



SmartPowerIndia

AUG 2021 - ISSUE 5

# SMART POWER CONNECT

Empowering Rural Communities & Transforming Lives

**Access to Reliable Electricity: Unlocking  
Rural India's Pandemic Response**

**Powering India's Resilient  
Economic Growth**

**Rural Women And The Journey Towards  
Achieving SDG7**





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# **FROM THE CEO'S DESK**

The story of two 'R's:

# **RESILIENCE AND RELIABLE ACCESS TO ELECTRICITY**

Greetings from SPI!

The COVID-19 pandemic has had many firsts to its credit - most of them unpalatable. But, it has also been a reflection of human resilience and grit. For us at SPI our community has always been core to our work, this year more so than ever.

All through the pandemic, we organised various initiatives to minimise its impact on our community. In 2020 when a nationwide lockdown was announced for the first time, we extended support to our mini-grid customers with the Customer Voucher Scheme (CVS). This enabled them to have continued access to reliable electricity and also helped mitigate some of the financial hardships that they faced due to job losses. In 2021, as the second wave of the pandemic hit us, we partnered with organisations such as GiveIndia Foundation, Swasth Foundation, and Eka Care to help people in need of health care. These efforts have helped us stay connected to our customers and strengthen the relationship that we share with them.

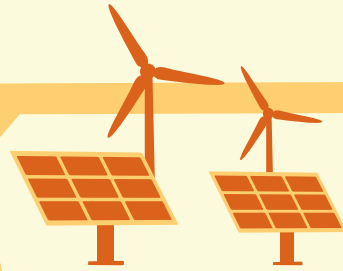
The inspiring stories of young men and women becoming entrepreneurs and generating employment for their fellow community members are a testimony to the impact that SPI has had with its initiatives. As we near our 500th mini-grid plant becoming operational, we seek to realise our vision of providing access to reliable electricity for 25 million people with renewed vigour, while also supporting the government in its efforts of providing '24 x7 Power for All' to its citizens.

Looking back at our journey over the last six years, it is heartening to see the landscape of rural electrification in India evolve. The cumulative efforts of stakeholders have ensured that our villages no longer remain in the dark. We have been fortunate enough to plug into this process through our partnerships with the DISCOMs and also the mini-grid developers to make rural and reliable electrification a reality in the country.





# RAYS OF HOPE

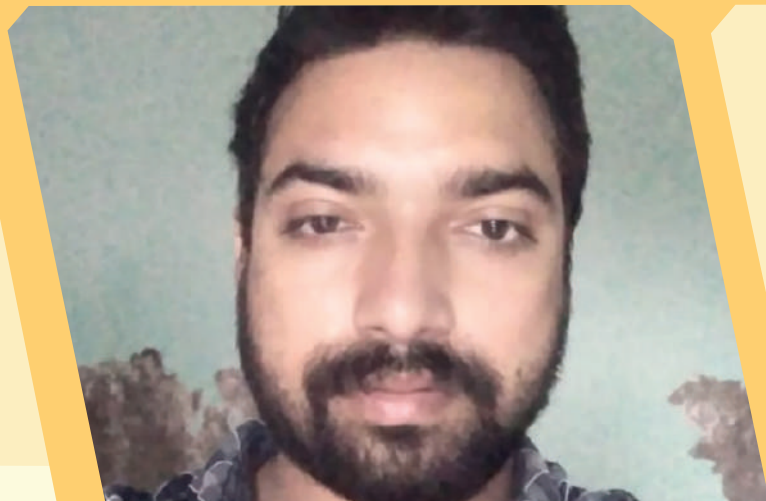


As in many villages in Bihar, Bheldi lacks quality educational facilities and an ecosystem that nurtures children's talents and supports their career aspirations. Consequently, many young people migrate to bigger cities to pursue higher education. Those who are not able to afford the move are left with no choice but to stay back in the village and give up on their dreams. Coaching centers that provide after-school education have proved to be a boon for these students.

Amit Kumar's coaching center - The Brain Reaction center, is one such facility that has been providing services for over 5 years now. The center tutors more than 500 students from grades 8 to 12 and also provides guidance for competitive exams in fields such as the railways, armed forces, IT services, etc.

Initially, Amit struggled with the unreliable supply of power in his village. It was since last year, that he availed of the mini grid services of SPI and Tara Urja. Since then, Amit has been able to run classes for a longer duration, even after dark. The center has a fully dedicated computer section and makes use of various aids such as projectors to make learning more practical and instructional. Amit has even installed a security system to ensure a secure environment for girls to attend classes. "Since the past five years all the toppers have taken tuition in my center," says Amit, beaming with pride.

**"The center has a fully dedicated computer section and makes use of various aids such as projectors to make learning more practical and instructional."**



The arrival of a solar-powered mini-grid in the village of Parsa, Bihar in November 2019 allowed Ruby Kumari to transform her sewing skills into a viable business. Moreover, dependable electricity proved to be a source of comfort for Ruby who was recently widowed.

She breathes easier knowing that she can turn on a light and keep her mobile phone charged. Though the onset of the COVID-19 pandemic had a significant impact on her earnings, access to reliable electricity has allowed her to launch a new venture of making masks for her neighbors.

**"We were managing our lives before, without power. But it is a comfort to have constant electricity when everything else is so unreliable."**

Before the pandemic hit, 38-year-old Ruby used to run a home-based sewing school with 80 students in two classes. Each student paid 650 rupees for six months of lessons. She is now one of 25 seamstresses being paid by Smart Power India (SPI) to supply five masks per household to various districts around Bihar for a combined total of 125,000 masks over a two-month period.

Ruby sews around 50 masks a day with help from her daughter Shalini and also cuts the cloth for her employees to sew. Each one returns 50 finished masks to her every two to three days. Each entrepreneur receives INR 30,000 to INR 40,000, depending on the number of masks they produce.



## COVID-19 PANDEMIC: BUILDING RESILIENCE FOR FUTURE THROUGH UNITED ACTION

A look into SPI's work on ground to respond to Covid related issues through efforts to mitigate the economic fallout and focus on healthcare delivery systems.

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## RURAL WOMEN AND THE JOURNEY TOWARDS ACHIEVING SDG7

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## POWERING INDIA'S RESILIENT ECONOMIC GROWTH

As the Indian economy focuses on coping with the aftermath of the pandemic, the power sector is set to play a significant role in its journey towards building a stronger and more resilient socio- economic fabric for the country.

## FIGHTING ENERGY POVERTY: WHY RELIABLE, AFFORDABLE ELECTRICITY IS KEY TO INDIA'S ECONOMIC GROWTH

Find out how a consumer-centric approach to ensure reliable, affordable, electricity can help improve India's economy.

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## MYANMAR'S MINI-GRID SECTOR: AN UNPARALLELED OPPORTUNITY FOR TRANSFORMATION AT SCALE

Find out how Smart Power Myanmar has transformed more than 220,000 lives to date with on-grid support initiatives.

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## GRID INNOVATION IS KEY TO FULFILLING INDIA'S USD 5 TRILLION ECONOMY DREAM

India needs to strengthen its power infrastructure to meet its economic goals. Read on to find out how grid innovation could help achieve this dream.

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## ENERGY RESILIENCE FOR PUERTO RICAN COMMUNITIES

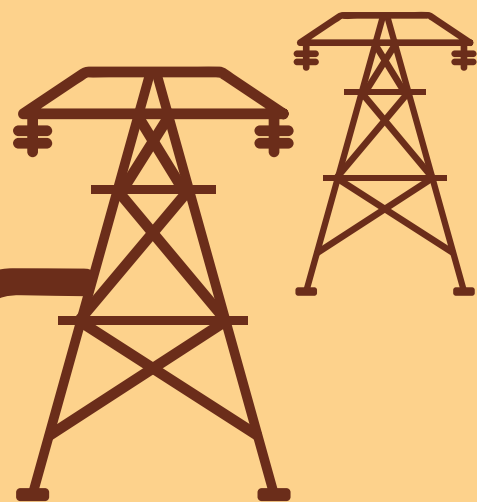
Read on about the efforts Rockefeller Foundation is working to build Energy resilience for Puerto Rican communities through financeable and scalable DRE solutions with proper innovative financing mechanisms.

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# INSIDE THIS ISSUE







# SMART POWER

## IMPACT ON GROUND



ODISHA

### Impacts



Rs 7 CR of revenue added to DISCOM



6.48% losses reduced for AT&C



450+ enterprises connected to the grid



4,500+ households connected to the grid



3000+ Dispute resolution



~ **2,500 MT**

of less CO2 emissions per annum leading to improved health benefits



**160**

Livelihood opportunities created for "Bijuli Didis"

(young women from the community) with potential income of INR 8,000 per month



**23,251**

meters replaced in the program period compared to 3,576 in the same period previous year

**₹10 Crore+**

savings per annum by rural communities due to shifting from diesel/kerosene to electricity



~ **20% increase**



in the Household electricity consumption (From 646 to 743 units per annum)

## MINI GRID



317

UTTAR PRADESH



131

BIHAR



44

JHARKHAND



Impacting lives of 412,952 people



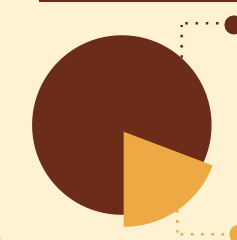
492 plants across Uttar Pradesh, Bihar and Jharkhand



45,467 Overall customers



14.9 MW Overall installed capacity



97% plants use solar energy

3% use solar/biomass hybrid technology



**68**

Institutions



**137**

Telecom & Micro-enterprises



**4,501**

Commercial users & Micro-enterprises



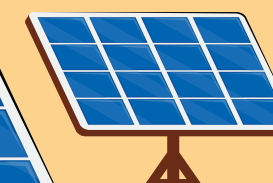
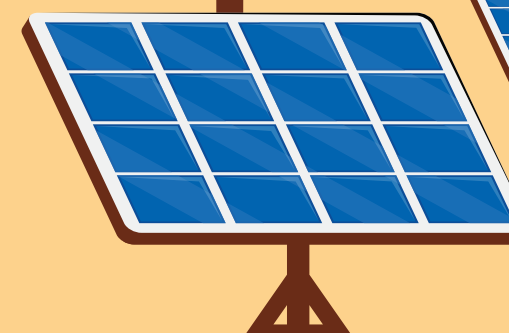
**14,830**

Shops



**25,931**

Households



MDZ

Updated on 5th July 202



# ACCESS TO RELIABLE ELECTRICITY

## UNLOCKING RURAL INDIA'S PANDEMIC RESPONSE

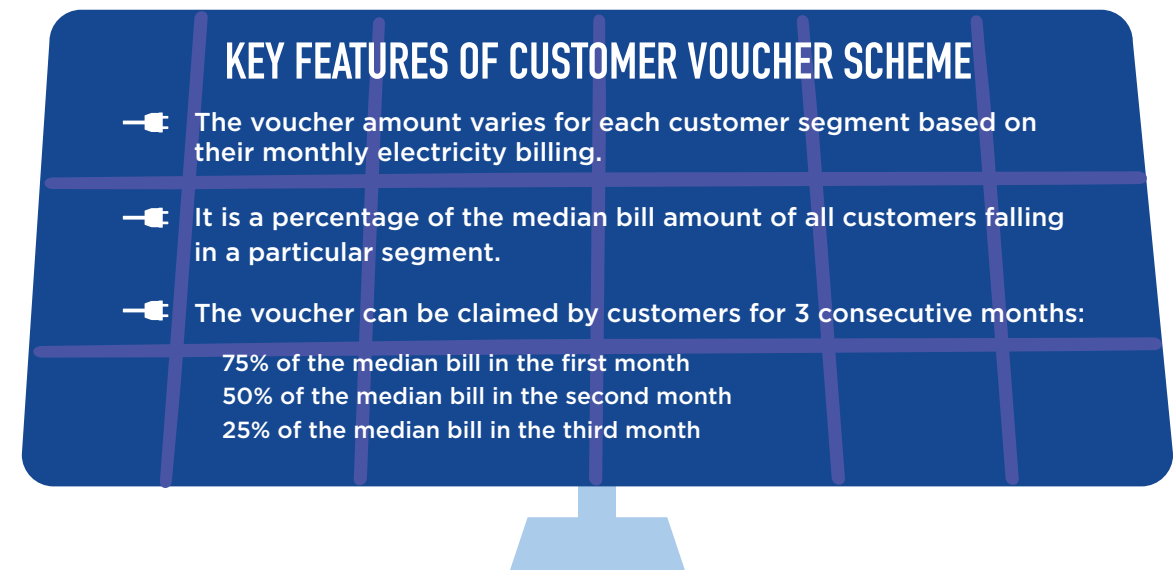


The COVID-19 pandemic has had an especially debilitating effect on rural communities. The immediate impact of the pandemic became clearly visible in the form of shortage in cash flows due to job losses, inadequate supply of essential goods and services, and breakdown of health infrastructure. When everything was uncertain, the one thing that remained constant was the need for reliable electricity to enable rural communities to cope with the pandemic.

