COSTS, CLOTHES, CHILDREN’S EDUCATION, ETC.)?

The survey also evaluated how power consumption patterns would be affected if electricity prices were to increase by 15 per cent (represented per district in Figure 14). Of total respondents, 62 per cent said that they would consume less electricity to maintain current payment levels, while 24 per cent said they would cut other items from their household budget. These results suggest a lack of coping mechanisms and a net loss on welfare for households as a result of higher power prices. Only 7 per cent reported that there would be no significant change in their consumption pattern. Regional differences exist, as shown in Figure 14. For example, in Jaipur 18 per cent of those surveyed announced that a 15 per cent price increase would not affect their consumption patterns and 12 per cent would switch to other fuels where possible.

¹ It should be noted that some unavoidable response bias is likely to be present in these results as respondents are aware that the survey instrument is designed to test attitudes and assess opportunities for electricity pricing reform.

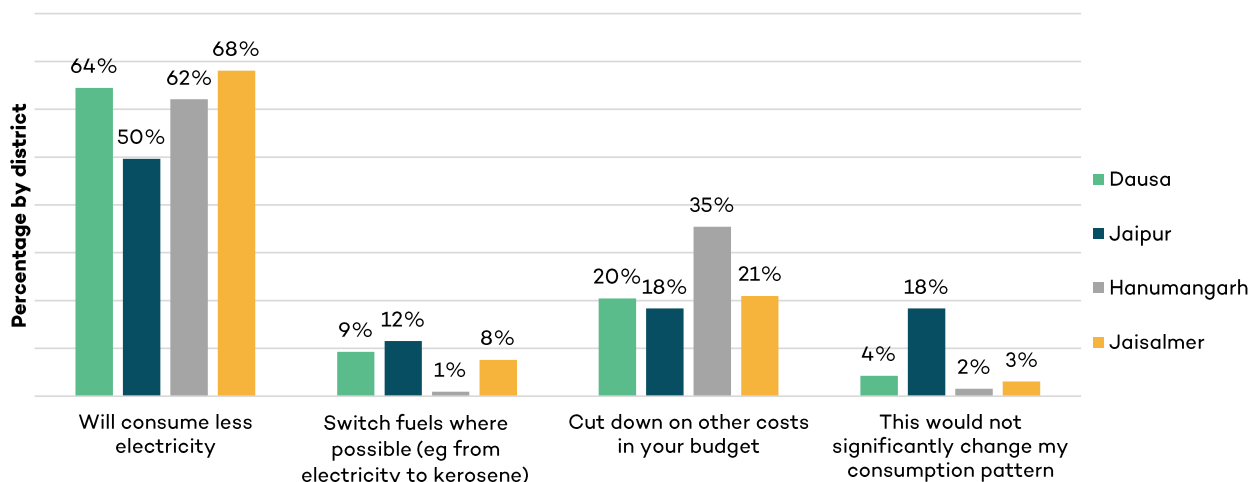


FIGURE 14: HOW WOULD IT AFFECT YOUR CONSUMPTION PATTERN IF ELECTRICITY PRICE WERE TO INCREASE BY 15 PER CENT?

As discussed above, the importance of electricity as an item in households’ consumption basket, combined with the lack of coping mechanisms in response to higher prices, may explain the relatively strong opposition to power pricing reform. As with a similar general acceptance of the notion of pricing reform, however, sensitivity to electricity prices is lower in Jaipur, which again may provide an opportunity for targeted, selective reform concentrated on this populous area.

3.4 SOMEWHAT LIMITED WILLINGNESS TO PAY FOR MORE RELIABLE POWER, BUT OPPORTUNITIES EXIST

According to respondents, poor electricity supply reliability represents a day-to-day challenge in Rajasthan. Despite some signs of improvement, thanks notably to investments in capacity throughout the electricity supply chain (Garg, Sanchez, & Bridle, 2016), power cuts are frequent and often long-lasting in all areas of the state. Poor power service tends to undermine confidence in the management of the electricity system and creates opposition to increased tariffs given the low quality of the service provided. Without enhanced revenue collection, however, it is difficult for discoms to undertake the investment required to improve supply reliability. This section examines consumers’ perceptions towards the often misunderstood trade-off between higher prices and improved power service provision.

