



SmartPowerIndia

August 2020

SMART POWER

CONNECT

Empowering Rural Communities & Transforming Lives

**Ensuring Universal
Electricity Access**

Five Stitches in Time

**Advanced Energy
Storage and Mini-Grids**

FROM THE CEO'S DESK

The Last Mile in Rural Electrification

Jaideep Mukherji
Chief Executive Officer,
Smart Power India

In the last couple of years, India has made phenomenal progress in the arena of rural electrification, achieving universal electricity access in 2018. This was catalysed to a great extent by the Saubhagya scheme of the Indian government, and acknowledged even by the International Energy Agency as one of the biggest successes of the year. This achievement catapulted India to the third position globally in electricity production and led us to achieve 100% electrification of households in 2019. Although poles and wires have reached the last mile, the same may not be said for a reliable supply of electricity. Shorter hours of power supply, frequent power cuts and voltage fluctuations have plagued rural India for a long time. Added to that is poor customer service, which includes inaccurate and untimely billing. This pushes many rural households, small enterprises and those engaged in agriculture to opt for alternative sources like the costlier-yet-reliable diesel generators. The time has come for India's rural electrification narrative to shift from mere access, to the quality of power and customer service. And there's no better time than now to bring the customer into the centre of the redressal efforts to bring about reliable electricity access and improved customer satisfaction.

To address these problems, the state-run DISCOMs need to strengthen distribution networks, ease the process of getting electricity connections, increase metering and regularize billing & collection schedules. Second, low-cost, abundant and non-conventional energy models like sunlight, water and wind can be harnessed to supply reliable electricity to rural households and micro-enterprises. If incentivized through policy support for generation and distribution of electricity, these models can be deployed in the country's remotest corners. Third, the integration of main and mini-grids can be a win-win for both customers and the electricity supply system. Finally, the models for rural electricity service and delivery should be sustainable, scalable, and market-based; and be able to engage private sector companies based on principles of true partnerships such as shared risks and gains.

When the Covid-19 pandemic struck, what came to the forefront was the indispensable role of electricity in our lives. In this young, still developing nation where two-thirds of the population still lives in villages, the lockdown tested not just our economic resilience, but also exposed the growing urban-rural divide and income inequality. And it is rural households without electricity access who most often bear the brunt. Inaccessibility and lack of power supply hampers the government's communications with its people. From this scenario emerges a clear direction that the rebuilding exercise should begin in rural India, where 'the soul of India lives', as Mahatma Gandhi said.

Research data from around the globe has shown a direct correlation between a country's electricity consumption and economic development. This means that reliable electricity can power India's rural economy in multiple sectors like healthcare, agriculture and micro enterprises. While the healthcare sector can be modernized with state-of-the-art infrastructure like uninterrupted power supply, agricultural productivity can be increased by using power to support critical functions. Reliable power also encourages the creation and expansion of small businesses, as is evident in villages with reliable electricity supply.

Apart from this, we've also hit a point where it is necessary to move away from traditional distribution models and develop an alternate distribution model with a customer-centric approach. We've started building momentum in this direction, and are already working with some state governments on alternate models through our Energy Service Framework (ESF) initiative.

This issue of Smart Power Connect primarily showcases alternate models of distribution on the work done by SPI under its ESF program. We are also grateful to our partners and experts in the sector for sharing with us their valuable insights and experiences. With their support, we have been able to stitch together a compelling narrative around rural electrification in India and its direction ahead.



POWERING THE FUTURE

It's a bright, sunny morning in Rajpur, Patna. Blue uniforms gleam atop lush green fields surrounding Bihar Public School. It is recess time. Mr. Shivshankar Yadav, Principal of Bihar Public School, recalls a time when a serial called "Krishna" would air on the television at 9 O'clock every Sunday, for an hour. And this was the exact hour of power cut. He remembers fidgeting around for a battery to run the television, as they did not want to miss the episode. Back then, people rearranged their daily schedules and lifestyles in accordance with the limitations of the power supply.

But today when he looks out at the children playing in the school's playground, he knows it's a different future they will inherit. His school was a launching pad for young dreamers. For long years, the children at BPS had to suffer the dark, foul-smelling smoke during their classes as they struggled to manage with a diesel generator. The thudding of the generator would overpower even the strongest voices in the classroom, making the classes ineffective. The students wouldn't be able to hear what the teacher taught, and the teachers wouldn't be able to hear the questions the students raised. People in the neighbourhood became reluctant to send their children to this school, and their reasons were valid.

Today, we've come a long way from that scenario. The dark cement hallways have been lit up since Mr. Yadav got an electricity connection for his school in February this year. Wires run over walls inside insulated pipelines; the classrooms are now installed with LED bulbs, and the fans have come as a boon during the blazing summers of July.

Earlier, the diesel from the generator used to cost Mr. Yadav a hefty 17,000 to 20,000 rupees a month, for a run time of 6 to 7 hours a day. Running the school with electricity has brought down the cost to a fraction of this – to just 2000 to 2200 rupees a month. The monetary benefit of this shift is also evident today – while the school earlier struggled to afford fans and lights, they've now been able to set up a computer lab with the money saved.

Word has spread about the changes in the schools. People are more willing to admit their children to this school now. There has been considerable improvement in their academic performance as well as holistic learning. The students are able to concentrate better in class and are more likely to be regular to school.

COMMUNITY VOICES

A HELPING HAND

Dooja is a chirpy 16 year old whose love for birds is quite well known in the village. As we visit her house, the sight of a variety of birds atop the array of wires welcomes us.

On a tour of the house, she proudly switches on the lights to show off various appliances that they own and operate because they now have assured supply of electricity.

But life had not always been this comfortable. Until about a year ago, Dooja's mother was running around trying to rectify an erroneous bill. They received their first electricity bill of 10,000 rupees in February, and subsequent bills of 14,000 rupees and 18,000 rupees, which left Dooja and her family of three, in distress. They barely received any support from the authorities to resolve this.

Then they met eRRF Raunaq Kumar, who assured them that the complaints would be resolved within 2 days. He helped them get their complaint registered and addressed, after which they received a bill of 5600 rupees.

They now receive monthly bills, and the money is collected from them by the e-RRFs. Last month, they received a bill of a little over 200 rupees, which they paid on time. "We are grateful to the e-RRF program for the support," says Dooja.





WELDING OPPORTUNITIES

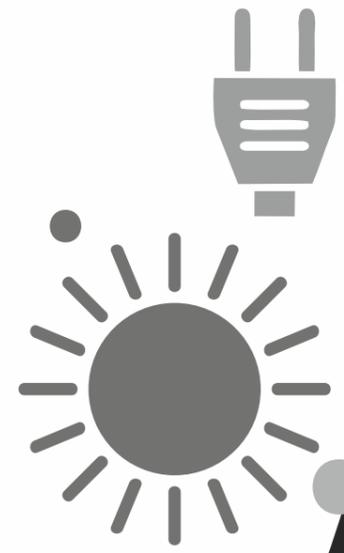
Deokali's local market is abuzz with activity, with all the local traders and shopkeepers busy selling their wares to local residents. Just a few meters into one of these criss-crossing lanes is Rahul Kumar's welding shop.

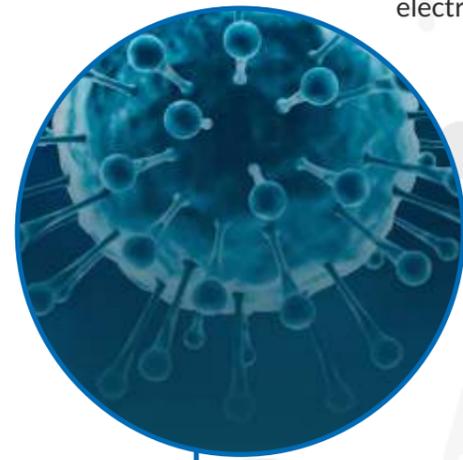
Rahul has been running this shop for about 5 years. The excitement in his voice is palpable when you ask him about the changes that he has witnessed in the past five years. "Business has increased manifold, especially after getting an electricity connection. And I need to pay only pay for what I use," says Rahul, his eyes twinkling.

The power that would have cost him over 6000 rupees per month with a diesel generator now costs him only 1200-1300 rupees. Not only is Rahul better off financially; the voltage is also more continuous and stable, with a greater output than what he could ever achieve with the generator. The supply that could only facilitate 10-15 hours of electricity earlier, now lasts up to 18 hours.

After getting a metered connection with the help of e-RRF* Rajiv, Rahul has managed to double his income. Thanks to the e-RRF programme, Rahul is now aware of how a bill is generated and about the billing and collection process.

The eRRF programme has led to a perceptible change in the perception among the customers towards adopting on-grid electricity.





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IMPORTANCE OF ELECTRICITY DURING COVID-19

In March this year, the pandemic Covid-19 broke out, bringing with it an economically damaging lockdown, with business activities grinding to a halt.

SMART POWER FOR ALL

Over the past decade, India has made remarkable progress in providing universal access to electricity.

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FOCUS ON CUSTOMER: KEY TO EFFECTIVE RURAL ELECTRIFICATION

Under the Central Government's SAUBHAGYA scheme and the State Government's 'Har Ghar Bijli' mission, Bihar has made significant progress in improving rural electrification, connecting over 32 lakh customers between October 2017 and October 2018.



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ENSURING UNIVERSAL ELECTRICITY ACCESS

Ensuring universal electricity access has been a key goal of the government and much effort has gone into realizing this.

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LISTENING INITIATIVE AIMED AT UNCOVERING VULNERABILITIES FOR OFF-GRID CUSTOMERS

Those are the opening lines of the "Electrifying India" chapter of the Solvable documentary short film produced by The Rockefeller Foundation.

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SPI IN ACTION

SPI launched the *Mini-Grid Handbook: A Business Guide for Developers and Investors* at the 3rd ARE Micro-Grid Workshop in Bengaluru, India on November 28, 2019.

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HOW A MORE INTEGRATED APPROACH COULD HELP END ENERGY POVERTY

With almost four years completed since the United Nations adopted the 2030 Sustainable Development Goals (SDGs), we face a narrowing window of opportunity to mobilize disruptive solutions and ambitious partnerships needed to bend the curve and improve the lives of billions within that timeframe, or indeed sooner.

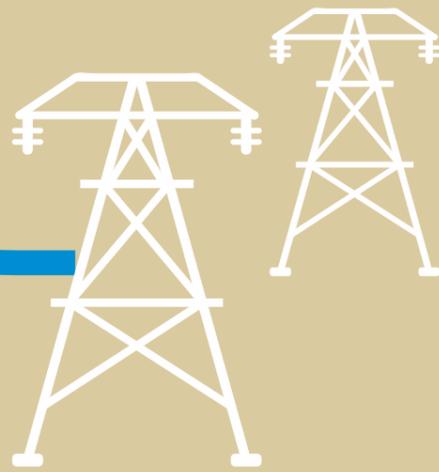
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ADVANCED ENERGY STORAGE AND MINI-GRIDS

While mini-grids were once thought of solely as a concept to power remote areas in rural villages or islands, it has generated new found interest in recent years.

INSIDE

THIS ISSUE



SMART POWER

The Journey so far



BIHAR



ODISHA

Impacts



Rs 8 Crores added to Govt Discom revenues per annum.



