

24x7 Power for All in Odisha

Strategies for on-ground action based on ACCESS 2015

BY SAURABH TRIPATHI AND ABHISHEK JAIN

According to data from GARV2, 37 per cent of households in Odisha are unelectrified, even as over 98 per cent of villages in the state have been electrified. In districts such as Nabarangpur and Angul, despite nearly 100 per cent village electrification, household electrification is considerably lower at 44 per cent and 64 per cent, respectively. While it is therefore important to focus on household electrification, even that may not be enough, as merely being connected to the grid is not a guarantee of access to electricity. To achieve 24x7 power for all, we must go beyond connections and provide adequate, sufficient and affordable electricity supply to all.

To support strategies for rural electrification in Odisha, the Council on Energy, Environment and Water (CEEW) presents the following results and recommendations based on a household survey on energy access conducted in collaboration with Columbia University in 2015. The survey, referred to as ACCESS, was carried out in three districts of Odisha, one from each administrative division of the state - Bargarh, Ganjam and Mayurbhanj. In all, 504 households across 42 villages were surveyed. The results are statistically representative at the district- and state-level, given the sampling strategy adopted in the survey.

Key insights and recommendations

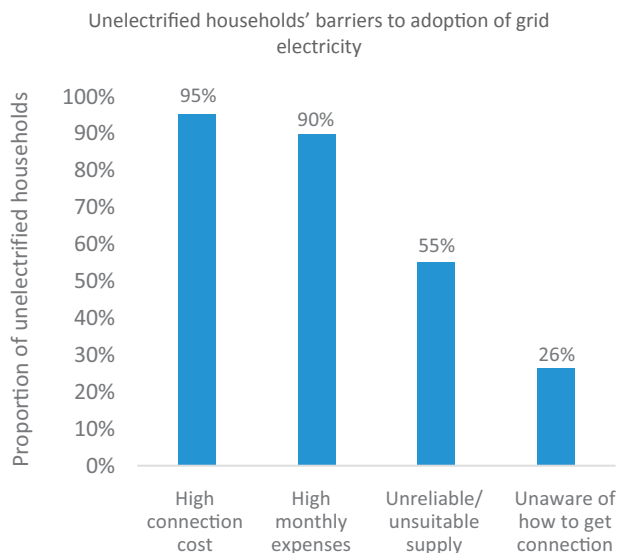
- a. Over 67 per cent of unelectrified rural households live in grid-electrified habitations. This presents an opportunity to rapidly scale up the electrification rate with only limited deployment of on-ground infrastructure.
 - b. Ninety per cent of unelectrified households viewed high monthly cost as a barrier to their adoption of grid electricity. However, while such households in Odisha spend INR 128 on kerosene every month, they are willing to pay only INR 122 for the monthly costs of grid electricity.
 - c. Almost 64 per cent of households experience 2 or more 24-hour black-out days in a month, while 31 per cent experience 3 or more days of low voltage supply.
- Few key recommendations to ensure 24x7 power for all:
- a. Awareness camps are required to educate unelectrified households of the prevailing tariff of grid electricity, especially since the fixed tariff of 30 units under *Kutir Jyoti* (INR 80) is much lower than their monthly willingness to pay for electricity. Yet, many such households view high recurring costs of grid to be a barrier to being electrified.
 - b. To reduce the number of 24-hour black-out days experienced by households, there is a need to focus on the improvement of maintenance services. Further, to allay voltage issues, there should be an attempt to match estimated demand with the power procured by distribution companies.
 - c. Of the 373 villages yet to be electrified (as on 30th August 2017), 187 have been identified for off-grid electrification. There is a need to go beyond the village-level to analyse habitation-level scenarios and needs, because even in grid-identified villages, many habitations could be more effectively served through decentralised energy solutions.

Reaching out to unelectrified households in rural Odisha

According to ACCESS, two-thirds of the unelectrified households in Odisha reside in habitations that are already connected to the grid. This presents an opportunity to rapidly pace the rate of electrification by prioritising unelectrified households in electrified habitations because they are unlikely to require significant outlay on heavy infrastructure.

