Current state of Affairs

Final objective

Complementary role rather than competition

Nature of India's Evolving Electricity System – Role of Mini Grids

Nitin Akhade
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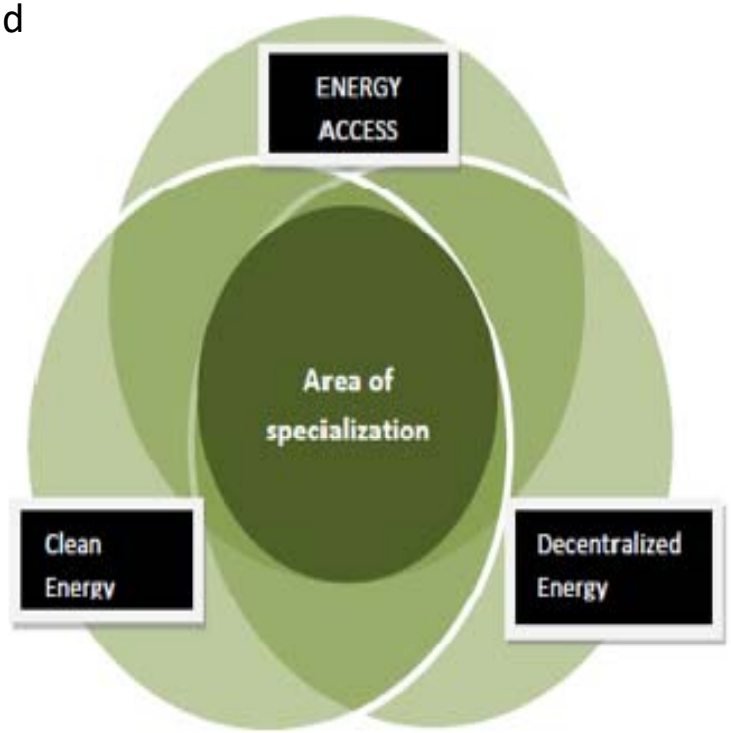
About CLEAN

CLEAN is a Network of Decentralized Clean Energy Enterprises and organizations

- Unserved and underserved
- Rural and urban
- Electrical, thermal and motive power
- Technology, scale and resources agnostic
- Solar, Biomass, Biogas, Pico hydro, Small Wind etc
- Across business models: Small portable units, Stand alone systems, Micro and Mini grids
- 123 members across the country



Focus Areas:

1. Policy Advocacy
2. Access to finance- for End users and Entrepreneurs
3. Skills and Training
4. Technology and Innovation
5. Networking and Information
6. Markets
7. Measurements, verification, monitoring and evaluation (to be added)