Electricity losses reduced by 8%



Over 350 enterprises connected to grid



Over 1500 households connected to grid



2500 kW customer load added to grid

MINI GRID



187

UTTAR PRADESH



73

BIHAR



40

JHARKHAND



Impacting the lives of 2,49,777 people



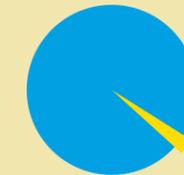
300 plants running across Uttar Pradesh, Bihar and Jharkhand



29,312 Total customers



9.2 MW Overall installed capacity



97% plants use solar energy

3% use biomass or solar/biomass hybrid technology



over **1200** MT of CO² emissions reduced per year: Reduction in carbon foot print



6,50,000

Lives impacted



1,30,000

End users



Over **12,000**

Paying customers



660

Villages electrified



19,045

Households



8,371

Shops



1,689

Commercial users & micro-enterprises



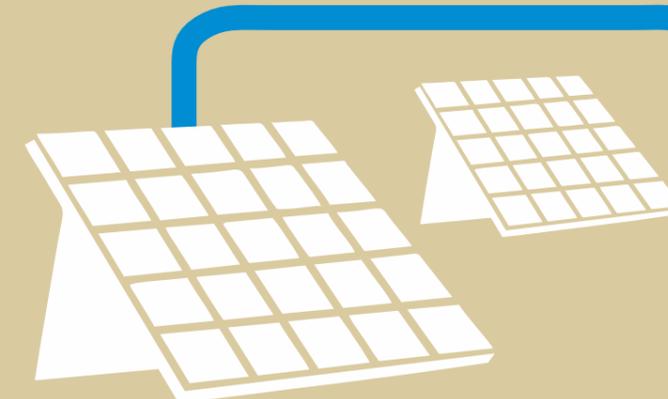
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Telecom towers



75

Institutions



*as on July, 2020

ESF



IMPORTANCE OF ELECTRICITY DURING COVID-19

In March this year, the pandemic Covid-19 broke out, bringing with it an economically damaging lockdown, with business activities grinding to a halt. Shops and commercial businesses were completely shut, even as there was mass migration of the unskilled and semi-skilled labour force from urban centres back to their homes in rural areas. The essential services that were permitted experienced low inventories and supplies due to disruption in logistics. Yet, amidst all this turmoil, what shone through clearly was the central role that electricity plays in our lives. It is with electricity that we still keep the lights on in our homes and essential establishments. With people being confined within the four walls, it is electricity that is holding us together and supporting our key functions - whether economic activities or virtual social engagements. Inaccessibility and lack of power supply, in fact hampers the government's communication with its people. Ensuring reliable electricity supply is vital during this time, and brings our attention to the many different initiatives, models and experiments that have helped to keep it going. Some of the models and systems that have played a key role in ensuring uninterrupted electricity supply include mini-grids, sustainable distribution models and alternate energy distribution frameworks.

Mini-grids, for example have been instrumental in ensuring universal electricity access in rural areas and function where main grids are non-existent or may only be partially operational. Mini-grids have been used to improve the reliability of electricity supply owing to their smaller scale and local-level operations, which have proved to be an advantage. SPI's mini-grids, for example, supply electricity to nearly a quarter of a million rural people (245,000) in the states of Bihar, Uttar Pradesh and Jharkhand. Several small and medium entrepreneurial activities like water treatment units, oil expellers, rice hullers, irrigation pumps, atta chakkis (flour mills), pulverizers and milk chillers have been supported through supply from these mini-grids.

Despite the challenges that the Covid-19 situation posed, this is also an opportunity for the mini-grid sector to build resilience in the short and long term. To achieve this, customer needs have to be given centre-stage. In SPI mini-grid villages, plants continued to remain operational despite a dip in electricity demand by 30%, as well as low cash flow among the customers who also grappled with depleting incomes. Connecting with the customer through carrying out a survey helped SPI not only profile its customers, but also understand the impact of Covid-19 lockdown, and study the impact on cash flow among the various mini-grid consumer segments. The findings revealed that 8 in 10 respondents had been negatively impacted by the lockdown and three-fourths of them experienced low cash flow. These findings helped SPI to develop an operations strategy with customer needs at its core. The immediate or short-term strategy to help minimize the impact of Covid-19 was to keep a majority of the plants operational, ensure safety of the ground team, keep up continuous communication with customers, ensure reliability in electricity supply and reduce diesel expense. On the supply side, SPI will enable the ESCOs to maintain operational stability and implementing one-time tariff discounting vouchers, details of which are worked out after a thorough study of the financial situation of the various customer segments. These strategies will enable the mini-grids to bounce back once the situation returns to normal.

Covid-19 also brings to light the need for combining best utility practices with the past experiences of DISCOMS. While most DISCOMS operate at a loss or very thin margins even as they are supported by government measures, customers on the other hand experience unreliable electricity supply with interruptions of power cuts and low voltage. This in turn leads to power theft and payment defaults, further deteriorating the financial situation of the DISCOMS. For this, the DISCOMS first invest in the grid network to improve reliability and quality of electricity, resulting in customer confidence and willingness to pay. Creating a successful model also demands going the extra mile when it comes to customer engagement. In SPI's model electricity distribution zone in the Paradip Electrical Division in

Orissa, SPI created a customer redressal system and built sensitivity among customers about electricity even through the Covid situation. Needless to say, business continued seamlessly with the ground staff being provided with all material required for preventive protocol. These efforts paid off – the DISCOMS were able to considerably increase their revenue.

We have also reached a point where we need to shift away from traditional distribution models and develop alternative distribution models with a customer-centric approach. Business models that put the partnership between DISCOMS and Energy Service Providers at its core are more likely to meet the objectives of customer satisfaction, electricity access, reliability, quality, efficiency and sustainability. Gaps of the past can be addressed by focusing on creating the right governance mechanisms, putting in place financial incentives, and having a standard set of regulatory and operating practices.

SPI has started working in this direction with some state governments on alternate models through its Energy Service Framework (ESF) Initiative, which is a set of three standard business models. Its first objective is Customer Service Delivery, which results in increased billing and collection efficiency for the Discoms, leading to increased revenues. The second model, which is distribution supply, provides customers with uninterrupted supply of reliable electricity, timely billing through metering and focused complaint resolution mechanisms. This reduces the AT & C losses, which in turn enables commercial viability. For the government, this increased efficiency also leads to tariff optimization and reduction in subsidy for the government. It also brings in higher revenues for the electricity service providers. The third model is the Distributed Energy Resource, which provides additional flexibility to the electricity service providers to draw from distributed energy resources to ensure uninterrupted electricity access to households even in far-flung areas. Designing such balanced, risk-sharing and comprehensive frameworks can go a long way in ensuring reliable electricity supply at all times.



SMART POWER FOR ALL

THE ENERGY SERVICES FRAMEWORK: A WIN-WIN FOR ALL STAKEHOLDERS

Over the past decade, India has witnessed remarkable progress in providing universal access to electricity. The journey started with the electrification of villages through the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY), followed by a strengthening of the rural electrification infrastructure for household electrification through Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY-2015). This culminated into achieving universal household electrification in the country by providing last-mile connectivity and electricity connections to all rural and urban poor households through the Saubhagya program in 2019. During this period, India not only ensured universal electricity access but could also tide over the electricity supply deficit, increasing daily hours of supply to 16-20 hours in rural areas. India has now embarked on achieving the aim of “24x7 Power for All” with a commitment to improving the quality of life of its citizens through availability of electricity.

However, the government’s plan to provide “24x7 affordable power for all” faces a significant hurdle, i.e. to ensure the commercial sustainability of providing electricity in rural areas. Despite significant progress in the last-mile electricity access, the DISCOMs continue to reel under severe financial stress. They face issues such as low bill collections in rural areas, high power purchase cost, inadequate electricity tariff hike and delayed subsidy disbursement. In response, most DISCOMs have been caught in the dichotomy of addressing only business viability, without focusing on the needs of the end-customer. This impacts the quality of service delivery to rural consumers.

IMPROVING BUSINESS SUSTAINABILITY: A MIXED BAG!

Many initiatives in the past have addressed the commercial viability aspect of last-mile rural service delivery in order to improve its efficiency. These initiatives have been carried out either through private sector intervention such as privatizing the state DISCOM, or through public-private partnerships with a private distribution franchisee. It has also taken the form of program-based intervention by the state-owned utilities themselves. These initiatives however have led to mixed outcomes.

DISCOMs in the states of Gujarat, Karnataka, Uttarakhand and Andhra Pradesh/Telangana have been able to resolve this dichotomy mainly due to the favourable socio-economic profile of its customers and with government and regulatory support. These states have a relatively higher industrial customer-mix and better prosperity indicators, which support the DISCOMs' viability.

The states of Delhi and Odisha opted for outright privatization of the electricity distribution sector. Delhi has been a success story mainly due to support from the government in the form of transition financing, a healthy mix of high-paying consumers, and sufficient baselining. In Odisha, privatization achieved limited success due to inaccurate baselining of techno-commercial parameters, abrupt withdrawal of subsidy during the transition period, and lack of flexibility in program-based interventions.

Other states like Rajasthan, Uttar Pradesh, Maharashtra, Madhya Pradesh, Bihar and Meghalaya have opted for a PPP model enabled through the appointment of distribution franchisees, again with mixed success. The success of the franchisees has hinged on sufficient risk-sharing-mechanism between parties, accurate base-lining of techno-commercial parameters and a 'true partnership' between the private player and the DISCOM.

But it is pertinent to mention that none of the current models fully achieved the dual aim of enhancing electricity service to customers, while ensuring the viability of the last-mile service delivery..

NEED FOR A CUSTOMER-CENTRIC APPROACH IN LAST-MILE SERVICE DELIVERY

Clearly, there is a need to develop a consumer-centric approach. A framework has to be built based on past learnings to ensure both commercial sustainability of the DISCOM as well as providing affordable power supply to all customers. Recent initiatives of the Ministry of Power, Government of India, are also aimed at improving DISCOM viability through a customer-centric approach by leveraging private sector expertise.



ESF: BUSINESS VIABILITY THROUGH IMPROVING CUSTOMER EXPERIENCE

Any consumer-centric approach is based on the following tenets: transparency, equity, accountability and flexibility. Smart Power India's Energy Services Framework (ESF) enables the development of viable business models to address gaps in past initiatives by applying these core principles, enabled through initiatives focused on governance mechanism, financial incentive, policy & regulatory and operating practices.

Smart Power India has designed three standard business models, at the core of which is the partnership between DISCOMs and Energy Service Providers (ESPs). Each model has its own set of performance metrics to enable meeting the laid out objectives i.e. customer satisfaction, electricity access, reliability, quality, efficiency and sustainability.

The first objective of this ESF model - Customer Service Delivery, offers the promise of customer service satisfaction with partial objectives of access, efficiency and sustainability. For DISCOMs, this model results in an increase in billing and collection efficiency leading to increased revenues. For the government, it brings improved efficiency leading to potential tariff optimization and subsidy reduction. For ESPs, it assures revenues with low-to-moderate investments; and for customers, it improves electricity service levels.

The second ESF model, distribution supply, meets the objectives of access, electricity quality, customer satisfaction and efficiency, and also reliability and sustainability. For customers, this model provides an uninterrupted supply of reliable electricity, timely billing through metering and focused complaint resolution mechanism. For DISCOMs, this model results in a reduction in AT&C losses, enabling commercial viability and optimizing the power purchase costs. For the government, improved efficiency leads to tariff optimization, subsidy reduction and expenditure savings to the exchequer, which provides scope for increased budgetary allocation to citizen-centric programs. For ESPs it assures higher revenues and returns potential compared to the first model, albeit with moderate investments.



