The Current Situation of Electricity Accessibility in India: Analysis of the India Residential Energy Survey (IRES) 2020

Mohd Arif

Abstract: ***The India Residential Energy Survey (IRES) 2020 investigated current electricity situation in India and point up the challenges that need to be solved to ensure reliable and affordable electricity supply for everyone. After implementation of Saubhagya scheme almost all households in India got electrified, only 4% households are remained to be electrified. So, for electrifying houses in remote rural areas, the government should continue to do efforts in this area. Survey found that in all electrified houses only 58% houses get 24x7 electricity, so there is improvement needed for making availability of electricity 24x7. In survey it is found that 63% houses are getting bills on regular basis and 38% of the houses reported that they are getting inaccurate billing or they are having faulty meters in their home. Among the houses which are getting bills, only 76% pay it on time, so there is a loss of discoms. So continued efforts should be taken for addressing these challenges. For providing 24x7 supply, there is a need of infrastructure in rural areas. And discoms should improve their metering and billing for getting payment on time so that they can generate revenue and improve their financial health. In conclusion, the IRES 2020 provides important insights into the situation of electricity accessibility in country and point out the need for continued efforts to improve access and making discoms profitable. It is critical to ensure that all households have access to reliable and affordable electricity supply, which is essential for improving their quality of life and productivity and driving economic growth in the country.***

I. INTRODUCTION

For economic and social development of any country electricity access is a crucial factor [1]. In our country, in recent years remarkable progress happened in electricity access. 87% Indian households have access to electricity according to IRES 2020. Yet there are many regions in which there is no access to electricity in country. So, in this article, we will try to examine the situation of electricity access in country based to IRES 2020. The results of this survey showed that 97% houses in urban areas have electricity access but only 78% of houses in rural areas have access to electricity. This situation of electricity access becomes even more critical when we consider lowest income households. Apart from the electricity accessibility in India there is also problem in quality of supply like voltage fluctuation, unreliable supply, frequent power outages. The survey results also showed that the houses which don't have access to electricity, they have to rely on polluting and inefficient sources of energy like kerosene and biomass for lighting and cooking. So, there should be continued efforts to provide reliable and clean access of energy to all houses in country. India's power sector is an essential component of its growth trajectory as India is one of the booming economies across globe [2]. Rural India electrification is a crucial aspect of government to provide reliable supply of electricity to the country. Major role is played by Saubhagya scheme in providing electricity access to millions of houses in the country. But, accessibility of electricity is only the first step for ensuring reliable service of electricity. To check the condition of electricity in country, CEEW administrated 2 successions of surveys in country's 6 energy poor states. As the population is huge in country so it is very important and crucial to ensure that metering, billing and collection (MBC) should be on time. It helps discoms in generating revenue and improving financial health. So, there is a need of checking the ground reality of situation of electricity accessibility in country and find out the gaps that need to be addressed. As our country in on the path of development in coming decades, so country's power sector will play an important role. Therefore, addressing all these issues is very important. For meeting country's development goals, the availability of reliable electricity is essential. And it is important to solve issues in electricity accessibility to ensure country's growth trajectory is sustainable.

II. SURVEY DESIGN

The IRES 2020 survey is conducted across country which includes 14,850 houses. Survey covers 152 districts of 21 states including national capital region of Delhi in which approximately 97% India's population reside. So, this survey is a nationally representative survey.

