



SmartPowerIndia

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Role of Mini Grids for enabling 24x7 Power for All

By:

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An estimated 83 million Indian rural households have little or no access to electricity, hindering their overall socio-economic development

- **7,874 villages¹** in India are **totally un-electrified**
- **Officially electrified villages** often have a **high percentage of un-electrified households**
- Government is aggressively electrifying rural areas, however **number of underserved households is expected to decline by only 5% in the next 10 years²**



There is a need to deploy alternative solutions that can compliment government's mission to achieve 24/7 rural electrification



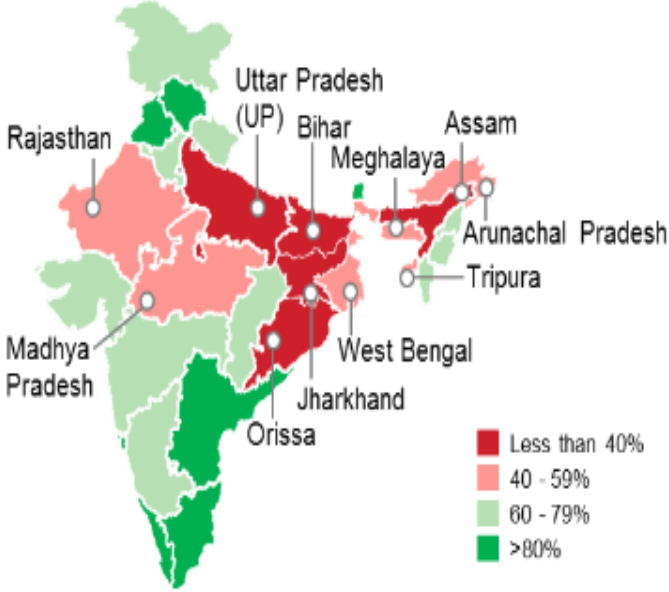
SOURCE: ¹Progress report of Village Rural Electrification as on August 2016 (<http://garv.gov.in/dashboard>)

SOURCE: ²The business case for off-grid energy in India – Climate Group; 2015

Smart Power India (SPI) was established by The Rockefeller Foundation to implement the Smart Power for Rural Development Program (SPRD) in India

The Smart Power program is driven by the following mission:

- Provisioning reliable electricity in Indian villages through a market driven model led by energy service companies (ESCOs)
- Socio-economic development of villages with electricity as a key enabler for productive use
- Creating an enabling ecosystem by engaging with project developers, investors, technology companies & policy makers



India Electrification Status*

Uttar Pradesh, Bihar and Jharkhand are the most un-electrified states in India and the focus of the Smart Power Program



In order to build an enabling eco-system, The Rockefeller Foundation committed USD 75 million to the Smart Power initiative

The initiative analyzed various available options for rural electrification; Distributed Renewable Energy (DRE) Mini Grids emerge as most viable

	Traditional solutions		'Renewable' alternatives for grid electrification				Provides 'Near Grid' experience
	Kerosene	Diesel	Solar Lanterns	Solar Home Systems	Pico grids	Mini-grids	
Uses	Lighting	Lighting Enterprises Agriculture	Lighting	Lighting	Lighting	Lighting Enterprises Agriculture	Promotes economic development
Households covered	1 HH	~40 HHs	1 HH	1-2 HHs	~40 HHs	~200 HHs	Serves key regions in a village
Potential to integrate with grid	No	No	No	No	No	Yes	Provides last mile resilience to national power system
Health and Environment Impact	Negative	Negative	Positive	Positive	Positive	Positive	Positive impact on health and environment
<ul style="list-style-type: none"> • Poor quality lighting solutions • Negative impact on health & environment 			<ul style="list-style-type: none"> • Low capacity solutions • Lighting only application • Suffer from poor maintenance and battery life over long term 		<ul style="list-style-type: none"> • Low capacity solution • Lighting only application 		

¹ 1 HH ~ 5 people

However, despite its huge potential, historically Mini-grids have failed to scale and attract investors and credible project developers



Concept of Solar PV mini grids pioneered in 1990s

- 1996: WBREDA installed 25kWp in Sagar Island
- 2004: CREDA installed solar mini grid in Chattisgarh