### Access to Reliable Electricity to Rural Communities during Pandemic

The critical need for electricity became even more pronounced because of its impact on the functioning of other sectors such as health, education, livelihood, etc. A major task for all the power distributors especially during the lockdown was to ensure a seamless supply of electricity to the community. SPI worked with the ESCOs in Bihar and UP to optimize the operational capacity of the mini-grids and in Odisha with the DISCOM to ensure regular supply of electricity. The distributors played a crucial role in providing reliable and quality power despite depleted workforces and institutional meltdowns. “We were operating at 100% capacity despite COVID-19 restrictions. As a result, we could ensure that our mini-grid customers had access to reliable power during the lockdown”, says Mr. Subhendu Goswami, Head – Business Development at Husk Power, one of SPI’s ESCOs.

Additionally, SPI extended all necessary social distancing and hygiene training to all on-ground personnel and customers. Awareness campaigns and distribution of safety kits helped ensure the safety and wellbeing of our customers.



### Mitigating the Economic Fallout of the Pandemic on SPI's Mini-grid Customers

As India went into lockdown in March 2020, SPI and its partners remained in touch with their mini-grid customers. We also strived to understand the impact that the pandemic had on customers. SPI conducted two customer surveys in different phases to analyze the impact of the lockdown on mini-grid customers in Uttar Pradesh and Bihar. The survey findings, in the first phase, pointed to poor cash flow. Those who had shops and establishments were the worst hit, as only 21% had agriculture as their primary occupation.

As the pandemic led to a decline in cash flow and job losses, people in rural India started prioritizing their spending on food, safety, and shelter over non-essentials like electricity. As a result, the consumer demand for electricity witnessed a drop. SPI introduced the Customer Voucher Scheme (CVS) to ease the economic burden on mini-grid customers and revive demand, allowing customers to continue to access reliable power even during the lockdown. The scheme provided them with a direct cash discount of up to 75%, over a 3-month period in their electricity bills.

“Rural communities were under financial stress as cash balances got depleted due to the lockdown. As a result, many customers either started defaulting on their payment, or requesting disconnection, or trading down on their service packs. Through the customer voucher scheme, we were able to provide crucial financial support to our mini-grid customers and help them continue to access reliable electricity,” explains Samit Mitra, Director – Program Implementation at SPI.

We also continued with our focus on micro-enterprise development and supporting existing customers who have small businesses that were in need of reliable power to be kept afloat. Micro-enterprise development is a key area of focus as it helps spur economic

activity and job creation for rural communities. Therefore, it was critical to support the existing micro-enterprises with interest-free loans and sufficient working capital to operate during the pandemic.

### Reliable Access to Electricity: A Critical Cog in the Healthcare Delivery System

The pandemic underlined the critical need of reliable electricity for a robust health care system. A joint study by the World Health Organization (WHO) and the World Bank recently noted that without access to electricity, many life-saving interventions cannot be undertaken, which is especially true for a country like India where a large majority of the population still lives in rural areas, without access to basic power services.

SPI's survey revealed that a majority of the respondents reported that they were not in a position to arrange doctor's consultation immediately in case of symptoms and that there was no COVID-19 care facility accessible to them. With the manifold increase in COVID-19 cases during the second wave, the life-saving role of the power distribution system became clearly visible.

SPI in partnership with key healthcare organisations initiated a series of relief efforts such as provision of oxygen cylinders, ration kits, tele-medicine consultations; and PPE kits for frontline health workers and rural communities. SPI also supported Eka Care, an app offering free-of-cost online consultations with available doctors.

As India emerges from the damaging impact of the pandemic, the need of the hour is to implement innovative solutions that will address the critical need for electricity in rural India and its role in enabling holistic economic and social development.





# POWERING INDIA'S RESILIENT ECONOMIC GROWTH

**Dr. Rajiv Kumar, Vice-Chairman, NITI Aayog**

India has traversed a long journey having emerged from a state of significant electricity deficit to a state of adequate supply to meet its citizens' demands. Today, the country stands proud having achieved widespread electrification ahead of the target timeline of 2022 - a success acknowledged globally. Led by the Central Government's ambitious vision to electrify everyone in the country and backed by programs like Deen Dayal Upadhyay Gram Jyoti Yojana, Saubhagya, and several State Government schemes, electricity connections have been made available to more than 750 million people over the last two decades.

Electricity access will be crucial to India becoming a USD 5 Trillion economy, with robust electricity supply infrastructure to industries and other segments forming the backbone of the economy. Currently, electricity amounts to only 17% of total energy consumption in India with a target of increasing it to 26% over the next one to two decades. With the imminent growth, it is now crucial to focus on the sustainability of electricity access and enhancement of demand amongst various consumer sectors. It essentially percolates to expanding access to a wider group of customer categories, as well as to ensure the commercial viability of the state-owned electricity distribution companies (DISCOMs)

India's power sector has historically struggled to sustain quality and affordable electricity supply in rural hinterlands due to operational and financial losses, leading to a lack of focus on the quality of supply and customer services. The government's reform initiatives like Ujwal DISCOM Assurance Yojana (UDAY), Integrated Power Development Scheme System, and Smart Grid Mission, etc. are steps being taken in this direction.

A study undertaken as part of NITI Aayog's Statement of Intent with the Rockefeller Foundation and its Indian subsidiary Smart Power India, 'Electricity Access in India: Benchmarking Distribution Utilities', provided a baseline of performance of DISCOMs on electricity access and their existing capacity to achieve targets. An insight from the study stated that focusing on operational and institutional processes is expected to drive better financial performance of the utilities as compared to only prioritizing capital investments. It also captured experiences of DISCOMs performing relatively better in solving fundamental bottlenecks that can also be adopted by other utilities looking for alternative mechanisms to improve performance.

As the Indian economy focuses on coping with the aftermath of the pandemic, the power sector is set to play a significant role in its journey towards building a stronger and more resilient socio-economic fabric for the country.



# DISTRIBUTED RENEWABLE ENERGY:



## An Enabler for Transforming and Powering Rural Lives

India has made huge strides in its pursuit of universal electrification by ensuring that each of its 664,369 villages has access to the government grid. However, the electric power consumed per capita in India is only 804 kWh, which is 75% less than the per capita electricity consumption in the world. The number is even lower for rural India, as the average electricity consumption per capita is estimated to be 468 kWh.

Many parts of the country, especially rural pockets, still continue to struggle with poor quality of electricity supply along with frequent power outages every day. Rural customers are dissatisfied with the quality and reliability provided by the government grid, but there is little incentive for distribution companies (DISCOMs) to improve the situation. DISCOMs perceive rural markets to be unprofitable due to high Aggregate Technical & Commercial (AT&C) losses, poor infrastructure, and challenges in metering, billing, and collection.

Insufficient access to reliable electricity affects not only the quality of life of the 900 million people living in rural India but also their agricultural and industrial productivity. Small enterprises in rural areas rely heavily on fossil fuels and do not have access to adequate, high-quality electricity. Mini-grids have the potential to serve this segment reliably, thereby helping the government not only to achieve its mandate of universal electrification but also increasing the mix of renewable energy in its energy mix.

## Powering Rural India's Economic Dreams through Reliable Access to Power

PROVIDES ELECTRICITY TO

492



VILLAGES

TRANSFORMING LIVES OF

380,447



PEOPLE

⚡  
SERVES 2412  
RURAL COMMERCIAL LOADS

We, at Smart Power India (SPI), the key agency implementing the Rockefeller Foundation's Smart Power Initiative, started our mini-grid programme in 2015 with a vision to spur economic development in villages by ending energy poverty and transforming the lives of the underserved rural population. As of June 2021, Smart Power India facilitates the largest mini-grid portfolio in the world, providing electricity to 492 villages spread across multiple districts in the states of Uttar Pradesh, Bihar and Jharkhand. SPI presently supports 13 Energy Service Companies (ESCOs) in transforming the lives of over 380,447 people in rural India. The Smart Power Initiative also serves 2,412 rural commercial loads including 344 electricity-based micro-enterprises, directly incubated by SPI.

Over the past six years, SPI has been working closely with a wide range of stakeholders to develop the ecosystem needed to conceptualize, catalyze and scale up the Distributed Renewable Energy (DRE) mini-grid sector in India. SPI works with ESCOs to successfully implement and operate smart solar mini-grids by leveraging the learnings gathered from facilitating the growing portfolio of 492 mini-grids. We provide support across all aspects of the value chain of mini-grids including financing, technical assistance, community engagement, load acquisition, and even working along with the central and state governments in establishing a conducive policy and regulatory environment.

SPI has transformed 380,447 lives by supporting 13 ESCOs that use a host of varied business models to build scalable and sustainable mini-grids. Our ESCOs have successfully demonstrated sustainable and scalable business models including telecom-based anchor models, market-based mini-anchor models, and micro-enterprise-based mini-anchor models. It is important for SPI to encourage ESCOs to explore dynamic models for their businesses so that they are able to leverage cost reductions and technological advances to improve the techno-commercial viability of their mini-grids.



OMC Power, one of our ESCO partners, operates 94 mini-grids that have telecom towers as anchor loads in Uttar Pradesh. SPI supported OMC to implement its first mini-grid without a telecom load by providing assistance across business plans, financial models, and sharing learnings about community engagement and load development through the pre-build and build phases of mini-grid implementation to ensure the development of a viable mini-grid project. This plant in Hardoi district of Uttar Pradesh presently serves 270 rural customers and is well positioned to bring in socio-economic development in the village through the layering of clean drinking water, electric vehicle charging and rural tele-diagnostics in the days to come.