Figure 15 illustrates respondents’ perceptions of the average daily frequency of power cuts. There is a significant difference in perceived outages in Jaipur compared with other areas—a fact that is largely understandable as most power cuts were observed in rural areas—with 23 per cent of urban consumers reporting no power cuts at all compared with 5 per cent of rural consumers. Survey data also showed that the duration of power cuts is much shorter in Jaipur than in other regions, with 92 per cent of Jaipurian respondents reporting no outages or those with a maximum duration of two hours, while consumers in rural Dausa, for example, experiencing power cuts of much longer duration (close to 40 per cent of respondents in Dausa indicated that average power cuts last for five hours or longer).

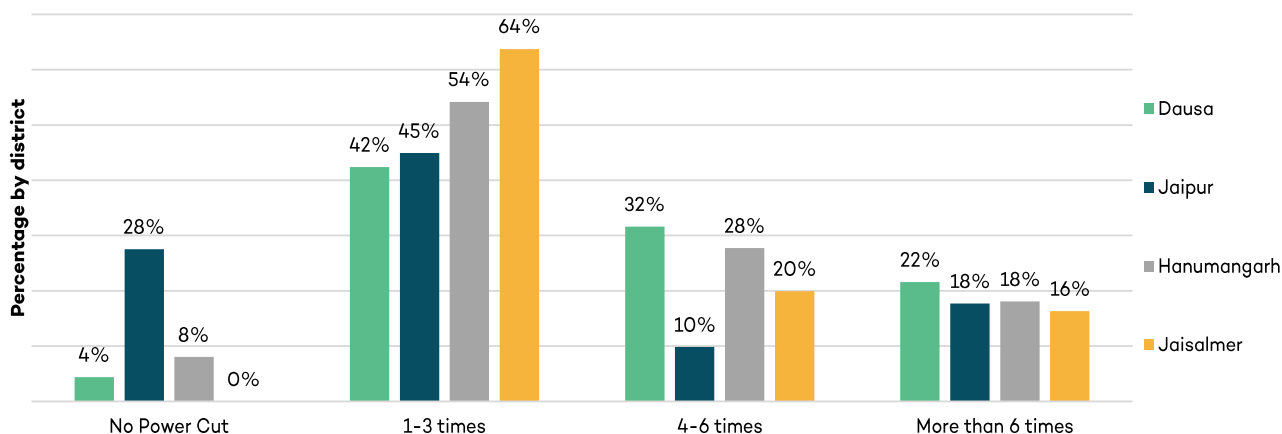


FIGURE 15: WHAT IS THE AVERAGE FREQUENCY OF POWER CUTS DURING A NORMAL DAY?

Of total respondents in both rural and urban areas, 65 per cent reported that poor power service has a high impact on productivity, with small differences between districts (see Figure 16) owing largely to greater supply reliability in Jaipur. Very few households used back-up power generation (4 per cent of total respondents) with back-up power costing at least 25 per cent more than grid power according to those respondents that use it.