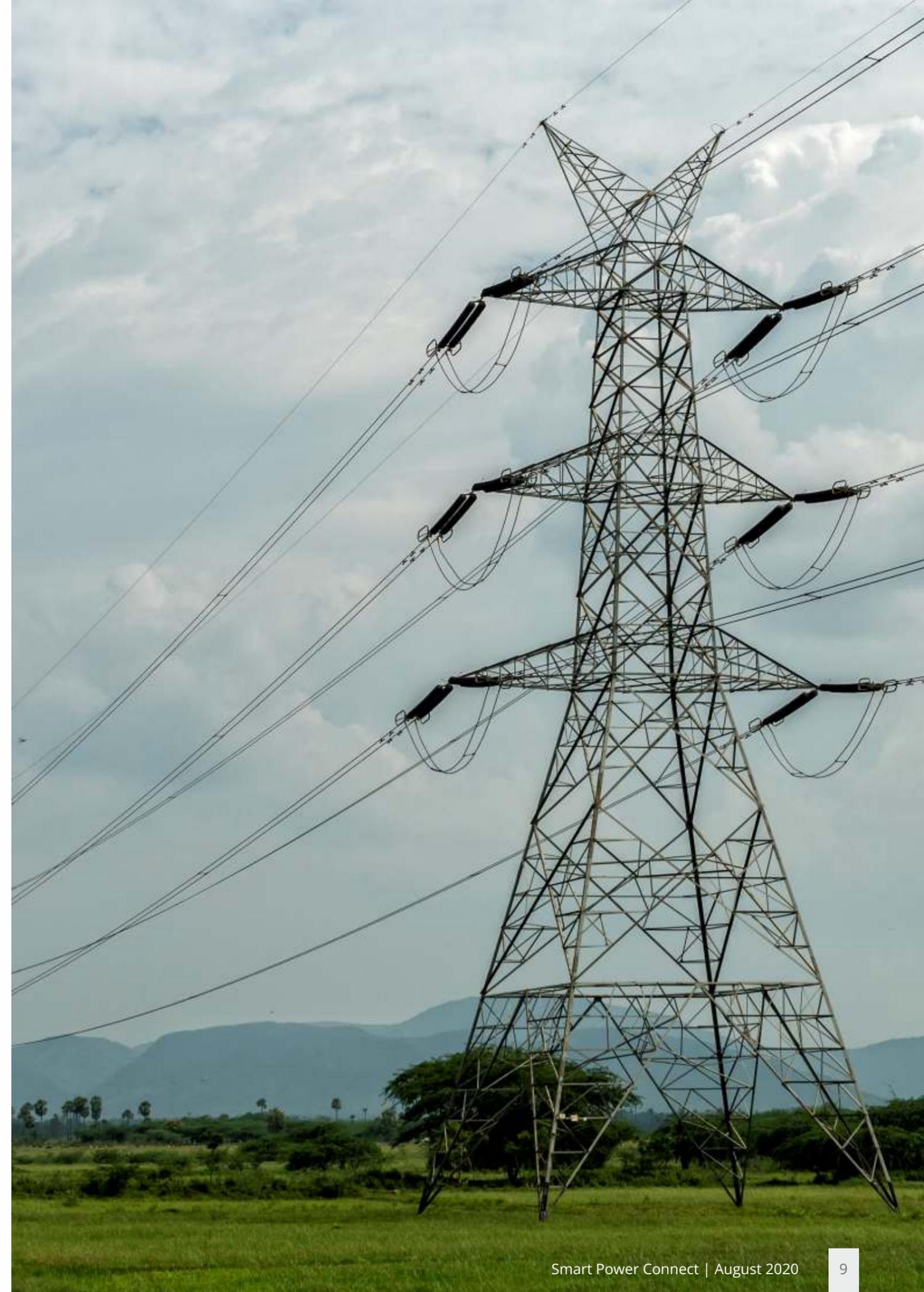
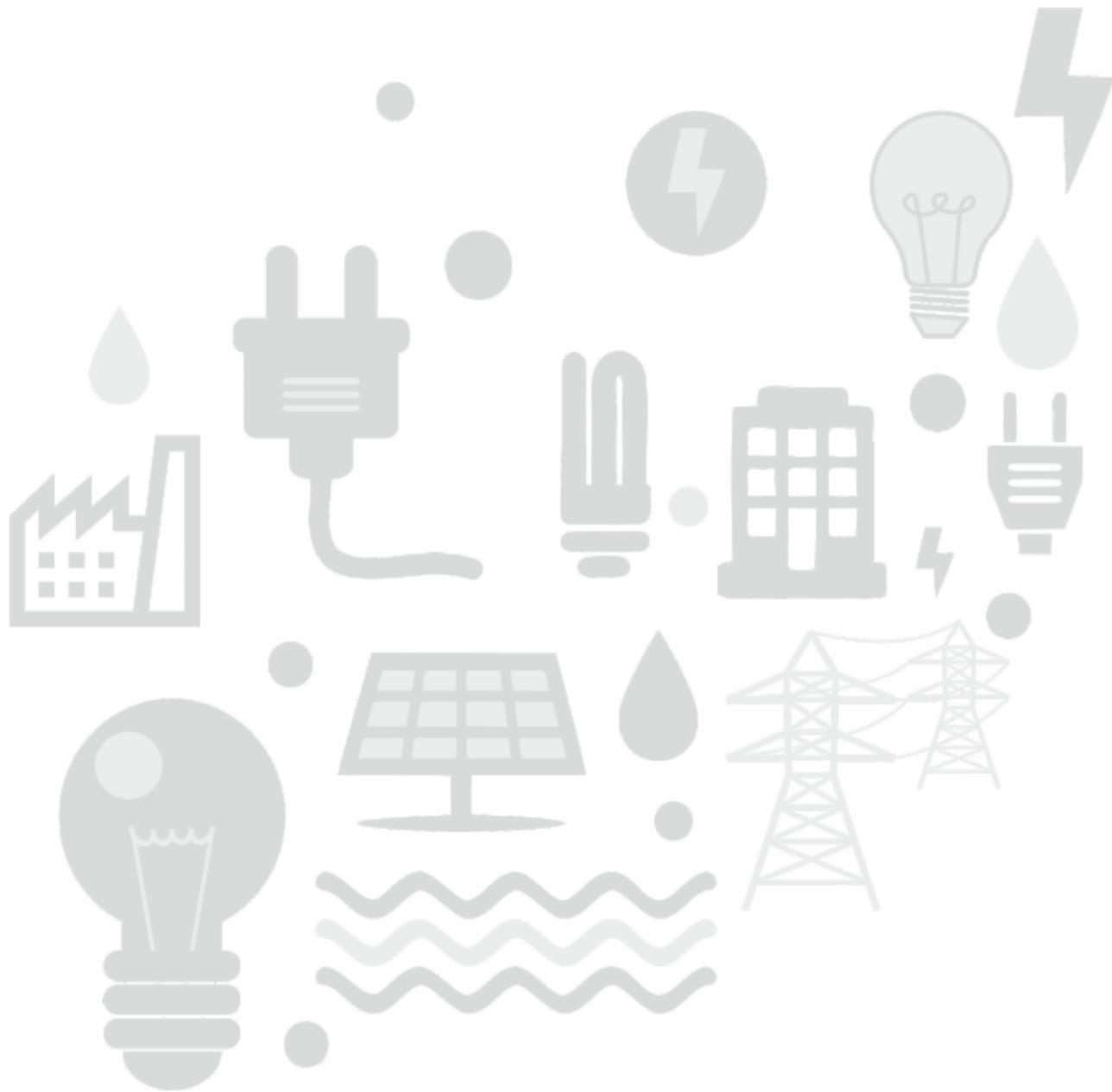
The third ESF model, Distributed Energy Resource, is a variant of Model 2 and meets all primary objectives of the second model with similar outcomes for all stakeholders. This model provides additional flexibility for the ESP to leverage distributed energy resources to provide uninterrupted electricity access to hamlets and households in remote and far-flung areas.

All the three models are comprehensive, with a balanced risk-sharing mechanism, and we can dovetail the choice of model with the State government's priorities.

A WIN-WIN SITUATION FOR ALL STAKEHOLDERS

India is at the cusp of a new future, with an opportunity to provide 24x7 reliable and affordable power to all its citizens in a sustained manner. The ESF model is envisaged to incentivize demand uptake resulting from enhanced customer experience and allows flexibility to the ESPs in the procurement of power. It clearly identifies areas for capital investment to ensure that government resources are optimally utilized, increases transparency through robust data integrity system, improves techno-commercial performance of DISCOMs and mitigates risks, while assuring greater certainty on returns.

ESF therefore, helps all the stakeholders – Customers, DISCOMs, Government, Energy Service Providers and State Electricity Regulatory Commissions to achieve their objectives. With a focus on access, reliability and quality, it leads to increased demand which, in turn, increases revenues for ESPs and DISCOMs, improves their viability, ushering in socio-economic development and improvement in the standard of living of the citizens. The ESF model promotes 24x7 reliable power to all in a sustainable and economically viable way.



FOCUS ON CUSTOMER: KEY TO EFFECTIVE RURAL ELECTRIFICATION

The eRRF program in rural Bihar

Under the Central Government's SAUBHAGYA scheme and the State Government's 'Har Ghar Bijli' mission, Bihar has made significant progress in improving rural electrification, connecting over 32 lakh customers between October 2017 and October 2018. The Government's focus is on two aspects - the first to achieve 100% connectivity and the second to improve state electricity supply. In line with these efforts, it has improved supply hours up to 16-20 hours per day in rural areas. While there has been considerable progress in the electrification of Bihar, DISCOMs are reeling under financial losses.

A study conducted by Smart Power India (SPI) titled, "Rural Electrification in India - Customer Demand and Behaviour" revealed that there are concerns about the sustained use of electricity for recently electrified households, particularly in the absence of satisfactory services. The survey data showed that one out of two grid-users in Bihar are not satisfied with grid-electricity because of lack of reliability, adequacy, and quality of electricity supply. There are also issues with metering, billing and customer redressal mechanism, impacting the profitability of the DISCOMs.

Household electrification has been an important part of public discourse. However, rural micro-enterprises engaged in non-farm activities have not found their deserved place in the electrification narrative. According to the study, only 65% of micro-enterprises had grid-electricity connections in Bihar. Rural enterprises are paying customers with a steady demand for electricity supply. It is time for DISCOMs to expand their focus to rural micro-enterprises. This will not only improve the financial feasibility of supply in rural areas, but also have a direct impact on socio economic development of rural Bihar. In FY18, the overall billing efficiency of DISCOMs was around 70% with rural areas having much lower billing efficiency and coverage. Taking cognisance of the problems in the services and collections, Bihar DISCOMs introduced the Rural Revenue Franchisee (RRF) scheme in 2013. RRFs are local-level individual entrepreneurs who have a service agreement with the DISCOMs to manage billing and collection at the last mile. Over the years, the RRF scheme has been revamped and new interventions like spot-billing and use of online apps for billing and collection have been added.

eRRF & SPI

Enhanced Rural Revenue Franchisee, with its mission to improve the distribution of electricity in rural areas to achieve increased electricity access, enhanced demand generation and socio-economic development, partnered with Bihar's DISCOMs to develop and implement the enhanced Rural Revenue Franchisee (e-RRF) program. The aim is to enhance customer services through improving RRF effectiveness, leading to enhanced metering, billing and collections for the DISCOMs.

The focus areas involve improving customer service by ensuring timely and accurate billing, providing timely information to customers on power outages and also improving the existing IT platform. There are also performance linked gross income improvement for the RRFs. Constant efforts are being made to connect more customers to the grid. A key focus area is also to improve the DISCOMs' financial health by increasing billing coverage and collection efficiency.

SPI formulated the program knowing that improved service would lead to increased demand, resulting in the viability of rural electrification for DISCOMs which would enable them to enhance service delivery to rural areas.

The scheme was designed leveraging the existing RRF 2018 scheme, enhancing the positioning of RRFs from 'Billing Agents' to "Customer Service Agents". We worked with the DISCOM officials on the ground to execute and implement the interventions that included incentive disbursement, clearing of databases and increased use of technology.

A total of 16,000 connections that reach a total of nearly 80,000 people were covered in the program over a period of 6 months during the pilot phase. SPI also developed an AI-based "Optical Character Recognition" (OCR) technology that would eliminate human errors in billing. The need for creating a customer relationship management (CRM) tool was also realized. Going forward, an inclusive app will be designed which will have both ORC and CRM integrated.

RRF implementation in Bihar- Key gaps

- Lack of customer-centric approach of DISCOMs and RRFs
- Lack of structured on-boarding, training & customer relationship management for RRFs
- Lack of adequate performance monitoring and feedback mechanism by DISCOMs for managing RRF's performance
- Inadequate or improper IT tools for RRF's day-to-day operations
- Inadequate incentives, leading to low motivation and poor performance among RRFs



KEY INTERVENTIONS BY SPI UNDER eRRF PROGRAM IN BIHAR

- Customer Engagement/Awareness Activities – Understanding the root causes of non-payment by the customer and implementing various customer awareness activities, one-on-one interactions with C & I customers informing them about the benefits of grid connection.
- Performance Monitoring Framework – Enhancing e-RRFs' performance by creating a daily billing and collection performance framework ensuring daily target setting and evaluation, in line with program targets.
- IT Interventions: SPI developed an AI-based "Optical Character Recognition" (OCR) technology that would eliminate errors in spot billing due to human error/negligence.
- Customer Indexing & KYC survey and DT metering – SPI undertook the initiative to map 16,000 customers in the pilot areas to the distribution transformers and feeders. Customer indexing coupled with DT metering will enable DISCOMs to understand the billing efficiency of the village. A KYC survey was conducted across 1,600 customers to understand their profile and device strategies to improve customer services.
- Training & capacity building - SPI provided training to e-RRFs and DISCOM staff for effective customer management and carrying out their scope of work.

Way Forward:

We are implementing the scaled up version of the e-RRF program in Bihar with a larger scope of work identified for the RRFs.

The success of the pilot programme has encouraged the utility to further expand the cadre of RRFs by almost 100 percent.

The DISCOM is working on a specially designed IT platform to bring in transparency and quality in the process of selection and monitoring of RRFs. SPI will be working with the utility to bring in a third party to work with the RRFs to enhance their productivity and performance through daily target setting and feedback, training for RRF and resolution of RRF's issues.

As we go forward, the focus of the programme will be to enhance consumer demand, promote 100% metering, service requests like meter replacement, add new connections, enhance load and enable timely resolution of complaints. The programme will train customers on new applications and technology that will ensure transparency in the MBC process and maintain an updated customer database.

We envisage that the programme will lead to improved/stronger customer engagement and services, leading to considerable enhancement of revenues. We will also be able to enhance demand, reduce diesel consumption and improve revenue collection by ensuring prompt and consistent services.