The biggest barriers to the adoption of electricity for such households are steep upfront costs and high recurring expenses. While affordability is an issue, it is interesting to note that over 90 per cent of BPL households in the state find the upfront cost of connection too high, despite being provided connections at highly subsidised rates. Such an awareness gap with regards to the cost of an electricity connection is a big impediment for rapidly increasing grid connectivity to the households. The challenge could be resolved through well-targeted awareness campaigns in areas where such perceptions exist.

Figure 1: Household perception of steep connection and recurring costs are the biggest barriers to electricity access



Source: ACCESS 2015

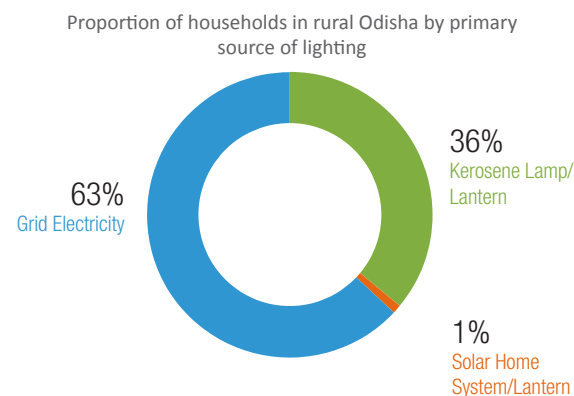
Further, while many households find the recurring monthly expense of grid electricity too high, they spend as much or more on kerosene as their primary source of lighting. It is essential to communicate this in awareness campaigns, specifically focussing on the difference between households' existing expenditure on kerosene and their willingness to pay (WTP) for electricity. Unelectrified households in Odisha are

willing to pay INR 122 per month, which is much higher than the INR 80 fixed monthly charge for 30 units of electricity under *Kutir Jyoti*. Many households will be able to afford grid electricity, given that their current monthly expenditure on kerosene for lighting (INR 128) is higher than their WTP and prevailing tariff of electricity for basic consumption. Despite the relatively better situation of electricity in Odisha in terms of duration and quality of supply, households do not seem to value grid electricity higher than kerosene.

Ensuring improved electricity access for electrified households

Across the three districts, while 70 per cent of households are connected to the grid, 63 per cent use grid electricity as their primary source of lighting. However, over one-third of households still rely on kerosene lamps or lanterns for their primary lighting needs. The penetration of decentralised energy solutions such as micro-grids and solar home systems or lanterns was found to be very low across the districts, even in villages with poorer availability of grid electricity.

Figure 2: Over a third of households continue to use kerosene as their fuel of choice for basic lighting needs



Source: ACCESS 2015

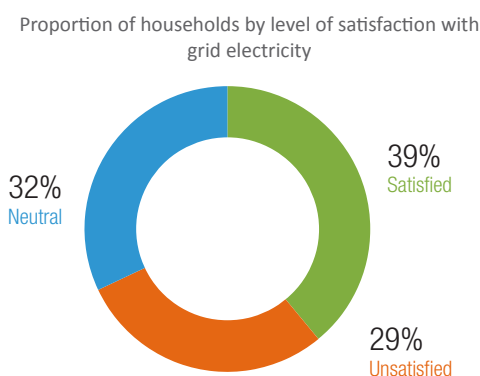
The difference between proportion of households having grid and using it as primary source of lighting is much lower in Odisha than it is in neighbouring states. However, there still is room to steadily improve household satisfaction from electrification, and the management of grid electricity as a service. This section explores several critical issues that impact household satisfaction, and the penetration and efficiency of metering.

Improving the satisfaction of households with electrification

Analysing households' satisfaction is critical because constituents are likely to form policy preferences based on their experiences with various technologies and solutions. When asked which source of lighting they would most like to see supported by the government, most households (58 per cent) in rural Odisha chose the grid. Despite the low penetration of decentralised energy solutions and relatively better grid performance in Odisha, it is interesting to note that eight per cent of households would like to see support for solar home systems and lanterns and 17 per cent are in favour of micro-grids. Unelectrified households were generally less interested to seek support for the grid, but instead of turning to decentralised solutions, they asked support for kerosene. This might be because kerosene is the only lighting option they think they can realistically depend on in the near-term, and due to their unfamiliarity with decentralised solutions and inherent perceptions around the poor reliability and availability of electricity.

