

In 2015, Prime Minister Narendra Modi announced that nearly 18,500 villages, which did not have electricity would be electrified within 1000 days; and, the Deen Dayal Upadhyay Gram Jyoti Yojana (DDUGJY) was launched. In his 2017 Independence Day speech, he reported that more than 14,000 villages had been electrified under the scheme.¹

In India, a village is considered 'electrified' if electricity is provided in public spaces like schools, panchayat offices, health centres, etc. and to 10 percent of households. So, a village could be considered electrified even if 90 percent of its households did not have electricity.² According to Ministry of Power, 99.5 percent of inhabited villages are electrified,³ yet 40 million households remain in the dark.⁴ Household-level data, thus, seems to be a better parameter to assess the outreach of rural electrification.

As on 12 Oct 2017, while 79 percent of the nearly 18,500 villages were electrified, only 8 percent of these had all their households electrified.⁵ In states like Bihar, Jharkhand, and Nagaland less than 50 percent of rural households have electricity supply.⁶ Jharkhand, one of the focus states of Oxfam India⁷, has the lowest percentage of household electrification; 45 percent households i.e. out of 5 million, only 2 million households have been electrified.⁸

But even household electrification does not guarantee reliable and consistent electricity supply. A 2015 study by Council on Energy, Environment and Water (CEEW) shows that 50 percent of the electrified rural households across six states⁹ did not receive even 12 hours of supply in a day; the situation was much worse in UP, Bihar and Jharkhand.¹⁰ During evening when light is most needed, half of the electrified households received less than three hours of supply.¹¹

The villages that remain to be electrified are either remote villages, or villages affected by left wing extremism (LWE), or villages in protected and ecologically sensitive areas. Some villages have scattered and remote hamlets with very few households; more often hamlets with fewer number of households are not considered for grid connection even when the village is being electrified.

In order to meet the electricity demands of these villages, off-grid electrification has been proposed for 2749 villages across India.¹² This will be done through Ministry of New and Renewable Energy (MNRE) and respective state agencies like Jharkhand Renewable Energy Development Agency (JREDA) in Jharkhand.

These villages are mostly in the North Eastern region (1330) — Arunachal Pradesh (958); Assam (357); Jharkhand (356); and Chhattisgarh (306).¹³ Stand-alone solar systems for households (LED lamp, fan, and mobile charging point), solar street lights, and solar rooftop for public buildings have been proposed for these villages.¹⁴ (See Box 1)

This scheme is likely to enhance the quality of life at the household level and benefit these villages economically. If solar lighting is provided and maintained well, it will reduce the dependency on kerosene, which is used as a primary source of lighting (See Box 2). In view of this, Oxfam India along with Naya Savera Vikas Kendra (NSVK) piloted domestic solar lighting project in three remote villages in Jharkhand. These villages have submitted their claims for forest rights and it was important to look at other aspects to strengthen their forest-based livelihoods.