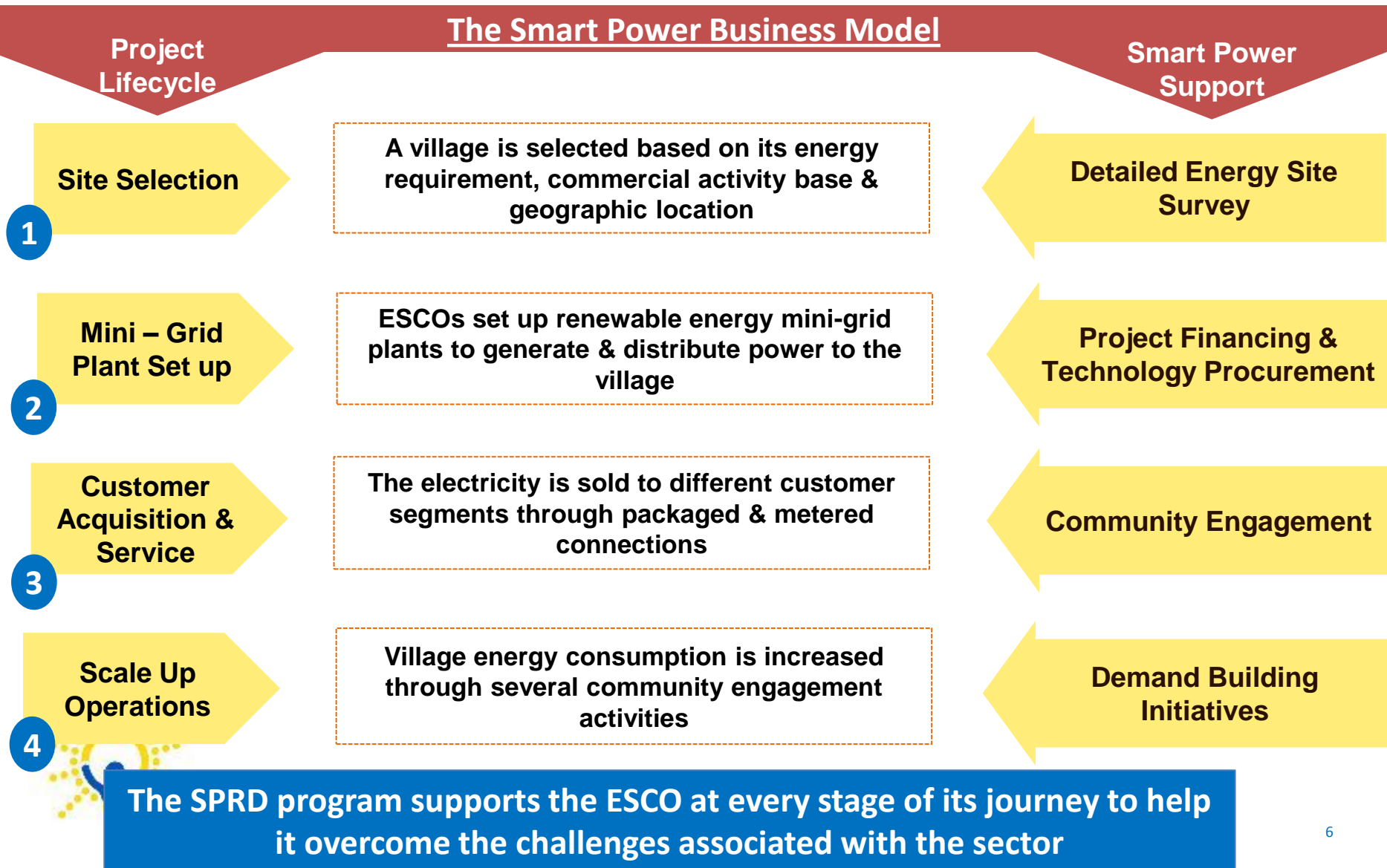
However, private players in the mini grid sector have not been successful

- **Lack of scalability**, sustainability and commercial viability of a mini grid business model
- Inability of mini grid companies to **raise commercial finance**
- **Logistical challenges** of operating in rural geographies