Over 60 per cent of households were either dissatisfied with or indifferent to their grid electricity situation. It is important to understand the combination of factors that result in such a low level of satisfaction, and how grid electricity could be improved to provide increased utility to its users.

Figure 3: Almost one-third of grid-electrified households were dissatisfied with their electricity situation

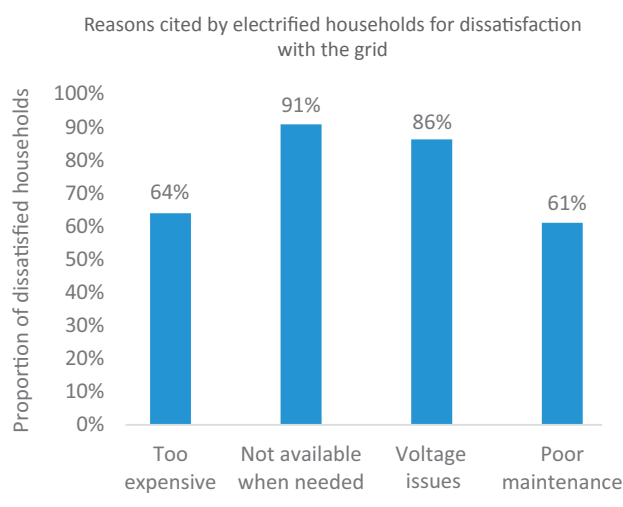


Source: ACCESS 2015

Among those households who were dissatisfied with grid electricity, most found poor reliability and quality to be a reason. Some issues are likely to be more important in some districts, while others elsewhere;

which is why distribution companies need to appraise and resolve these issues based on local challenges.

Figure 4: Unreliable supply and voltage fluctuations were the major reasons for dissatisfaction with grid electricity



Source: ACCESS 2015

Seventy one per cent of electrified households were unable to use appliances that they would like to use, only because of limited supply or poor quality of electricity. Interestingly, ceiling fan and television were the most commonly mentioned appliances by households in this regard. It is important to understand electricity supply from a capabilities approach, to appreciate the appliances it enables households to use, as this is likely to be a key influencer of their level of satisfaction.

Extended black-outs

In Ganjam, 10 per cent of respondents reported experiencing three or more black-out days in a month, i.e. days with no electricity for 24 hours continuously. The situation is considerably worse in Bargarh and Mayurbhanj, where more than two-thirds of the households experience two or more black-out days every month. Such issues might be due to distribution companies undertaking intentional load-shedding for severely extended periods to manage their supply and demand, inadequate efforts to restore outages arising from technical issues, or poor maintenance services.

Quality of supply

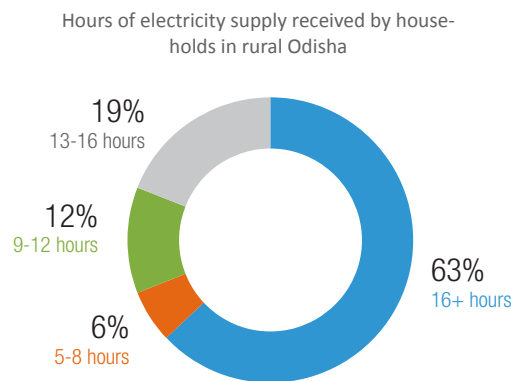
Across the state, 31 per cent of the electrified households experience low voltage supply on three or more days in a month. To rectify this, the distribu-

tion companies must forecast demand better, proactively manage their power purchases and focus on reducing illegal connections to better estimate demand.

Duration of Supply

Typical rural households in Odisha receive electricity supply of 18 hours of electricity per day with 10 per cent of them receiving 10 hours or less. Supply during evening hours is an equally important element of household satisfaction, as found in our research with Columbia University. 72 per cent of households across our sample reported receiving 4 or more hours of electricity in the evening. This is encouraging and certain to reduce reliance on kerosene for lighting in the evening. The state must continue to focus on improving the duration of supply to improve households' utility and satisfaction from electricity and to improve the perception of the grid supply among unelectrified households.