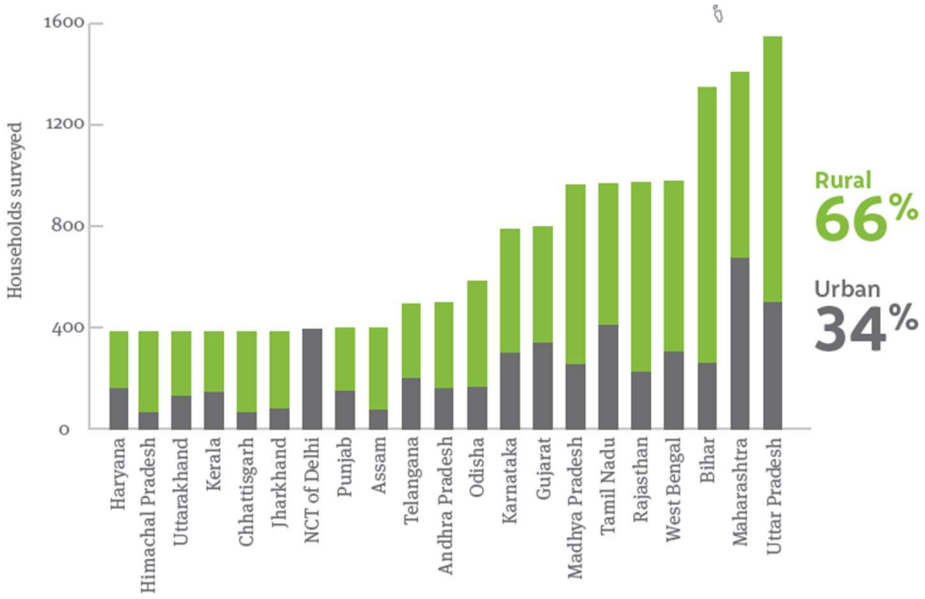

Fig.1: Share of rural and urban in survey data

III. IS THE HOUSEHOLD CONNECTED TO THE ELECTRICITY GRID?

Electricity access is very important for millions on Indians who rely on it for their daily life needs like lighting, livelihood etc. Scheme launched by government of India, Saubhagya provided 26.3 million connections at subsidized rate or at free of cost. According to the government data, all willing consumers got electricity connection in their home till March 2019. But there is lack of ground report of electricity accessibility in rural India indicating how many houses are still unelectrified in country.

3.1 How many houses are having grid connection:

According to Survey data 96.7% of houses are connected to grid, and 0.33% having off-grid setups. While more than 99% of urban homes have electricity, only 96% of rural areas have access. 2.43% of households are still unelectrified, with the majority located in rural areas. Assam, Andhra Pradesh, Himachal Pradesh, UT-Delhi, Kerala, Punjab, Maharashtra, and Telangana's all houses are connected to grid, while in Rajasthan, Chhattisgarh, Haryana, and UP there are more 4% houses which are not having electricity. Further efforts should focus on these states to fill the electrification gaps.

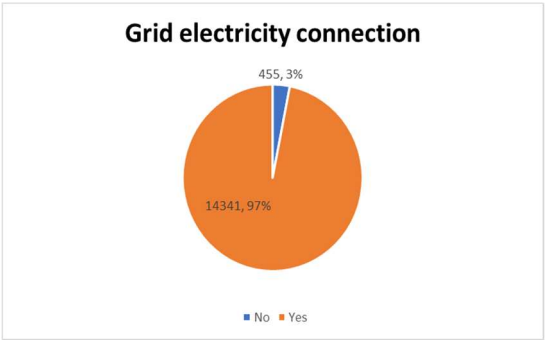

Fig.2: Share of household having grid connection

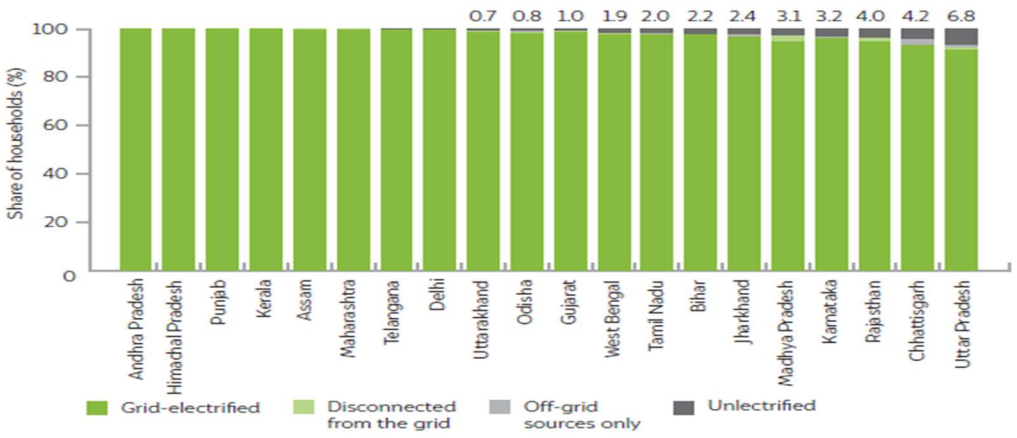

Fig.3: State wise electrification rate

3.2 What are the reasons for some households in India remaining without electricity?

Although, government is trying hard to give electricity access freely to every single household in the country by the schemes like Saubhagya but some consumers are still not able to access the electricity due to lack of awareness and not able to pay the bills on time. Some consumers got their connection disconnected as they were not able to pay huge amount of accumulated money due to non-providing of electricity bills on time by discoms. And some households have not got connection as their application are under process.