Partners

Strength

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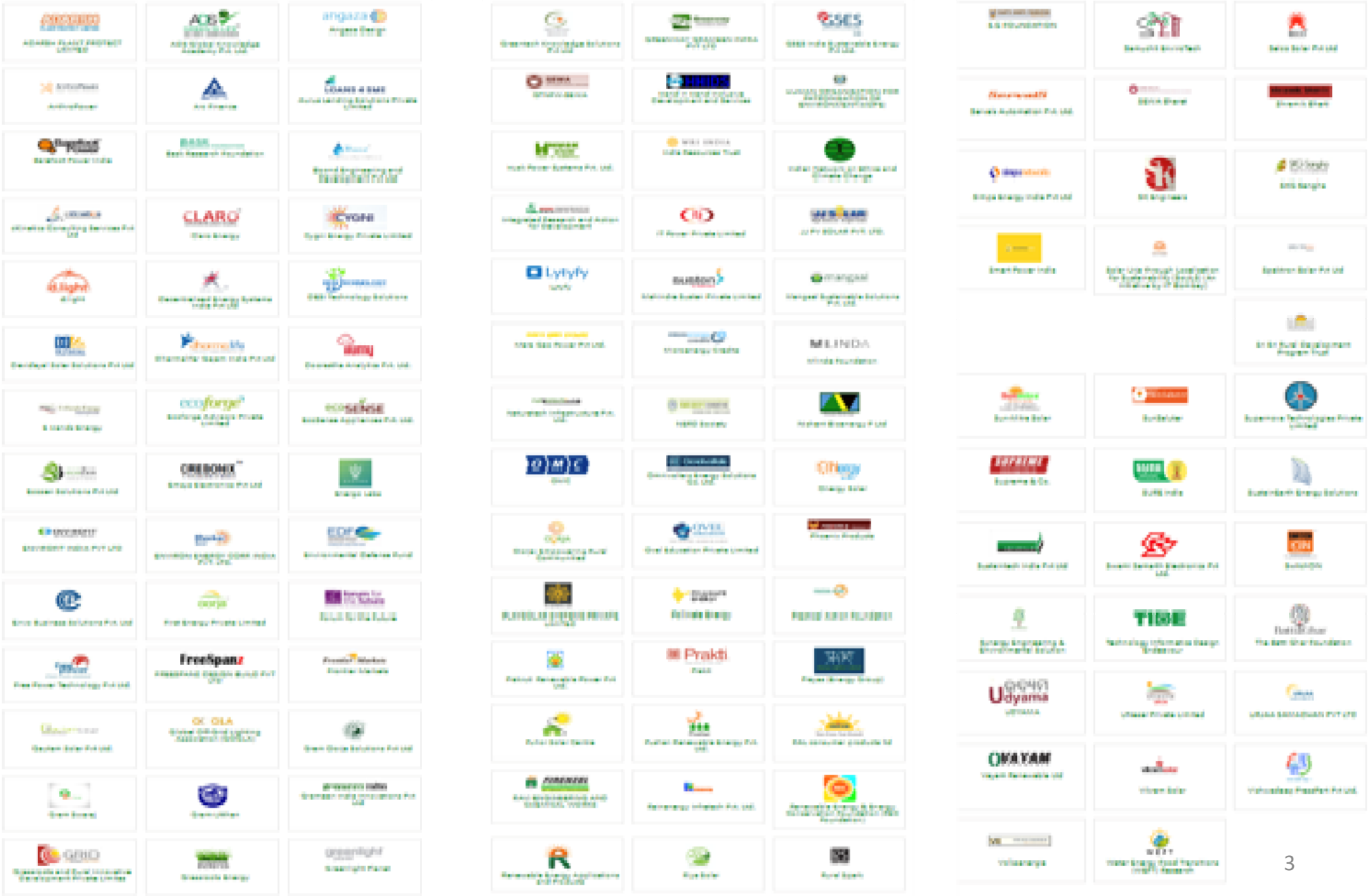
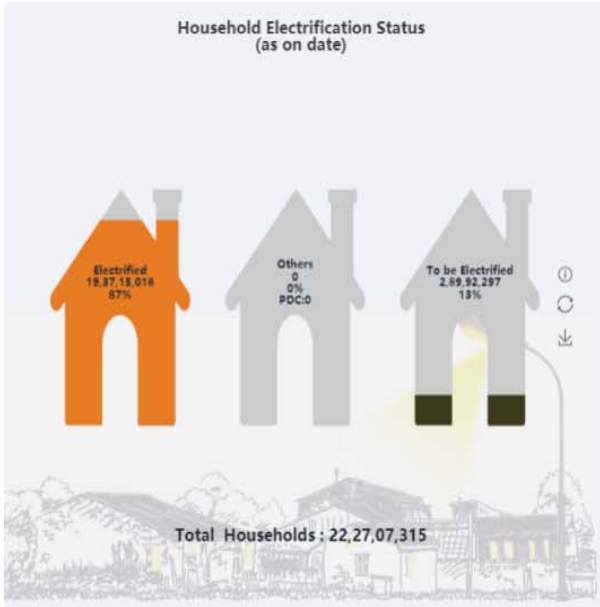
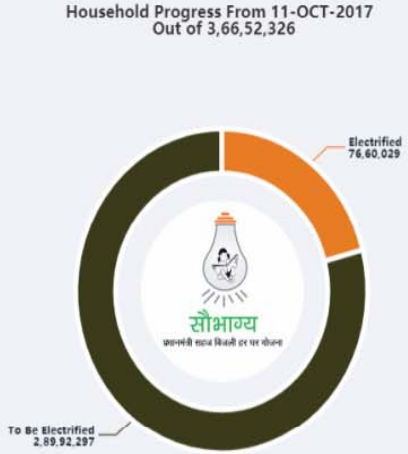
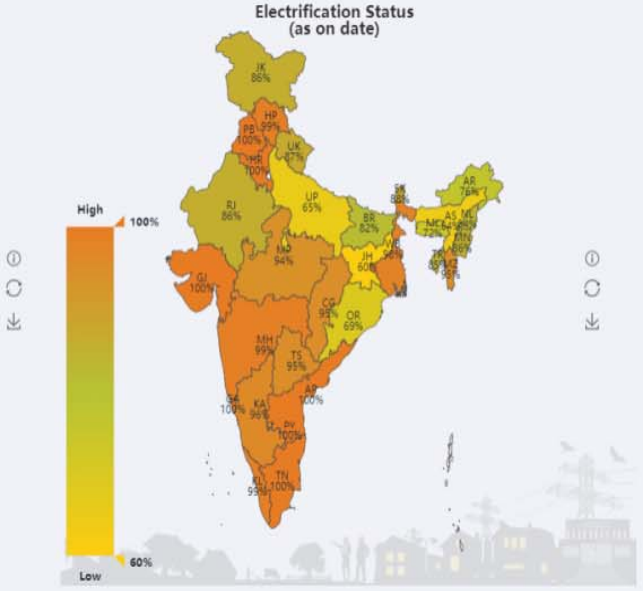