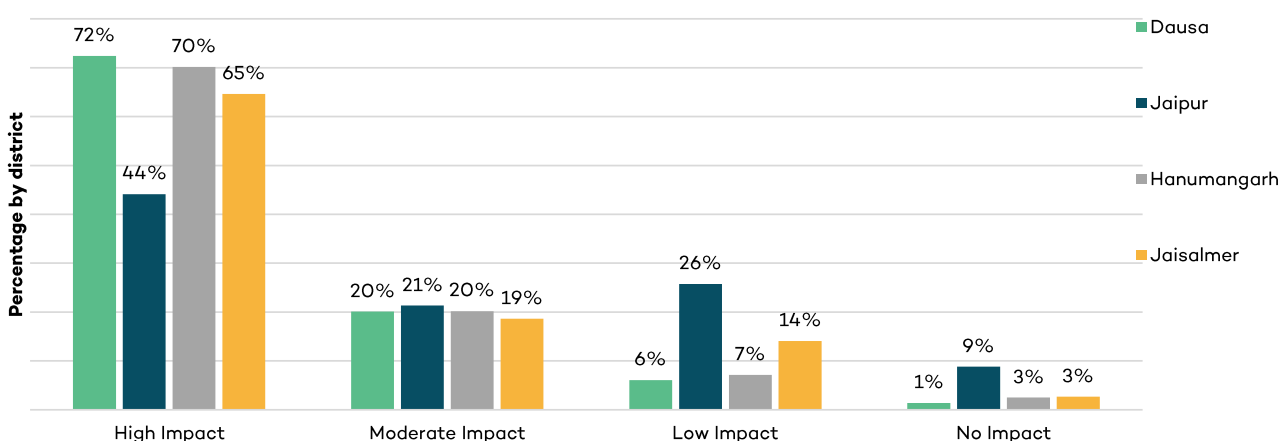


FIGURE 16: LEVEL OF IMPACT OF POWER CUTS ON PRODUCTIVITY?

Since consumers view unreliable electricity service to be detrimental to their output, it may be hypothesized that they would be willing to pay higher prices for more reliable power. The survey investigated this question, with answers per district presented in Figure 17. Overall, 30 per cent of respondents indicated that they would pay more for uninterrupted power. While this proportion was approximately evenly distributed across urban and rural areas, differences across districts are striking (see Figure 17). Interestingly, Dausa and Jaipur, the two districts with by far the highest willingness to pay for reliability, are both supplied by Jaipur discom. At the same time, as discussed, Jaipur and Dausa had the highest and lowest levels of supply reliability, respectively. While 30 per cent of consumers are willing to pay more for enhanced reliability, these consumers are, in general, not willing to pay significantly more (see Figure 18). Eighty per cent of respondents said that they would be willing only to pay a maximum of 5 per cent more, although a non-negligible 10 per cent of Jaipurians are willing to accept a 6–10 per cent increase in tariffs, reflecting a general rural-urban split in the scale of willingness to pay.

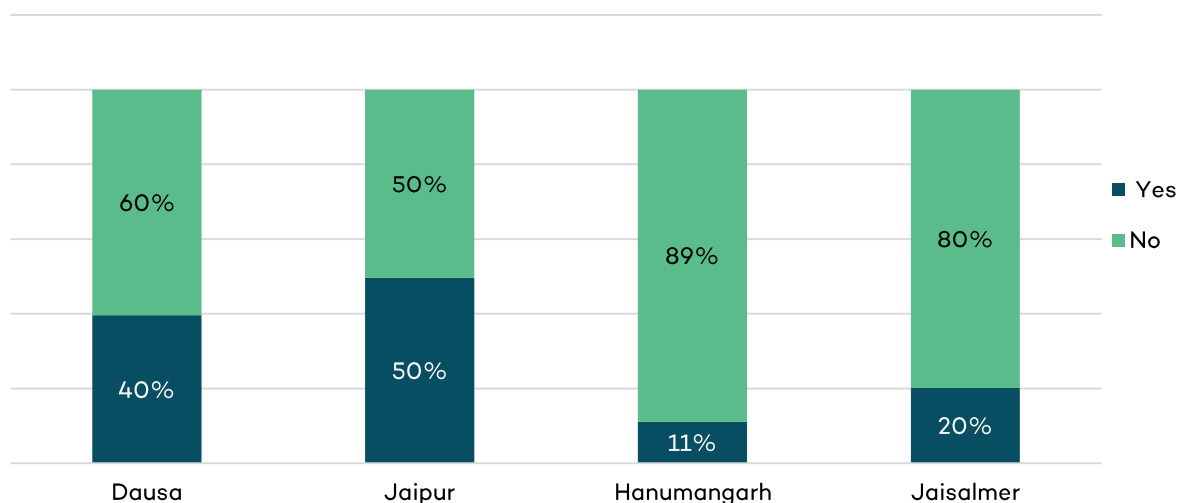


FIGURE 17: WOULD YOU BE WILLING TO PAY MORE FOR ELECTRICITY IF THE SUPPLY WAS MORE RELIABLE AND UNINTERRUPTED? RESPONSES IN PERCENTAGE BY DISTRICT.