"The e-RRF programme has ably demonstrated the constructive intervention of a third party towards building customer awareness and RRF's capacity for service. This has led to strong customer connect and faith in the electricity services. Therefore, there was a clear need to build a business model to deliver these services at scale and sustainably, said Mr. Pratyaya Amrit, Principal Secretary, Energy, Bihar."

In Discussion with Shri. Sandeep Kumar R. Pudakalkatti 'Chairman Cum Managing Director', North Bihar Power Distribution Corporation Limited.

1. Currently in rural Bihar, around 30% bills are issued on an average basis either due to defective meters or no meter. In your view, what is the best way to address the issue?

The work of installation of meters in the consumer premises on a mass scale has been taken up both against replacement of defective meters as well as providing meters in unmetered premises in a mission mode. For providing meters in unmetered premises, the services of a turnkey agency has been taken whereas the work of replacement of defective meters is being carried out by billing agencies, the RRF and at the department level.

2. Many customers, especially in rural areas, complain about wrong billing due to wrong meter reading. What's your view on resolving this issue?

We are in the process of installing smart meters with pre-paid functionality for all customers in Bihar. Under the eRRF programme, DISCOMs are developing IT solutions for automatic meter reading from existing electronic meters using 'Optical Character Recognition'. This technology will minimise the role of meter reader in meter reading to a large extent. In future, this OCR app can be used to extend option of self-billing by the customer itself, which will help them to generate their own bills.

The scope of RRFs was expanded to include customer servicing aspects. The scope of work and corresponding incentives in the revised scheme were designed to drive motivation and performance of RRFs. Special attention was paid to training and capacity building of RRFs and DISCOMs staff to bring in more efficiency. There was increased focus on customer awareness programs along with the development of a standardised communication tool kit.

Owing to these efforts, the number of paying customers increased from 30% to 47%; and the DISCOMs' financials improved due to additional collection, and there was an increase in the number of customers with 341 KW load added to the grid during the project phase. Significant improvement in billing was also witnessed with 16% growth in the number of customers receiving timely bills.

CONCLUSION

The performance of e-RRFs in a short period of implementation has paved the path for developing customer-centric models leveraging customer satisfaction to achieve improved performance at the last mile. E-RRF models provide win-win for both DISCOMs and customers. It can improve financial viability in rural areas for DISCOMs through improved revenues. On the other hand, for customers it ensures better services in rural areas.



Model Distribution Zone (MDZ) program – Odisha

The time has come to move away from traditional distribution models and develop an alternate distribution model with a customer-centric approach. At SPI, we're already building traction in this direction and are working with some state governments on alternate models through our Model Distribution Zone (MDZ) initiative. The sustainable MDZ program in Odisha is one such case that achieved the triple goals of reliable electricity supply, customer confidence and a viable business model for the DISCOM.

In the 1990's, privatization was just beginning to emerge as a possible panacea to the many ills that the electricity sector faced - inefficiencies, financial stress and power theft. In pushing the utilities to run on sound commercial principles, Odisha became the first state in India to privatise electricity supply in 1995 with World Bank support. Orissa's electricity regulator, OERC, set up a new private DISCOM called CESCO with the objective of ensuring electricity supply to its customers. But what began with this lofty objective soon faded out within a span of six years. By 2001, CESCO was struggling with contractual, organizational and financial issues, and was declared unviable. OERC revoked CESCO's license in 2001 and set up CESU, another utility directly administered by OERC, expecting greater efficiency. CESU's objective too was to ensure uninterrupted electricity supply to its customers.

By 2015, CESU did achieve significant success in ensuring electricity access to households under its purview in a matter of 15 years. But even through most households had acquired electricity connections, CESU's financial losses mounted. Its cost-benefit ratio was unsustainable: while the cost of serving a unit of electricity was Rs.4.89, the collection against it from the customer was only Rs.2.50. It's no surprise that in FY 2019, the AT&C (Aggregate Technical and Commercial) loss recorded stood at 32 percent. This was a result of many factors - customers defaulting on payments - mainly due to low quality of electricity with voltage fluctuations, and frequent power cuts. To bring about a sustainable model of electricity supply, the entire cycle of issues needed to be fixed.

To develop a sustainable electricity supply distribution system, it was important to learn from past experience and combine it with the best utility practices. And before rolling it out in the entire state, this model needed to be tested through implementation in a smaller zone to validate proof of concept. SPI and OERC jointly embarked on this program with the Paradeep Electrical Division (PED) becoming the location for the "sustainable model distribution zone" experiment. Catering to more than 550,000 people in 630 villages, the zone occupies an area of 860 square kilometers. Here, 9 in 10 households are connected to the grid, but power supply is unreliable with 4-5 power cuts of 3-4 hours a day. The quality of power was also poor with 3-5 hours of low voltage a day. Adding to that, every third customer defaulted on payments. This amounted to low power consumption in the households (30-40 units a month against national average of 60-80 units). The number of enterprise connections was also low at 4% against the national average of 20%. It came as no surprise that enterprises preferred the more reliable option of diesel to electricity, despite its higher cost and detrimental environmental impact. The AT&T losses too had mounted to a peak level of 57%, against a national average of 22%.

The OERC was faced with the dual challenge of improving the quality and reliability of power on the one hand, and reducing payment defaults on the other to improve its revenue. These two factors could in fact be considered cause and effect; and the cause needed to be rectified first. To get this going, the DISCOM first invested in the grid network to improve the reliability and quality of electricity. This would improve customer confidence and their willingness to pay. While the DISCOM anchored program implementation by providing reliable electricity supply and service, SPI, along with its resource partners, took on the responsibility of enhancing customer engagement, which formed the core of creating this sustainable model.

Such customer engagement was a project in itself, supported by a multi-pronged strategy, and highly dedicated human resource. It included training and capacity building of women self-help groups, creating a customer-centric redressal system, building sensitivity among the customers, running mobile camps, and encouraging informal community discussions on the topic over tea. All of this would feed back into creating a revenue-generating electricity supply model.

A hundred and twenty women, who came to be popularly known as Bijulee Didis, were appointed across 53 Gram Panchayats. They engaged with metering, billing, collection and redressal of customer complaints. SPI and its resource partners provided them with training, capacity building and monitoring. These efforts considerably increased the DISCOM's revenue, apparent while comparing revenues of the same month with that of the previous year. It also enabled the women to earn an additional Rs.8000 a month. The financial gain from the additional revenues helped the DISCOM to invest in network strengthening measures. Business continued seamlessly even during the Covid-19 era, with SPI sensitizing the WSHG members with the precautions to be taken, by providing face masks, soaps and hand sanitizers. In fact, the face masks were sourced from fellow-WSHG groups in the Bolangir district of Odisha!

To register network-related complaints at the customers' doorstep through a mobile application, Bijulee Sathis were engaged, who resolved the complaints quickly through dedicated mobile network restoration vans that helped to reduce supply downtime during peak hours. This led to an increase in monthly household consumption from 36 units to 39 units. The rate of failure of the distribution transformer also decreased by 7% on a year-on-year basis. The third initiative engaged and sensitised the customers directly on the importance of electricity and the benefits of timely payment. It is such a two-way street that would ultimately help improve electricity supply in these rural areas. This initiative, called Mo Gaon-Ujjwala

Gaon, utilised different modes of local communication like loudspeaker announcements, banners mounted at major markets and distribution of pamphlets to convey the message to customers.

Adding to this, electric vehicles turned into e-Ujjwala Raths functioned as mobile camps for customer engagement and complaint resolution activities. It drove home the point that shifting to electricity from diesel can lead to savings of Rs. 1.3 Lakh a year, while also reducing carbon emissions by up to 5 tonnes a year. "One2One Connect" was another program series that encouraged enterprises to shift from diesel to electricity. "Chai pe Charcha" (discussions over tea) meetings became yet another mode to make customers aware of the benefits of electricity, and on how to apply for new connections. Customers were also sensitized that stealing of electricity is a crime.

After tasting success in its experiment zone, the MDZ program was finally ready to be rolled out across the state with support from the private sector in 2019. The results have been encouraging; and the idea of an efficient and sustainable model of electricity supply in Odisha is finally becoming a reality. We touched another recent milestone in June 2020, with Tata Power taking over the management of CESU for a license period of 25 years. An era of sustainable electricity supply has begun in Odisha, and we hope it will show the way to many other states grappling with similar problems. Timelines and milestones

1995 – Odisha becomes the first state in India to implement privatization of electricity distribution, with support from World Bank, forming CESCO for the purpose, a private DISCOM owned by AES Corporation-led consortium.

2001 – CESCO's license revoked by regulator OERC, owing to organizational, financial and contractual issues. OERC forms a new, directly administered utility - CESU, which took over the administration of electricity distribution of the erstwhile CESCO areas.

2015 – CESU has made rapid strides in ensuring universal access to electricity with majority households getting electricity by 2015, but is financially stressed. SPI, in partnership with OERC, embarks on an initiative to combine learnings from past experience and efficient best utility practices to build a "sustainable model distribution zone" in rural areas.

2019 – MDZ program rolled out with support from private sector. A multidimensional Project Management Unit (PMU) is established under the leadership of CESU to execute the objectives of the MDZ program. OERC oversees the functioning of the PMU, acting as regulator and enabler of the program.

2020 – Tata Power takes over management of CESU for a license period of 25 years. The new distribution licensee is TP Central Odisha Distribution Ltd. (TPCODL), with Tata Power holding 51 per equity, and state-owned GRIDCO the remaining 49 per cent.

REPORT ON RURAL ELECTRIFICATION IN INDIA

Customer behaviour and demand

A collaboration between Smart Power India (SPI) and the Initiative for Sustainable Energy Policy (ISEP), this study provides a comprehensive picture of rural electricity customers, their demand, preferences and attitudes. The findings are based on the primary data from more than 10,000 rural households and 2000 rural enterprises across four Indian states, positioning it amongst the largest electricity customer surveys.

KEY FINDINGS

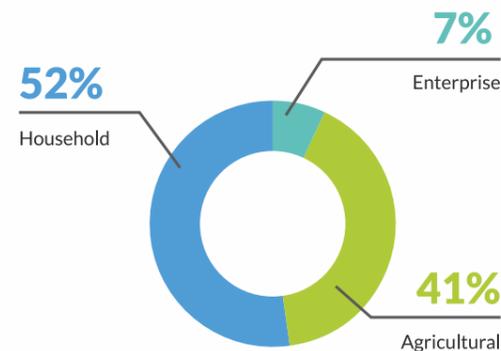
- Grid-electrification coverage and adoption is about 90% among rural households and 65% among rural enterprises.
- Usage of non-grid electricity sources like diesel generators and solar mini-grids is 16% for households and 40% for rural enterprises.
- Only 60% of the electric grid customers are satisfied with the DISCOMs' services.
- Service and reliability drive customer satisfaction, coupled with the perception of affordability.

IMPLICATIONS AND ACTIONS

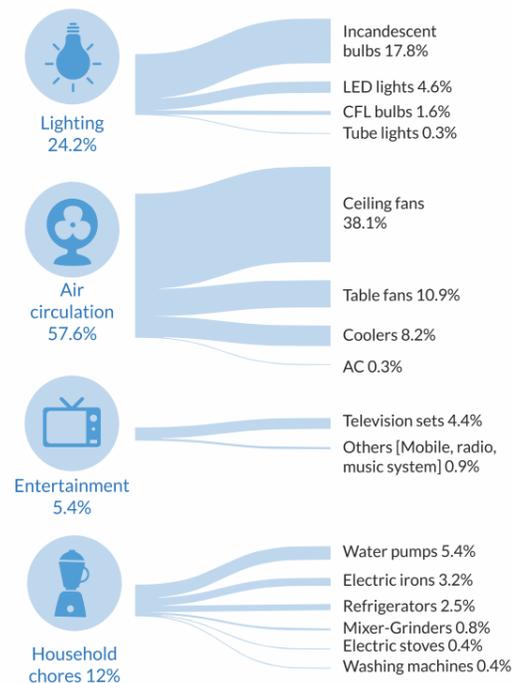
- Electricity service providers should adopt a 'customer-first' approach and focus on improving quality of supply and customer service.
- DISCOMs should expand coverage to rural enterprises, as these customers have higher electricity demand and better paying capacity.
- Efforts should be made to improve penetration of appliances and boost electricity demand in rural areas.