Figure 5: Nearly 18% of households receive 12 hours of supply or less

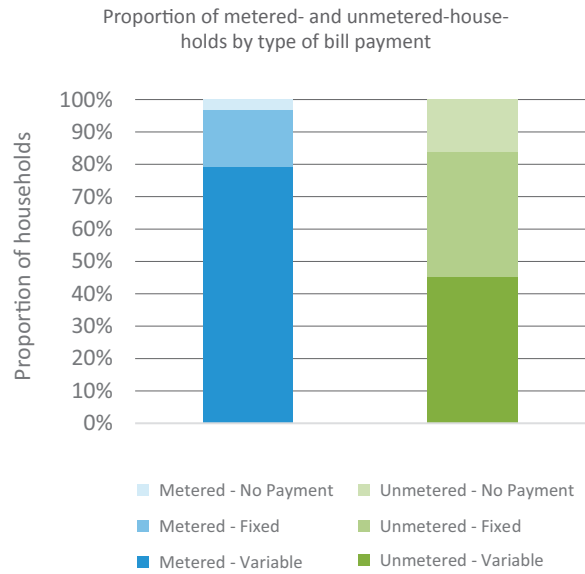


Source: ACCESS 2015

Scope for efficiency improvements in grid electrification

It is positive to note that more than 95 per cent of electrified households pay for grid electricity across the three districts surveyed, with 91 per cent paying a representative of the electricity department directly. However, while 7.5 per cent of electrified households did not have meters installed, almost 35 per cent of households in Odisha were unaware (or did not think) that electricity-theft is illegal. It is necessary for such ill-informed perceptions to be addressed through targeted information campaigns, which could ultimately help reduce the losses due to theft and improve peoples' understanding of the cost of grid electricity.

Figure 6: One-fifth of households with meters were not paying for electricity, or receiving fixed-payment bills



Source: ACCESS 2015

The majority of metered households receive variable bills, while over 17 per cent receive fixed bills, despite having meters. The latter is more prevalent in Mayurbhanj, where many meters are perhaps either not working or not read by distribution companies on a regular basis. The generation of variable bills might improve the perception of the high or non-transparent recurring cost of electricity. Distribution companies could use a range of collection mechanisms such as spot billing or voluntary declaration by consumers with periodical verification visits, to lower cost of collection and improve transparency around billing. Unsurprisingly, a larger proportion of households that had unmetered connections received fixed bills, or reported not paying for their electricity at all.

Revenue of distribution companies could be increased by improving collection efficiency through incentive mechanisms for end-consumers. Billing compliance could be improved by devising an incentive structure wherein groups of households are provided with better quality supply based on their collective bill-payment record. The added social pressure of group payments and the linked incentives are likely to improve revenue of distribution companies.

Odisha already has an extensive network of distribution franchisees that operate on an inputs-based model to deliver electricity to remote households, with pay-offs for many such franchisees linked to reduction in AT&C losses. However, it is important

