Workshop on Scaling up RE Mini-grids For Rural Electrification

Raipur

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Naturetech Infra

Powered By Nature.

Driven By Team Work.

A

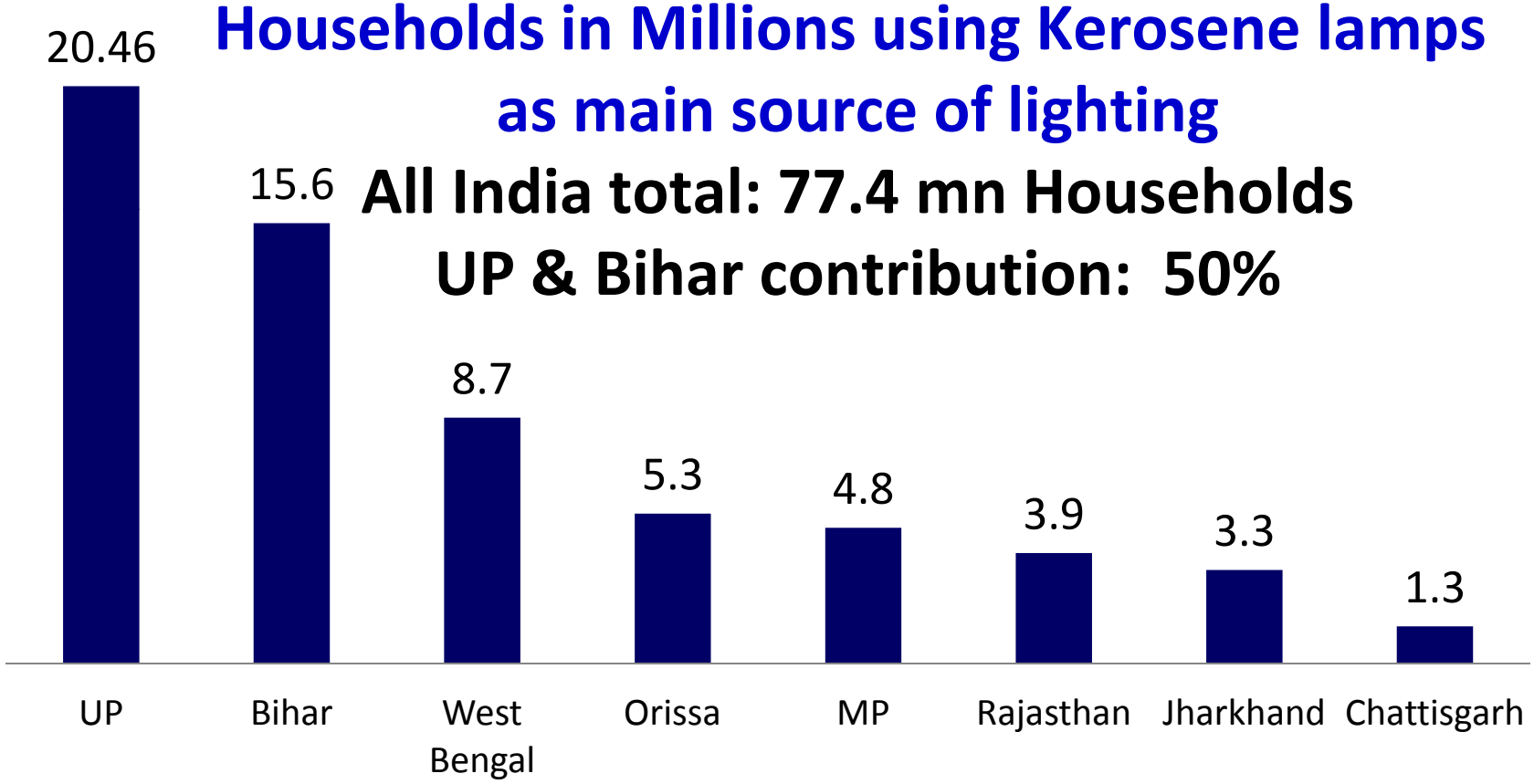
One-Stop

Rural Clean Energy Services Provider

for