Dynamics of Indian Electricity system







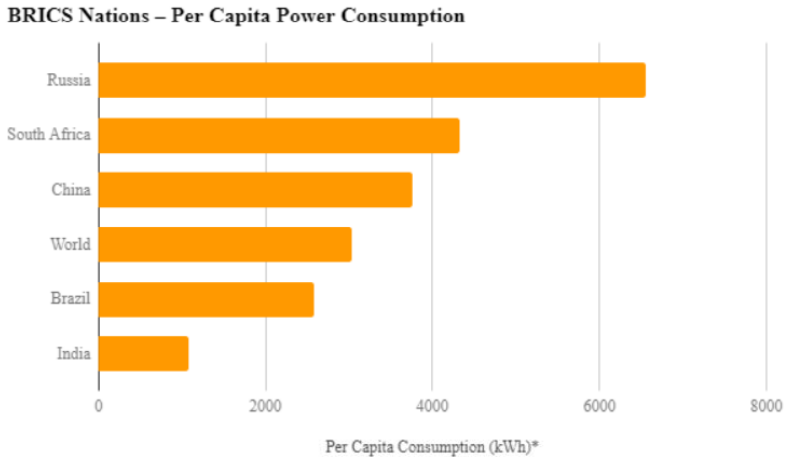
Definition of Rural Electrification?