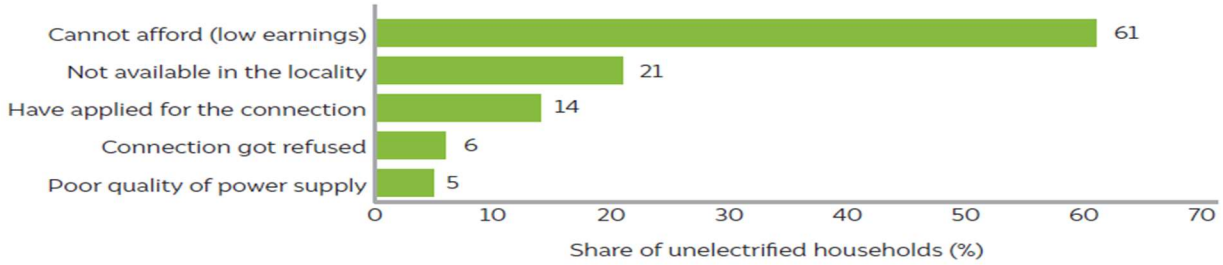

Fig.4: Reasons of not having grid connection

Some areas in rural districts don't have access to electricity till now. The houses which don't have electricity access are multidimensionally poor. So, government should provide electricity to these houses at a very low cost.

3.3 Exploring the steps taken towards achieving universal electrification for all households:

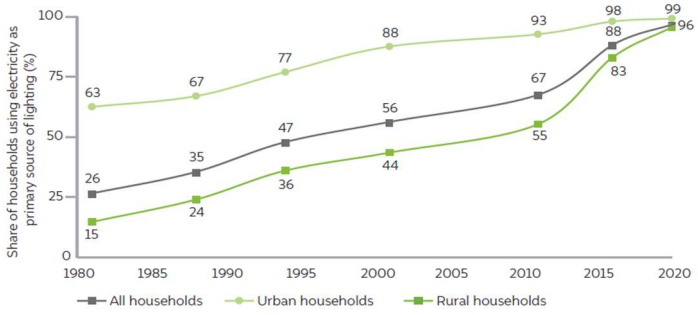

Fig.5: Journey of electrification

Till 1981 only 15% houses have grid connection in rural area and 63% houses have connection in urban area. At that time electricity in rural area was mainly for irrigation. But after that government focuses on electrification of houses also in rural areas [3]. Two schemes boomed the rural area: Rajiv Gandhi Gram Vidhyutikaran Yojana (RGGVY) which was launched in year 2005 and which is now known as under Deen Dayal Upadhyay Gram Jyoti Yojana. And the second one is Saubhagya scheme which is launched in year 2007. In last two decades approx. 800 million Indian houses came out of darkness. By achieving these goals India also going closer to SDG-7 of United Nations.

3.4 Possible solutions:

India achieved near-universal household electrification, but the remaining 2.4% of unelectrified households are mostly in rural areas, and socio-economic assessment shows they are multidimensionally poor, hence proposing actions to achieve universal electrification.

- To achieve universal electrification in India, the government needs to identify unelectrified households and provide them electric connection or off grid setup like solar home systems. Targeted efforts are required to address infrastructure gaps and documentation challenges, especially in remote areas with concentrated unelectrified households.
- There should be provision of ultra-low tariff plan for poor families. As it is found by survey 0.5% houses was unable to continue connection because they were not able to pay bills on time. This issue rises in great extent during Covid period. So government should make policies in accordance to these problems.