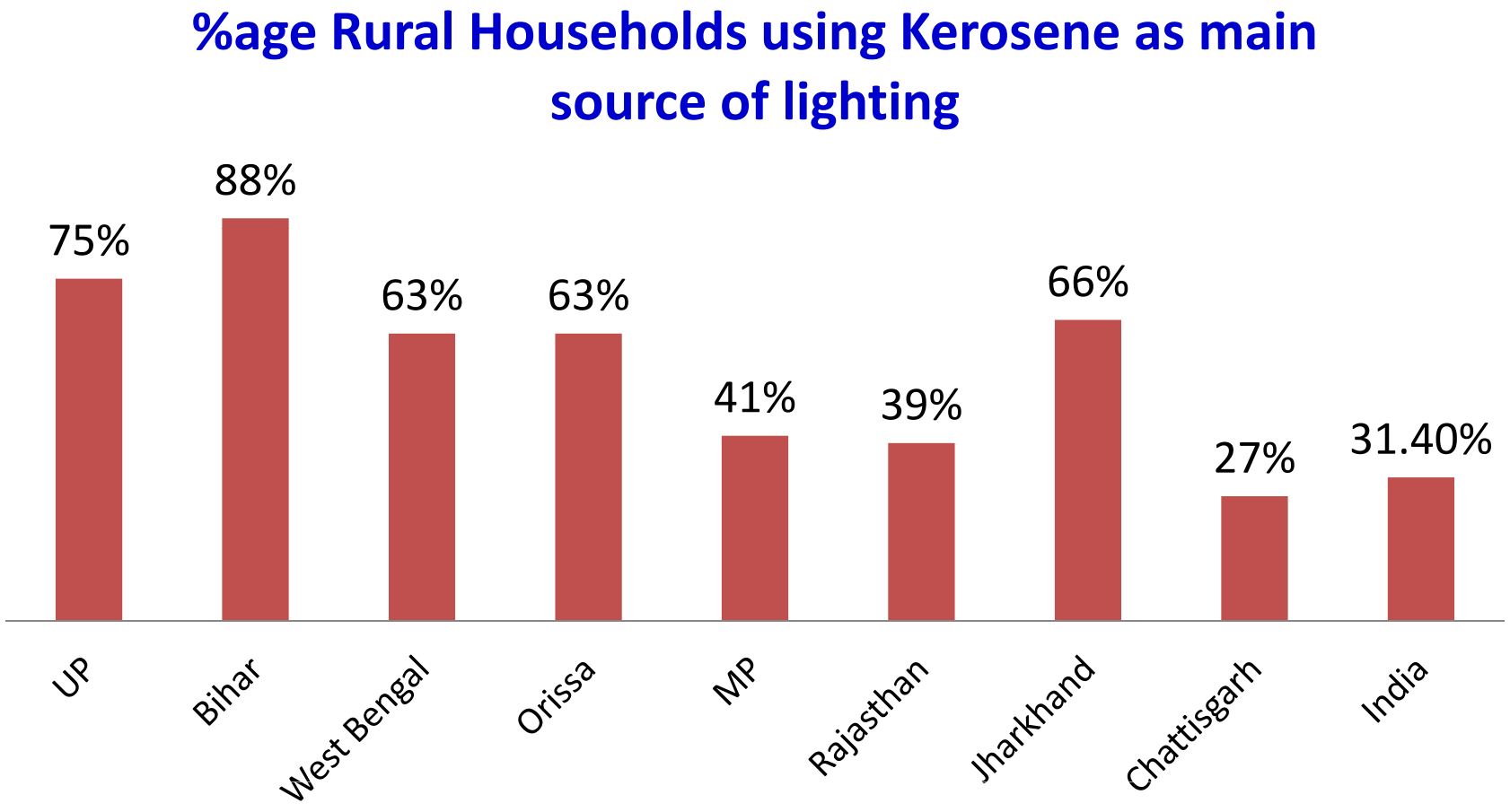
complete energy needs of a village

The energy access issue in India



Source: As per Census 2011, Govt. of India

Rural areas synonymous with lack of clean energy access



Source: As per Census 2011, Govt. of India

How are we doing our bit?

