



## Proceedings of workshop on

# “Bankability and Scalability of Access to Clean Energy Models in Off-grid and Remote Villages/Hamlets Invisible to Government”

*Hotel Taj Darbar, Bodhgaya, Bihar on 7<sup>th</sup> July, 2016*



## **Proceedings:**

Indian Grameen Services (IGS), an affiliate of BASIX and CUTS International, Jaipur had organized a workshop on “Bankability and Scalability of Access to Clean Energy Models in off grid and remote villages /hamlets invisible to government” at Hotel Taj Darbar, Bodh Gaya on 7<sup>th</sup> July, 2016 from 9:30 am to 3:00 pm. The program was inaugurated by the Honourable Gurwa MLA Mr. Rajiv Nandan by lighting the lamp.

Mr. Hareshwar Prasad Singh (Assistant Vice President, IGS-BASIX, Bihar) had hosted the program and in his opening platform he welcomed all the distinguished guests. He also introduced participants about the workshop and its matter.

Following are the brief summary of the points presented / shared by key speakers:

**Mr. Rajiv Nandan** thanked IGS BASIX in his opening remarks for their effective work on the field of clean energy. He remarked that our growing population will be benefited from using solar energy products and for that people have to learn new technology, in which renewable energy is today’s modern world need. In the present scenario, solar energy is the only energy which is good for health and environment. Since our mineral and resources are getting depleted, so renewable energy is the only option as it is never ending. Mr. Rajiv also encouraged women to come in front with the help of federations and self-help groups and gave emphasis to set up small industries by them.

**Mr. H. P. Singh & Dharmendra Sriwastwa from Indian Grameen Services** presented about the different types of work ongoing in Gaya in the field of renewable energy by IGS. They mentioned that there are 90 female renewable energy business women in Bankey Bazaar, who are earning INR 1500-2000/- per month by working from their home. He also introduced the participants to about 12 different models of irrigation pumps (pay and use model) and two DC solar micro grids by IGS.

**Mr. Anil Verma** - the promoter of PRAN (an NGO working extensively on sustainable agriculture practices) also explained the link between agriculture and clean energy. He said that as irrigation is the most important part of agriculture, the irrigation pumps installed by BASIX has given new dimensions to farmers as well as being a blessing for them.

All the present representatives of different organizations also gave their valuable feedback on renewable energy and made the program successful. The problems and how renewable energy reach to the maximum masses was mainly discussed. Solar energy supply models were also articulated one by one by the participants.

## **1. VLE (Renewable Energy Charging Station Entrepreneurs – Rural Spark):**

An Urja Mitra / Sahelis (Mostly women entrepreneurs) who has a good local standing and preparedness to service energy needs through lending low-cost solar lamps. S/he will own an energy charging station developed by Dutch company 'Rural Spark' which ports 12 GLP solar lights and energy cubes. S/he will also have the option of upgrading rental customers to Panasonic lights and home system owners and earn higher margins.

This is a lady act as a community resource person from the village who will be trained by us on marketing, renting and technical aspects of the solar lights and home systems so that they will able to do the preliminary after sales service. She will also help customers with warranty issues.

The initial investment will be around Rs 20,000 and monthly profitability is expected in the range of Rs 2000 to 3000.

- Empowered 65 Urja Sahelis profitably with Rural Spark kits
- 1200+ and growing households gained access to clean energy through rental of solar products and services

## **2. VLE (Solar Water Pump Entrepreneur – Pay & Use Model):**

This project's aim is to facilitate livelihoods around natural resource the use of solar energy for electrification, domestic water supply and irrigation is a natural focus. Urja Bandhu's are entrepreneurs who support solar-operated DC microgrids for operating irrigation pumps.

The proposed pilot aims at designing and deploying a market-based solution for irrigation service delivery using pump sets deployed by group of farmers/co-operative and local entrepreneurs (working with farmers). The objective of this pilot is to demonstrate the efficacy of a services-based approach, develop protocols for service providers to enter and contract with farmers in the market, address the key risks which these private service providers may have with farmers with regards to payment security and move the market to a future structure where Renewable Energy Service Companies (RESCOs) work in partnership with grass root level organisations in designing, deploying, operating and scaling these service models.