T&D losses in India are highest in world 26.67 %

Voltage regulation

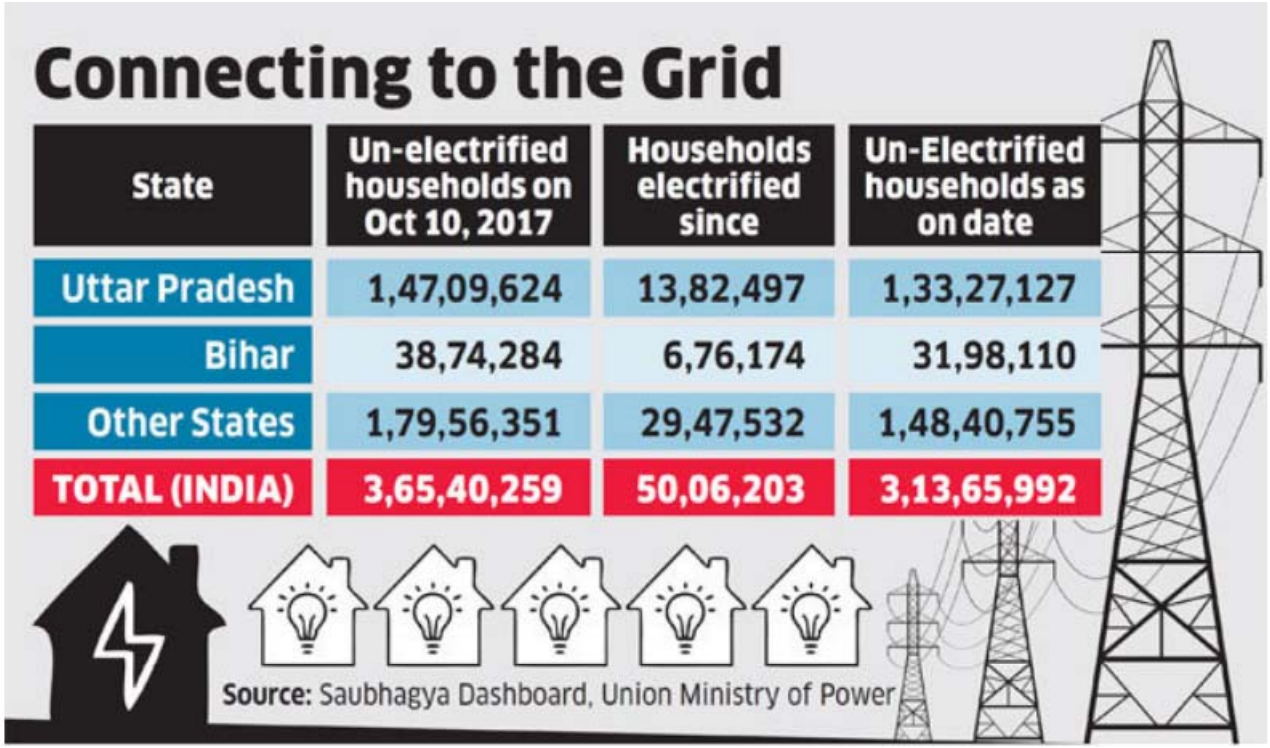
Quality of power supply and life

DISCOMs ????/ freebies



Source: Data for India: Parliamentary Questions, 2015; Other Nations: International Energy Agency, 2013

Big Test for Big Three states in India – Uttar Pradesh, Bihar and Jharkhand



Challenges and Opportunities

1. Ageing Infrastructure
2. End user attitude – No more freebees
3. DISCOMs and SERC needs to be pro-active and sense the pulse of people
4. Aspiration of young generation
5. Technology connect for rural livelihood enhancement

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Can Sate DISCOMs and Mini Grid players play complimentary role in taking India forward

HOW DOES THE GOVERNMENT DEFINE AN ELECTRIFIED VILLAGE?

MERELY TAKING A POWER LINE IS NOT ENOUGH, LIKE IT WAS IN THE PAST

Central Electricity Authority's norms on electrification:

Basic infrastructure of distribution transformers & lines are provided in the inhabited locality, as well as Dalit bastis

Electricity is provided to public places like schools, panchayat office, health centres, dispensaries, community centres

At least **10%** of total number of households in the village should be electrified

The gram panchayat **needs to certify** electrification

The situation has improved, but shortfalls remain:

Many houses in villages still do not have electricity connections

Even if they have a connection, they face **frequent blackouts**

Supplying power is a **losing proposition** for state discoms

These companies often cut supplies **to reduce losses**

In some areas, farmers often get power only **for a few hours** around midnight

THE WAY FORWARD

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National Mini Grid policy (Paper Tiger)
UP and Bihar Big Test for electricity access

National Level Mini Grid Policy

1. Lesser chances of clearing - Notion that by 2019 April all villages will be electrified. But we are still optimistic and lobby for same and pushing MNRE to clear it.
2. We had discussion with Secretary MNRE for inclusion of Mini Grids for benchmark cost of rupees 239 per watt. Combine effort of CLEAN, Shakti founda

(iii) **Standalone Solar Power Plants/Packs**

Capacity (kW)	Battery back-up (hrs)	Benchmark Costs (Rs./Wp)	
		General Category States	North Eastern States/Hill States/ Island UTs
Up to 10	6	100	110
	3	80	88
	1	68	75
Above 10 and up to 25	6	90	99
	3	72	79
	1	61	67