Mlinda, one of our other ESCO partners, has been able to successfully demonstrate a micro-enterprise based mini-anchor model in an extremely difficult Naxalite environment in the Gumla district of Jharkhand. Mlinda operates 44 solar-based mini-grids with a total installed capacity of 985kW kW powering over 7958 tribal households and 170 agri-based productive loads. SPI has worked closely with Mlinda to develop micro-enterprises in these villages by ensuring forward and backward market linkages along with providing access to various energy-efficient appliances. To ensure the commercial viability of the mini-grid, Mlinda works with the local agriculture-based community to drive use of motorized machinery including water pumps, rice hullers, pulverizers, oil expellers and cold storage units. Manoj Sinha, Founder and CEO, Husk Power Systems - Minigrid Program says, "mini-grid plants are critical enablers for transforming rural economies. Our experience in working with rural communities suggest that access to reliable power can create economic and social opportunities for people living in underserved areas. Mini-grids can be effectively deployed in rural areas to spur economic activities, provide better healthcare access and unlock entrepreneurial potential."

Smart Power India's experience has shown that there is a US\$ 18.50 per capita increase in the village GDP, a measure of economic progress and social benefits for the rural communities. Households in mini-grid villages have increased their power consumption by 25% and micro-enterprises by 460%, primarily due to the reliability factor. This is beneficial to the community as it has been widely accepted that poverty reduction cannot be achieved without an increase in electricity consumption. Access to adequate, 24x7 electricity has a positive impact on health outcomes as health-centres become more reliable, and respiratory difficulties and accidents due to kerosene lamps are enormously reduced. The Smart Power Initiative has also provided rural communities access to safe drinking water as water treatment plants have been established as sustainable mini-anchors in mini-grid villages. Electricity from mini-grids has also provided children with an average of two more hours of study time, women with a greater sense of security because of increased lighting, and farmers with less expensive water pumping for irrigation. Mini-grids, along with the services they enable, have the potential to be significant drivers of rural development by bringing in electricity as an enabler to bind other sectors together leading to holistic community development.

For more information on mini-grids, read our 'Mini-Grid Handbook' available at <https://smartpowerindia.org/>





# BUILDING A ROBUST MICRO-ENTERPRISE DEVELOPMENT ECOSYSTEM FOR RURAL INDIA: A FRAMEWORK FOR GENERATING DEMAND

Electricity is critical for economic and social development. Off-grid clean energy solutions have an immense potential to create a flourishing ecosystem for sustainable development in India as it continues to power millions of unelectrified and under-electrified households and enterprises. For a country with 70 percent of its population living in rural areas, an increase in micro-enterprise activities not only leads to a rise in demand for electricity but also results in improved economic activities and social development.

SPI remains deeply committed to supporting micro-enterprise development activities through its ESCOs partners for higher capacity utilization of mini-grids that positively contribute to their financial sustainability. The cost of a mini-grid is sometimes only justified when productive loads—especially daytime loads—are large enough to supplement the night-time household loads. To ensure that electricity is used for productive end uses, ESCOs need to put in additional efforts in developing village level micro enterprises which depend on the mini-grid. ESCOs need to

invest resources in training and capacity building of the local community in order to stimulate the creation of micro enterprises. The key consideration that the ESCO needs to keep in mind is that micro enterprises are likely to come up or existing micro enterprises may subscribe to the mini-grid sooner than later. This means identifying the likely micro enterprises early on and assisting them in developing strong business plans and identifying financing modalities is very important. Development of micro enterprises also helps in:

- Adding new services other than electricity where micro enterprise has become available to the local community.
- Creating social impact on livelihood/health/education of the local community which results in higher acceptance and use of the mini-grid.

## Enabling Micro-enterprise activities in Rural India through Mini-grids

From a mini-grid perspective, a micro enterprise is defined as an enterprise which can act as an anchor load for the grid. Anchor load is an activity or enterprise which has a contribution towards capacity utilization of 30 to 60% of the total electricity generated by the mini-grid consistently and mainly as a day load.

### The '5S' for Framework for Micro-enterprise Site Selection

Making the right selection for micro enterprise is a complex task because of the number of factors to consider. The decision becomes even more intricate when there are competing factors and activities which can be set as micro enterprises for new demand. This therefore calls for a structured approach to new demand generation. Assessing this need, SPI has developed '5S' Framework as an approach to selection of micro enterprise.

The Micro-Enterprise Development program follows the '5S' framework to help a practitioner to select a micro enterprise keeping sustainability at the center.

The '5S' model is made up of five broad components and their subcomponents. The following figure describes the framework and its components. The reason towards its representation as a 'key' is driven from the fact that it acts as a key or guide to an ESCO for selecting a micro enterprise keeping all the factors in consideration.

## COMPONENTS OF FRAMEWORK

### Site Identification and New Demand Potential

This is the first component and it comprises two sub-components Demand Conditions and Factor Conditions in the context of electricity demand. On the basis of the data collected at the time of site selection economic activities or sub activities are identified. Site assessment gives a list of possible economic activities that can be taken up. In the context of electricity demand the components of Site Selection are explained as below.

- **Factor Conditions** - These are conditions which are advantageous to a particular type of enterprise in a given area. From a mini-grid perspective, it covers the presence of surplus raw material and current source of electricity suited to micro enterprise as important factor conditions.
- **Demand Conditions** - These are analyzed from the perspective of leading to potential demand for the output of the micro enterprise. Demand conditions themselves refer to local demand, external demand, mild competition, cost competitiveness, and the presence of alternatives.

A number of economic activities may come up during the site selection, however, only those activities are shortlisted which have electricity demand and in the future can act as 'Anchor Load' as described earlier and is mostly consistent throughout the year.

## Scale Potential

It is the second component of the framework and refers to the potential to scale the micro enterprise. It is measured through load suitability and replicability of the activity as explained below:

- **Load Suitability** - This refers to the identification of an activity that fits as an anchor load. Furthermore, the requirement for single phase or three phase connection requirement, electricity surge, and voltage requirement by the specific load in the catchment area of the solar mini-grid should also be considered.
- **Replicability** - This refers to whether the activity is scalable over time as a function of both output demand as well as an increase in electricity demand. Moreover, this also refers to whether there is a latent demand in the local market that can be tapped. The water treatment unit can be taken as an example which shows the potential to scale as more and more households are adopting RO filtered water with an increase in awareness. Also, there is a latent demand outside the catchment areas of the mini-grid which can be tapped.





## Support Required

It includes all required support and associated costs and time which need to be factored in while calculating sustainability. Therefore, while selecting a micro enterprise, cost comparison vis-a-vis electricity utilization is also required. This component refers to support related to

- ⚡ **Financial Linkages** - linking the enterprise to formal financial institutions for credit / line of credit for working capital and other financial services.
- ⚡ **Market linkages** - linking the buyers of the output with the micro-enterprise.
- ⚡ **Marketing and Branding** - establishing the product as a brand and activities related to promoting the brand.
- ⚡ **Capacity Building** - managerial and technical capacity building.

## Sustainability

This forms the core of a micro enterprise and refers to assessing the financial viability of the project. There is no fixed definition of financial sustainability; however, from the point of view of new demand, financial sustainability refers to a list of activities or activities which generate surplus/profit which is enough to keep the business running for a long time.

By the time financial analysis starts ESCO will have a much shorter list of potential activities. Moreover, by this time a lot of information helping to build the assumptions for business models has already been gathered by the field team which will help in realistic projection and analysis.

## Selection

This refers to the final step for choosing a micro enterprise basis its alignment with the impact an ESCO wants to achieve as per its organizational objective. Depending on the objective of the organization - social, commercial, or mixed, the final selection of the micro enterprise takes place.

Water treatment units, irrigation pumps, oil expellers, bulk milk chillers, flour mills, pulverizers, and rice hullers were found to be highly scalable in Indian villages. Micro enterprises such as honey processing units, apparel manufacturing units, bakeries, cold storage, and pellet machines were found to be region-specific.

Till date, SPI along with its ESCO partners supported more than 490 plus micro enterprises providing impetus to the socio-economic indicators in the rural areas. Only with access to reliable power are enterprises likely to employ relatively expensive and sophisticated 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.

SPI aspires to enable the generation of demand for reliable electricity, impact the mini-grid sustainability, support micro-enterprises, and the well-being of the rural community.

## PEOPLE SPEAK

"Mini- Grid electricity is reliable and ensures that product wastages are bare minimum. The quality of my product has improved which has helped me gain the trust of my customers. During COVID lockdown, I was one of the few shopkeepers who could continue selling."  
- Baratilal, Sona Traders, Sonwa, Uttar Pradesh

For more information on micro-enterprise development, read our 'Demand Generation Manual' available on <https://smartpowerindia.org/>

# BOOSTING POWER DELIVERY IN INDIA THROUGH BETTER DATA MANAGEMENT

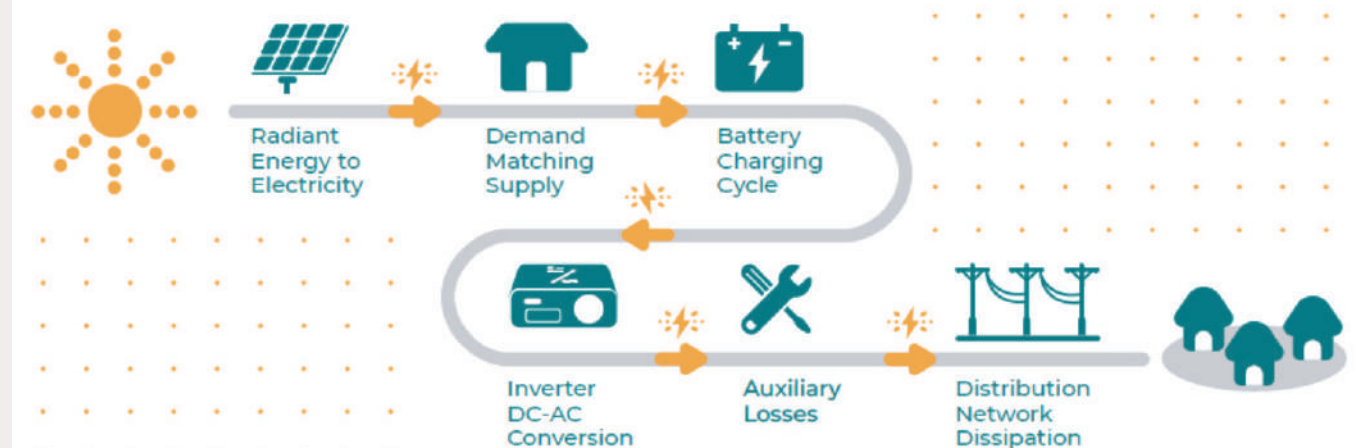


Smart Power India aspires to nurture an ecosystem for the private sector that can scale up distributed renewable energy-powered mini-grids to electrify underserved parts of rural India and thereby drive socio-economic development. Rural mini-grids are one of the most challenging businesses to be in. They are perceived to be a very high-capital investment business, done in very remote rural areas, servicing the most vulnerable customers and often in competition with state-funded power companies that deliver power at very subsidized rates. Also, most of the customers such as small enterprises (flour mills, oil expellers, carpenters) use inefficient motors and power tools that are either not maintained properly or are very old. This puts a lot of pressure on the mini-grid plant to deliver reliable power.

A robust data management system is essential to increase the efficacy of a mini-grid plant. The need for such a system arises because of a variety of challenges that SPI's partners faced as their plants aged and their customer base increased. In several of the mini-grids, it was observed that the plants were not able to support certain high load customers, despite them not running to their maximum potential. It became apparent that the system was not running as efficiently as it should. First, the challenges were diagnosed by conducting technical audits and the need was real-time plant-level information for timely maintenance and upkeep of these plants. This led to SPI building an in-house data management system to gather data from the field. It is hosted on the cloud and consists of a number of mobile apps and a web-based dashboard.