IV. IS THE AVAILABILITY OF ELECTRICITY 24X7?

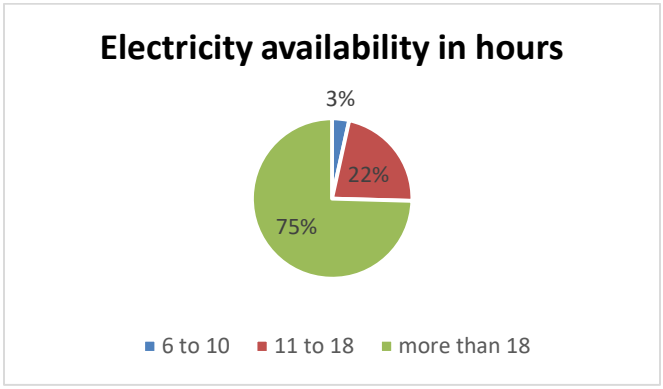

Fig.6: Availability of electricity in households

4.1 How many hours electricity is available?

Indian houses get approx. 20.6 hours of average electricity in 24 hours, but with significant variation across states. Delhi, Gujarat, Kerala, and Tamil Nadu get largest duration of electricity, while Uttar Pradesh, Jharkhand, Assam, Bihar, and Haryana experience the most prolonged power cuts. Earlier in 2005 these 6 states get approx. 12.5 hours electricity but this is improved to 18.5 hours in 2020. However, houses get less supply duration than observed at feeder, indicating a need for granular monitoring and transparent reporting.

4.2 Frequency and predictability of power cuts:

Discoms may have to undertake load shedding for maintenance work, and utilities are expected to inform consumers in advance. Only 24% of households receive prior knowledge about power cuts, mostly in states with low power cut durations. Power outages are unpredictable for most villages and towns, with almost 2/3 of rural areas and 2/5 of urban houses experiencing daily cuts. Only a small percentage of households receive almost uninterrupted supply.

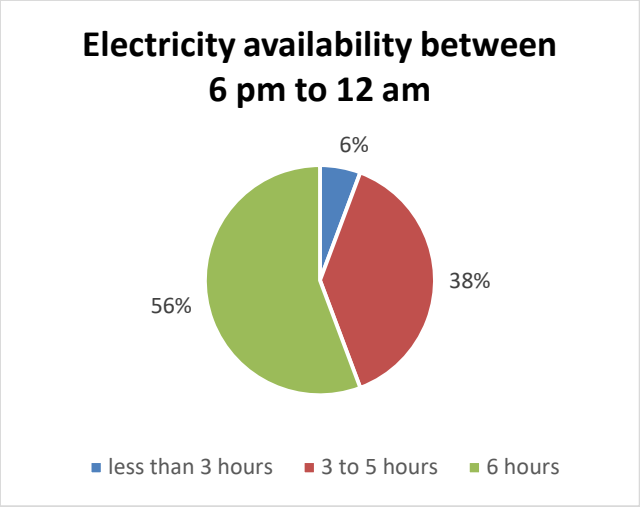

Fig.7: Availability of electricity in evening hours

Rural households face frequent power cuts in evening, out of which 50% experience it per day. Urban households, on the other hand, mostly enjoy an uninterrupted power supply during the evening.

4.3 How do consumers react to power supply disruptions?

In our country, consumers faces various issues on supply side like voltage fluctuations, blackouts, unreliable supply etc. Discoms should follow mentioned Standards of Performance (SoPs). Discoms should pay to consumers if they are not able to fulfill SoPs. Kerala is highest in complaints of 13 % . As it may be a result of education level of state. And those consumers are aware of their rights. So consumers should be aware of their rights and Sops. So that they can use get an access of electricity and hold discoms accountable for meeting the SoPs.

4.4 Possible solutions:

Although, country boomed in electrification rate but supply related issues like disruption, reliability is yet need to be addressed. Government is continuously trying to solve these issues.

- Monitoring of supply should be done continuously. It is recommended that upcoming schemes include provisions for funding disbursals aimed at enhancing metering and improving the quality of electricity supply.
- To address the low number of consumer complaints related to supply quality issues, it is necessary to educate consumers about their rights to register complaints and enforce the specified Standards of Performance (SoPs). However, consumer activism alone is not enough to solve the problems of supply quality. It is also important to ensure strict regulatory compliance by State Electricity Regulatory Commissions (SERCs) through penalties on discoms for violating SoPs. SERCs should pay automatically to consumers without waiting for consumer complaints, to ensure compliance from discoms. This would streamline discom operations and improve supply quality.