BOX 1: STATUS OF RURAL ELECTRIFICATION IN JHARKHAND (AS ON 31 AUGUST 2017)*

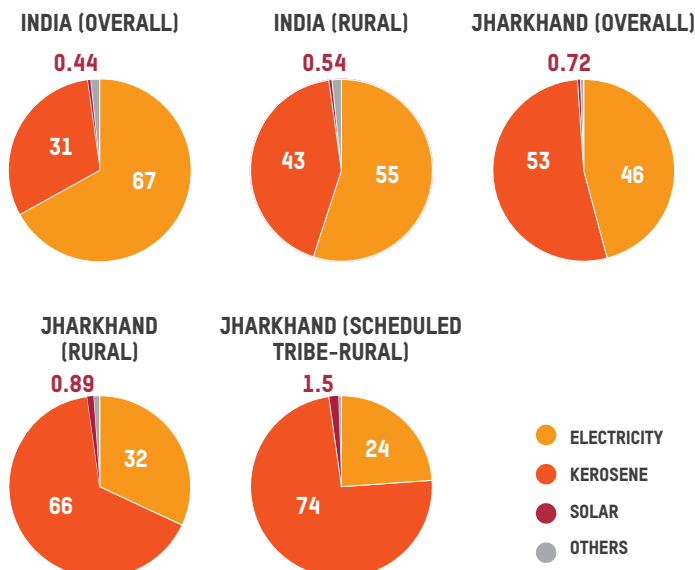
- TOTAL INHABITED VILLAGES (2011): 29492
- UNELECTRIFIED VILLAGES (1 APRIL 2015): 2525
- VILLAGES ELECTRIFIED (APRIL 2015- AUGUST 2017): 2101
- UN-INHABITED VILLAGES: 56
- UNELECTRIFIED VILLAGE: 368
 - TO BE ELECTRIFIED THROUGH GRID: 136
 - TO BE ELECTRIFIED THROUGH OFF-GRID: 225
 - TO BE ELECTRIFIED UNDER STATE PLAN: 7

335 VILLAGES OF THESE UN-ELECTRIFIED ARE IN NAXAL AFFECTED AREAS: WEST SINGHBHUM (108), HAZARIBAG (19), RANCHI (1), GUMLA (23), LATEHAR (57), LOHARDAGA (31), SIMDEGA (6), AND CHATRA (76)

DDUGJY DATA FOR JHARKHAND (AS ON 31 AUGUST 2017), SHOWS THOUGH PROJECTS WORTH RS 196 CRORE HAVE BEEN SANCTIONED AND ALL THE PROJECTS HAVE BEEN AWARDED, THE STATE IS YET TO WITHDRAW FUNDS.¹⁵

*Source: <http://garv.gov.in/assets/uploads/reports/statesnaps/Jharkhand.pdf> (viewed as on 13 Oct 2017)

BOX 2: SOURCE OF ELECTRICITY FOR HOUSEHOLD LIGHTING (AS %AGE OF TOTAL ELECTRIFICATION)*



*[Source: Census 2011]

WHY JHARKHAND

In Jharkhand, 76 percent of its household is in the rural area and 66 percent of the rural household depends on kerosene for lighting. This is a serious concern, especially when rural electrification schemes of government speak of lifeline supply of 1 Kwh/household/day.¹⁶ The lack of access to energy impedes delivery of essential services like education and health in rural Jharkhand, which has the largest share of un-electrified rural primary schools and primary healthcare centers.¹⁷ Ninety percent of the scheduled tribes in Jharkhand – i.e. 26 percent of the total state population – reside in rural areas and three-quarters of their lighting needs are met by kerosene.

Oxfam India has been working with Scheduled Tribes and other traditional forest dwellers in Jharkhand along with NSVK on the implementation of Forest Rights Act 2006, since 2012. As almost all the project villages have now submitted their claims for forest rights, it became imperative to look at other aspects that can strengthen forest-based livelihoods.

One such identified imperative was lack of access to sustainable and quality energy for cooking, lighting, and livelihood. The project implementation team of NSVK identified three remote, un-electrified tribal hamlets/villages in the Bishnugarh block of Hazaribagh – Gidhaniya, Dombabeda and Masuritari- to run a pilot on domestic lighting. These Santhal villages have no access to any form of electricity; firewood and kerosene were their only source of energy.¹⁸

All these villages are in the process of filing their individual and community forest resource (CFR) rights. While 17 families in Masuritari, 30 families in Gidhaniya, and 33 families in Dombabeda have filed IFR (Individual Forest Rights) claims, these villages are in the process of completing documentation and mapping of CFR (Community Forest Resource Rights) claims for their villages.

Lack of electricity impeded household work in the evenings; restricted studies and economic activities; crime continued unabated; elephant attacks at night were rampant.

So it became essential to facilitate access to sustainable energy to these villages. For a community dependent on minor forest produce, subsistence farming, broom-making and / or migration for income generation, it was quite difficult to envision how access to electricity could add value to their lives and livelihoods.