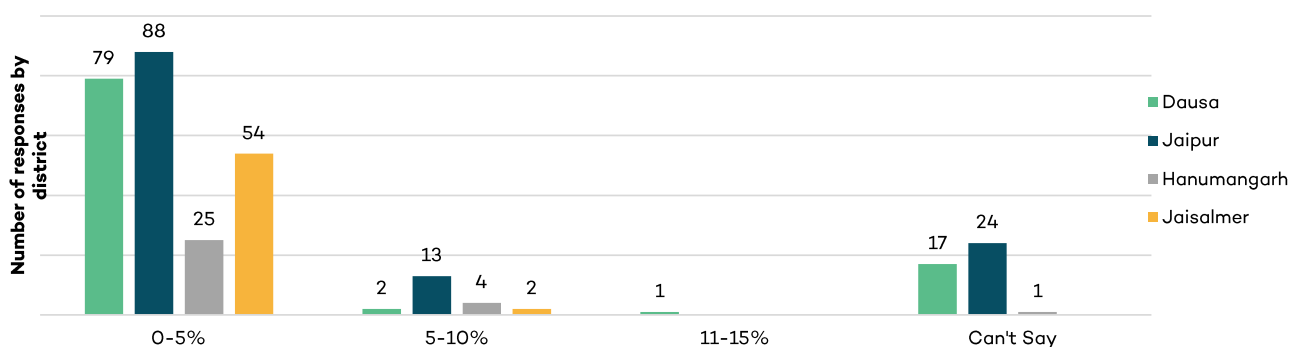


FIGURE 18: IF WILLING TO PAY MORE FOR ELECTRICITY FOR A RELIABLE AND UNINTERRUPTED SUPPLY, BY HOW MUCH?

Despite the fact that power cuts can be frequent and long and that respondents admit that poor supply quality has a considerable impact on their daily output, a significant majority of consumers are not willing to pay more for better quality power service. This may reflect the fact that respondents have little confidence in power sector management and in the practical realization of better quality power service resulting from higher tariffs.

Although Jaipur and Dausa represent the two districts in the current sample with the most and least reliable power supply, respectively, they are also the districts with the greatest willingness to pay for better quality service. This suggests that there may be two kinds of household that are willing to pay for a higher quality service: a) wealthier, more urban households that are aware of the benefits of reliable power service and eager to ensure this over time; and b) households that are currently suffering from debilitating power outages that are willing to do what is necessary to try to enhance power service, even if this means an additional financial burden. In all cases, policy-makers should be sure to emphasize the links between power tariff reform and greater supply reliability in making the case for reform.



4.0 What Do our Findings Mean for Reform?

The findings presented above have a number of important implications for the design of successful electricity tariff reform in Rajasthan, and specify several opportunities that could be exploited in order to move toward greater cost recovery over time for discoms in the state. Four key implications, specifying certain policy recommendations, are described in detail in this section:

1. Communication (through government and its allies in reform) that raises awareness among households—and especially rural households—about the existence and scale of electricity subsidies, the serious developmental trade-offs they require and the regressivity of their distribution will be critical in enhancing support for reform, without being a “silver bullet” itself.
2. Given that higher power prices are likely to have significant welfare impacts on households, and especially poor households, price reform should be coupled with clear and well-publicized mitigation measures (energy-efficiency schemes, short-term direct benefit transfers, etc.). These measures should ideally be built on existing programs, and both ease the transition to higher prices and, importantly, build support for the process of reform. In the same way, price reform should take place in a gradual, phased manner in order to lessen impacts on households.
3. Electricity tariff reform is likely to meet least resistance (and be best targeted) in urban areas, especially Jaipur, where the ability to pay higher prices and an understanding of the rationale for reform are currently more developed. There are a number of ways to undertake targeted reform, which should be considered.
4. As price reform takes place, energy policy-makers and discom executives need to focus on improving the quality of power service provision. A significant proportion of households will be more accepting of reform if this is accompanied by a commitment to, and observed, improvement in the reliability of power supply.

Taken together, these complementary aspects can help policy-makers to build a highly resilient reform program that builds and leverages support for the process of reform, in part by protecting vulnerable households from the impacts of this process.