Taking the Road Less Travelled …

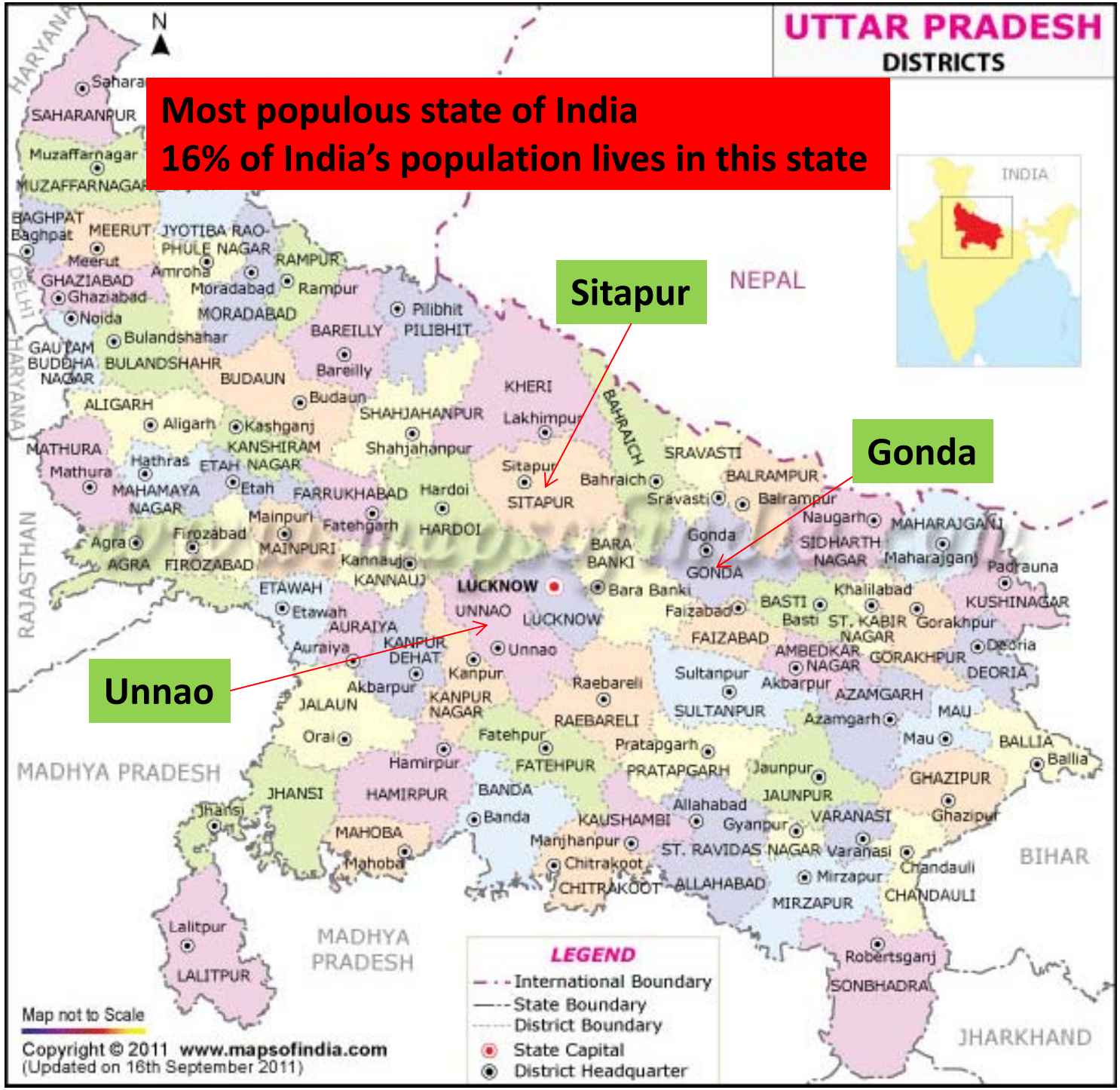
Supplying electricity to remote villages in the state of UP through very Innovative & Smart SOLAR MICROGRIDS

Advantages of **SOLAR ENERGY**

- ✓Available everywhere
- ✓No fuel cost
- ✓No fuel transportation
- ✓No fuel storage issue
- ✓No water for power generation
- ✓No CO_2 Emissions
- ✓Noiseless power generation
- ✓If utilised in day time like solar pumping, storage batteries cd be avoided

Why Solar Mini-grid?