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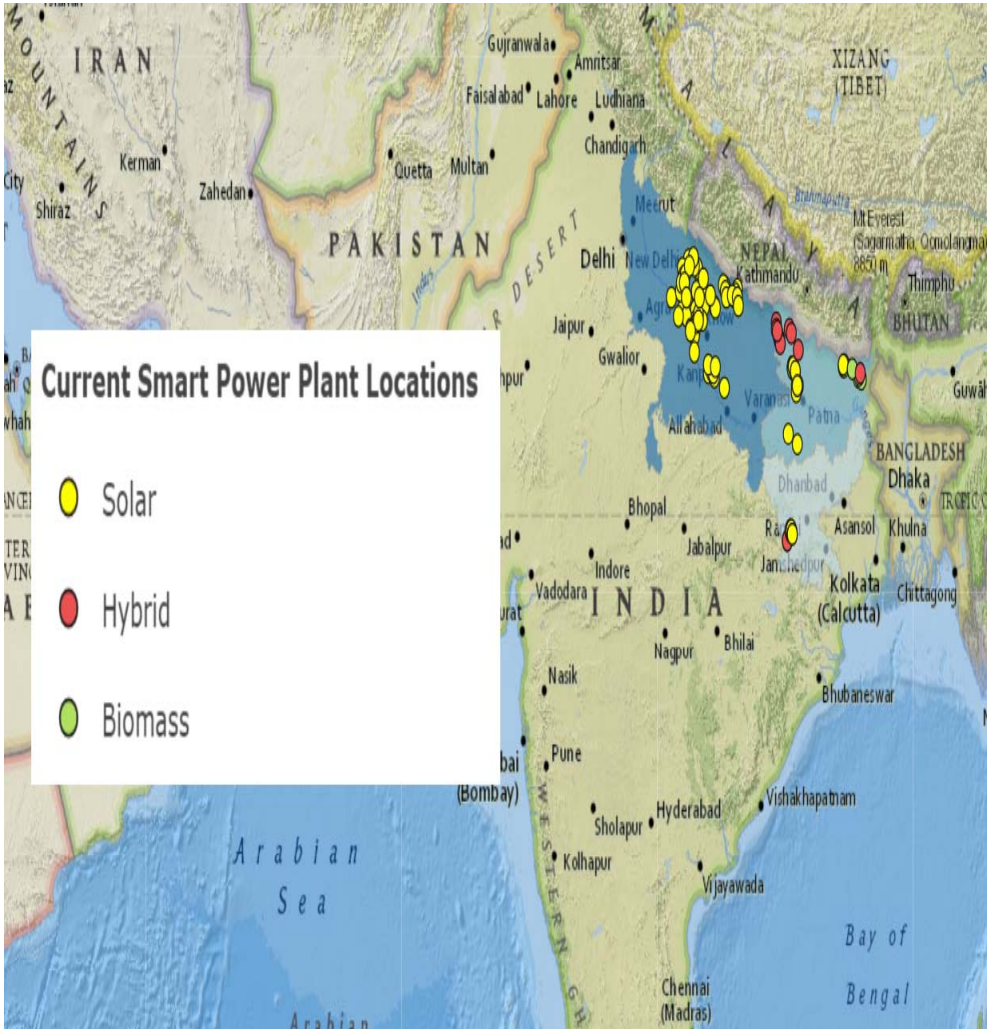
Mini Grid outreach pan India



CLEAN Mini Grid Players

24 Mini Grid players (AC-DC players)

1700+ installations

5-70kW size

70-80 % Utilization factor

1+ millions lives impacted

50k Commercial users and shops

Better billing efficiency

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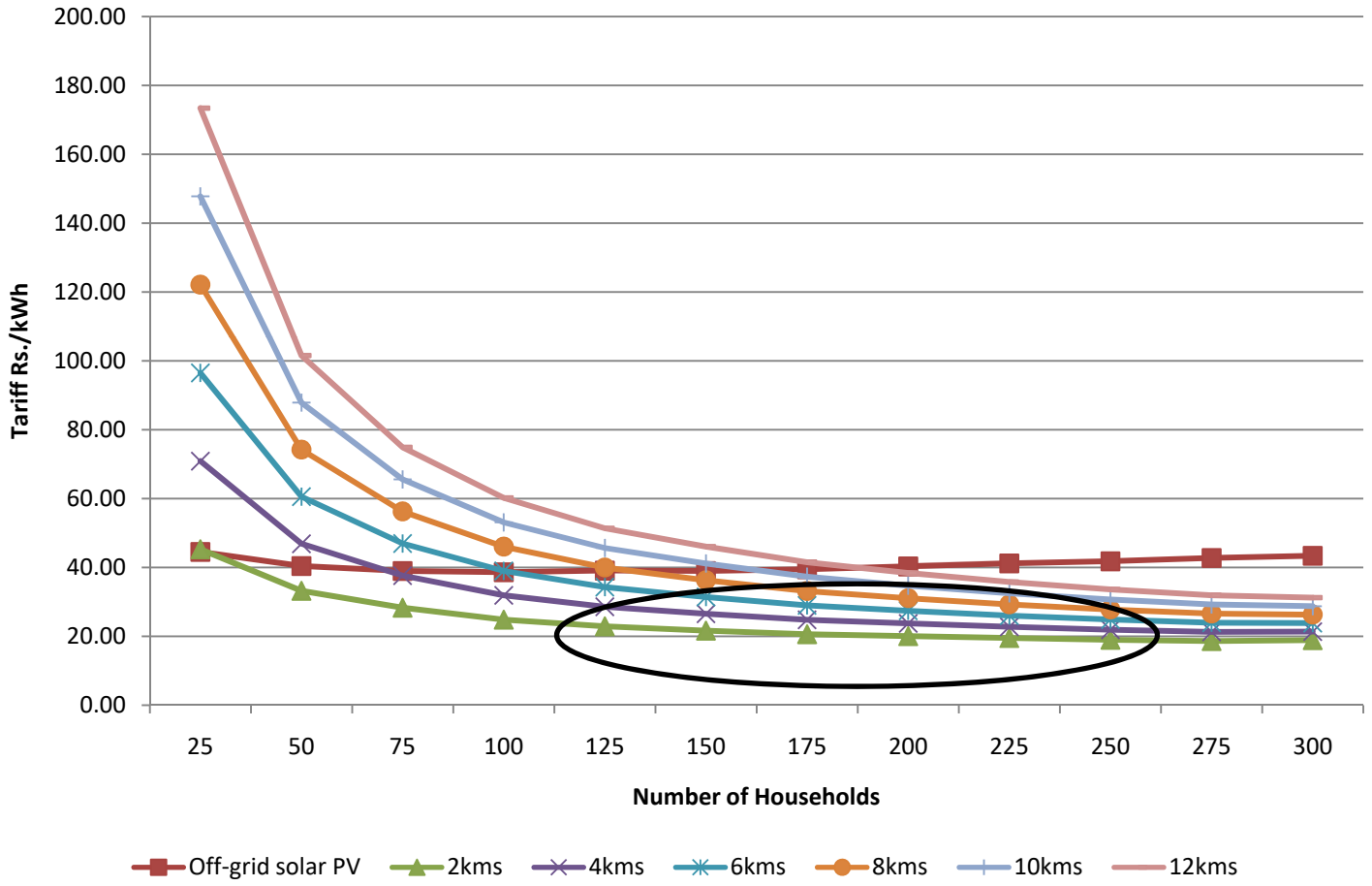
Grid Single Phase Ext. vs Off-grid – Bihar 2016-17