The system is integrated with power electronics that give the generation side data and with smart meters that give consumption side data. This helps ESCOs measure exactly how efficiently the system is operating against benchmark performance. The journey of an electron in a solar mini-grid is fascinating as it travels from the solar panel and has to go through a number of electrical conversions on the way to the customer through a distribution network. SPI's system gives in-depth data of all these conversions. Right from what is coming into the system and what is going out. It helps identify specific problems such as inverter faults, battery charge ups, generation side issues, etc. SPI monitors about 300 data points including technical and operational indicators, which come to the platform at various levels of frequency. For instance, the electricity consumption data from smart meters or inverter output comes every 15 minutes, but a customer's billing, metering and collection data comes once a day.

## Points of energy loss on the journey from sunlight to electricity.





SPI also has a couple of mobile apps, one for the field agents, which is used to record their daily activities (such as plant maintenance, customer billing, etc.) and one for our customers, which they use to register complaints and track their electricity consumption. From the mobile app, it is possible to switch off or on, any customer's meter, or run diagnostics on plant performance pinpointing any ongoing problems. On the technical side, the system allows for the tracking of system efficiencies really well and identifies, for instance, a faulty solar array that is generating less power. On the business side, it allows for the tracking of customer payments and usage behavior over time. And most importantly, the system helps in the creation of a larger historical database.

Improvement in data management has quite significantly boosted the overall efficiency. When SPI did the technical audit of some of its plants, the system efficiency was around 60% - this has increased to as high as 75% by taking several corrective measures based on data analysed. It is now possible to track who is adhering to their maintenance schedule through the mobile app and dashboards. On the business side, the top management can now track their field team and communicate with customers on a real-time basis, and address their problems with a quick turn-around time.

The challenges seen in India are not necessarily the same as those seen elsewhere. In much of Africa, especially sub-Saharan Africa, many mini-grids are underutilized when they are first installed because the use is largely among relatively low-consumption households as commercial activity is limited. In Africa, mini-grid operators focus more on business development, on getting more commercial customers over time, such as small and micro enterprises and agriculture customers. In India, our mini-grid villages are bustling with existing commercial activity, and it is important to note that the main grid is everywhere, unlike many parts of Africa. So, a lot of the customers, such as households, actually use mini-grids as backup power to the main grid and commercial customers use mini-grid as a primary source of power because they want reliability.

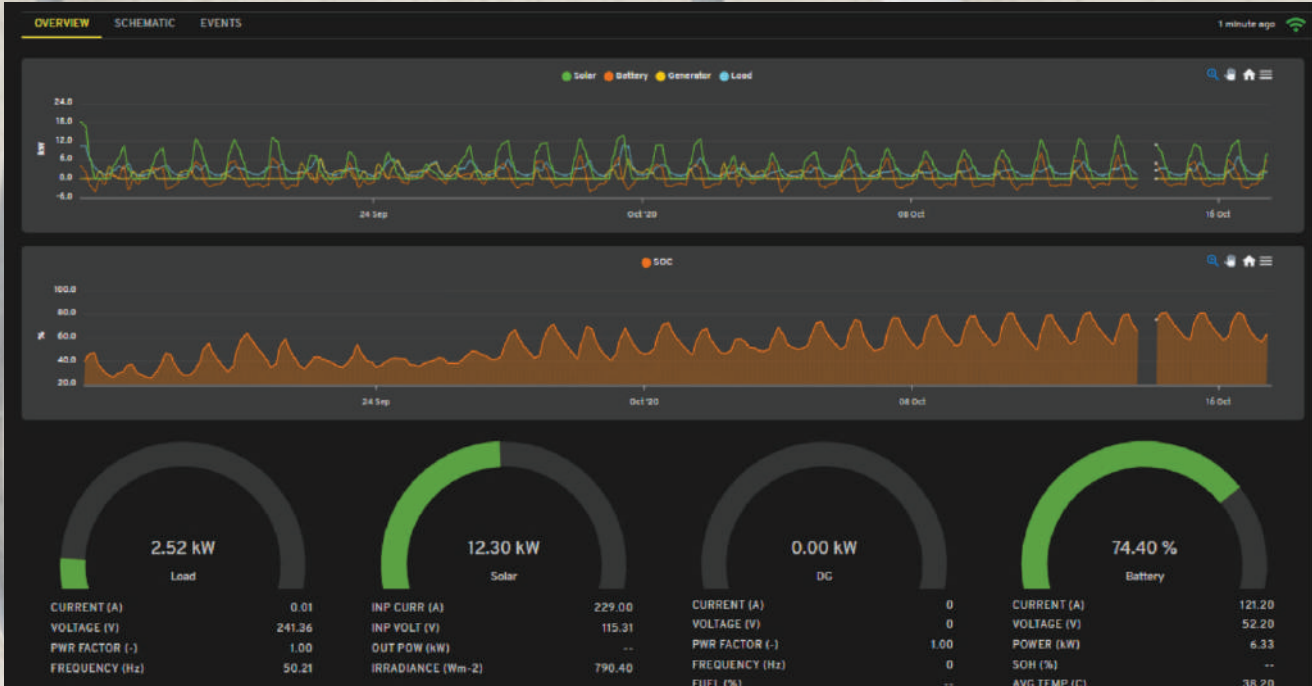
The demand is quite high very early on and it becomes imperative that the system runs at high efficiency.

One of SPI's key roles is to motivate and inspire global and regional technology companies to take the rural electrification sector, especially DRE technologies, and its specific challenges seriously. Avoid offering products that might not work with SPI's on-ground technology such as an off-the-shelf inverter made for captive consumption of large industries. Or an off-the-shelf battery built for urban markets where the grid is more reliable. Innovation in storage technology is the make or break for the mini-grid sector as solar only generates for 5 to 7 hours a day and we must supply affordable power around the clock. Current storage costs are too high, and all the innovations right now, specifically in the Lithium-based storage solution, are focusing on the electric vehicle market. Solar panel prices are going down, but batteries remain the biggest challenge. Another technology breakthrough needed from the demand side is the development of super-efficient productive use machines that can be made available in rural areas to replace the inefficient ones - such as food processing mills, power tools, etc.

One solution that can truly prove to be transformative right now is low-cost smart meters. The current meters cost upwards of \$60, which is far too much investment from an ESCO for a customer who pays less than \$2 a month for their electricity. Low-cost smart meters would greatly increase SPI's ability to have 100% of the customer base on them and have historic consumption patterns to inform decisions.

It is important for people to understand that SPI is not just trying to bring enough electricity to turn on a light bulb. If that were the case, SPI could just provide every rural household with solar lanterns. The goal is to bring access that allows for sustainable economic development that really comes from income-generating activities via the productive use of electricity. In that regard, it is important to talk about what SPI calls the modern energy minimum—the per capita consumption baseline that allows for there to be real economic development. The fastest, and probably the cheapest way, to bring reliable, clean, and adequate amounts of power to large, underserved communities of the developing world now is through distributed renewable-based technologies such as the mini-grids.

For more information, read our 'Technical Monitoring Guide' on <https://smartpowerindia.org/>



# ENERGY ACCESS THROUGH A GENDER LENS

In conversation with Sudeshna Mukherjee, Director - Operations, Hamara Grid

## 1.How do you see the gendered aspects of the conversation on recovery from COVID? What are the impacts of COVID19 and the accompanying economic shock on the women community?

Covid had a debilitating impact on rural communities, especially for rural women in terms of contracting the rural economy, reducing household incomes, increasing unemployment, limiting mobility, and curtailing active participation in local enterprises. Added to these economic shocks, an increase in household drudgery and health risks, domestic isolation with limited access to basic facilities, and related insecurities made the situation even more challenging and vulnerable for rural women. All kinds of barriers - be it domestic, institutional, systemic, as well as gender, made the COVID-19 recovery path for her and her family even more complicated.

I have closely worked with rural women over two decades and have seen them emerge as local champions of change in challenging situations. As part of their Covid recovery journey, women have actively reached out to self-help groups and NGO platforms to revive some local enterprises. These local conduits have been instrumental in reconnecting them with income generation activities and increasing family incomes. Local governance structures and State/ Central administration have extended financial benefits and skill training to rural women to start local enterprises. However, to make these recovery solutions more effective on the ground, there has to be greater coordination of local actors, packaging of 'need-based' interventions for rural women, and collection of gender-disaggregated data on impact.



**2. Being the primary caregivers for families in rural India, women form an important part of the potential electricity consumer base. How can we encourage the use of clean sources of energy and energy-efficient appliances among them? COVID19 and the accompanying economic shock on the women community?**

Rural women constitute an important part of the electricity consumer base in rural India. It is crucial to recognize this and target rural women as a separate social category (as against generic rural communities) when promoting clean DRE solutions. We can encourage the use of clean DRE solutions and energy-efficient appliances through them in the following manner:

- Build their capacities and make them aware of DRE solutions and energy-efficient appliances
- Extend financing support to rural women for them to be active advocates of clean energy solutions, energy-efficient appliances, and clean energy-based enterprises in the village
- Encouraging peer to peer engagement amongst rural women is very effective towards promotion of Energy efficient appliances
- Build their capacities on local business growth. Involve them not only as promoters but also as active local entrepreneurs in the villages. Women-headed enterprises should lead the way for a sustainable and inclusive rural economic growth. Create local champions of change to lead by example
- Populate a particular geography (district as an administrative unit) for visibility, scale and impact

**3. How do you see this role evolving outside the household and in the community, through access to modern and reliable energy?**

There is enough evidence on the ground to testify to the evolution of rural women from domestic caregivers to active rural entrepreneurs. She is no longer confined within the four walls of domestic drudgery. Access to clean and modern technology at the doorstep through diverse DRE solutions along with low-cost financing solutions have made this transformational change sustainable. This has been accelerated through the following interventions across rural business value chains, impacting both individual and systemic changes:

- Identification of appropriate technology for rural women with gender-friendly machine ergonomics
- Capacity building of rural women on the technology
- Training on managing end to end business
- Training on engaging with local stakeholders
- Access to low-cost finance and markets
- Mentorship and handholding
- Achieving scale
- Creating visible impact for policy information

Hence, it is important for the system actors to create this enabling environment for the rural women to emerge as true champions of local change and sustain the process of inclusive rural economic growth.

**4. Do you agree that women should hold a prominent place in the discussions during COP26? What would be the key issues?**

Gender planning for climate action through equitable growth should be in the forefront of COP26 global discussions. This becomes all the more crucial in the post-COVID-19 scenario where economies are staggering and the impact remains enormous- be it on healthcare, education, politics or policy information. In this context, some of the key issues that may be proposed in this global policy platform driving critical climate action are:

- Global Alliances and coalitions to promote women-led BOP clean energy businesses, towards building resilient, low-carbon rural economies
- Role of women in the energy transition to a DRE-driven low-carbon economy, towards cheaper renewables
- Climate financing towards the growth of women-led clean energy rural enterprises for a zero-carbon economy
- Gender-integrated nature-based solutions(NBS)

**5. Could you elaborate on how enabling women can lead to a trickle effect charging the rural society and economy?**

Empowering rural women and making them active entrepreneurs can have a transformational impact on strengthening the rural economy and livelihoods. This can lead to the growth of local businesses, greater household incomes, and enhanced socio-economic benefits for the family as a unit. Empowering rural women economically through DRE solutions also contribute to improved participation, increased mobility, and greater participation in decision-making processes. Local women champions of change inspire other rural women to come forward and encourage them to be active participants rather than passive recipients of energy in the clean energy ecosystem.