- What are the clean alternatives in physically un-electrified areas?
  - Solar Lantern (inconvenient)
  - Solar Home lighting solutions (not everybody can afford it, about 5-10% of a village have managed to go for it
- **Solar Micro-grid is the answer, which fits into BOP Bill**
  - Convenient, electricity at the household level
  - Pay on a monthly basis by way of recharges
  - Upfront cost of registering for the service is very low in comparison to getting an electricity connection from grid


UTTAR PRADESH
DISTRICTS
Most populous state of India
16% of India's population lives in this state
Sitapur
Gonda
Unnao
N
INDIA
NEPAL
MADHYA PRADESH
RAJASTHAN
HARYANA
DELHI
UTTARANCHAL
BIHAR
JHARKHAND
LEGEND
International Boundary
State Boundary
District Boundary
State Capital
District Headquarter
Map not to Scale
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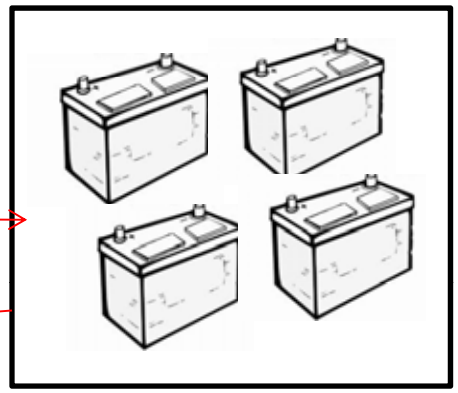
(Updated on 16th September 2011)

What is Our **SOLAR MICROGRID MODEL**?

Off-grid decentralised Power generation

Battery array for on demand power delivery



Charge System

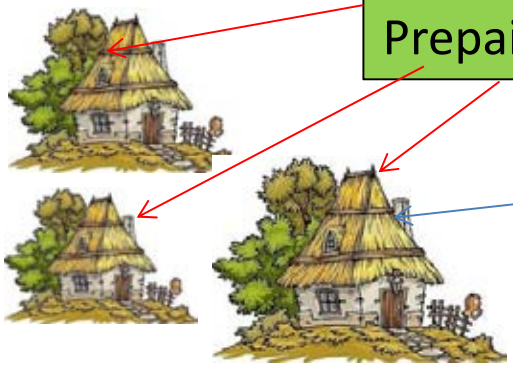
Electrical AC Conversion system for Households & rural micro enterprise

Grid connectivity

When grid is extended
Power can be imported
Or exported

Distribution Node with Prepaid meters

U/G Power distribution



2 LED lights & 1 Power point for TV/Fan/Music system/Computer etc.

Features of Our Microgrid Model

- 24 hours electricity supply to villagers
- Plug & Play any electrical appliances like TV, Fan, Electrical Stitching machines, music systems etc. (under 100 wattage with option to extend it up to 250 watts)
- On Demand Electricity
- Customers pay as per their estimated usages in advance like prepaid mobile phones
- Completely underground power distribution network (no room for power theft)
- Tamper proof prepaid metering (no room for by-passing the meter)
- All of these at Ultra Low Cost (far lower than cost of any other Smart Solar AC Microgrid in Operation in India)

The Biggest Two Myths!

1. The Sun doesn't shine for 50-60 days in a year. So how does a solar microgrid deliver power during these days?

2. The villagers won't pay for the electricity

How **Myths were Bust**?

- For last 24 months our solar microgrids are operating with about **98% availability and 100% reliability**
- No cases of default in payment, there are cases of late payments though
- With our prepaid energy metering in up coming projects, aligning their payment habits in line with their prepaid mobile phone spending **(pay as per your estimated uses in advance)**