Assumption
1. **11kV** feeder
2. Serving load of **200-500** watts per household
3. Operation for period of **20 years**
4. **4.45** INR cost for electricity

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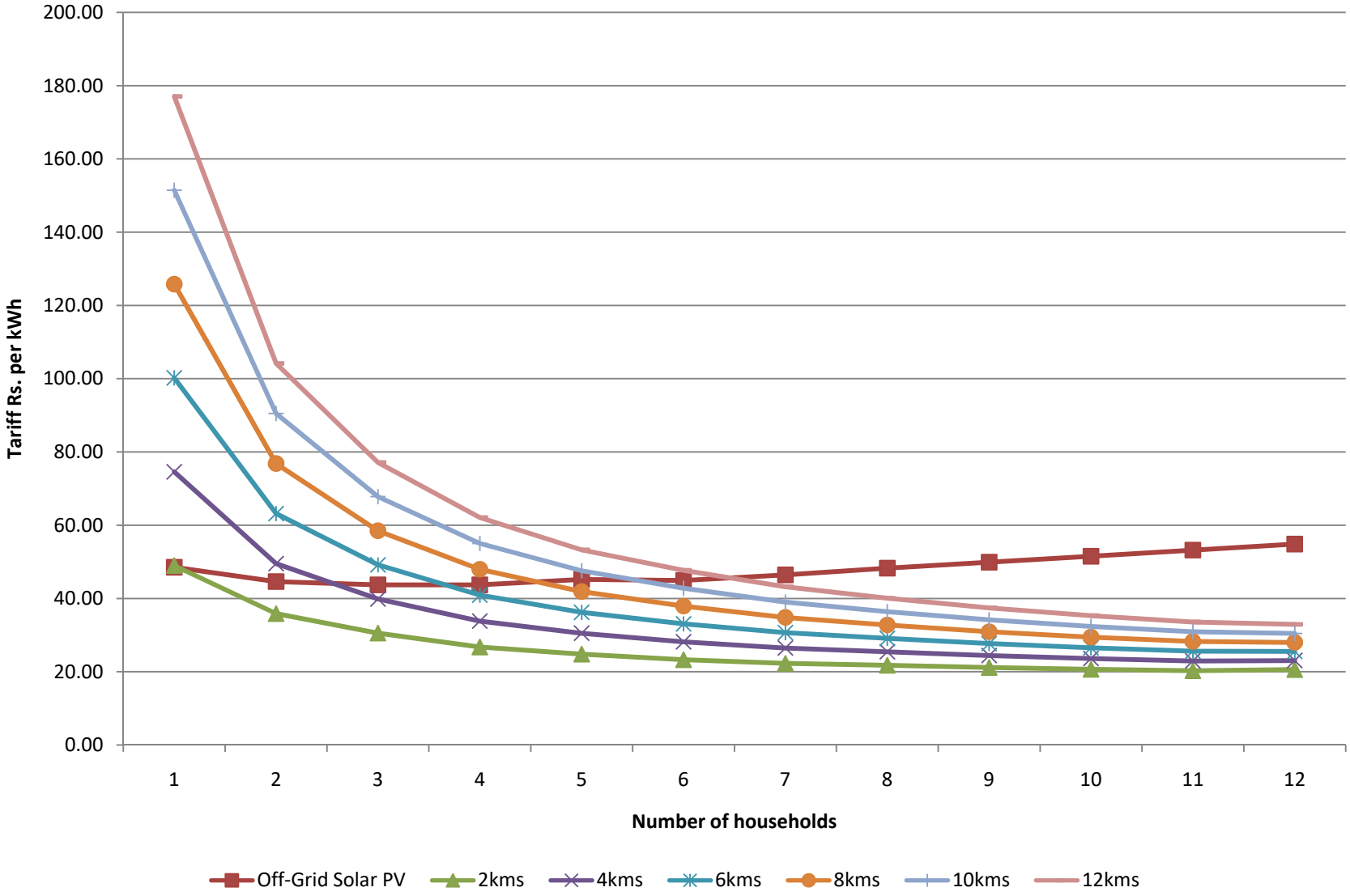
Grid Single Phase Ext. vs Off-grid - Orissa