4.1 RAISING AWARENESS: THE NEED FOR COMMUNICATION

A lack of awareness of the existence and scale of power subsidies among consumers is arguably the most important challenge facing policy-makers in the pursuit of sustainable electricity tariff reform. Without knowledge of the significant financial resources and trade-offs involved in the continued subsidization of electricity consumption, it is difficult for consumers to understand the rationale for increasing prices. As discussed above, regression analysis also suggests a clear correlation between basic knowledge regarding the nature of electricity subsidies and indicators of support for reform among households. A lack of awareness can be tackled by effective communications strategies that seek to both raise awareness about the facts surrounding electricity subsidies (and the developmental trade-offs entailed) and to actively encourage support for reform by stressing the importance and benefits of this process.

Communication campaigns have been successfully employed in the past to help to support energy subsidy reform. The Indonesian government implemented an integrated communications strategy in 2012 while announcing plans to restrict the use of subsidized transport fuel and raise fuel prices (Indriyanto et al., 2013). In 2014 the Government of Egypt introduced long-awaited energy subsidy cuts along with a government-led messaging strategy that emphasized the benefits of resulting fiscal savings and commitments to greater budget allocation for education and health care. In Iran,



government effectively communicated its plans to provide cash transfers to households following the removal of fuel subsidies, which helped to enhance the popularity of reforms.

The findings of the survey suggest that there exists what analysts describe as an “entitlement-minded” attitude among Rajasthan’s electricity consumers. The expectation of the continuation of certain existing government benefits is relatively common in contexts where social protection systems are less well developed or where benefits such as energy subsidies are seen to be part of a long-standing social contract (e.g., in oil producing nations). In the Gulf region, for example, research has shown that information and communication supporting entitlement and subsidy reform lowered opposition to reforms, even among entitlement-minded populations (Krane, 2014).

Communications in support of electricity pricing reform should be based on an understanding of the negative attitudes and concerns of key stakeholder groups that are subject to the process of reform. Key stakeholder groups need to be identified through stakeholder mapping, and their views regarding reform assessed and considered. The stakeholder consultation survey undertaken to inform this report is therefore a good first step in this regard.

Once these attitudes and concerns are understood, a messaging strategy can be developed that both raises awareness about the current situation regarding electricity subsidies and that makes the case for reform among key stakeholders based on the wastefulness, regressivity and opportunity costs of the status quo, to complement and support effective tariff reform design (see Section 4.2). IISD-GSI has significant experience in developing communications strategies of this kind supporting energy pricing reform in countries in Asia and the Middle East. These are powerful tools in breaking the political deadlock that impedes timely pricing reform.

4.2 DESIGNING REFORM IN A WAY THAT MINIMIZES IMPACTS ON HOUSEHOLDS WILL BE CRUCIAL TO SUCCESS

According to the results of the survey, there exists considerable resistance to electricity tariff reform in Rajasthan and, relatedly, higher electricity prices are likely to have significant impacts on many households. In order to be publicly palatable, therefore, tariff reform needs to be designed in a way that both eases the transition to higher prices and, importantly, that builds support for the process of reform among citizens. This requires that reform be accompanied by mitigation measures that reduce the impact of higher prices on households (through additional benefits transferred to vulnerable households or programs that enhance energy efficiency), and that the process of reform be undertaken gradually, in a phased-out manner that allows consumers to best cope with higher prices over time.

4.2.1 MITIGATION MECHANISMS

Complementary policies that reduce the impact of energy pricing reform on households come in many forms; however, they can be generally separated into measures to better target low-energy prices, measures to provide (temporary) income assistance of various kinds, and measures to enhance the efficiency with which consumers use energy, each of which is discussed below.

In terms of better targeting of electricity subsidies, policy-makers might consider the manipulation and extension (to agricultural users) of the current block tariff system, so that larger and more wealthy consumers pay an increasingly greater difference in prices compared to “lifeline” tariffs in a general movement towards overall cost-recovery.