V. ARE HOUSEHOLDS RECEIVING REGULAR METER READINGS AND BILLS?

Discoms in India are facing grave financial torment because of respite in metering the consumers, billing them and collecting the bills, which has led to a significant increase in the overall technical and commercial losses (AT&C). In last 3 years 10% connections made the condition very bad. Discoms are facing high costs in procuring electricity and not getting bills from customers. Prompt realization of revenue from billed consumers is essential to support needy consumers by way of subsidies. Technology can be used to address MBC challenges effectively.

5.1 An assessment of metering household consumption reveals both progress and gaps:

Metering is important to keep track of how much a consumer is consumed and how much he has to pay for it.

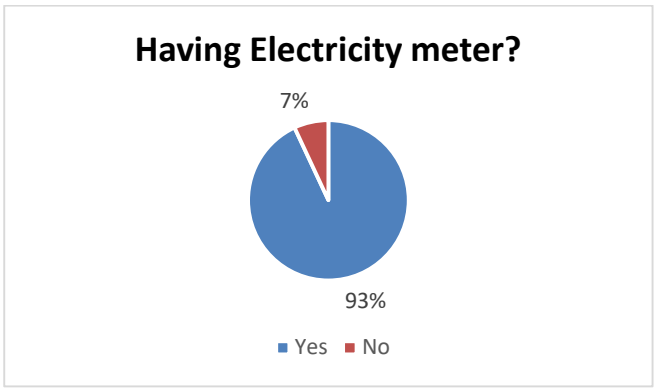

Fig.8: Share of household having electricity meters

In India 93% houses are connected to grid, but gaps in metering still exist, particularly in rural areas. Newly electrified households may not have installed or activated meters, which results in non-profit generation for discoms. There are different metering rates across country, with Jharkhand and Madhya Pradesh having lower rates. Metering all electrified households is crucial to alleviate commercial losses of discoms and make customer to trust in billing.

5.2 Billing the meters and how regularly they are billing:

Usually, discoms are unable to bill the consumers regularly which make them got loss. In India 91% houses are billed on the regular basis, 4% on irregular basis while 5% have never received a bill despite using electricity for over a year. Billing irregularities are mostly arising in rural India, where 13% consumers never received a bill or get it on very irregular basis.

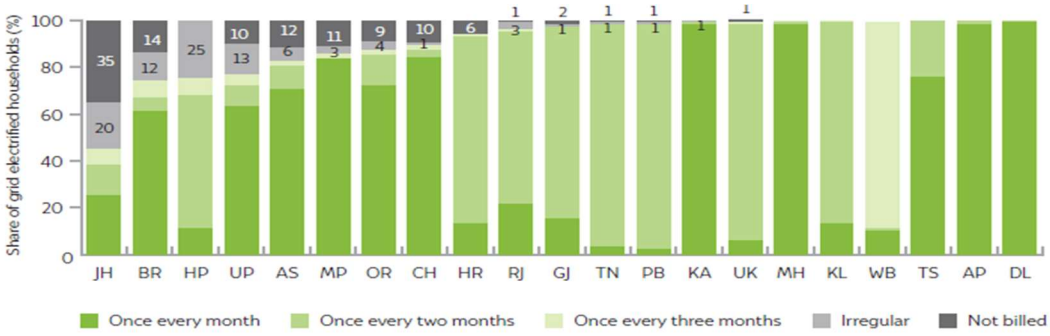

Fig.9: Electricity billing frequency

5.3 What is the perception of consumers regarding prepaid meters?

Prepaid electricity meter has been regulated in several states in India and are being considered for universal deployment in the future. They require consumers to buy electricity in advance, allowing them to control and monitor their electricity expenditure. By doing this liability of paying is shifted to consumers itself. But only 10% customers have heard about prepaid meters. So, we have to make consumers aware about these meters.

5.4 Possible solutions:

In India, despite significant progress made in metering domestic consumers, gaps still persist particularly in states with high AT&C losses.

- To tackle the issue of timely billing, discoms in India should make billing system regular, So that discoms can get revenue on a continuous basis.

- Distribution companies in India should provide consumers with multiple convenient payment options, including digital payment methods, especially in areas where traditional payment methods are not easily accessible. They can also leverage microentrepreneurs and alternative approaches, to improve billing and revenue collection.