WHY DOMESTIC LIGHTING?

The need for access to energy for domestic purposes though unspoken, existed. Oxfam India opted to pilot domestic lighting for three reasons: a) to start with smaller capacities for technology demonstrations to make the community aware of available technologies, b) to train communities to maintain and manage the systems and own it as their own asset, c) to generate demand for energy from ground for various different needs so that communities are motivated to apply for government schemes.

Women suffered the most; they had to rely on kerosene for light in the kitchen in the evening. Kerosene is supplied in the Public Distribution System (PDS) shops and at about Rs 35-45 per litre; each household requires about 5 litres of kerosene a month for their lighting and cooking needs. Women, especially in Gidhaniya and Masuritari, supplemented their income by making brooms. With no electricity in the evenings, it was near impossible for the women to continue with their economic activities.

The children were affected as well. Students here either go to schools in their villages (primary) or Bishnugarh block (secondary and higher); a few even go the neighbouring blocks on the border of Hazaribagh and Bokaro district. These schools are, thus, some distance away and by the time they come back it is dark; no electricity means that students hardly have any time to study in the evenings.

Further, the villagers had to travel for almost 10-12 kms to the nearest market place to get their mobile phones charged. One of them would take all the mobiles to a shop to get them charged and then come back to the village; charging each phone cost Rs 5.

Considering these scenarios, it was decided to provide two three-watt (3W) LEDs (light emitting diodes) along with a charging point for every house. A street light was also provided to enable community activities and meetings in the evenings, keep away the elephants, and reduce criminal activities.

TRAINING THE COMMUNITY

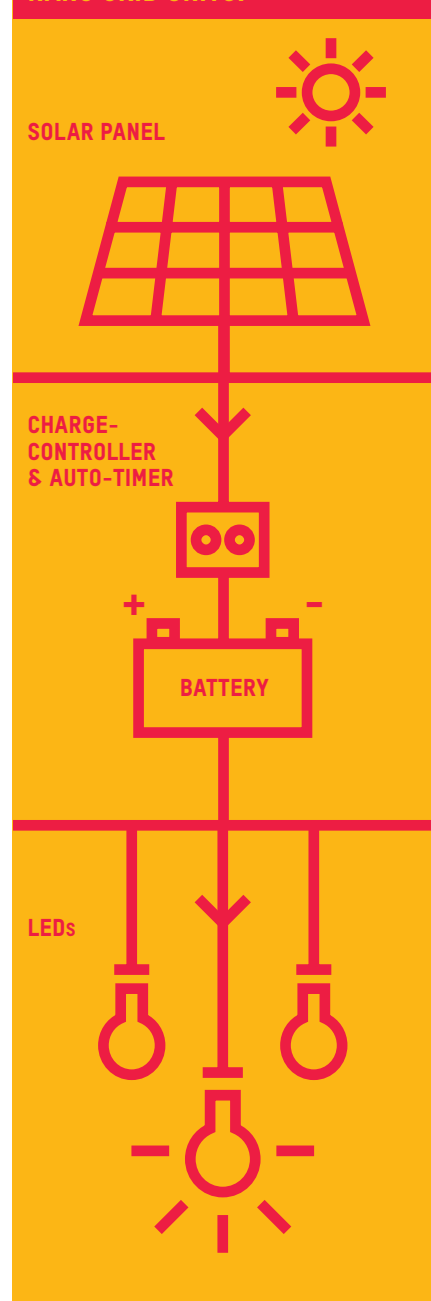
The decision on domestic lighting was reached after several rounds of discussions with gram sabhas of all the three villages. They passed resolutions giving a go ahead for setting up centralised solar-based nano grids in the villages. The installations in the three villages were completed between December 2016 and January 2017. These three nano grids provided home lighting to 110 households in the three villages.

While the batteries, panels and other accessories were being procured and installed, meetings were held with villagers simultaneously. These meetings were organised to raise awareness regarding renewable energy among the community members.