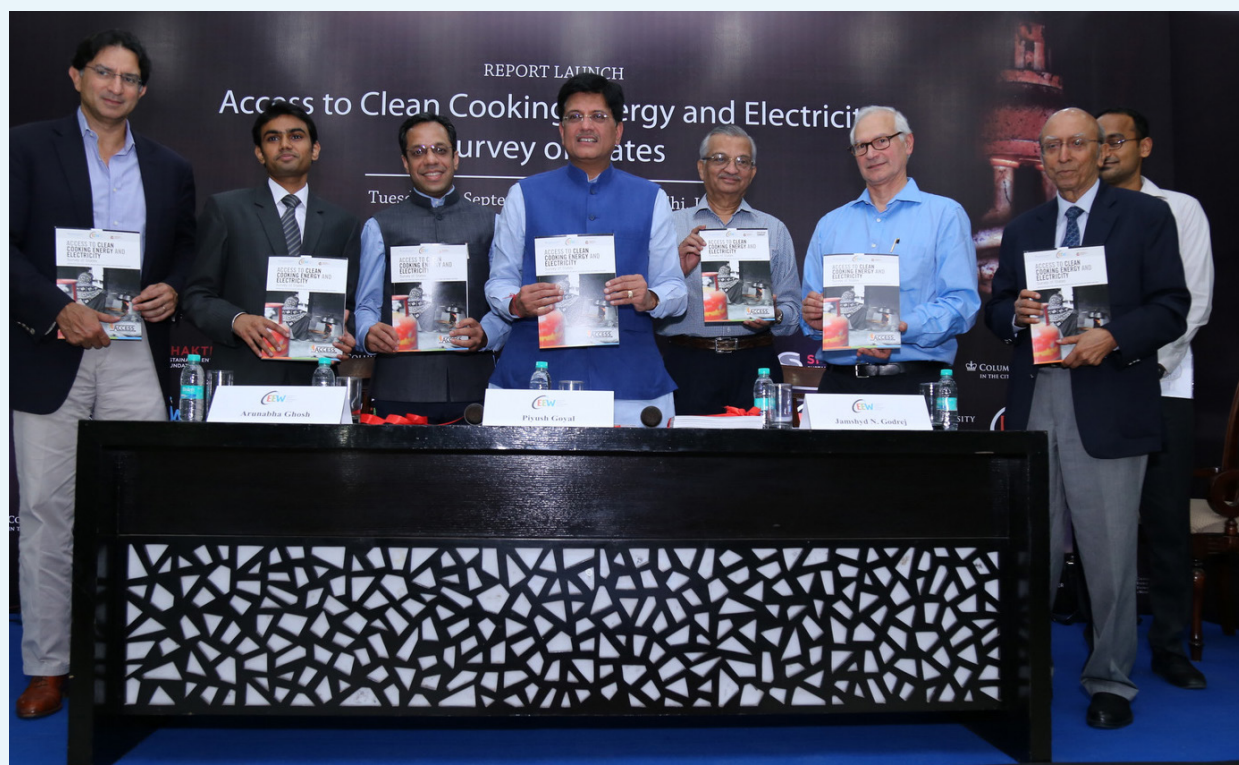
to enforce contracts that are fair to all parties, where the electricity supply from distribution companies is set at a minimum guarantee. This would help franchisees in distributing reliable power and in improving their financial health. Alternatively, they could be allowed and incentivised to generate locally and feed the excess into the grid, which will also ensure adequate supply, maintenance services and high billing and collection efficiency.

Conclusion

While Odisha has certainly shown good progress to provide electricity access for its people, there are a few key areas for intervention that could cover greater population and improve reliability and quality of power. ACCESS shows that majority of unelectrified households live in electrified habitations, and this

presents a unique opportunity to scale up the rate of electrification. The insights presented here drive the need to view energy access from a multi-dimensional perspective, and for going beyond connections. The high prevalence of 24-hour black-outs in certain districts calls for the need to improve maintenance services, while the low voltage spells ask for better demand forecast and power procurement by distribution companies. Lack of awareness about the prevailing tariff of electricity also appears to barrier to realising 24x7 power for all. As the state strengthens the grid network further, it is imperative to complement it with improved maintenance, higher energy procurement, and integration with decentralised energy solutions to provide reliable and high-quality electricity access to all.

About the ACCESS study



The Access to Clean Cooking Energy and Electricity – Survey of States (ACCESS) is India's largest energy access survey, covering more than 8500 households, 714 villages and 51 districts, across Bihar, Jharkhand, Madhya Pradesh, Odisha, Uttar Pradesh and West Bengal. The ACCESS study was published in collaboration with Columbia University in September 2015. Shri Piyush Goyal, former Minister for Power, Coal and Renewable Energy, released the study. The ACCESS study found that despite 96% of villages electrified, only two-thirds of rural households had a connection and only half of them received more than twelve hours of power a day.

Meet the authors



Abhishek Jain is a Senior Programme Lead at the Council on Energy, Environment & Water (CEEW) and leads the council's research and work on 'energy access'. His research focuses on energy provision and use for households, community, and productive applications, fossil fuel subsidies reform, and circular economy. With close to seven years of professional experience, Abhishek has worked on multiple issues at the confluence of energy, economics, and environment. He holds an MPhil from University of Cambridge and an engineering degree from IIT Roorkee.



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