BASELINE ELECTRICITY DEMAND OF A VILLAGE IN INDIA

VILLAGE DEMAND
1,826 kWh/day

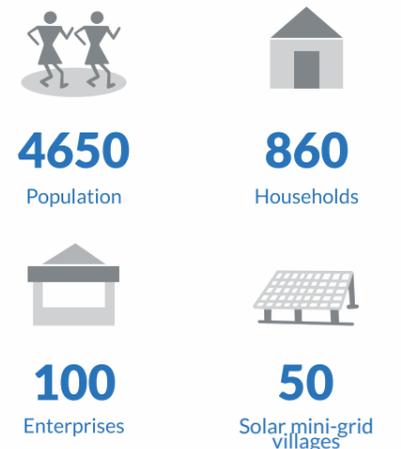


Composition of Household Electricity Demand
For a consumption of 100 kWh per month

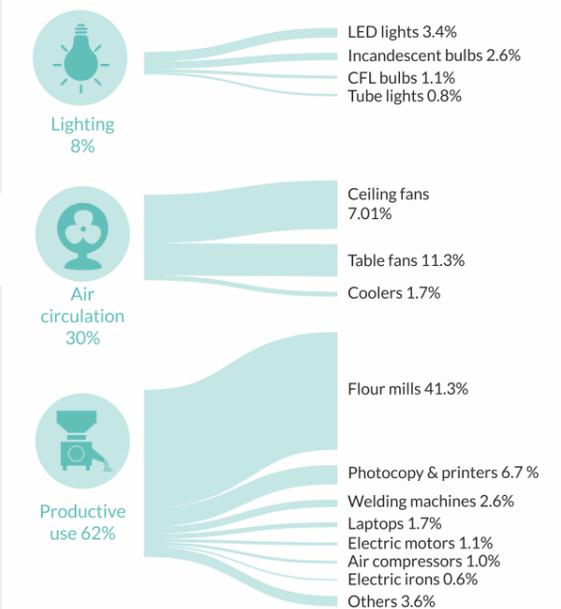


VILLAGE PROFILE

Based on average values of 200 villages



Composition of Enterprises Electricity Demand
For a consumption of 100 kWh per month



*This is a representative image, based on compiled data from this study

Use the link below to download the report
<http://smartpowerindia.org/media/1228/spi-rural-electrification-in-india.pdf>

* DISCOM: Electricity distribution utility is commonly termed as Distribution Company (DISCOM) in India

ENSURING UNIVERSAL ELECTRICITY ACCESS

Story of Saubhagya

Shri Mritunjay Kumar Narayan,
Joint Secretary,
Ministry of Power

BACKGROUND

Ensuring universal electricity access has been a key goal of the government and a lot of effort has gone into this. It has three major facets (i) creation of adequate electricity infrastructure to facilitate connectivity (ii) last mile connectivity / service connections to prospective consumers/households and (iii) supply of quality and reliable power.

The Government of India launched an integrated scheme in 2014-2015 covering all aspects of power distribution in rural areas called 'Deen Dayal Gram Jyoti Yojana' (DDUGJY) looking at (i) electrification of un-electrified villages (ii) intensive electrification of already electrified villages to provide access to households (iii) strengthening & augmentation of sub-transmission and distribution infrastructure to improve quality and reliability of power supply (iv) feeder separation to provide assured power supply to farmers and (v) metering of feeders, distribution transformers and consumers.

100% VILLAGE ELECTRIFICATION

There were around 18,000 villages that were un-electrified in the year 2015 and the target was to electrify these villages within the next 1000 days. Most of these remaining villages were located in remote and inaccessible areas with difficult geographical terrain and left wing extremism. Thus, the most important aspect of the program was to overcome these challenges and extend electricity to these villages. With the involvement of all stakeholders viz. States, DISCOMs, contractors, vendors, equipment manufacturers and citizens, we were able to meet the target on 28th April 2018.

HOUSEHOLD ELECTRIFICATION

While the country was inching towards 100% village electrification, efforts were also being made to connect the unconnected households under DDUGJY. Though the results were not encouraging, this process provided a useful opportunity in identifying major barriers in household electrification, such as cost of obtaining a new electricity connection, lack of awareness among rural households about benefits of electricity, and the challenges faced by villagers in obtaining new electricity connections.

SAUBHGAYA LAUNCH

In October 2017, Government of India launched the 'Pradan Mantri Sahaj Bijli Har Ghar Yojana' (Saubhagya) with the objective of achieving universal household electrification by ensuring last-mile connectivity and electricity connections to all remaining un-electrified households in rural and urban areas.

SCHEME DESIGN

As the name suggests, the scheme means 'Sahaj' i.e. Simple / Easy / Effortless and 'Har Ghar' i.e. universal coverage.

Economically poor households and others can avail the electricity connection for free. A fee of Rs. 500 is charged after release of connection in 10 instalments that can be adjusted in monthly electricity bills. Camps were organized for on-the-spot registration and release of connections. The scheme also uses a mobile app for identification of beneficiaries and electronic registration. Several awareness programs were undertaken to motivate people to avail electricity connection. The scheme also uses a real time monitoring system which updates progress. It also had an SPV based stand-alone systems component for households located in remote areas. All new connections to households under the scheme are metered and there is flexibility given to states for choosing the mode of implementation.

SIZE OF TASK

Nearly 4 crore households were estimated to be un-electrified as per the State census. Implementation in the initial stage provided an important insight on the number of households to be electrified to achieve 100% electrification. It also indicated sizeable reduction in the number of un-electrified households as compared to earlier estimates reported by the states. They were regularly updating the data on Saubhagya portal as per ground conditions. The number of un-electrified households as on 10.10.2017 (base date of Saubhagya) finally came down to 2.62 crore from the earlier reported data of 4 crore.

Electrification of such a large number of households in a time bound manner was a huge task and required concerted efforts by all the stakeholders along with determination and an innovative approach



CHALLENGES

(i) Varying requirement of infrastructure: It was observed that there are villages where basic infrastructure already exists and only service connections are to be released while some villages do not have the infrastructure required to provide connectivity.

(ii) Ongoing infrastructure work under DDUGJY: In some states, creation of infrastructure sanctioned under DDUGJY including its RE component was under way in various stages and remaining households are to be electrified after completion of this work.

(iii) Requirement of additional funds for creation of infrastructure: Some of the states reported that the funds allocated for creation of incremental infrastructure and last mile connectivity may not be adequate to achieve 100% household electrification.

The other challenges included mobilization of requisite material and equipments, skilled manpower, beneficiary identification, and monitoring at the grassroots level.

ADDRESSING CHALLENGES

(i) Different modes of implementation were allowed for different categories of villages as per the requirement of the states on turnkey / partial turnkey / departmental execution.

(ii) States were authorised to utilise funds sanctioned for infrastructure creation under DDUGJY including its RE component for supporting 100% household electrification with the approval of State Level Standing Committee (SLSC). They were also provided flexibility to utilise these sanctioned funds across various districts within the DISCOM/state. Rs.14270 crore was additionally sanctioned.

(iii) For mobilisation of requisite material / equipment, the Ministry coordinated with Indian Electrical & Electronics Manufacturers' Association (IEEMA) to ensure speedy supply for timely completion of the task. A conference was also held in Kolkata in association with IEEMA. For Arunachal Pradesh, Assam and Tripura, RECPDCL procured key material/equipment on their behalf and supplied it to various stores in a short span of time enabling timely completion of work.

(iv) To facilitate availability of adequate skilled manpower, Ministry of Power collaborated with Ministry of Skill Development and Entrepreneurship (MSDE) for skilling the workforce involved in effective implementation of Saubhagya. The Power Sector Skill Council (PSSC) also organized the delivery of training and certification programs in the states.

AWARENESS CAMPAIGN

A comprehensive awareness campaign was conducted to motivate un-electrified households to avail electricity connections under the scheme using various forms of media such as print, radio, television and social media. Camps were organized in villages in which public representatives (MLAs, MPs, Gram Pradhan) also participated actively in creating awareness amongst public. A special campaign was also launched in the state to identify any left out un-electrified households, who were later provided with electricity connections. This campaign had a special vehicle called 'Saubhagya Rath' which moved around in the villages/towns, so that the unelectrified households could approach them to avail electricity connection. A dedicated toll free helpline 1800- 121-5555 has also been launched for the purpose of reporting households left out of the electricity supply system. In addition, there is also an existing helpline number 1912.

SAUBHAGYA PORTAL

In addition to the above, rigorous review and monitoring mechanism was instituted at all levels by the Ministry for monitoring the progress for the timely resolution of issues. A comprehensive web portal 'saubhagya.gov.in' was developed to capture village level in-depth information for the entire country. All the stakeholders were provided secured access for regular updating of progress on the portal.

USE OF MOBILE APP

Mobile apps were used extensively by DISCOMs/states where there were a large number of un-electrified households in order to identify beneficiaries and carry out on-the-spot registration. The process of releasing and mapping the connection could be done using a mobile app.

AWARD SCHEME

The award scheme was envisaged to felicitate the DISCOMs / Power Department of the States and their employees for achieving 100% household electrification in their area of operations.

DISCOMs / Power Departments were divided into three categories and two awards were allocated in each of these categories. Under the first allocation, the first DISCOM / Power Department to achieve 100% household electrification by 30th November 2018 was awarded with a cash amount of Rs. 50 Lakh to be distributed amongst the employees. The second award is a cash grant of Rs. 100 Crore to the concerned DISCOM/ Power Department to be spent on distribution of infrastructure development in their area of operation.

PROGRESS

Electricity connections were provided to 239.43 lakh households and all states except Assam, Chhattisgarh, Meghalaya and Rajasthan reported 100% saturation in household electrification by the end of December 2018.

Assam and Meghalaya later declared 100% saturation, while 28594 un-electrified households remained in the states of Chhattisgarh and Rajasthan at the end of January 2018.

During the 'Saubhagya Rath' campaign, electricity connections were released to an additional one lakh households by the end of March 2019. States reported electrification of 262.84 lakh households under the scheme and all households except 18374 households in Chhattisgarh have been reported as electrified by the states as of end of March 2019.





FIVE STITCHES IN TIME

Regulatory and policy actions to ensure effective electricity service

By Sreekumar N.
Member,
Prayas

It is indeed a welcome development that due to the government's persistent efforts, all villages in India have been electrified and today, almost 100% households have received electricity connections. Now that the government has achieved this commendable feat, it is time to shift attention to the next electrification challenge of providing effective, quality electricity supply and service. Electricity is a change agent that improves quality of life and promotes economic activities. However, in order for it to work as an effective catalyst, it is essential to ensure sufficient and affordable electricity supply, delivered with good quality, and supported by good services.

Building electricity infrastructure and providing connections is a one-time effort which was achieved through concerted drives. To achieve near universal electrification, the maximum resources of the state and central governments were deployed at different locations, during different periods of time. On the other hand, ensuring quality of supply is a long-term commitment. At present, Quality of Supply and Service (QoS) is the responsibility of cash-strapped Distribution Companies (DISCOMs), and in their pursuit of this goal, they are faced with several issues beyond their control. These include generation and transmission system failures, unforeseen weather-related events, consumer (mis)behaviour, and the poor quality of equipment like meters, relays or Distribution Transformers (DTs). Presently, the QoS is reported as poor, not only in newly electrified states like Jharkhand and Uttar Pradesh, but also in more developed states like Maharashtra and Haryana.

If the QoS is poor, consumers may not pay their bills, may resort to theft, or reduce their dependence on electricity supply from the DISCOM for their energy needs. Their electricity connection may get terminated due to non-payment of high bills, often wrongly issued to them. Uptake of appliances and growth of productive loads will also suffer. All these factors would result in an increase in financial and technical losses for DISCOMs, as well as sub-optimal benefits from the massive public investment of around Rs 70,000 crore that has gone into creating electricity infrastructure and providing connections in the last 15 years. Ensuring quality supply is therefore crucial, and is a different challenge compared to providing connections. There have been various challenges such as Standards of Performance (SoP) regulations and their effectiveness, poor official data collection and provision (both at state and central level) and non-implementation of regulatory directives. This has led to limited success in improving metering and billing and has made tracking of quality of supply difficult.

Improving the QoS while simultaneously nursing the DISCOMS back to the state of financial viability seems like a herculean task. However, taking a consumer-centric approach and working with an integrated approach could be a break-through in constructing a financially viable distribution sector for rural areas. There are five concrete actions that could be taken up by the Ministry of Power, Forum of Regulators (FoR), State Electricity Regulatory Commissions (SERCs), DISCOMs and civil society organisations that would help in improving quality of supply in rural areas.