Homes in Masuritari village have been lit up by solar power

NANO GRID UNITS:



A few of the community members were taken for an exposure visit to a village in Patratu block in the neighbouring Ramgarh district; this village was provided solar lights by Krishi Gram Vikas Kendra (a Ranchi-based NGO). During the exposure visit, the community members were also shown biogas units as an alternative medium for cooking.

The community mostly uses firewood or kerosene for cooking; in Gidhaniya village two (out of 36 households) were using cylinders secured through the Pradhan Mantri Ujjwala Yojana. Once the gas is over, they have to buy a refill for Rs 700 (around Rs 200 is later refunded in the bank account as subsidy). The distance and the money involved is a deterrent for villagers to either continue with the gas cylinder or opt for them in the first place.

The meetings and exposure visits proved useful, according to an endline survey conducted by an external evaluator, the awareness levels regarding renewable energy among the community increased by 90 percent from when the baseline survey was undertaken.

FORMING AKSHAYA URJA SAMITIS

The Gram Sabha, formed Akshaya Urja Samitis (Solar Energy Committee) in all the three villages. Youths who had attended trainings and been on exposure visits were made members of the Samiti. These Samitis were formed for the operation and maintenance of solar panels. They were trained in the repair and replacement of the LEDs and charging points, and the upkeep of the street lights. The seven-member committee, four men and three women, are supposed to convene every month. They are responsible for collecting a maintenance fee of Rs 50 per month per household.

Masuritari and Dombabeda were more regular with their meetings and collections as against Gidhaniya village (36 HH) that met just once since February 2017. This reflected in the money collections as well. Until October, Gidhaniya had not made any collections after March; while in Masuritari village, all the 37 households have made contributions regularly for seven months and collected Rs 12,950. Similarly, Dombabeda village has collected about Rs 10,000 though it has 37 households, 26 have made regular payments. All three villages used the money to change distilled water in batteries.

The LEDs come with a warranty; they can be replaced anytime within two years. In August, 10-15 households in Dombabeda village lost their LEDs during lightning. While some of the better off households, have replaced them, others are still waiting for their replacement. This is now the responsibility of the Samiti members to connect with project implementation team of NSVK, deliver the damaged LEDs, and get new ones for those 16 households. These LEDs come with a three-year warranty. After this period, all replacement costs are to be met by

the collections made by the Samiti. While funds have been collected in a couple of villages, bank accounts for the Akshaya Urja Samiti are yet to be opened. The collected funds is, kept with one of the Samiti members, for the time being. Apart from the bank accounts, the Samiti members were also responsible for preparing a safety manual and pictorial safety instructions for handling the solar panel unit. This is yet to be done in any of the villages.

HOW HOME LIGHTING CHANGED LIVES

Light is provided for six hours – four in the evening and two in the morning between 6 - 10 pm and 3 - 5 am respectively. "Earlier when we used to work in the paddy fields, we had to rush back to be able to finish cooking during daytime. Now it is much more relaxed. There is light in the evening/night and this gives us more time to work both in the field and at home. Again with the two hours that we get in the morning we are able to get up early and do some work- whether it is cooking or making brooms," says Anita Soren of Masuritari village. She was married into this village a year ago; back then, there was just one street light provided by the Panchayat. That too stopped working after the LED fused.

In Gidhaniya, women make brooms to supplement income. The home lighting has ensured extra working hours in the evening. "Earlier, about 15 brooms were made in a week. Now with the extra four hours in the evening, one woman can make up to 40 brooms a week. Each broom is sold between Rs 30-50 in the neighbouring markets," says Kiran Soren, one of the Samiti members in Gidhaniya.

Most of them sell shelled corn and this is done in the evenings. Apart from increasing their income from selling the extra brooms and corn, the households are also saving money on the kerosene oil; they would have used anything between 3-4 litres of mitti tel (kerosene oil) every month.