**6. Could you share any instances of success stories that you may have come across, of empowered women enabled by energy access?**

We had worked with a women's self-help group (5 member tribal group) in Pasanga village, Gumla district, Jharkhand in June 2017 to build their skills in the rice-hulling business. Ghasni Devi, the SHG leader, took the lead in convincing the group to take up this clean energy business powered by the solar mini-grid. We developed the business model with inputs from local women and explained the model to SHG group



members in the simple, local language. We trained them on running the electric rice huller machine effectively by using mini-grid electricity.

With SPI's support, we helped finance the electric rice huller machine as the women did not have access to institutional finance at that point in time. Access to financing was a game changer for these women. They independently developed business linkages within Pasanga village and in the neighboring villages for paddy procurement for hulling and selling rice in local markets. They also hulled paddy for domestic consumption. We supported them in developing market linkages in Gumla town. The by-product chaff/husk was sold as cattle feed locally and acted as another revenue stream for them. Today, this group has turned into a successful rice huller entrepreneur group and is earning Rs. 18,000- 22,000 per month (October to April) during the peak season and Rs. 14,000 - Rs. 15,000 (May to September) during the lean season. Their families also participate and support them in this clean energy business.

This tribal SHG group has also helped in incubating additional 2 SHGs in this rice hulling business and over 5 women huller entrepreneurs in other mini-grid villages in Gumla, Jharkhand.





## 7. What is the future? How has our strategy to achieve the SDGs shifted in the context of COVID, and where do we see women, especially in rural areas, playing a special role?

We all agree that the realization of 17 SDGs can effectively happen with the integration of gender equity. It is of critical importance that women actively participate and play a key role in transforming rural lives and livelihoods. Essentially it is SDG7 for SDG8 which means access to clean, reliable, affordable, and modern energy leads to sustainable and inclusive economic growth. This requires an active gender inclusion approach and collaboration of actors on gender-centric planning, implementation and monitoring processes. It is important to recognize the special contribution of rural women as a trigger to put the rural economy back on track, especially in post-Covid scenarios, and create an enabling multi-layered, inclusive architecture to support rural women to realize their full economic potential. Rural women's economic empowerment depends on our analysis of the constraints, context and capacities of proposed solutions and hence it is imperative that we all act in a collaborative and coherent manner to take this agenda forward. It's time we realize that we can scale upwards by scaling down!



## RURAL WOMEN AND THE JOURNEY TOWARDS ACHIEVING SDG7

**Damilola Ogunbiyi** - CEO and Special Representative of the UN Secretary-General for Sustainable Energy for All, Co-Chair, UN-Energy

The SDGs advocate for equal and equitable development, an objective we can't achieve without ensuring opportunities for women. Rural women, one of the most vulnerable demographics, play a critical role in achieving Sustainable Development Goal 7 (SDG7) – access to affordable, reliable, sustainable, and modern energy for all by 2030.

Rural women end up contributing a lot to the economy through their involvement across various tasks generally assumed to be associated with men. Drawing from their entrepreneurial approach of growing solar businesses or growing produce for local sale, access to electricity and clean cooking fuels changes lives for women in rural areas. As community leaders, women are also best equipped to advocate for the energy needs of their neighbours.

Women around the world also make substantial contributions to agriculture production, amounting up to 60% in some regions. They shoulder the burden of unpaid care and domestic work and are often responsible for the food security of their families. Their leadership is key to managing community resources. Women are well-equipped to build community resilience to the impacts of climate change. In rural communities across many developing nations, women are on the front lines of the sustainable energy transition. And access to reliable electricity can dramatically improve their lives, helping alleviate many time and labour burdens.

For instance, reliable access to water through solar water pumps can cut the downtime required to collect water. Cookstoves powered by clean power eliminate the need to cook over harmful fuels for hours at a time and simple lanterns provide an element of safety or opportunity to extend the day past sundown.

Access to reliable electricity plays an integral role in helping rural women attain equal and equitable development. It allows them to be economically productive, leading to higher incomes or formal employment opportunities. Improved energy infrastructure can also support community resources such as schools for young girls, access to sanitation or healthcare clinics.

Now, as the world continues to deal with the pandemic, women are increasingly vulnerable due to reductions in access to healthcare. A look at the cold chain that will likely be necessary for a COVID vaccine tells us that energy access will play an essential role in ensuring women across rural communities have access to COVID solutions and long-term care. As countries seek to "Recover Better"<sup>(1)</sup> from the crisis, it is absolutely critical to put women's knowledge and experiences at the heart of our recovery. Rural women leaders and social groups must be empowered to make decisions around household and community energy solutions. In the wake of this health crisis, rural women must also be included in policies that seek to build resilience to future health, ecological, and economic shocks.

As noted in Sustainable Energy for All's Energizing Finance<sup>(2)</sup> research series, women face additional barriers in accessing finance for energy solutions and outlining various financing approaches, such as targeted credit solutions or loan guarantees, that can help improve women's access to energy. Ultimately, we need more women, from rural and urban settings, to be more involved in the decision making and be central to the design process of electricity systems, pricing and sales in the energy sector. We cannot meet SDG7 without women's full contribution, participation and leadership.

(1) <https://www.seforall.org/RecoverBetter>

(2) <https://www.seforall.org/energy-finance>



# ELECTRICITY ACCESS IN INDIA AND BENCHMARKING DISTRIBUTION UTILITIES

Electricity Access in India and Benchmarking Distribution Utilities India's commitment to provide reliable, high quality, 24\*7 grid power supply to all willing customers introduced a range of challenges for its DISCOMs. SPI took this opportunity to map and assess the capacity of India's DISCOMs to service the needs and aspirations of their customers and meet ambitious electricity access targets.

Based on a primary survey conducted across 10 states--representing about 65% of the total rural population of India and with a sample size of more than 25,000, including households, commercial enterprises and institutions--the report assesses 25 distribution utilities.

## KEY FINDINGS OF THE REPORT

As much as 92% of customers reported the overall availability of electricity infrastructure within 50 metres of their premises; however, not all have connections, the primary reason being the distance of households from the nearest pole.

Overall, 87% of the surveyed customers have access to grid-based electricity. The remaining 13% either use non-grid sources or don't use any electricity at all.

A satisfaction index was created to assess the overall satisfaction level of customers with utility services. The study suggested that a total of 66% of those surveyed were satisfied--74% of customers in urban areas and 60% in rural areas.

## IMPLICATIONS AND ACTIONS

The report underlines some best practices adopted by the better-performing electricity distribution utilities in India and provides key recommendations to enhance sustainable electricity access.

The data from the survey provides evidence that the infrastructure of providing electricity across sectors has improved over time.

### Sources of Electricity



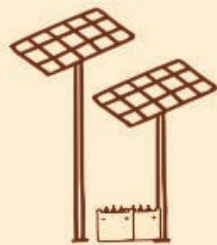
#### Grid

96%  
HOUSEHOLD

52%  
AGRICULTURAL

91%  
COMMERCIAL

78%  
INSTITUTIONAL



#### Non-Grid

4%  
HOUSEHOLD

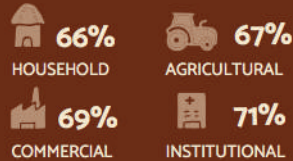
48%  
AGRICULTURAL

9%  
COMMERCIAL

22%  
INSTITUTIONAL

### Customer Satisfaction

URBAN	RURAL	State-wise	% Satisfied
63%	75%	AP	80
		Assam	39
		Bihar	66
		Gujarat	91
		Karnataka	80
		Meghalaya	17
		MP	73
		Punjab	81
		UP	60
		West Bengal	54



Other customers either stated they were dissatisfied or they were neither satisfied nor dissatisfied



### State of Access

#### Availability<sup>1</sup>

URBAN	RURAL
19.5	16.9
18.1 HOUSEHOLD	14.7 AGRICULTURAL
16.7 COMMERCIAL	17.9 INSTITUTIONAL

#### Quality<sup>3</sup>

URBAN	RURAL
48%	33%
36% HOUSEHOLD	38% AGRICULTURAL
41% COMMERCIAL	46% INSTITUTIONAL

#### Reliability<sup>2</sup>

URBAN	RURAL
65%	72%
71% HOUSEHOLD	64% AGRICULTURAL
70% COMMERCIAL	62% INSTITUTIONAL

#### Capacity<sup>4</sup>

URBAN	RURAL
88%	87%
92% HOUSEHOLD	67% AGRICULTURAL
76% COMMERCIAL	78% INSTITUTIONAL

State-wise	Supply Hours	Reliability	Quality
AP	21.5	40%	70%
Assam	15.4	94%	35%
Bihar	16.5	89%	11%
Gujarat	21.8	17%	78%
Karnataka	18.1	72%	48%
Meghalaya	17.5	71%	24%
MP	18.8	65%	43%
Punjab	16.1	51%	48%
UP	14.6	71%	37%
West Bengal	21.0	91%	23%

1. Availability is measured in hours
2. Percentage of surveyed customers who reported 1 or more powercut/day during past 1 week
3. Percentage of surveyed customers who reported no voltage fluctuations in a day during past week
4. Low capacity connections denote the following for each customer category Household - 0-2 kW, Commercial - 0-5 kW, Agricultural - 0-5 hp, and Institutional - 0-5 kW



### State of Connectivity

#### Availability Rate

URBAN	RURAL
98%	90%
97% HOUSEHOLD	75% AGRICULTURAL
98% COMMERCIAL	97% INSTITUTIONAL

#### Hook-up Rate

URBAN	RURAL
91%	85%
99% HOUSEHOLD	70% AGRICULTURAL
93% COMMERCIAL	91% INSTITUTIONAL

#### Access Rate

URBAN	RURAL
96%	84%
96% HOUSEHOLD	52% AGRICULTURAL
91% COMMERCIAL	78% INSTITUTIONAL

State-wise Access Rate	Rate %
AP	79
Assam	77
Bihar	77
Gujarat	89
Karnataka	100
Meghalaya	83
MP	92
Punjab	99
UP	89
West Bengal	83

For more information read the 'Electricity Access in India and Benchmarking Distribution Utilities Report' on <https://smartpowerindia.org/>



# ENERGISING RURAL MICRO-ENTREPRENEURS WITH RELIABLE ENERGY ACCESS

*Off-grid clean energy access has vast potential to create a flourishing microcosm for sustainable development in India. What's encouraging is that the unserved rural areas have taken a leap of faith in off-grid energy solutions. Awareness about solar lanterns, solar home systems, and decentralised renewable energy is rising in regions that face economic challenges due to disruption in access to grid electricity. The additional benefit is that the off-grid power has a shorter cycle time to set up accessibility and recover the cost. Non-grid electricity is also considered flexible and resilient as it can offer seamless quality power to consumers as per their evolving energy requirement in the catchment area.*

Nidhi Sarin - Senior Advisor Gesellschaft für Internationale Zusammenarbeit (GIZ) India, Co-Authored with SPI

Rural entrepreneurship in the past only referred to agriculture-related activities. Despite the reliable and quality energy access through non-grid resources, the definition of rural micro-enterprises largely remained limited to the retail trade. Although, around two-third of the non-farm enterprises in rural areas still engage in retail trade in grocery, hardware, food or other fast-moving consumer goods. Micro-entrepreneurship in production and manufacturing activities, or service-based or skill-based enterprises has started taking root. Occupations like tailoring, personal beauty care services, blacksmithing, pottery, weaving, carpentry, mobile repairs, cybercafés etc. have started growing. In a nation with agriculture as the dominant source of livelihood, solar pumps, flour mills, dairy, warehouses, and cold storage etc. can be income-generating vocations.