1 TRACK QoS FOR NEWLY ELECTRIFIED HOUSEHOLDS AND RURAL AREAS



Nearly 120 million new household connections have been added in the country since 2011. Many problems in metering, billing, hours of supply, and inadequacy of supply have been reported for newly provided connections. To ensure that these connections are retained, there is a pressing need for periodic monitoring and evaluation of the supply and service quality to the newly electrified villages and households. This is essential to ensure accountability of the quality and reliability of supply. This could include parameters like hours of supply (especially during evening hours), metering and billing information, disconnection data, information on new connections for productive use, consumer complaints and compensation paid for poor QoS. Such information can be reported on national dashboards, SERC and DISCOM websites and regulatory submissions in an easily accessible and disaggregated manner. Further, consumer surveys and third-party evaluations of QoS needs to be carried out, while special efforts should be made to track QoS in rural areas. The Ministry of Power and SERCs can prepare annual reports analysing progress and ranking DISCOMs for overall rural quality of supply based on many parameters and data on hours of supply, metering and billing gathered from DISCOMs, SoP reports and those of various schemes. Civil society groups can take up independent studies on the quality of supply and service of newly electrified areas, using surveys, RTI queries and public hearings. They can also cross check data on quality of supply submitted by DISCOM to SERCs and the Ministry of Power. Additionally there needs to be pressure from the ground to ensure that DISCOMs progress towards quality rural supply.



2 TECHNOLOGY AND OTHER MEASURES TO IMPROVE THE CREDIBILITY OF QoS REPORTS

Even though provisions exist in SERC regulations for SoP reporting, the availability, quality and credibility of such reports have been poor. This demands improvement, which could be done through the use of Information and Communication Technology (ICT) for consumer supply quality monitoring, commissioning third party audits, conducting periodic consumer surveys and reassessing reliability indices. Capital investment plans are already underway for Distribution Transformer (DT) and feeder metering. These metering interfaces could be mandated by the SERC to be fully automated to record data and upload to a server without any manual intervention. This data could be made publicly available in order to help track the duration and number of interruptions. Currently most indices relate to feeder reliability, not consumer supply reliability, which is more important. Reports can be prepared with more granularity, indicating division-wise and consumer category-wise indices at different voltage levels. Mobile apps employed by DISCOMs could also be used to conduct periodic consumer surveys on QoS. Other than features like bill payment and consumption history, apps could provide details like power outage history and bill breakups. Complaints for preventive action should also be included. Further, third party audits of QoS parameters can improve the credibility and quality of QoS reports prepared by the DISCOM.



3 CONSUMER AWARENESS AND SEPARATE REGULATORY PROCESS FOR QoS

In the area of QoS, SERCs should make special efforts to increase public awareness, proactively encourage participation of civil society organisations to improve QoS, and organise public hearings dedicated to QoS. The SERCs could increase efforts towards consumer awareness by commissioning booklets, posters and audio visuals in local languages. Apart from this, simple posters on the SoP regulations and complaint redressal mechanisms can also help increase awareness. Such content needs to be made available by SERCs and DISCOMs to all consumers through meetings, printing of messages on electricity bills, display at DISCOM offices, mobile apps, text messages and social media. Civil Society Organisations (CSOs) can organise state and district level camps, and prepare booklets and audio-visuals to raise awareness about consumer rights and encourage the registration of complaints about issues like metering and billing, outages, delays in repair, safety and accidents. The SERCs should organise separate public reviews of QoS parameters. Annual reports and petitions on QoS should be submitted by the DISCOMs, and comments should be invited through public notices and public hearings held at different locations in the state.



4 LINK SoP PARAMETERS TO DISCOM REVENUE

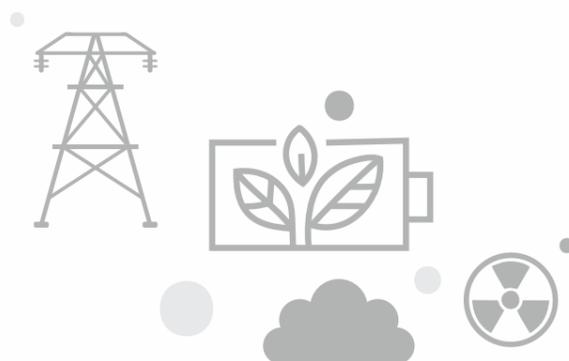
It is important that the SERCs adopt a carrot and stick approach to gradually improve the QoS, either during the tariff revision process or by way of separate QoS public hearings. If the performance is better than what is specified in the SoP regulations, the DISCOM can be rewarded through an all India ranking system and state level financial incentives. Failure to meet the QoS norms should invite penalties on the DISCOM. Tariff and SoP regulations can be amended by SERCs to ensure this. If SoP reports are not submitted in the required format and in time, DISCOMs should be penalised. The performance could be determined on the basis of a matrix of important parameters specified by the SERC such as metering and billing, duration of outage, and DT failure rates. These will vary for different circles of the DISCOM; and penalties could be imposed for not adhering to the overall standards for these parameters.

In the SoP regulations, SERCs could identify a few key parameters, which are important to the consumer and which can be remotely monitored for automatic compensation if the shortcoming is due to the DISCOM. This could start with DT / feeder failure, billing errors, delays in connection, and consumer outages reported through mobile apps. The list could be slowly expanded to include meter failure, consumer outages and other issues.

5 CENTRAL GOVERNMENT PROGRAMMES AND SUPPORT FOR QoS

Just as the states needed central government support to meet the connection challenge, it will also require similar support to provide quality supply, especially because most of the DISCOMs are making financial losses. The extent of support will vary across states and the duration of support will depend on the level of improvement in the financial health of the DISCOMs. If tracking of new connections can be done on the various QoS issues especially for newly electrified consumers, that data would help the central government in making informed decisions. Disincentives could be designed for disbursement of central government funds in case of inadequate state government interventions in poor QoS pockets. The Government of India can periodically commission countrywide surveys on QoS and the effectiveness of rural electrification to make data availability more robust and to increase the accountability of the process. National level ranking and credit rating of DISCOMs should include QoS parameters also, in addition to financial performance and regulatory compliance. This will help to highlight good practices which can be adopted by all DISCOMs.

The Integrated Power Development Scheme (IPDS) can increase focus in rural areas – especially in improving rural infrastructure, metering, billing and maintenance systems. DISCOMs will need support for supply to low revenue generating areas to overcome the financial disincentives of supplying electricity to consumers with low tariff. The central government can financially support these states to provide supply of low-cost power. This power can be obtained from states which have surplus or stranded capacity. Thus, this surplus capacity can be re-allocated at concessional rates, with part of the fixed costs foregone. However, this should be conditional and carried out after monitoring the supply of power.



CONCLUSION

Stepping up the quality of supply and service is a tough and ongoing challenge. The cash-strapped DISCOMs can meet it only with support from all quarters. It is unfortunate that while significant attention is being paid to tariffs and the financial viability of DISCOMs, QoS for small and rural consumers suffers neglect. The existing SoP regulations of the SERC can be put to better use to increase accountability of DISCOMs for QoS. This would require enforcing the standards, monitoring compliance, improving reporting, creating consumer awareness and simplifying grievance redressal mechanisms. The Indian government has played a significant role in the connection drive, and should now facilitate the improvement of QoS.

Unless the five urgent actions outlined above are implemented to address the worsening issues in metering, billing, and the reliability of supply, the danger of the massive distribution infrastructure falling into disuse is real and imminent, and may lead to low realisation of the benefits of universal electrification.

LISTENING INITIATIVE AIMED AT UNCOVERING VULNERABILITIES FOR OFF-GRID CUSTOMERS

Their voices are often unheard in the global conversation, and their pandemic challenges underrecognized, so as part of a listening initiative, The Rockefeller Foundation and its partners are surveying rural electrical customers in six countries to identify vulnerabilities and make sure energy poverty does not spread or worsen during the Covid-19 crisis.

The survey, begun in May and extending for five months, will tally the responses of about 9,000 customers, most of them off-grid, in India, Myanmar, Nigeria, Tanzania, Sierra Leone and Uganda. The initiative is part of a partnership between the Foundation and 60 Decibels, a social impact measurement company spun out of the nonprofit impact investment fund Acumen.

With dual health and economic challenges triggered by the Covid-19 crisis, the survey has two primary purposes. First, it will provide insights into where economic hardship may be most acute, seriously threatening customers' ability to pay for essential goods and services, including electricity. This can help energy companies, national governments and policymakers, and global energy access funders target their responses.

"The initiative is an eye opener in terms of understanding the on-the-ground situation and the needs, expectations and challenges of the rural communities," said Smart Power India's CEO Jaideep Mukherji, whose beneficiaries are among those being polled. "The survey will help organizations like ours prepare precise and community-centric strategies in delivering our programs to the last mile."

Secondly, the survey offers a chance to add seldom-heard voices to the global pandemic discussion. "In a context where every news headline was about Covid-19 and its impact on people, a dearth of data on realities in rural communities, particularly in the global south, was troubling," said Shawna Hoffman, the Foundation's Director of Measurement and Program Performance. "When the story is completely focused on some parts of the globe and devoid of perspectives from other places, that's an equity issue. We knew lots about how people in capital cities were faring, but very little, if anything, about what was happening in rural lower-income communities."

"We weren't hearing the voices of those likely to be most impacted," agreed Kat Harrison, Director of Impact for 60 Decibels, which is carrying out the survey. "All of us are struggling; no one is having a good time. But if you are vulnerable to begin with, it is really so much worse."

"Last week, heavy rain and storms in my village destroyed road lights. So, please repair that," requested a 47-year-old man in Myanmar.

"The solar plant is just behind my house and my high school brothers are sitting idle at home. Can the plant employ them?" asked a man, 22, in India.

"All I know is that we are one nation. I pray that God will heal those people who are affected," said a 30-year-old Nigerian man.

From Food to Covid Information, Customers Seek Support

Because providing affordable, reliable and clean electricity is a critical first step toward helping a community lift itself from poverty, the Foundation, working with partners in Asia and Africa, has made ending global energy poverty a priority, often through off-grid renewable electrification to underserved communities.

Despite Covid-19-linked hardships, initial trends show most off-grid customers are still paying their electric bills, indicating their willingness to make short-term sacrifices to keep on the lights and be able to use electricity-powered tools.

At the same time, Covid-19 has created high levels of distress. Of the countries surveyed, Sierra Leone customers reported the highest level of anxiety, with 84 percent saying they were very concerned and another 15 percent identifying as slightly concerned. Myanmar customers reported the lowest levels, with 8 percent saying they were very concerned, and another 57 percent listing slight concern.

The shape of those worries was revealed in wide-ranging answers to a question about how their electricity provider could help them survive Covid-19.

"Please discount the monthly electricity bill at this time," requested a woman, 43, in Myanmar. "And I want free electricity for the monasteries in my village."

"If they can supply two bags of rice, I'll be really grateful," said a 48-year-old woman in Sierra Leone.

"If they can give me an update by SMS about coronavirus and number that I can call in case I feel the symptoms," requested a woman, 29, in Tanzania.

"I have no idea how they can help," responded a 40-year-old woman in Myanmar, a sense of futility seeming to linger behind those words.



Compiling Coping Strategies and Hope

60 Decibels, whose name refers to the volume of human conversation, implemented two best-practice methods intended to ensure high quality responses. First, it uses phone surveys, noting that mobile phones are often ubiquitous in some of the most remote areas, and online surveys exclude some 50 percent of the population not connected to the internet, disproportionately disenfranchising lower-income individuals living in rural or developing areas. Secondly, it hires locally based research assistants who intimately know the language and culture of those they are calling.

60 Decibels has created a public dashboard, updated weekly, which combines the information collected for other stakeholders into a fuller picture. As of Aug. 11, it had surveyed more than 16,000 people in 16 countries.

Finally, it developed a Vulnerability Index to quantify how shocks impact a family's situation. The index considers three main factors: household poverty level prior to the pandemic, perceived change in financial health, and coping mechanisms, including effects on food consumption. Those who viewed their situation as much worse or were selling assets or eating fewer meals to survive were seen as more vulnerable.

"A sign of immediate stress is when people report reducing their food intake," Harrison noted. "And if you have to sell an asset because you can't feed your family, that's going to impact your long-term resilience."

Among the countries 60 Decibels is surveying as part of the Rockefeller Foundation partnership, Sierra Leone shows the highest level of vulnerability with

about 52 percent of the population extremely or very vulnerable. Tanzania has the lowest level, at about 5 percent. The highest vulnerability levels seem to occur in countries where governments enacted the strictest Covid-19 restrictions, Harrison noted.