"There is more time for studies. The evenings are important, especially, since we spend a lot of time in traveling to and from colleges or schools. Moreover, we need not waste time in going to the nearby town just to get our mobile phones charged. The charging point is very useful," says Sohan Hembrom, president of the Masuritari Samiti. Eighteen-year old Sohan is also completing his graduation from Bishnugarh College.

"With the street light in the village, meetings are now held in the evenings; this has ensured increased participation in community meetings. We were able to celebrate the Karma festival well into the night this year without having to hire diesel generator sets," says Gautam Murmu, president of the Dombabeda Samiti. "The street lights have kept the elephants away from the village, and the home lighting warns us of the presence of snakes and scorpions."



Members of the Akshaya Urja Samiti of Gidhaniya village at a meeting



Students like 18 year old Sohan Hembrom are now able to spend more time studying in the evenings

NANO GRID UNIT

The nano grid set up in the village consists of a 300-watt solar panel attached to a battery and an auto-timer. The battery is fixed with a charge-controller which maintains the flow of solar energy. "It prevents any kind of fluctuation in electricity. A solar charge-controller manages the power going into the battery bank from the solar array. It ensures that the deep cycle batteries are not overcharged during the day, and that the power doesn't run backwards to the solar panels overnight and drain the batteries. This is an important safety device as well. The charge-controller also ensures that electricity is supplied on days of low to no sunlight," explains Prakash Verma of NSVK.

The auto-timer observes the sunrise and sunset pattern for three days, then it auto shifts to whatever time it gets dark. "For instance, if during winters, the auto-timer observes the sunset to be at 5.30 pm on three days, on the fourth day it will automatically turn on at 5 pm. These timers were especially procured from Chennai," adds Prakash.

The three-watt (24 volt) LEDs are especially procured for these units. "This is to ensure that no extra bulbs or bulb with a higher wattage is fixed; this would put extra load on the unit resulting in its failure," adds Prakash. They cost about Rs 90-100 per piece and come with a warranty of two years. Ten LEDs are kept as backup options, which the members of the Samiti have access to.

The entire unit for one village cost Rs 100,000. The recurring costs for the operation and maintenance has to be borne by the community; and this is the money that the Samitis collect.

THE WAY FORWARD

A need for a training on safety and hazards while using and managing the nano grid systems was felt. Oxfam India has to explore ways to address this gap. Nevertheless, the awareness regarding renewable energy, and solar energy in particular, has created demands for more lighting systems. The community needs to be trained to approach the state agency i.e. JREDA for subsidies and schemes that they can avail. For instance, JREDA provides lantern on subsidy. The Gram Sabha can pass a resolution and apply for the scheme in order to get solar lanterns.

There is also a demand for lift irrigation units. "Our farms are rain fed. Though there are rivers, they are too far or too low and it is difficult to bring water up to our fields. We need irrigation systems to increase our productivity and also be able to grow crops round the year," says Narayan Soren, a farmer and member of the Samiti in Dombabeda. Communities are now interested to apply for solar irrigation unit; states provide subsidy assistance in the range of 40-60 percent in addition to the subsidies provided by Ministry of New and Renewable Energy.¹⁹

With more awareness on renewable energy systems, communities are also expressing interest in biogas units. "We do have cattle. But we need training on how we can run these biogas units at a community level," says Narayan.

The community needs to meet more, build stronger links with the government and help in increasing the coverage of various government schemes such as Ujjwala Yojana and other schemes based on renewable and clean energy.

NOTES

¹ Jain, Abhishek (2017). 'Power For All, Always'. Indian Express. Sept 23, 2017. <http://indianexpress.com/article/opinion/columns/power-for-all-always-electricity-24x7-indian-households-2022-target-4856673/> [as viewed on 12 Oct 2017]

² Patil, Mukta (2017). 'In 2 Years, BJP Govt Electrified 13,523 Villages; Of These, Only 8% Were Completely Electrified'. IndiaSpend. May 26, 2017. <http://www.indiaspend.com/cover-story/in-2-years-bjp-govt-electrified-13523-villages-of-these-only-8-were-completely-electrified-83376> [as viewed on 12 Oct 2017]