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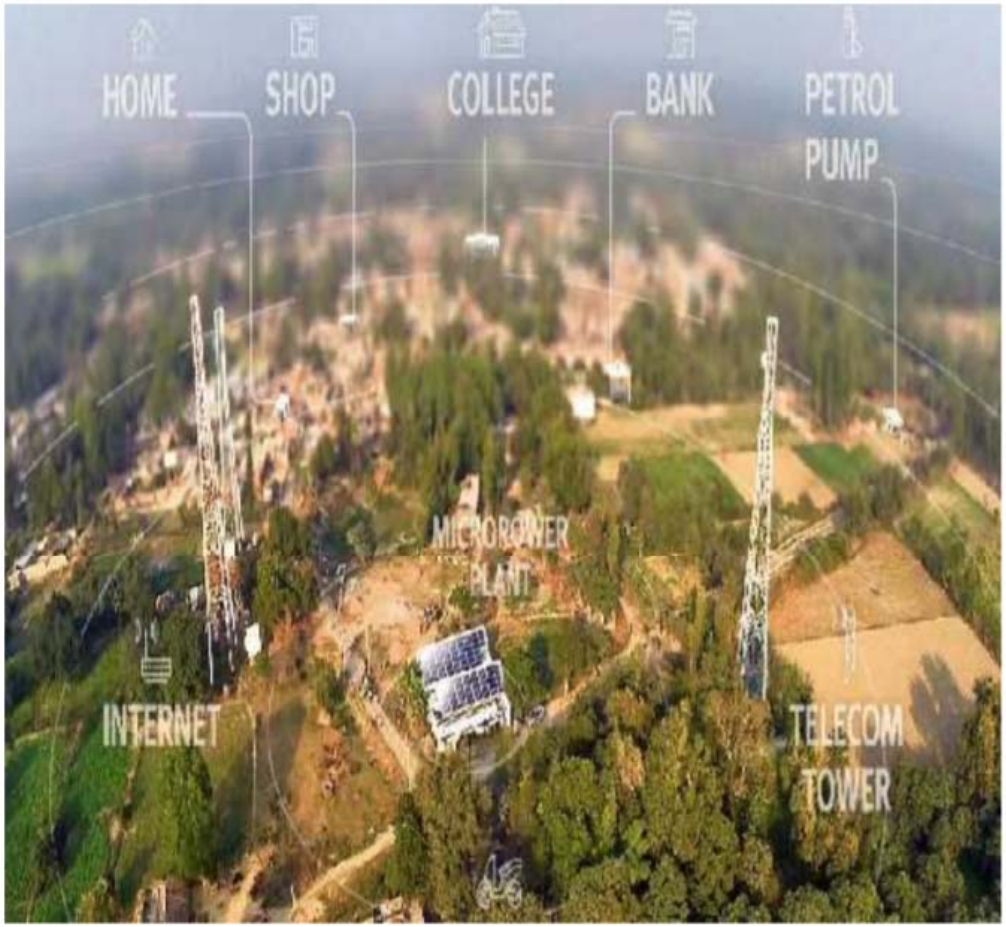
Mini Grid Models in India
Boosting rural economy