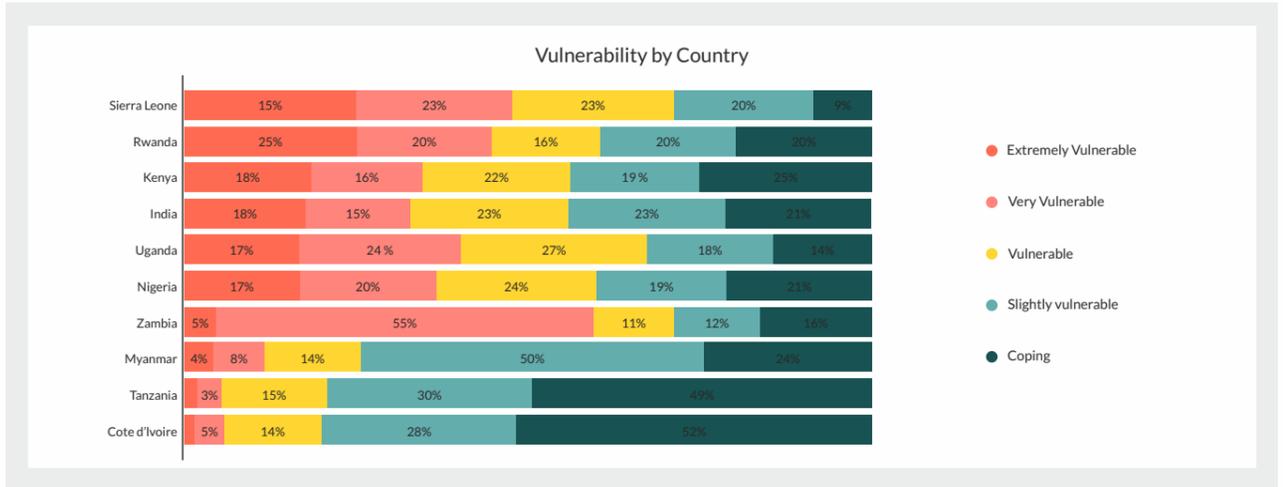
On the other hand, when asked to identify their sources of hope in the face of current health and economic challenges, 35 percent cited the lockdown and travel restrictions as fueling hope that Covid-19 would be brought under control. Some 34 percent mentioned handwashing, and 34 percent mentioned masks.

A full 20 percent, though, said they had no source of hope. Overall, 78 percent of the respondents said their financial situation had worsened to some degree, and 35 percent reported some decrease in food consumption.

“I am a contractual painter and haven't worked for the past four months because now no one allows me to enter their homes,” said a man, 54, in India.

“My prayer is for it not to reach at our place of work,” said a man, 37, in Sierra Leone who added that his sister's husband died of Covid-19.

“I love my life,” said a 49-year-old Ugandan man. “I don't want to die because I have a lot to do.”



Tata Power enters rural electrification

JYOTI MUKUL
New Delhi, 4 November



Tata Power announced a new business in partnership with The Rockefeller Foundation, under which it will set up micro grids based on renewable power and manage electricity supply in rural areas. A micro grid is a localised system of power generation

Power was formed, the purpose was to supply clean, abundant and affordable power. "The paradigm shifted to Mumbai, where we supplied power. Now, this is the leadership (which) Tata Power will have to demonstrate and if 25 million people have to be impacted, it has to be Tata Power," he declared. The Rockefeller Foundation's Smart Power India (SPI)

Villages are getting powered by mini grids and not giant thermal coal power stations amid lockdown

By FE Online | Published: May 30, 2020 6:42 PM

During the coronavirus lockdown, rural India is getting powered by mini grid services and not giant thermal coal power stations for electricity supply and more people are finding it a reliable solution for their needs.



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'Mini-grids in villages keep services running'

Even as the virus halted economic activity, mini-grids in villages have kept healthcare services and Jan Dhan Yojana benefits running, a survey by Smart Power India said



7% respondents claimed access to very good health services

75% RESPONDENTS REPORTED LOW CASH FLOW DURING LOCKDOWN

80% of respondents said the lockdown left a major negative impact on their livelihood and are worried about the revival of their businesses in the near term

12% mini grid customers stated dissatisfaction due to lack of communication or on billing during lockdown period

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SPI launches scheme to boost power demand of micro grids

The scheme, therefore, is expected to play a significant role in retaining the mini-grid customers during the lockdown and ensure continued on-time payment behavior once cash flow improves, it added

PTI • Updated: June 19, 2020, 08:07 IST



New Delhi: Smart Power India (SPI) said that it has launched a customer voucher scheme (CVS) for mini-grid customers. The scheme is expected to have a significant positive impact over 125,000 lives in 200 villages, an SPI statement said. The vouchers will provide monthly electricity to mini-grid customers.

Rockefeller Foundation, Tata Power partner for 10,000 microgrids in rural India

Updated: November 11, 2019 03:47 PM IST

Rockefeller Foundation, the United States-based philanthropy organisation, is stepping up efforts to collaborate and invest into the Indian market. In this direction, the foundation recently entered into a partnership with Tata Power to develop 10,000 microgrids in India.

Covid-19: Helping rural Bihar and UP get free vouchers to buy green power

Smart Power India (SPI), an initiative of Rockefeller Foundation, has begun a voucher system for power consumers in 32 villages of Bihar and Uttar Pradesh

Topics: green power | Bihar | Coronavirus
Jyoti Mukul | New Delhi
Last Updated at June 3, 2020 09:40 IST



THE NEW INDIAN EXPRESS

Central Electricity Supply Utility of Odisha inks pact with Smart Power India to improve electricity access in Odisha

Odisha has been one of the few States to have provided 24x7 power to its customers for the last several years.



Lockdown: Closure of commercial activity has hit Bihar, UP villages

But most respondents to a survey conducted by Smart Power India said they saw a positive change in social hygiene behaviour during lockdown

Topics: healthcare | Coronavirus | Lockdown
Jyoti Mukul | New Delhi
Last Updated at May 9, 2020 13:17 IST



across India, especially in the rural belts, gain access to affordable electricity. In India's states, the government is investing opportunities.

Cash flow in small villages severely hit amid lockdown: Report



Photo Credit: IANS

SPI IN NEWS

SmartPowerAccess Tweet-chat with Anjali Garg, International Finance Corporation – October 2019

We organised a Twitter chat on the “State of Electricity Access in Rural India” with Anjali Garg, Energy Specialist, International Finance Corporation, moderated by Sarita C. Singh, The Economic Times. The discussion was joined by energy sector and media influencers and touched upon issues like sustainability of access and role of stakeholders.



TP Renewable Microgrids launch - November, 2019

We highlighted stories from the launch of the TP Renewable Microgrids launch held in Delhi, India attended by the leadership team at The Rockefeller Foundation and Tata Power, Amitabh Kant, Chairman, NITI Aayog and other eminent personalities from Indian policy and power sector.



#Power4Progress Multimedia Series – Ongoing

#Power4Progress is an ongoing digital campaign in which we highlight the ways in which reliable electricity impacts socio-economic outcomes in the village ecosystem. Through this campaign, we shared documentary videos on the many ways in which electricity has changed the face of healthcare provision and women empowerment in the village. We also featured case studies on the difference that electricity has made in the lives of entrepreneurs.



COVID Action: Mini Grid Employee Guidelines and Relief Measures with Partners – April, May 2020

The novel Coronavirus posed a variety of challenges for the rural communities as well as mini-grid operations on the village sites. We released detailed guidelines for the prevention and management of COVID-19 for the benefit of mini-grid employees. We also carried out COVID relief measures such as spreading awareness about social hygiene and providing essential items with the help of our partners on sites, namely through the Bijulee Didi program in Odisha, CESU, and Tata Power.



Customer Survey 'Impact of Post COVID-19 Lockdown' – May-June 2020

Smart Power India carried out a customer survey in two phases to record the impact of COVID-19 on the village economy and level of social hygiene, while also assessing the state of electricity supply from the grid and mini-grids. We shared findings from the customer survey and the phase-wise impact of Lockdown 1.0-4.0 in a digital campaign on social media.



#SmartPowerImpact Tweetchat & Animation Video

#SmartPowerImpact is a digital campaign through which we spoke about the impact of reliable electricity on the lives of customers. This included a content series especially focusing on the impact of COVID-19 pandemic. The campaign took off with an animation video explaining how electricity changes lives, which was well received by our audiences. To gain insights on this issue, we organised a tweetchat with our CEO, Jaideep Mukherji, Ruchi Soni, Programme Manager, Sustainable Energy For All, Ashwin K. Swain, Fellow, Centre for Policy Research, and Reji Kumar Pillai, President, India Smart Grid Forum. The session was moderated by Sarita C. Singh, Journalist, The Economic Times.



SPI IN ACTION

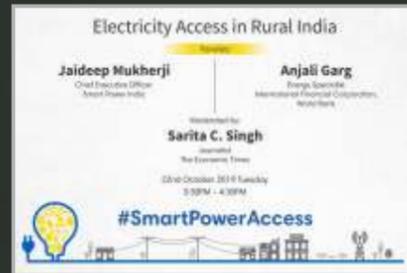
THE SOLVABLE FILM SCREENING IN GUMLA, BIHAR – OCTOBER 2019

We organised the screening of the documentary film “Solvable” as part of the international campaign and summit hosted by The Rockefeller Foundation. We invited customers who were featured in the film which captured the impact of reliable electricity in rural India.



THE ECONOMIST SUMMIT 2019: SETTING THE COURSE FOR SUSTAINABLE GROWTH

SPI participated in the bespoke panel on energy, “The Winds of Change: Towards Renewable Energy” at the annual edition of the Economist Summit 2019 held in Mumbai, India on October 23, 2019.



LAUNCH OF MINI-GRID HANDBOOK: A BUSINESS GUIDE FOR DEVELOPERS AND INVESTORS

SPI launched the Mini-Grid Handbook : A Business Guide for Developers and Investors at the 3rd ARE Micro-Grid Workshop in Bengaluru, India on November 28, 2019. The launch was held during a session focussing on decentralised micro-grids to power India's 21st century rural economy. It witnessed participation of Ms. Sukla Chandra, Board Member, ARE & Senior Managing Director, GE Licensing and Technology Investments; Mr. Samit Mitra, Senior Director, Smart Power India; Mr. Pranav Mehta, Chairman, National Solar Energy Federation of India and Ms. Mohua Mukherjee, Programme Ambassador, International Solar Alliance.



TP RENEWABLE MICROGRIDS LAUNCH – NOVEMBER 2019

Smart Power India is the technical partner to the Rockefeller Foundation and Tata Power alliance TP Power Microgrid, which will provide electricity access to 25 million people through 10,000 new mini-grid projects. The project was launched in a closed event in Delhi and was attended by esteemed personalities from the power sector.



SMART POWER INDIA COMPLETES 5 YEARS! – April 2020

We observed the 5th anniversary of SPI on 1st April, 2020. This was an occasion to celebrate the impact of SPI's work in various fields of socio-economic development in rural India. We also highlighted these issues on our social media channels.



SURF AND SAND: SPI's SUMMER RETREAT! – February 2020

The Smart Power India team went on a refreshing 3-day retreat in Goa in February, 2020. The days were filled with fun activities, water sports and dining – the days just flew by before we knew it.



HOW A MORE INTEGRATED APPROACH COULD HELP END ENERGY POVERTY

By Ashvin Dayal
Senior Vice President,
The Rockefeller Foundation



Four years after the United Nations adopted the 2030 Sustainable Development Goals (SDGs), we face a narrowing window of opportunity to mobilize the disruptive solutions and ambitious partnerships needed to bend the curve and improve the lives of billions within that timeframe. Nowhere is a sense of urgency greater than with SDG 7 (“Ensure access to affordable, reliable, sustainable and modern energy access for all”) – which addresses an area that is both lagging, and simultaneously, viewed as one of the most solvable.

The Rockefeller Foundation is working to apply the lessons from our decentralized rural electrification initiative, Smart Power India, to markets across sub-Saharan Africa. The renewable energy mini-grids supported by the Smart Power initiative in the Indian states of Jharkhand, Bihar and Uttar Pradesh are now powering micro-enterprises and homes in more than 200 villages. Improved energy access has transformed the lives of over 160,000 people, including thousands of small businesses. A joint report, Rural Electrification in India: Customer Behaviour and Demand, launched in February 2019 in partnership with Johns Hopkins University contributes to a growing body of data that shows that low-income, rural consumers are ready and willing to pay for reliable electricity access. Smart Power India mini-grid partners average 97–100% on-time revenue collection, and 80% of household users and 90% of enterprise users report that they are “satisfied” or “very satisfied” with their mini-grid connections.