## Low demand for off-grid electricity

It has been observed that while the awareness on sourcing of green electricity from non-grid sources is rising, the overall demand for electricity remains low. A significant number of enterprises engaging in activities such as repair services and tailoring choose to remain outside the grid. Despite the proximity to the centralized grid, they remain unserved due to economic constraints. Such enterprises continue to operate at a very small scale and rely on kerosene or solar lanterns.

## Tapping latent demand for electricity in rural India

Some businesses, who choose to stay outside the periphery of energy access, meet their energy demand through fossil fuels like diesel and kerosene. In situations when subsidized fuel is unavailable to meet lighting needs or power high wattage motor loads, such enterprises willingly switch over to cleaner electricity sources. Energy service companies need to generate awareness about the benefits of medium to high-power appliances, or weave in affordability, efficiency and convenience factors in customer service and make electricity attractive to consumers and tap the latent demand.

As long as there is continuous innovation there cannot be a dearth of creative solutions to beat the challenges in energy access and tapping the latent demand. Creating integrated energy systems with private sector micro or mini-grids and public sector grid or setting up micro-franchisees can resolve the issue of quality and access and benefit millions in rural areas. One such example is the model distribution zone that Smart Power India set up in association with the Odisha public utility in 2020. The model demonstrated how micro-franchisees can go a long way in creating reliable energy access and improving customer service.

## Scaling up sustainable energy solutions

Innovation needs to take centre stage not just in the deployment of energy access but lending scale and size to it. For example, Mlinda Foundation, a non-governmental organisation (NGO), has shown how off-grid electricity can not only turn the tide around in energy poverty but result in overall community development. The NGO runs 49 mini-grids and electrifies 50 villages in Jharkhand. As of 2020, it has recorded a 23 per cent increase in household incomes, a 7.3 per cent rise in GDP per capita, and a 28 per cent increase in village enterprise revenue since the deployment of its projects in the region in 2018. GIZ is also implementing the Indo-German Energy Programme (IGEN) in partnership with local Indian partners and focusing on sustainable and inclusive development solutions that meet local needs.

The immense potential of off-grid solar has even warmed up private capital owners and corporations to the idea of investing in DRE projects in rural areas and encouraging entrepreneurship. The partnership between Tata Power and Rockefeller Foundation plans to install 10,000 microgrids by 2026. The ambitious project aims to support 100,000 rural enterprises, create 10,000 and support the irrigation needs of 400,000 farmers.

## The symbiotic relationship between energy service companies and enterprises

Off-grid solar players have innovated business models to drive energy demand by handholding and enabling local enterprises to scale up. The business model encourages trust-building between enterprises and energy service companies by understanding their energy needs, and offering reliable solutions for business growth.

As local business owners achieve scale in operations, it results in greater energy demand and increased economic activity in the area. The mentoring by off-grid solar companies helps in modernizing and expanding operations by enabling marketing linkages, entrepreneurial skills training. They can even help in accessing credit to adopt advanced technology and shift from manual operations to the motor-run tool or retrofit fossil-fuel run appliances with energy-efficient green appliances.

The mentoring results in many benefits for enterprises such as an uptick in productivity by as much as 50 per cent, expansion in business and rise in household income, and even more, livelihood options for the local community. Then energy companies also reap benefits in terms of securing increased and stable demand for their power.

The need to push microenterprise development in rural India will become a key role in helping the economy recover from the pandemic led economic crisis. The awareness about reliable energy access among rural enterprises and their relationship of trust with off-grid energy service companies need a greater push like never before.



# FIGHTING ENERGY POVERTY: WHY RELIABLE, AFFORDABLE ELECTRICITY IS KEY TO INDIA'S ECONOMIC GROWTH

**Bharath Jairaj** - Executive Director, Energy Program, World Resources Institute (WRI),  
Co-Authored with SPI

*While there have been isolated successes in linking energy with development goals, a systemic approach has proved elusive. It is important to place access to reliable and affordable electricity in the front and centre of policy and regulatory efforts.*

India's energy access challenges have come down significantly in the last two decades, due to the concerted efforts by national and state governments. Though significant progress has been seen on the electrification of willing households, gaps still exist, especially due to poverty and inequality: those who are unable to pay for electricity rely on less optimum fuels. A recent study by Smart Power India (SPI) titled 'Electricity Access in India: Benchmarking Distribution Utilities' states that lack of adequate electricity infrastructure is a major reason why a larger number of electricity customers have not been able to connect to the national grid. As a result, institutional customers such as hospitals, farms, schools, and skilling centres are forced to invest in expensive and polluting diesel generators to enjoy uninterrupted power supply.

Progress on electrification rates masks the energy poverty that continues to constrain the delivery of basic services as well as farm and non-farm productivity. Recent work by World Resources Institute India (WRI India) reiterates that without a reliable source of electricity, health care facilities struggle to deliver vital services to communities, and those providing agricultural and non-farm enterprise support services are also impacted. More than 30,000 health centres across rural India, and scores of schools, community centres, and anganwadis (rural child care centres) are not yet connected to the grid. Without basic access, outcomes in the health, education and livelihoods sectors will remain difficult.

While there have been isolated successes in linking energy with development goals, a systemic approach has proved elusive. As COVID-19 threatens the well-being of people and economies across the world, building resilience of communities, particularly in Indian states with lower socio-economic development, is paramount. Access to reliable electricity will be critical in spurring economic activities in rural India.

A key success story in recent times is that of the Customer Voucher Scheme (CVS) that SPI, a subsidiary of the Rockefeller Foundation, launched during the lockdown to provide financial relief to mini-grid customers and, in turn, bolstered the liquidity of mini-grid companies. A mini-grid can be defined as a set of electricity generators and possibly energy storage systems interconnected to a distribution network that supplies electricity to a localised group of customers. The scheme provided three months of subsidy to 5,000 customers in 92 villages in Uttar Pradesh and Bihar, resulting in recovery of electricity revenue for mini-grid developers to pre-Covid levels, 100% tariff collection efficiency, and uninterrupted electricity supply to mini-grids. Such initiatives on a larger scale can help address economic barriers and provide reliable electricity to customers in underserved communities.

## How can India provide reliable and affordable electricity to all?

It is important to place access to reliable and affordable electricity in the front and centre of policy and regulatory efforts. Placing consumers at the centre of the next stage of reforms in the sector will require a more nuanced understanding of consumer priorities including capacity, sustainability, quality, and customer service. Additionally, energy policy, sector regulation, operations, infrastructure, and governance will need to be revamped to align with this approach.

Done right, India will be able to achieve the United Nations' mandated Sustainable Development Goals 7 - providing affordable and clean energy to all, with no one left behind. As the SPI study reveals, a customer-centric approach wherein the focus is on customer satisfaction will help DISCOMs improve their financial health and overall energy delivery performance. We need to focus efforts to ensure the provision of electricity that matches the electricity demand, beyond just households, to meet the needs of the health, education and livelihood sectors that operate across rural and remote parts of the country.

This will need making new electricity connection processes more efficient and harnessing a wide variety of Decentralized Renewable Energy (DRE) solutions that can help utilities in meeting unmet and under-met demand. DRE refers to power, which could be locally produced close to the consumers, instead of requiring large investments such as solar parks or giant windmills, which are then grid-connected. The added benefit of including DRE in the service delivery is that grid inefficiency and losses can be avoided. This can be explored through a franchisee relationship between utilities and DRE entities. Service delivery should be grid-agnostic, to overcome the limitations of high grid extension costs, and challenges with extending the grid to remote areas. DRE also ensures climate proofing as large installations are more susceptible to extreme weather events.

A simple, yet effective way to implement this would be the establishment of a ready fund that can be used to fast-track connections by providing last-mile connectivity, standardizing service connection costs, reviewing pending or previously rejected applications, and compensating DRE companies for any gap in revenue. Equally important is the need to review that the right consumer tariffs are being charged to the right customers, and that subsidies are being rightly targeted. Increased customer awareness will require public outreach campaigns about subsidies for electricity, direct benefit transfer, consumer rights and other benefits.

A consumer centric approach will also help improve India's per capita electricity consumption. Currently, some parts of the country consume electricity in excess, and other parts barely consume any. We need to look at more energy efficiency, including building efficiency, to reduce the wasteful consumption of energy, while at the same time, increasing household and institutional energy consumption in rural and remote parts of the country.



# Grid Innovation is Key to Fulfilling India's USD 5 Trillion Economy Dream

*The decentralized network of electricity in off-grid, mini-grid or franchise models has proven to be a successful second option for improving energy access in unserved or underserved areas.*

William Brent - Chief Campaign Officer, Power for All , Co-Author with SPI

The government's vision for a new India is to achieve broad-based and inclusive economic growth across regions, states, and sectors. In order to achieve its economic goals, India needs to look at strengthening its power infrastructure across the country. Although India has achieved 100% household electrification; reliability, quality, and affordability continue to remain major challenges. Without secure electricity access, developing basic facilities like education, health, clean drinking water, or even training and skill development in the rural hinterland will always remain an uphill battle. The Economic Survey 2018-19 highlighted that India's energy usage is much below the global average. The per capita energy consumption of India stands at 0.6 tonnes of oil equivalent (toe) against the global per capita average of 1.8 toe. It added that India needs to increase its per capita energy consumption by at least 2.5 times to achieve economic growth and increase its per capita income to \$5000.

## Current state of electricity access in India and the challenges

A 2015 World Bank study 'Power for All: Electricity Access Challenge in India' highlighted that despite access to electricity, many rural households choose not to apply for these connections. There are multiple reasons why nearly one-fifth of India's rural households, around 31 million of them, continue to depend on biomass for their energy use. Among them, other than the reliability and quality of power, is the inability or unwillingness to pay for electricity.

This reluctance could be addressed through i) on-grid connectivity with distribution infrastructure; ii) off-grid connectivity that includes mini-grids; and iii) a hybrid option that integrates the grid with off-grid solutions. The decentralized network of electricity in off grid, mini-grid or franchise models has proven to be another successful option for improving energy access in unserved or underserved areas.

## Key mini-grid led demand generation strategies

Mini-grids have played a critical role in providing access to reliable electricity in rural India. A mini-grid distribution network has the potential to give rise to micro-enterprises, and (per community) generate access to at least 100-140 households, 50-60 shops as it extends 1-2 km from the plant. We need to generate demand for mini-grids at scale, and increase electricity consumption among underserved rural communities for better social and economic development.

Specifically, here are three steps to generate demand for electricity among potential rural customers:

### ● Awareness generation among potential and existing users

Raising awareness through an effective mode of communication, with a tailor-made strategy for individuals, households, and the community will be a key step to generating demand. Systematic information to explain the cycle of bill generation, the reason for fluctuation in the bills, tariff patterns, and grievance redressal mechanism, driving a shift from awareness & education to evidence-based behaviour change communication (BCC) strategies. For mini-grid projects, the ESCOs need to design a communication strategy that targets individuals, households, and the community separately so that behaviour changes can be stimulated.