In terms of income support, the traditional process of providing in-kind subsidies (i.e., cheap power to consumers) might increasingly be replaced with direct benefit transfers (DBT) to certain households, following the model implemented for liquified petroleum gas. Under a DBT for power, the block tariff system would be designed to achieve cost recovery (while maintaining significant stratification in tariffs based on usage level); however, eligible households would, in addition, be compensated with direct budgeted cash transfers to support the transition to higher prices. IISD-GSI will be undertaking a feasibility assessment of DBT for power in India in the coming months.

Given that more than half of the survey sample indicated that price increases would force them to cut electricity consumption, ambitious measures to enhance households' energy efficiency are also likely to enhance the popularity of reforms. The Indian Government has taken positive steps in this direction and is currently distributing light-emitting diode (LED) bulbs under domestic efficient lighting programs. Energy Efficiency Services Limited is implementing the Unnat Jyoti by Affordable LEDs for All (UJALA) program to provide LED lighting under the Domestic Efficient Lighting Programme, which is currently running successfully in over 120 cities across India. Energy Efficiency Services Limited has already distributed over 9 crore LED bulbs across the country during 2015/16. These programs should be supported and replicated as necessary and appropriate at the state level.

4.2.2 PACING OF REFORM

The pace at which reform takes place and the magnitude of individual price increases are two factors that are likely to play a defining role in the success of subsidy reform (Beaton, Gerasimchuk, Laan, Lang, Vis-Dunbar, & Wooders, 2013). International experience clearly demonstrates that reform that takes place in a gradual and phased manner is likely to be more palatable to citizens. India's own experience in successful, gradual diesel price reform is a case in point.

While jurisdictions with very large subsidies or intractable political opposition may have no choice but to plan large reforms—or may try to time larger reforms for periods of relative political “good will,” such as post-election or at seasonal periods when living costs are lower—the regression analysis undertaken by Bringéus and Karlsson (2016) of the survey data presented in this report demonstrates that consumers prefer smaller price increases over an extended period, rather than “big bang” reforms. This should be considered when planning tariff reform.

4.3 REFORM MUST BE DEMOGRAPHICALLY TARGETED WHERE POSSIBLE

Similarly, in designing reform, policy-makers should be careful to leverage existing opportunities for reform among certain discrete populations in Rajasthan. While electricity tariff reform is, as might be expected, often an unpopular concept, there are certain groups within the diverse population of Rajasthan that are more open to this process. These groups should be identified at a very granular level, and ways to pass on targeted higher prices to them should be devised.

For reasons likely related to household income, households in Jaipur, in particular, showed greater acceptance of the need for reform while at the same time indicating that the impact of higher prices on budgets would be lower there than in other areas. There are a number of ways that wealthier, more urban households can be targeted with more a more determined reform plan that can help to move discoms toward cost recovery. Regulators, for example, can allow Jaipur discom to pursue more ambitious price increases in the short-term than that in other areas. Alternatively, as discussed above, the residential block tariff system, which applies largely to urban users, could be “stretched” to ensure that large and wealthy urban consumers—of the kind that indicated an enhanced willingness to pay for electricity in the survey—pay a tariff that reflects this willingness and ability to pay.



4.4 POLICY-MAKERS NEED TO FOCUS ON QUALITY OF POWER SERVICE

Policy-makers should be encouraged by the fact that a large minority of consumers (around 30 per cent) are willing to pay higher tariffs for better power service, presenting an opportunity for price reform that is linked to the improved quality of electricity supply. In the process of selling, designing and implementing reform, policy-makers should be careful to stress the often-misunderstood linkages between tariff reform and enhanced reliability of power supply, in order to convey the potential benefits of reform to consumers who currently do not appreciate the connection between cost recovery and reduced power outages.

More importantly, however, in an effort to move towards greater cost recovery over time, energy policy-makers, discom executives and regulators should steadfastly concentrate on enhancing electricity service in practice (by investing in transmission and distribution infrastructure) in the process of power sector reform (which includes pricing reform). This will tap into, and expand, the willingness to pay. Over time, as above, this will also help to convince certain skeptical consumers that tariff reform represents not just an absolute financial loss for them, but can often be naturally paired with improvements in the quality of power supply, which currently causes significant productivity losses for them.