VI. WHAT IS THE LEVEL OF SATISFACTION OF ELECTRICITY CONSUMERS WITH THE SERVICE?

The article discusses about how much consumers are satisfy with connection and what are their perception. It emphasizes that customer satisfaction is crucial for the success of any service provider, including electricity providers.

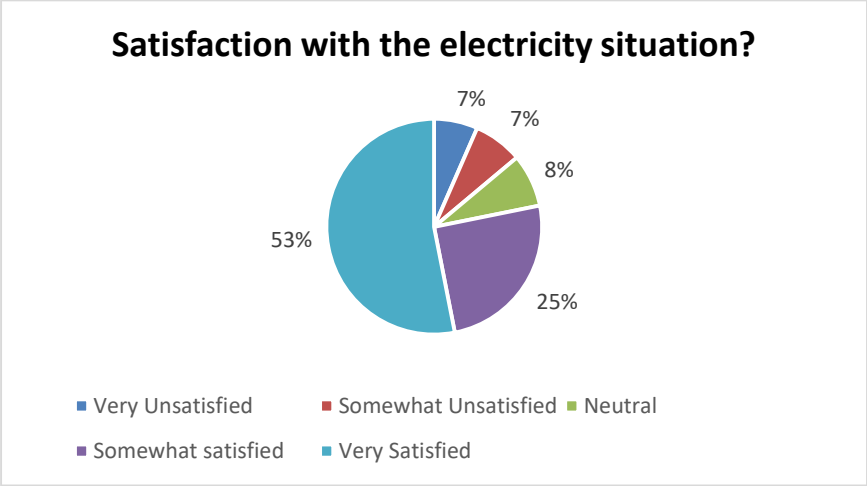

Fig.10: Satisfaction level of consumers

6.1 The satisfaction level of households with their grid electricity connection:

The survey conducted shows that 77% of grid-electricity users in India are satisfied with the electricity service provided by distribution companies, reflecting the improvement in services. Rural consumer satisfaction has risen from 26% in 2015 to 71% in 2020 in the 6 states. Top states with high satisfaction levels have less than 2 hours of power outages. Kerala, with good power supply, has only 60% of satisfied households, reflecting the subjective nature of consumer satisfaction influenced by cultural norms and other service-related factors.

6.2 Factors influencing customer satisfaction with grid-electricity services:

The duration of electricity supply is strongly linked to household satisfaction levels with the probability of satisfaction increasing as supply hours increase. Regular billing is also a significant predictor of consumer satisfaction, as irregular billing can result in accumulated charges that becomes burden on consumers.

6.3 Possible solutions:

Efforts to improve electricity services have led to high levels of consumer satisfaction in India, but factors such as duration of supply, reliability of supply and regularity of billing are major components of checking the satisfaction of consumers.

- To improve household satisfaction with electricity services, distribution companies should provide uninterrupted supply and supply should be reliable. These efforts would make discoms more user-centric and increase consumers' willingness to pay for electricity.
- To ensure customer satisfaction, Discoms should regularly evaluate the levels of satisfaction and related supply variables. Regulators should mandate discoms to assess customer satisfaction periodically to better understand how improvements in supply affect consumer behavior and expectations.

VII. CONCLUSION

The IRES survey conducted in 2019 found that India had achieved near-complete electrification, but the COVID-19 pandemic and economic slowdown have impacted power consumption. 2.43% of households in rural northern and central India still lack access to electricity. To sustain support for deserving poor consumers, budgetary support is necessary. Supply hours have improved in rural areas, but outages during peak demand suggest more needs to be done. Discoms should focus on maximizing revenue, investing in infrastructure, and reducing technical losses to improve operational performance. The article discusses the issues of reliability of electricity supply and quality in India. There should be installation of prepaid meters. Distribution companies should focus on providing continuous supply and they should also keep an eye on reliability of supply. Distribution companies should make bill payment methods easily accessible. Distribution companies should promote online payment. They should incentivize the consumers who are making online payment. Discoms should follow SoPs. The proposed reforms in the Electricity Act Amendment Bill (2020) aim to increase accountability, but may come at a higher cost. Future studies will focus on improving energy efficiency and determining deserving beneficiaries for subsidies.

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