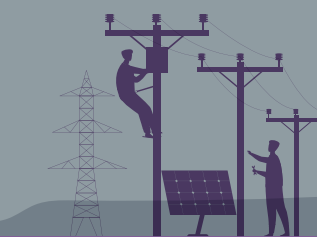
### ● Target underserved but high demand regions/communities

Targeting a high demand area is critical for generating adequate demand. A robust site selection framework should be able to estimate the potential demand of the village as well as provide inputs to the demand generation strategy. The critical factor for the success of any solar mini-grid is its reliability in meeting consumer demand cost-effectively. At the core of the framework is the generation of electricity demand to ensure that the mini-grid is sustainable, scalable, and attractive for an ESCO.

### ● Demand enhancement through energy efficient appliances

Targeting basic lighting and conversion and expansion of commercial motors helps ESCOs achieve 30%-35% of the targeted load to make the solar mini-grid sustainable. An additional 5%-10% increase in utilization can be achieved through energy-efficient appliances. Meeting the energy needs of such appliances can contribute up to 40 to 45% of the total demand for electricity of the mini-grid and hence is quite essential. The introduction of energy-efficient appliances (EEAs) creates numerous additional benefits for both the consumers as well the ESCOs.

After 100 percent electrification, India needs to simultaneously work on the demand generation in the underserved areas and economic social development of our villages, as both will depend on each other. Mini-grids can play a significant role in creating demand as power reliability is guaranteed, and help India achieve the goal of becoming a USD 5 trillion economy by 2025.





# SPI IN NEWS



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## Reliable Electricity Access Smart Power India Uplifts Commercial And Micro-Enterprises Rural India

Smart Power India has developed a set of services to help micro-enterprises at the village level as well as small businesses in urban areas.

## SPI Partners With 3 NGOs To Provide COVID Relief

The firm had launched a Customer Voucher Scheme (CVS) for mini-grid customers in rural areas.

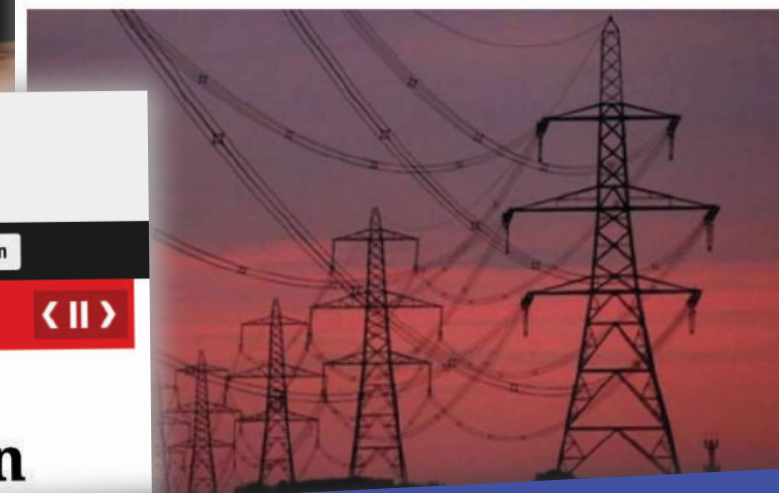


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## Boosting power sector: These two areas may hold key to revival post-pandemic

October 5, 2020 11:15 AM

India's power sector has shown great resilience in the wake of the COVID-19 pandemic with continued generation and supply of electricity to millions of households and business establishments.



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The Indian EXPRESS

Thursday, August 05, 2021

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Home / Opinion / How green energy can empower women

## How green energy can empower women

We need to build upon the connections between energy access, agriculture, water and women's empowerment.

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NEWS / BLOGS / INDIA / Power Sector Outlook 2021: A defining year for India's clean energy future

INDIA

## Power Sector Outlook 2021: A defining year for India's clean energy future

January 20, 2021 5:36 PM IST / Jaideep Mukherji in Voices, India, TOI

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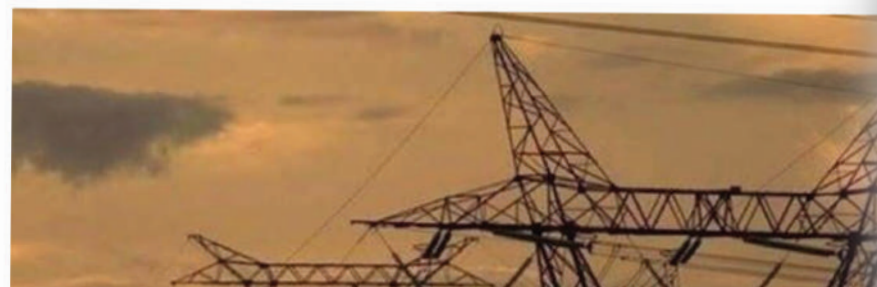
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## Fighting energy poverty: Why reliable electricity is key to India's economic growth

Updated: December 09, 2020 1:51 PM

While there have been isolated successes in linking energy with development goals, a systemic approach has proved elusive.



## Smart Local Solutions Help Accelerate Reliable Energy For All



Deepali Khanna Contributor

Asia

I write about the economics of solving the global goals.

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This article is co-authored with Jaideep Mukherji, the CEO of Smart Power India (SPI).



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## Modi to Spend \$42 Billion to Revive Power Retailers

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Healthcare/Biotech Healthcare Covid care facilities inaccessible in case of emergency: SPI survey in mini grid villages

## Covid care facilities inaccessible in case of emergency: SPI survey in mini grid villages

reau Last Updated: Jun 01, 2021, 12:18 PM IST

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## PANEL DISCUSSION - #ENERGYEMPOWERS

In early September we conducted an online panel discussion in collaboration with The Rockefeller Foundation on the critical role reliable energy access plays in the pandemic and its recovery. Several insights were gained and documented on effective recovery of the power sector and the role reliable electricity plays during the pandemic.



## RELIABLE ELECTRICITY AND #RURALWOMEN

We ran a campaign in October, 2020 to highlight the role rural women play in development of rural communities and the impact reliable electricity can have in the lives and development of these women and their communities as a whole.



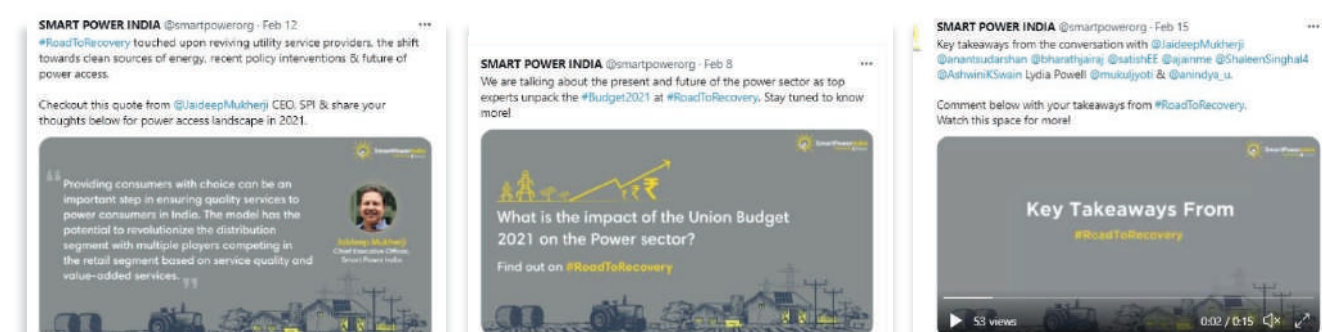
## CAMPAIGN AND WEBINAR - #SHEPOWERS

The global conversation on ending energy poverty has consistently recognized gender equality as an inevitable aspect of our transition to more sustainable outcomes for the energy sector. On International Day for Women, SPI echoed this belief by raising conversations around key aspects of gender and energy access and how we envision the future of the power sector in our campaign #ShePowers, where we shared stories of women's role as catalysts in the future of energy access as consumers, drivers of economic progress as well as members of the energy service industry.



## PANEL DISCUSSION - #ROADTORECOVERY

Building on the implications of the budget, SPI organised an online panel discussion with eminent experts and contributors in the energy sector to discuss the future of access and effective implementation of the new policy directions. The discussion was focused on policy recommendations and strategies which can be utilised to create a roadmap for more reliable access to electricity in the coming year and contextualizing the upcoming recommendations for better reliability and access.



## MITIGATING IMPACT OF COVID ON OUR CUSTOMERS AND PARTNERS

Smart Power India supported various initiatives contributing to the fight against the virus and its impacts on the country. We actively surveyed the field to better understand our customer's needs so that relief efforts can be informed and efficiently channeled. We shared learnings from the survey along with other relief work. We also formed partnerships with three organizations doing stellar work to mitigate the impact of the pandemic namely, GiveIndia Foundation, Swasth Foundation and Eka Care.



## MICRO-ENTERPRISE DEVELOPMENT CAMPAIGN- #POWER4PROGRESS

In June, we shared the voices of our customers and partners, to showcase glimpses of economic and social advancement in rural communities.



#smartpowerindia



# SPI IN ACTION

## Building EU-India Technology Partnerships to promote Distributed Renewable Energy (DRE) as source of reliable energy access to power rural India

With the objective to increase business involvement in strategic areas of bilateral cooperation between the EU and India, the Business Support to the EU-India Policy Dialogues Project in collaboration with the EU-India Clean Energy and Climate Partnership Project and the Delegation of the European Union to India organized a webinar on “Building EU-India Technology Partnerships to promote Distributed Renewable Energy (DRE) as source of reliable energy access to power rural India” on the 11th of May 2021.



SPI presented the learnings from a survey conducted on the impact of COVID-19 lockdown and how mini-grid companies coped with the pandemic in UP.

## India Distributed Energy Forum (IDEF)

The India Distributed Energy Forum is the premier meeting of the off-grid solar sector providing a unique platform for knowledge exchange and networking. The event focused on discussions around the future potential for the decentralized solar market in India, keeping the private sector at the center.



SPI spoke at the IDEF, sharing key learnings from its experience. SPI explained the need for proper billing services and improved customer service to address the issues faced by customers and DISCOMs. It was announced that the MDZ model piloted in Odisha by SPI was picked up for implementation by multilaterals in other states.

## RE Master Talks

The RenewX Master Talks serve as the time and place to meet the most trusted and preferred brands catering to India and the world in the renewable energy sector.



Samit Mitra, Senior Director, Programme Implementation, gave detailed insights into our MED Programme and SPI's focus on community engagement. He emphasised the need to work alongside village-level entrepreneurs and commercial entities in order to support, facilitate and scale initiatives at a sustainable and commercially viable level.

## PODCAST - In Sight: Discussion with Jaideep Mukherji, CEO, Smart Power India, on the future of mini grids in rural India

ET Energy world's weekly podcast featured Jaideep Mukherji, CEO of Smart Power India. In this conversation, Jaideep demystified the utilization and advantages of mini-grids and the role they play in the socio-economic development of rural India.



Our CEO, Jaideep Mukherji, discussed with ET Energyworld, how mini-grids are the most suitable option for many low and medium-density areas and can address a large number of low-income families more economically than alternative options.

## #ShePowers - A webinar to discuss the role of women as catalysts in the future of energy access

A webinar with eminent guests from the energy sector including key contributors to the global conversation on gendered energy access outcomes was hosted. This webinar was part of a bigger campaign about the outcomes of gender in energy access - #ShePowers



SPI offered learnings from the experience of working on the ground with women in rural India. event also featured eminent speakers from SEforALL, The Rockefeller Foundation, SEWA, Power Africa, Smiling Through Light, PEG Africa and Shell Foundation. The event was co-hosted by Rockefeller Foundation, Power for All and Smart Power India. A pool of insights on the role of women as catalysts in the future of energy access was created and shared as key takeaways.