In order to make solar irrigation pumping services viable, utilization of the solar pump will be maximized. Analysis of the project economics reveals that the cost of solar pumping is inversely proportional to the number of days the pump sets are operational; the threshold

level is 250 days of operation per year. Keeping this in mind, the focus will be on maximising the use of the solar pumps. The solar pumps that will be deployed will be of 3 hp capacity each and each can irrigate about an acre of land with vegetable farming during a day using a frequency of irrigation as once in every eight days. To maximize the days of operations, a larger catchment area - 8 acres per pump - will be utilised. Also, a service rotation system would be developed to serve all the farmers within the command area. Water flow meters will be used to record the water delivered to each farm/ farmer and the services will be delivered on pre-paid basis with farmers paying for the quantity of water first.

The pilot is designed to demonstrate commercial feasibility of solar pumps and targets scaling up and integration into service networks like RESCO's. Tariff for the water services would be designed to recover all the cost of operations as well as the cost of capital of the project. Based on a detailed financial model developed by the project developers, the tariff for water would be about Rs.2.00/m<sup>3</sup>. Underlying assumptions for the tariff is that the solar pump will be operating for 250 days per year. Any decrease in the operating days would require an increase in tariff to recover the cost of operations and capital. This tariff is much lower than cost of water pumped using diesel pump set (which is about Rs. 2.75/m<sup>3</sup>). It should be noted that ultimately the customers will determine their own tariff based on demand and supply

### **3. DC Micro Grid (Village Electrification Model):**

This project is about setting up ten 7-8kW microgrids using an entrepreneur-led, user-owned model and DC technology, to prove bankability and scalability in hamlets of 20-70 households, which are invisible to the Government.

This project uses innovation in the business model, energy & water delivery and access mechanism. VLE invests in DC generation and distribution of power; the users invest in storage and their loads, which include lighting, fans, TV and light commercial loads. A solar pump is an anchor load operated by the VLE.

Since the storage component is distributed, there is high buy-in from the users and lower risk for the VLE. The capital cost for the VLE is also reduced. The model is modular, profitable and scalable with higher energy usage and community adoption.

The uniqueness of this solution comes from the technological shift to DC power. DC allows transmission with low losses at relatively low voltages over a 2 km radius. Moreover DC cannot be misused for heating and motor-related activity unless the user invests in an inverter. And as the storage is distributed, the VLE can bring in a diesel generator set for supplementing generation in lean-solar periods.

A solar pump as an anchor load is another unique value-add as it provides water to marginal and small farmers on a pay-by-use, shared services model. The VLE services the supply end and collects fixed amounts from the small farmers for providing irrigation water, replacing their spends on hiring diesel gensets. Further, with appropriate storage and distribution the VLE will supply domestic water to households for improving the health, hygiene and sanitation conditions of the community, again on a fixed monthly payment basis.

The common challenges in setting up microgrids (conventionally AC power based) are:

- Large initial investment; prohibitive for village entrepreneurs
- Risk perception around payment collection over a sustained periods
- Lack of true community ownership due to corporate/Govt sponsorship

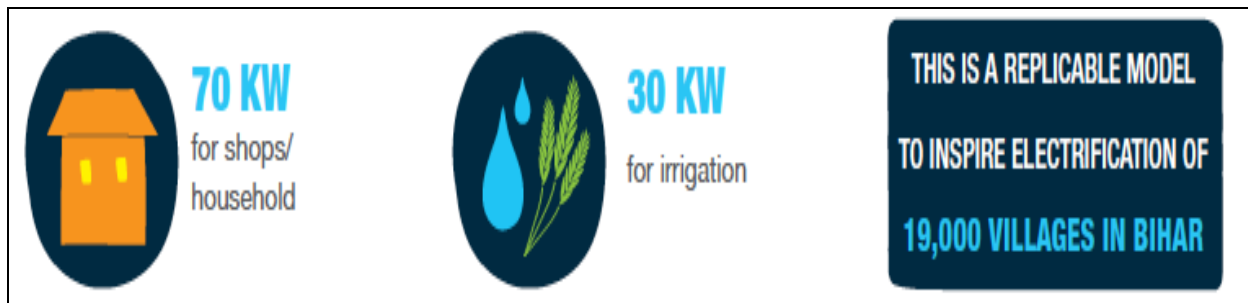
This project addresses these challenges by:

- Reducing initial investment by
  - shifting from AC to DC technology
  - moving storage from central to households
- Securing the revenue stream by providing power for productive use
  - irrigation pump directly increases agricultural output
  - domestic water causes users to see immediate benefit and stickiness
- Allowing user control over timing, load, applications and thus being more attractive for householders and commercial users viz shops, weavers, tailors, artisans, dairies etc, who would earn more as a consequence of modular / customized energy access
- Envisaging a smaller community size of 20-70 households for homogeneity of users, which helps overcome fundamental economic, social and technical barriers to off-grid electricity access
- Encompassing water, which the VLE may also use to breed fishes or ducks and set an example to increase revenue per acre

#### **4. AC Micro Grid (Village Electrification Model - Dharrni):**

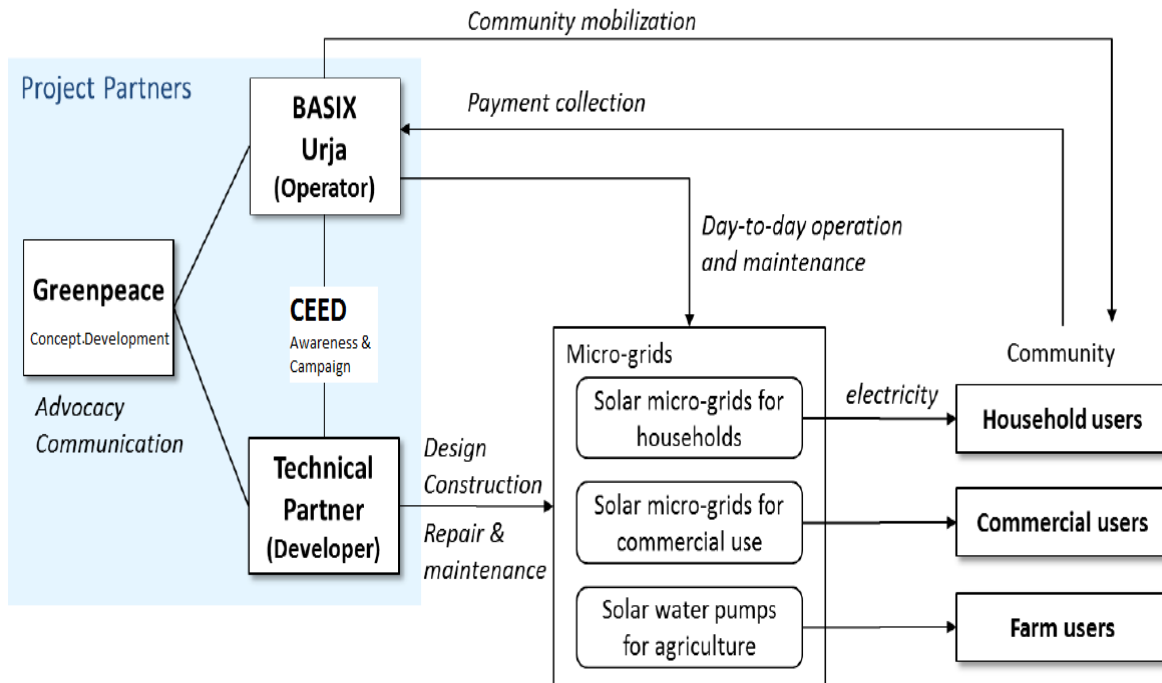
- The Micro-grid runs on Solar energy coupled with battery storage.
- The micro-grid is based on a bottom-up approach. It begins with a certain ambition and can be scaled up based on people's demands and requirements.

- The micro-grid is financially sustainable so as to take care of its own operations from the revenue generated.



- There are more than 300 million people still waiting for electricity in India even today .There are about 26,000 villages like Dharnai which are still yet to be electrified in Bihar alone. Close to 82% of Bihar’s population are on the line of poverty because of this lack of access.
- Agriculture, the backbone for Bihar, has been majorly affected with no electricity access for irrigation throughout the year.
- Decentralized Renewable Energy generate electricity near the point of consumption using locally available renewable resources and are more reliable in terms of Energy delivery and access.
- DRE mode provides improved efficiency, quicker access and an alternative model where people no longer have to depend on utilities or the centralized grid.