Figure 4.15: Perceptions of household mini-grid users
Households (%)

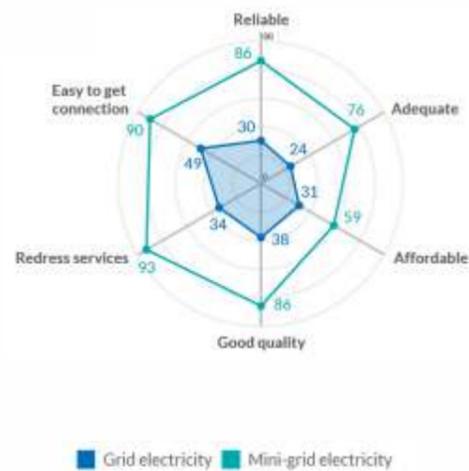
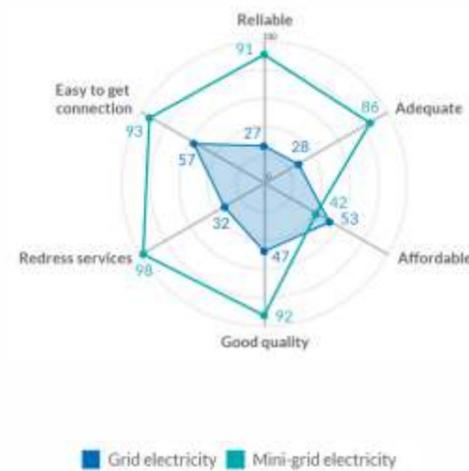


Figure 4.16: Perceptions of enterprise mini-grid users
Enterprises (%)



The mini-grid sector has proved that reliability is key to unlocking latent demand and achieving the full economic potential of energy access in under-served regions. Only with access to reliable power are enterprises likely to employ relatively expensive appliances for productive purposes. When this happens, we observe a triple-win of improved household incomes, increased enterprise productivity and higher revenue for mini-grid operators. This was captured in a third-party impact report on the Smart Power India effort, which revealed that from September 2016 to January 2019, connected businesses experienced an average 49% increase in monthly revenues, with 43% of enterprises purchasing new appliances and equipment to grow their businesses.



Reliability is key to unlocking latent demand and achieving the full economic potential of energy access in underserved regions.

While significant reliability and affordability challenges remain, India is on the cusp of achieving universal grid access at the household level. For sub-Saharan Africa, however, with approximately 600 million people still not connected to the grid, we have a unique opportunity to combine the strengths of both grid and off-grid distribution solutions via integrated electrification strategies to recognize and serve a huge unaddressed market. This will require a dramatically enhanced commitment to collaboration, backed by new tools, incentives and capabilities to roll out electrification in a quicker and more cost-effective manner.

EASING THE GRIDLOCK

Combining grid and off-grid solutions requires utilities to work with off-grid providers to incorporate business models better tailored to the needs and wallets of a poorer rural customer base. For their part, off-grid companies must see themselves as partners of, rather than as alternatives to grid electrification. Only with such a paradigm shift, where utilities and off-grid companies work collaboratively to address the challenges of last-mile electrification, will we see real progress towards ending energy poverty in sub-Saharan Africa. And this is where African governments can play a catalytic role by embracing the potential of the off-grid sector, supporting electrification strategies that integrate the best mix of solutions, and aligning investment and other policies to unleash a new wave of last-mile electrification.

To advance this effort, the Rockefeller Foundation has partnered with Power for All on its Utilities 2.0 report. Bringing together Uganda's largest utility, Umeme, and the private sector, off-grid companies for the campaign's first project in Africa, Utilities 2.0: Integrated Energy for Optimal Impact, was launched by Power for All at African Utility Week in Cape Town, South Africa. This project will provide a concrete example of the kinds of public-private partnerships needed to fundamentally transform the trajectory of energy access in Africa and around the world.

There are still 800 million people living in extreme poverty, most of whom lack access to reliable and affordable electricity. With increasingly integrated economies, energy has become a major requirement for participating fully in economic life – whether it be for irrigation, harvesting, storage or processing in agricultural value chains, or for off-farm service and retail activities. Never before have we seen the end of poverty so dependent on ending energy poverty. And so, never before has it been more essential to disrupt and accelerate the process of achieving universal electrification.

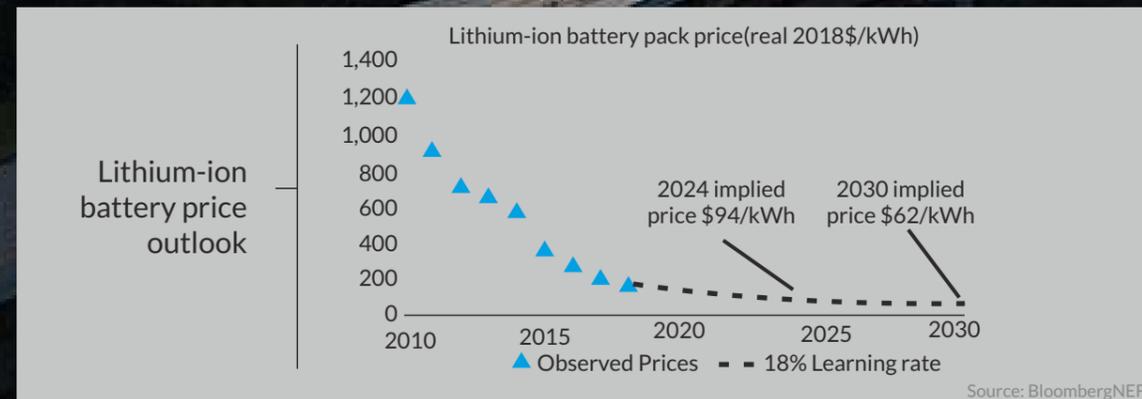
ADVANCED ENERGY STORAGE AND MINI-GRIDS

Ayush Misra
CEO
Ampere Hour Energy

Mini-grids - while once thought of solely as a concept to power remote areas in rural villages or islands, have found a new found interest in recent years. Technological development in the Solar PV and Battery space combined with digital technologies like Machine learning and Blockchain are disrupting the Power sector. In order to better understand the path forward, we look at some clear industry trends:

Falling prices of Li-ion batteries disrupting Lead acid batteries for stationary energy storage

With an impetus towards decarbonization of energy and transportation, governments across the world are coming up with incentives for low carbon technologies. We are witnessing a rising global demand for Li-ion batteries especially in the Electric Vehicle space that is leading to a faster than projected drop in battery prices due to mass manufacturing.



This is resulting in better overall cost economics for mini-grids and energy storage systems with Li-ion batteries as compared to conventionally used Lead acid batteries. New age LiFePO₄ (LFP) batteries offer a much higher warranted life of around 4000 cycles (at ~80% Depth of discharge) as compared to 1000 cycles (at ~50% depth of discharge).

Following are some of the advantages of Lithium-ion batteries as compared to Lead acid

- Inbuilt Battery Management Systems for state of health monitoring
- Lower space and weight, reducing housing and transportation costs
- Lower rate of degradation
- Lower maintenance
- Higher efficiency (~90-95% for Li-ion compared to 80-85% for Lead acid)
- Higher Charge rates (faster charging for Li-ion)

Increasing share of intermittent renewable energy on the electrical grid

With the goal to decarbonize the electrical grid, the percentage of solar and wind energy on the utility grid has been rising sharply in recent years. These sources are intermittent, with high variation during the day and over seasons. As their share on the grid increases, the need for a fast-acting energy resource like intelligent Energy Storage Systems (ESS) becomes necessary. These ESS provide a wide variety of services to the grid - some of which are listed below:

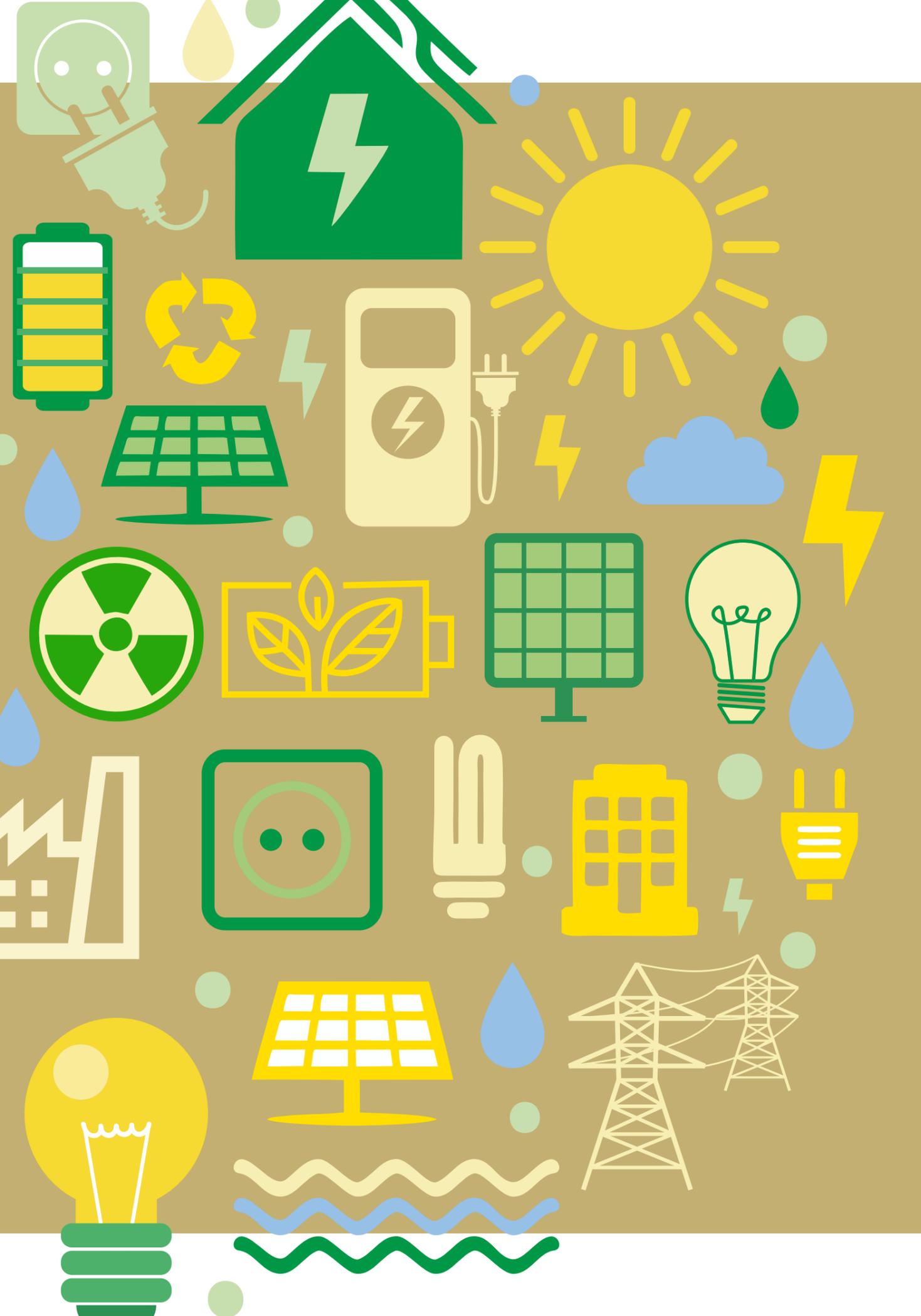
- Frequency regulation
- Peak shift
- Voltage support
- Spinning reserve
- Defer capex in electrical network upgrade

Ampere Hour Energy's energy dispatch software engine ('Elina') is among the first few EMS platforms in India to be deployed on a grid connected ESS asset that helps perform some of the functions mentioned above. We believe these ESS will become the backbone of the low carbon grid of the future, providing the necessary resilience.

Mainland utility reaching rural mini-grids

We are beginning to see a number of remote places where mini-grids are being operated in parallel with the mainland utility either because the mainland utility is still not reliable in remote pockets or the grid reached the remote area after the mini-grid had already been set up. This offers a unique opportunity to mini-grid operators to utilize their assets for providing some of the services to the grid in a de-centralized manner as mentioned in the previous section. This would help generate additional revenue for the mini-grid developers resulting in better project economics.

Thus, moving forward into the future, we believe Li-ion based Energy Storage and mini-grids both at a centralized and decentralized level can play a critical role in integrating higher amounts of renewables on the mainland grid while also strengthening it.



 **SmartPowerIndia**





Smart Power India (SPI), a subsidiary of The Rockefeller Foundation, was founded in 2014 to implement the Smart Power Initiative of the Foundation. SPI enables access to power to the under-served with the larger aim of ending energy poverty and transforming livelihoods. To this end, we are working towards building and nurturing ecosystems to promote sustainable and scalable models to deliver electricity access.

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