# MYANMAR'S MINI-GRID SECTOR:

## AN UNPARALLELED OPPORTUNITY FOR TRANSFORMATION AT SCALE

**Smart Power Myanmar works at the intersection of the public and private sectors to achieve one goal: accelerate electrification through catalysing new sources of investment, knowledge and know-how, to end energy poverty and promote economic opportunity in Myanmar. Smart Power Myanmar is a part of Pact, a global non-profit development organization, and is supported by The Rockefeller Foundation.**

**Richard Harrison - Chief Executive Officer, Smart Power Myanmar**

Decentralised renewable energy solutions have the potential to greatly accelerate energy access in Myanmar and catalyse profound economic transformation. Smart Power Myanmar's CEO Richard Harrison outlines their status today and explains what is being done to support their expansion.

At the start of the third decade of the 21st century, more than 23 million people in Myanmar lack access to electricity. The importance of fully electrifying the country cannot be overstated. At this critical juncture in Myanmar's history, communities require tools that are proven to strengthen resilience, catalyse economic growth and alleviate poverty. As in India, electricity has profound ramifications for the life and well-being of every household and business.

Decentralized renewable energy solutions, such as solar-hybrid mini-grids, play a critical role in connecting the unconnected. Globally, governments and policymakers have started to recognise the potential these solutions have to empower rural communities. Moreover, as the climate crisis intensifies, these solutions provide an unparalleled opportunity to align the goals of ending poverty and providing clean energy.

Today in Myanmar, mini-grids form a small yet crucial component of the national energy mix. Myanmar's Department of Rural Development (DRD) developed a subsidy scheme in 2018, co-financed by the World Bank, to support the development of mini-grids. As of June 2021, this scheme has been used by more than 10 private developers to build 160 mini-grids that provide electricity to more than 10,000 households and businesses.

Though significant progress has been made, much more remains to be done. Smart Power Myanmar's Decentralized Energy Market Assessment identified a potential market of 16,000 mini-grids in Myanmar by 2030, a 10,000% increase on today's mini-grid sites, to complement national grid expansion.

The high cost and limited availability of credit prevents mini-grid developers from achieving economies of scale and deters households and businesses from connecting. The mini-grid sector lacks the tools and experience required to identify and develop economically viable sites. Bifurcated electrification planning inhibits coordination and reduces investor confidence.

These are the issues that Smart Power Myanmar (SPM) was created to address. Founded by The Rockefeller in 2018 and managed by Pact, Smart Power Myanmar's central goal is to accelerate electrification to promote economic opportunity. In order to do so, we developed a toolkit of approaches that can broadly be divided into three categories: financing energy access; mini-grid performance optimisation and growth; and integrated electrification planning.

To address the issue of limited access to affordable credit for consumers, developers and microfinance institutions, Smart Power Myanmar designs, enables and implements a broad range of financing initiatives. Through our Energy Impact Fund, we support connection financing for villagers who are unable to pay a lump sum amount for a connection and provide financing to scalable productive use enterprises that play a key role in the success of both a mini-grid and a community. At the national level, we collaborate with key institutions to develop innovative financing solutions for developers aimed at reducing risk and spurring market confidence.

The Myanmar Equipment Financing Facility, launched in January 2020, has made more than \$18.3 million available to developers to fund equipment costs and paved the way for more sophisticated project finance approaches. This complements SPM's work with market-leading microfinance institutions who also require guarantees and other support to be able to expand product offerings in the energy and productive use space.

## IMPACT IN ACTION



*Daw Ni is a fisheries entrepreneur living on a remote island in Myanmar's Tanintharyi Region. Starting in early 2020, SPM began working with her community and a mini grid that would provide access to reliable electricity for the first time in the community's history.*

To maximise mini-grid viability, and to ensure communities translate electricity access into economic opportunity, SPM deploys a variety of performance optimisation and productive use growth initiatives. We offer hands-on technical support to developers, working with data platforms to facilitate informed decision making. Teams on the ground identify and support high-potential productive uses of electricity that can improve utilisation rates. Alongside developing site selection and demand algorithms, our Applied Energy Lab tests key hypotheses and publishes technical briefs with regional and global relevance.

Finally, our work in digitalised electrification planning helps key stakeholders to envisage and plan the integrated electricity grid of the future. In collaboration with several other organisations, Smart Power Myanmar is contributing to the development of Myanmar's first ever digitalised electrification planning tool – the Myanmar Power Map (MPM). This tool allows users to visualise both current and future energy infrastructure and to use key parameters to stratify and select data on the move.

Combined with on-grid support initiatives, these activities have allowed SPM to transform more than 220,000 lives to date. This is just the start. By continuing to identify and deploy innovative approaches, and by working closely with partners in India and beyond to share learnings and develop joint initiatives, we can empower every community across South and Southeast Asia while building the climate-smart energy system of the future.



*Smart Power Myanmar works at the intersection of the public and private sectors to achieve one goal: accelerate electrification through catalysing new sources of investment, knowledge and know-how, to end energy poverty and promote economic opportunity in Myanmar. Smart Power Myanmar is a part of Pact, a global non-profit development organization, and is supported by The Rockefeller Foundation.*





# ENERGY RESILIENCE FOR PUERTO RICAN COMMUNITIES

Isabel Beltran - Director Resilience & Energy, Power & Climate Initiative, The Rockefeller Foundation

Roy Torbert - Principal, Rocky Mountain Institute

Lillie Ogden - Intern, Rocky Mountain Institute

After extreme weather and earthquake events, prolonged financial crises, and troubled grid operations – Puerto Ricans, especially the most vulnerable communities, are increasingly turning to distributed energy solutions and seeking new financial mechanisms to facilitate this transition. Rocky Mountain Institute (RMI) and The Rockefeller Foundation have been supporting the island in this effort. In September of 2017, hurricanes Irma and Maria made landfall within weeks of each other, leaving parts of Puerto Rico without power for 7 months<sup>1</sup>. Several high magnitude earthquakes in recent years have further compromised the power sector by destroying large portions of the transmission and distribution lines. According to the IPCC, climate change will only bring stronger winds, heavier rainfall, and more severe damage from these natural disasters<sup>2</sup>.



As a result of these increasingly more destructive disasters, petroleum power plants, that normally only operate during times of peak electricity demand, had to increase operations in Puerto Rico. In 2020, nearly half of the total electricity generating capacity came from petroleum products, requiring 46% of GDP to go towards these fuel imports<sup>3</sup>. This, compounded by an aging and fragile grid infrastructure, has led to inevitably volatile electricity prices in Puerto Rico, where prices were already high to begin with. The average Puerto Rican facility pays about 24 cents per kilowatt-hour, which is more than double the amount that facilities pay on the US mainland. With 44.9% of the population living below the poverty line, this means that lower-middle income (LMI) communities are particularly energy burdened, having to spend a large share of their income on polluting, back-up energy<sup>4</sup>.

The challenges facing the Puerto Rican power sector and the communities, accentuate the growing need for distributed renewable energy (DRE). Specifically, self-contained solar PV and battery energy storage microgrids provide greater resilience from energy supply disruptions in the grid, and they can power critical loads during prolonged outages or black-outs. This is especially important for public and private facilities providing essential life services, emergency services, or economic and social services to vulnerable or dependent populations. Apart from improving community resilience amidst an unreliable grid, DREs are sustainable and low-carbon, which will help Puerto Rico reach its energy goals to achieve 40% renewable electricity generation by 2025, 60% by 2040, and 100% by 2050, as outlined in their new Integrated Resource Plan: they currently stand at 2.5%<sup>5</sup>.

Although the need for distributed resources is clear in Puerto Rico and the government has plans for the aggressive deployment of renewables, there are currently many barriers to their adoption. First and foremost, the high up-front costs, often tens of thousands of US dollars, excludes most Puerto Ricans from accessing renewable microgrids. In addition to the expensive down payment, these communities are deemed high-risk, so bank loan offers tend to involve high interest rates at ten percent and above, making ensuing monthly costs impracticably high. The added burden of the COVID response has been taking priority for the last year and a half and has diverted attention away from the renewable transition. Finally, there is a general lack of trust and knowledge when it comes to leveraging public funds to help support the deployment of DREs.

In order to combat the barriers of DRE adoption and promote community energy resilience in Puerto Rico, RMI and The Rockefeller Foundation have devised an integrative solution called the Puerto Rico Community Energy Resilience Initiative.

The goal of the initiative is to create a blended financing vehicle, which leverages both philanthropic and private capital to de-risk the investment opportunity with public sector investments, with the goal to make microgrid systems affordable to LMI communities. A pure debt solution would be too expensive for the facilities and too risky for the fund investors, since most LMI communities have low-to-no credit history. Money coming from public streams, such as the Federal emergency management agency (FEMA), is simply insufficient to expedite the installation of microgrids and similarly, private, philanthropic capital alone cannot scale deployment of microgrids.

However, a blended solution attracts other private capital from investors by focusing on impacts and returns, which de-risks the investment and secures low interest rates from banks, while also strategically unlocking public funds. For each facility, the goal is to determine the precise amount of private grant in comparison to a bank loan or public funding, so that the total project costs of the microgrid system are matched, while ensuring that the future monthly payments of the facility are lower than their current electricity bills. With this scheme, as opposed to just fully funding a few microgrid systems, the initiative can reach a multitude of facilities, while still generating desired savings for them.

The initiative has thus far comprised of a multi-faceted approach that involves the identification of critical facilities, the technical and financial analysis to determine the system size/cost as well as the grant portion versus loan or public fund portion, the pre-installation efforts, and the final installation. The identification and selection of facilities is crucial to the mission and facilities are chosen based on their vulnerability, the historical time-lapse before the utility restores their power, and their service provided, among others. The next phase determines all system costs and sizes and precisely decides how the project will be financed. In parallel to this phase, the pre-commissioning efforts deal with subcontracting structural engineers, hiring EPC contractors, finding banks, exploring public streams etc., with the final goal to install the microgrid happening soon after.

The model and ideas at the foundation of the PR Community Energy Resilience Initiative can be transferred to a variety of diverse projects across the globe. The specific goal of the initiative is to create a fund that will assist about 300 critical facilities in Puerto Rico, which could lead to a cascading effect in the public and private sectors that would help the nearly 23,000 critical facilities across the island to receive self-sufficient microgrids. However, an unreliable grid, increasingly damaging natural disasters as a result of climate change, and excessively high DRE costs, are not problems unique to Puerto Rico.

This solution can be applied to remote or vulnerable populations across sub-Saharan Africa, India, and other parts of developing Asia who face similar challenges amidst a worsening climate. Microgrids are often the best option for these types of populations as the technology is robust and resilient, allowing facilities in these regions to maintain power during large scale blackouts and to reduce their dependency on diesel generation. Furthermore, critical facilities in these types of communities often have a crucial role as they provide pockets of resilience during hardships, and microgrid systems would empower these places to continue facilitating social and economic life. The initiative demonstrates that, although these DRE microgrids are expensive, they are financeable and scalable with proper innovative financing mechanisms.

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4 - US Census (2019). <https://www.census.gov/quickfacts/PR>

5 - Puerto Rico Energy Bureau (PREB) (2020). Final Resolution and Order on the Puerto Rico Electric Power Authority's Integrated Resource Plan. <https://energia.pr.gov/en/integrated-resource-plan/>





**SmartPowerIndia**

Powered by  **ROCKEFELLER  
FOUNDATION**

Smart Power India (SPI), a subsidiary of The Rockefeller Foundation was founded in 2015 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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