³ Census India 2011 <http://www.censusindia.gov.in/2011census/Hlo-series/HH07.html> [as viewed on 16 Oct 2017]

⁴ According to Power Ministry's Grameen Vidyutikaran (GARV) data dashboard. <https://garv.gov.in/garv2/dashboard/garv> [as viewed on 13 Oct 2017]

⁵ Only 1190 villages were 100% electrified. According to Power Ministry's Grameen Vidyutikaran (GARV) data dashboard. <https://garv.gov.in/dashboard/ue> [as viewed on 12 Oct 2017]

⁶ According to Power Ministry's Grameen Vidyutikaran (GARV) data dashboard. <https://garv.gov.in/dashboard/ue> [as viewed on 12 Oct 2017]

⁷ Oxfam India works in six focus states – Uttar Pradesh, Bihar, Jharkhand, Chhattisgarh, Odisha, and Assam

⁸ According to Power Ministry's Grameen Vidyutikaran (GARV) data dashboard. <https://garv.gov.in/dashboard/ue> [as viewed on 12 Oct 2017]

⁹ Uttar Pradesh, Bihar, Jharkhand, Madhya Pradesh, Odisha and West Bengal

¹⁰ In these states, three-quarters of electrified households in these states received less than 12 hours of supply in a day

¹¹ Jain, Abhishek (2017). 'Power For All, Always'. Indian Express. Sept 23, 2017. A 2015 study by Council on Energy, Environment and Water (CEEW) conducted in collaboration with Columbia University conducted the largest energy access survey of its kind in India, ACCESS, covering 714 villages in six major rural electrification deprived states – Uttar Pradesh, Bihar, Jharkhand, Madhya Pradesh, Odisha and West Bengal. <http://indianexpress.com/article/opinion/columns/power-for-all-always-electricity-24x7-indian-households-2022-target-4856673/> [as viewed on 12 Oct 2017]

¹² This data is as on 31 March 2017, according to the Ministry of Power [http://ujwalbharat.gov.in/sites/default/files/Rural-Electrification-Three-Years-Achievements-\(2014-17\)-English.pdf](http://ujwalbharat.gov.in/sites/default/files/Rural-Electrification-Three-Years-Achievements-(2014-17)-English.pdf) [as viewed on 13 Oct 2017]

¹³ Progress Report of Village Electrification as on March 2017. <https://data.gov.in/resources/progress-report-village-electrification-march-2017/download> [as viewed on 13 Oct 2017]

¹⁴ Patil, Mukta (2017). 'In 2 Years, BJP Govt Electrified 13,523 Villages; Of These, Only 8% Were Completely Electrified'. IndiaSpend. May 26, 2017. <http://www.indiaspend.com/cover-story/in-2-years-bjp-govt-electrified-13523-villages-of-these-only-8-were-completely-electrified-83376> [as viewed on 13 Oct 2017]

¹⁵ <http://garv.gov.in/assets/uploads/reports/statesnaps/Jharkhand.pdf> [viewed as on 13 Oct 2017]

¹⁶ Agarwal, Shalu et al (2016). 'Solar for Powering Health and Education in India'. Working Paper. Feb 2016. <https://www.oxfamindia.org/sites/default/files/WP-Solar-for-Powering-Health-and-Education-in-India-EN.pdf>

¹⁷ ibid.

¹⁸ When the pilot was planned, these villages were unlikely to be connected to the grid anytime soon. However, soon after the pilot the government did extend the grid but supply was yet to begin, when documentation was undertaken.

¹⁹ 'Implementation Framework for Solar Agriculture Pump Program'. Shakti Sustainable Energy Foundation. July 2015. http://shaktifoundation.in/wp-content/uploads/2014/02/Final-Report-on-Implementation-Framework-for-Solar-Agriculture-Pump_FINAL.pdf [as viewed on 13 Oct 2017]

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PHOTO CREDIT: SAVVY SOUMYA MISRA

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