The project aims to challenge the dominant perception that centralized power addition will deliver power to all & instead campaign to create political and policy champions on the decentralized approach. This micro-grid cluster approach is a one of a kind demonstration project of a Theoretical Energy Revolution model to a sustainable practical working micro-grid.



### SALIENT FEATURES OF THIS CLUSTER APPROACH

- ◆ Darkness to light in 3 months- Short installation time.
- ◆ 24\*7 electricity supply to all
- ◆ Sustainable street lighting solution providing safety
- ◆ Water round the year for Irrigation
- ◆ Easily replicable model in Bihar and across India
- ◆ Self sustained operations from income generated



## MEDIA Coverage

1) Hindustan Daily Newspaper July 07, 2016 (grid inauguration)

**अच्छी पहल. गांवों को सौर ऊर्जा से मिलेगी बिजली**

# बिना बिल दिये बिजली का इस्तेमाल अपराध : मंत्री

- पशुपालन व मत्स्यपालन मंत्री अवधेश कुमार सिंह ने की बिजली चोरी रोकने की अपील
- बोकनारी में सौर ऊर्जा आधारित मिनी माइक्रो ग्रिड का किया उद्घाटन

**परिचय > परेया**

बोकनारी गांव में बुधवार को पशुपालन व मत्स्यपालन मंत्री अवधेश कुमार सिंह ने सौर ऊर्जा आधारित मिनी माइक्रो ग्रिड का उद्घाटन किया. इंडियन ग्रामीण सर्विस बेसिस के सौजन्य से गांव व देश के विकास से जुड़े एक माहत्वपूर्ण योजना के पूर्ण होने पर ग्रामीणों को नवीकरणीय व व्यापक ऊर्जा स्रोत के उपयोग का अवसर मिला. बेसिस के समन्वयक रजनी प्रुषा ने बताया कि इस योजना के तहत सौर ऊर्जा का उपयोग कर गांव के घरों में बल्ब, पंखे, टीवी चला सकते हैं. इसके अलावा सौर आधारित पंप के माध्यम से किसान कम लागत में खेती भी कर सकते हैं. कार्यक्रम का शुभारंभ अतिथियों को पुष्प भेंट कर किशोरियों के स्वागत गान से हुआ. सभा में मौजूद विधायक राजीव नंदन दांगी ने परेया की जनता को वोट के साथ से उठ कर विधायक के समक्ष अपनी समस्याओं को रखने व उससे अवगत कराने की

बधा कही. मंत्री अवधेश कुमार सिंह ने लोगों को संबोधित किया. उन्होंने मतवाली व उससे हो रहे सामाजिक परिवर्तन को लेकर महिलाओं की राय मांगी. श्री सिंह ने युवाओं को विकास की रीढ़ बताया और कहा कि किसी भी गांव या समाज के विकास के लिए युवाओं का साथ होना बहुत जरूरी है. परेया के सुदूरवर्ती गांवों में सड़कों की जरूरत कायम को देखते हुए मंत्री ने जल्द से जल्द निर्माण व मरम्मत का आश्वासन दिया. विभिन्न सरकारी योजनाओं को धरातल पर लाने और क्षेत्र के विकास के लिए ग्रामीणों के सहयोग को श्री सिंह ने अपेक्षित व अनिवार्य बताया. श्री सिंह ने सरकार द्वारा गांव-गांव बिजली पहुंचाने की योजना को सफल बनाने के लिए भी आम जनता से सहयोग का आग्रह किया और बताया कि बिना बिल भुगतान किये बिजली जलाना एक अपराध है. इसके लिए कई कानूनी विधान और टैंड का प्रावधान है. ग्रामीण क्षेत्र में हो रही बिजली की चोरी को रोकें और लगातार और उत्तम श्रेणी की बिजली सुविधा का लाभ उठाएँ. इस अवसर पर स्थानीय गुरुआ विधायक राजीव नंदन दांगी, पूर्व जिला पार्षद राघवेंद्र नारायण यादव, वर्तमान जिला पार्षद पति नरेश प्रसाद, वरिष्ठ प्रबंधक, बेसिस हरेश्वर प्रसाद, धर्मेश श्रीवास्तव, सुधा डेवरी के प्रबंध निदेशक डीके सिंह, मगध मिल्क की महिला प्रसार पदाधिकारी प्रियंका कुमारी व अन्य लोग शामिल थे.