Courtesy @OMC power

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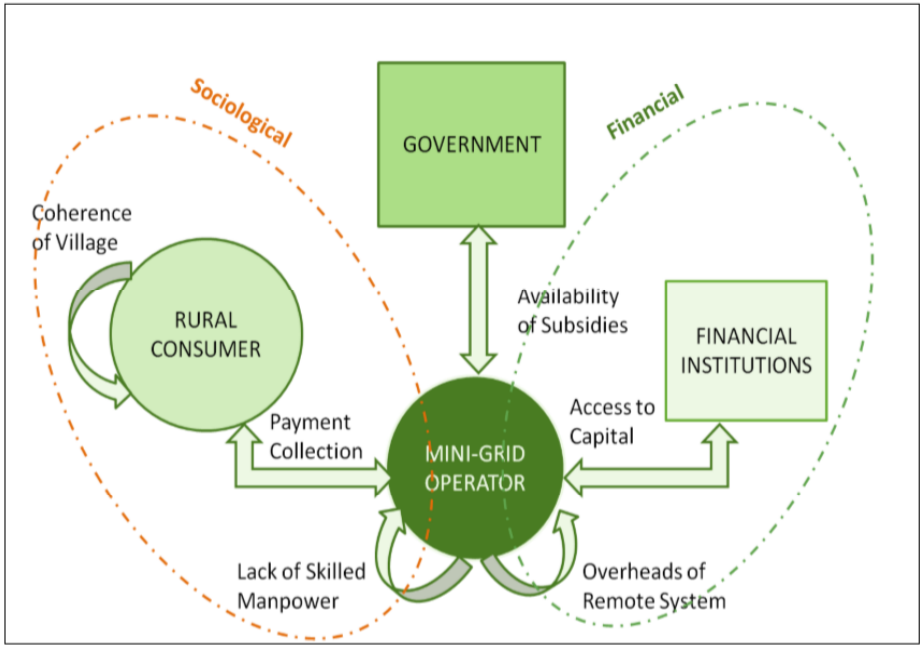

Only couple of players able to raise some debt or equity by investor

Bankers awareness for mobilising funds in RE technologies??? – CLEAN attempt of having financial literacy program for Bankers cum enterprises

Villages are not listed in Census??

Revenue collection model??

Battery technology Fintech model??

Anchor load philosophy won't work but need deep dive in Micro Enterprise through grids

Rural Transportation key avenue for exploration with government pushing heavily for E-mobility policies

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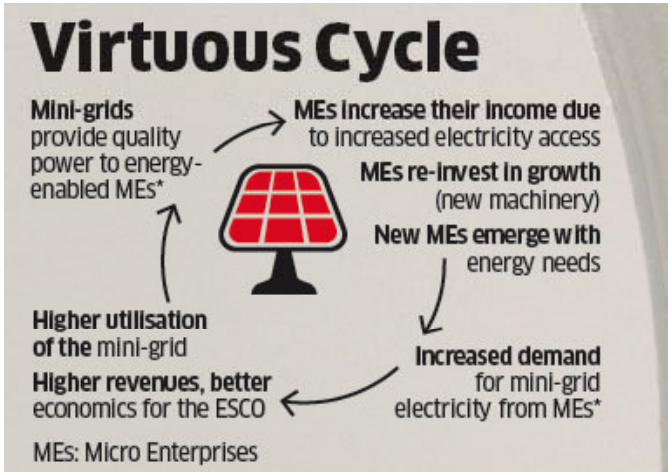
MSMEs for the state of Uttar Pradesh

Location	Product
Agra	Foundry,Leather Footwear, Mechanical Engineering Equipment
Aligarh	Brass & Gunmetal Statues,Locks, Building Hardware
Mau	Power loom, Leather Products
Banda	Power loom
Khurja	Ceramics
Firozabad	Glass Products
Noida	Electronic Goods,Toys, Chemicals, Electrical Engineering Equipment, Garments, Mechanical Engineering Equipment, Packaging Material, Plastic Products
Ghaziabad	Chemicals, Mechanical Engineering Equipment, Packaging Material
Gorakhpur	Power loom
Hathras	Sheet work (Globe, Lamp)
Jhansi	Power loom
Kannauj	Perfumery & Essential Oils
Kanpur	Saddlery, Cotton Hosiery, Leather Products
Meerut	Sports Goods, Scissors
Moradabad	Brassware
Muzaffarnagar	Rice Mills
Saharanpur	Rice Mills, Woodwork
Varanasi	Sheet work (Globe, Lamp), Power loom, Agricultural Implements, Electric Fan



Identification of upcoming cold storage through District Association chamber?

Capitalising on the KUSUM scheme

Market Development Agency for high cash crop value

Water heating and cooling for small industries need.

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