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Annex 1 – Sample Selection Data

Data supporting the sample selection process (see Section 2, Methodology).²

Table A1: Basic statistics on coverage of distribution companies

Sr. No	Name of Discom	Number of Districts	Area (in million sq.km.)	Total Population	Total Households	Households with Electricity	Population Density
1.	Jaipur Discom	12	0.07	256,00,673	45,98,348	33,45,790	322
2.	Ajmer Discom	11	0.09	229,36,936	44,08,365	29,04,286	281
3.	Jodhpur Discom	10	0.18	200,10,828	35,74,590	21,79,964	143

Table A2: Selection of districts from Jodhpur discom

Sr. No.	District	Percentage of HH with Electricity	Index Score (% of HH with Electricity)	Population Density (per Sq Km)	Index Score (Population Density)	Total Score $\{(4+6)/2\}$	Ranking
1	2	3	4	5	6	7	8
1.	Barmer	28.2	3.7	92	4.6	4.13	9
2.	Bikaner	58.7	7.7	78	3.9	5.79	8
3.	Churu	66.7	8.8	147	7.3	8.02	6
4.	Ganganagar	75.7	9.9	179	8.9	9.40	2
5.	Hanumangarh	73.9	9.7	184	9.1	9.41	1
6.	Jaisalmer	38.0	5.0	17	0.8	2.92	10
7.	Jalor	49.1	6.4	172	8.5	7.48	7
8.	Jodhpur	65.2	8.6	161	8.0	8.27	5
9.	Pali	76.2	10.0	164	8.1	9.06	4
10.	Sirohi	66.3	8.7	202	10.0	9.35	3

Table A3: Selection of districts from Jaipur discom

Sr. No.	District	Percentage of HH with Electricity	Index Score (% of HH with Electricity)	Population Density (per Sq Km)	Index Score (Population Density)	Total Score $\{(4+6)/2\}$	Ranking
1	2	3	4	5	6	7	8
1.	Alwar	77.2	8.6	438	7.4	8.00	4
2.	Baran	67.1	7.5	175	2.9	5.22	8
3.	Bharatpur	68.2	7.6	503	8.5	8.04	3
4.	Bundi	62.2	7.0	192	3.2	5.09	9
5.	Dausa	67.1	7.5	78	1.3	4.41	12
6.	Dholpur	47.5	5.3	398	6.7	6.00	6
7.	Jaipur	86.4	9.7	595	10.0	9.83	1
8.	Jhalawar	78.1	8.7	227	3.8	6.27	5
9.	Karauli	50.3	5.6	264	4.4	5.03	10
10.	Kota	89.5	10.0	374	6.3	8.14	2
11.	Sawaimadhopur	55.5	6.2	297	5.0	5.60	7
12.	Tonk	59.1	6.6	172	2.9	4.75	11

² Unless otherwise noted, data is drawn from Government of India (2011).

**Table A4: Proposed distribution of sample households across urban & rural area**

Sr. No.	District	Percentage of Households with Electricity Connection		Proposed Distribution of Sample Households		Total Sample
		Rural	Urban	Rural	Urban	
1.	Dausa	83	17	208	42	250
2.	Jaipur	37	63	92	158	250
3.	Hanumangarh	75	25	188	62	250
4.	Jaisalmer	73	27	183	67	250

Table A5: Classification of Indian households based on Pew Research Centre

Sr. No.	Categories	Income (Per day)	Percentage of Indian population
1.	Poor	INR 130.00 or less	20
2.	Low	INR 130-650	75
3.	Medium	INR 651-1300	4
4.	High	INR 1301 & above	1

Table A6: Proposed distribution of sample households across different Income groups.

Sr No.	District	Distribution of Households based on Income (in %)				Proposed Distribution of Sample Households				Total Sample
		Poor	Low	Medium	High	Poor	Low	Medium	High	
1.	Dausa	20	75	4	1	50	188	10	3	250
2.	Jaipur	20	75	4	1	50	188	10	3	250
3.	Hanumangarh	20	75	4	1	50	188	10	3	250
4.	Jaisalmer	20	75	4	1	50	188	10	3	250

Source: Kochhar (2015)

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