बोकनारी में कीचड़ भरी सड़कों से गुजरती विधायक व मंत्री की गाड़ियां.

## कीचड़ भरी सड़कों से गुजरे मंत्री व विधायक भी

**परेया.** पशुपालन व मत्स्यपालन मंत्री अवधेश कुमार सिंह व गुरुआ के वर्तमान विधायक राजीव नंदन दांगी का काफिला कच्ची सड़कों पर फंसा रहा. परेया के बोकनारी गांव में मिनी सौर ग्रिड के उद्घाटन कार्यक्रम में शामिल होने जा रहे सभी जनप्रतिनिधियों को कीचड़ भरी सड़कों से होकर गुजरना पड़ा.









5) Dainik Bhaskar published on 8th July (workshop)



6) Dainik Jagran Daily Newspaper July 08, 2016 (workshop) bigger / in Box Dainik Bhaskar Daily Newspaper July 06, 2016



7) Telecasted on E TV on 8th July

**बढ़ती जनसंख्या व कम होती खनिज संपदा के बीच तौर ऊर्जा बेहतर विकल्प**

- ऊर्जा ऊर्जा के विकास में...
- ऊर्जा के विकास में...

विद्युत के अभाव में खेती में बाधा पड़ती है, जो किसानों को उत्पादन के लिए दवायों से प्रभावित करता है। ऊर्जा के अभाव में किसानों को खेती में बाधा पड़ती है, जो किसानों को उत्पादन के लिए दवायों से प्रभावित करता है। ऊर्जा के अभाव में किसानों को खेती में बाधा पड़ती है, जो किसानों को उत्पादन के लिए दवायों से प्रभावित करता है।

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## मंत्री ने किया सोलर मिनी ग्रिड का उद्घाटन



(गया कार्यालय) श्रीवा (समु)। सुबे को पर्याप्त एवं मूल्य प्रबंध निदेशक दिनेश कुमार सिंह, संग्रहण प्रभारी सुधीर प्रसाद चौरीसिन्हा, महिला प्रसार पर्याधिकारी

वन्दन, रांगी, पूर्व जिला परिषद राधेश्वर, पदमण यादव, वर्तमान जिला परिषद पति नरेश प्रसाद आदि के द्वारा संयुक्त रूप से जोरकुन्नी में मिनी सोलर प्लांट का उद्घाटन किया गया। उद्घाटन कार्यक्रम में इंदिरा ग्रामीण सर्वसंयुक्त बेसिक्स के परियोजना निदेशक राजनी धूमण, बेसिक्स के वॉरंट प्रबंधक हरेश्वर प्रसाद सिंह, धर्मेश श्रीवास्तव, सुधा डेपरी के प्रबंध निदेशक दिनेश कुमार सिंह, संग्रहण प्रभारी सुधीर प्रसाद चौरीसिन्हा, महिला प्रसार पर्याधिकारी प्रियंका कुमारी के अलावा ग्रामीण शामिल हुए। कार्यक्रम कायदेपर यादव की अध्यक्षता में जोतेन्द्र यादवके द्वारा संचालित किया गया। ग्रामीण को सबसे पहले स्थानीय विधायक राजीव नंदन दौरे ने संबोधित किया।

मंत्री अवधेश कुमार सिंहने गांव या समाजक विकासके लिए युवाओं की भागीदारीपर जोर दिया श्री सिंहने सरकारके द्वारा गांव-गांव बिजली पहुंचाने की योजना को सफल बनानेके लिए भी आ जवलासे सहयोग का आग्रह किया। उन्होंने कहा कि बिना बिल भुगतान किये बिजली जलाना एक अपराध है। परिया के गांवों में सड़कों की हालत ब देखते हुए मंत्री श्री सिंह ने जल्द से जल्द इन निर्माण व मरम्मत कार्य को शुरू करवाने आग्रहान दिया।

**List of Participants**

<b>Sr. No.</b>	<b>Name</b>	<b>Designation</b>	<b>Organisation</b>	<b>Contact No.</b>	<b>E-mail ID</b>
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		Bihar			
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