The Road Travelled So Far…

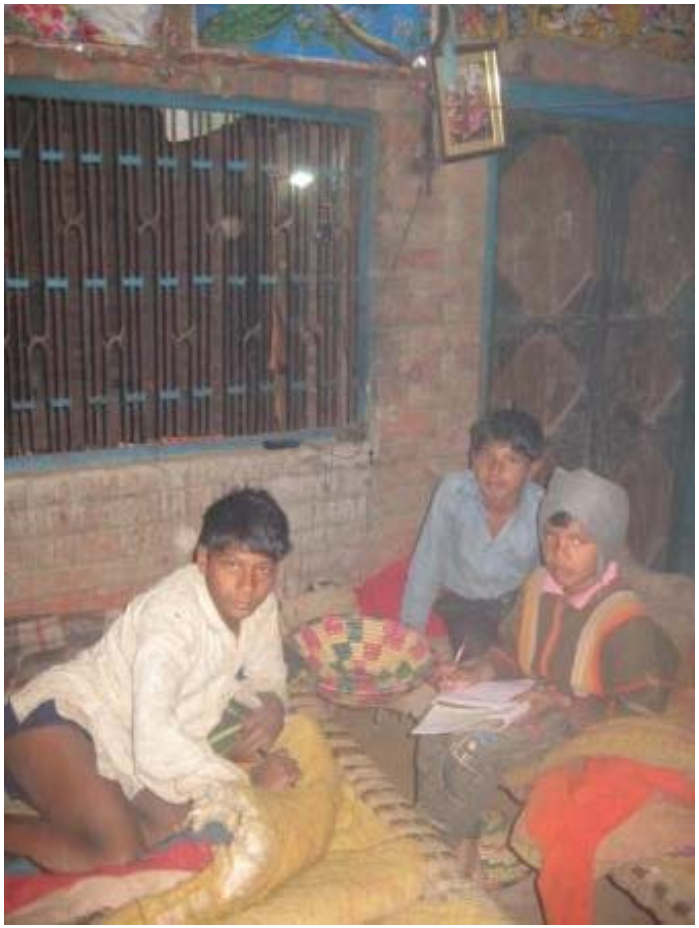
- **Our first Smart AC Solar Minigrid Model is operational in a village in Sitapur Dist., since April 2013**
- **Supplying electricity to 10 villages in UP & 1 village in Bihar**
- We have installed **7 Solar DC Microgrids for UPNEDA, Govt. of UP,** under a Pilot Project
- Launched a no. of **complementary, innovative & cost effective clean energy products** to meet all the energy needs of rural households like
  - **electricity (through a range of solar lights, radio, mobile chargers),**
  - **cooking gas (through potable Biogas plants) &**
  - **transportation (through battery operated cycles, rickshaws, 3 wheelers etc.)**

The Social Impact Created

- ✓ **Savings in cost & efforts**. Our customers have even stopped buying kerosene, leave after burning them
- ✓ **Preventing CO2 emissions**
- ✓ **Better health**, as internal pollution is avoided
- ✓ **Kids get better grades** as they now enjoy studying under clean light & prepare better
- ✓ **Extended productive hours** beyond sunset leading to higher income

The Road Ahead
… **miles to go**

- Scaling up our New Model of **Solar Smart AC Microgrid**
- To electrify 20,000 rural households by 2018



Kids now find it encouraging to study under our bright and clean lighting

Girish Tailor now happily works in the evening under clean and bright lighting

Bustling business and income generation activities now in the village extending to late in the evening

The night life has changed in our villages. Come & experience it.

Prized possession for our customer (having an electric fan)-Benefits of getting connected to our Smart AC Solar Micro grid

Smart Installation of our Solar PV Plant & battery bank

Ensuring minimum land requirement & hassles

Smart Enclosures for Prepaid Meters,
Leaving no scope for bypass of meters

Villagers now would like forget these stuff, but the black patches in their houses still remind them the pitiness of not having access to electricity in past






Pictures taken from our villages

Challenges in Mini-grid Operation

- It is a Service Business, requires a robust O&M & Payment collection Set up
- Plants operating often in remote villages
  - No access road or very poor access roads
  - No basic amenities in the village (worst part no toilets, you have to go to field)
- Challenging customer profile
  - Poorest of the poor
  - Low Spending on electricity (Rs. 100 – 200/month)
  - Very demanding customers w.r.t electricity reliability
    - No Back up (no kerosene) with them if no electricity

… Leading to very high cost of serving the customers, unless you reach a critical mass of customer base, you even struggle to recover your operating cost also

Financing Issues

- Very limited sources of funding
  - Sector is nascent and in early stage
- Grants & subsidies are the key & most important funding sources
  - Need to support Mini-grid operators considering the challenges and social impacts of the Mini-grids
  - Financial viability of this model & other sources of funding to these operators shall come after a certain scale of operation
- If external capital can be patient and can be enough to carry through a scale-up journey, then the model is sustainable and financially viable

What is holding back Commercial Capital?

- Low scale of operation for Mini-grids
- Policy & regulation clarity
- Tariff issues
- Scope of services

What is required?

- Risk capital to build a certain scale to attract commercial capital
- **Who can bring that?**
  - Impact Investors
    - They also wait for a minimum scale
    - Terms tougher for Promoters
  - Promoters' capital
    - How many promoters can afford that and till how long?
  - Alternate sources
    - Subsidy
    - Grants
    - **CSR money (Game Changer with 2% profit share as per New Companies Bill)**

We can do more, better & faster
if each of us do our bit in
contributing to this effort

To know how, pls. mail us to:

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