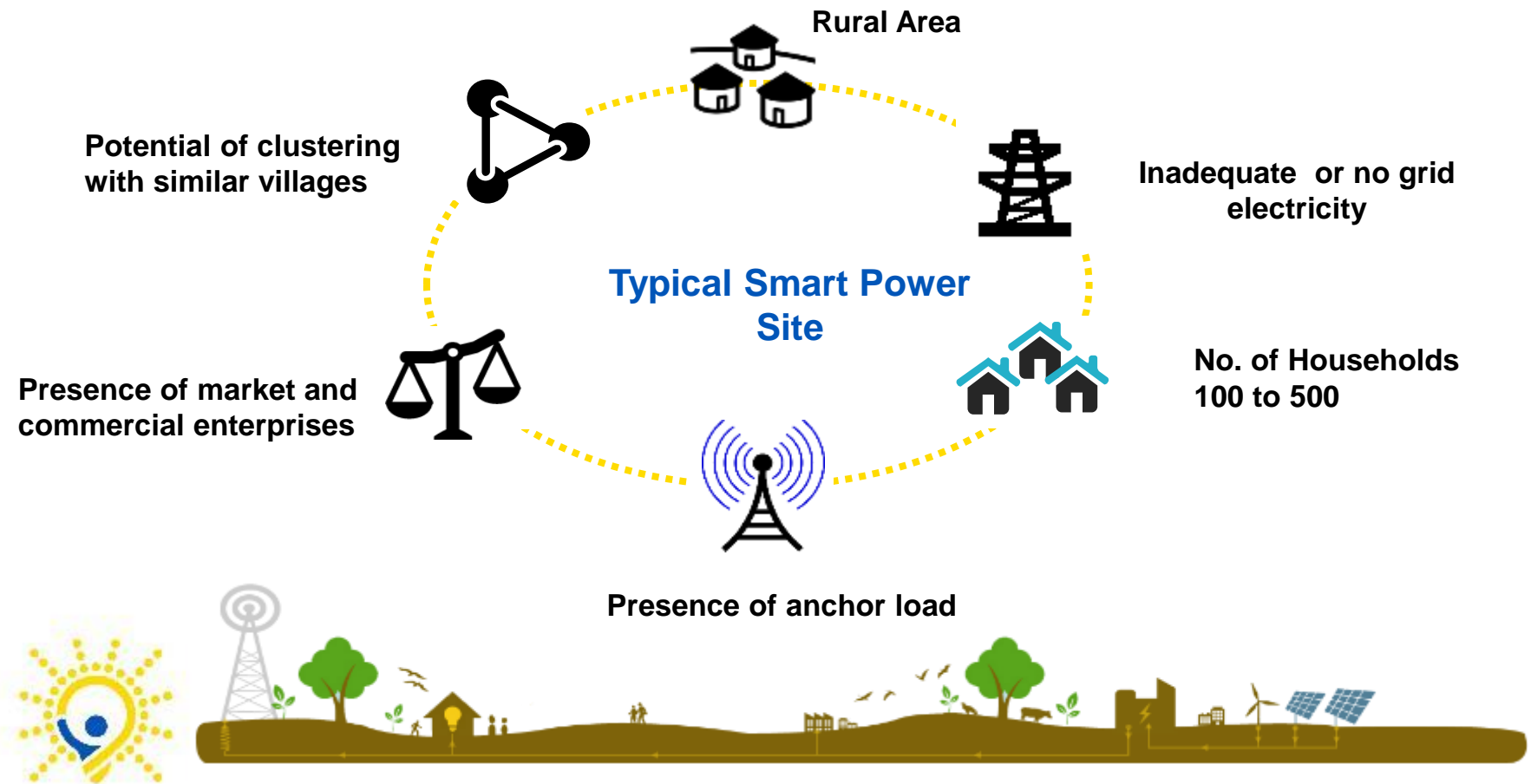
- Most existing models **are lighting only and don't serve productive loads**
- **Grant funded** models dominate this landscape – these are **not commercially sustainable models**

The Smart Power program is a market driven model that caters to different customer segments



Site selection is one of the most important criteria to implement the Smart Power model, as not all villages are suitable for mini-grids

Smart Power recommended village profile



Smart Power mini-grids are operated by Energy Service Companies (ESCO), driven by a robust on ground infrastructure & customer service support



	Generation	Distribution	Connection	Revenue Collection	Customer Service
ESCO's Responsibility	ESCOs set up renewable energy plant to generate power	ESCOs set up mini-grids to distribute power to the consumers	ESCOs provide connection to consumers	ESCOs collect monthly revenue from customers	ESCOs resolve customer grievances



The ESCOs provide electricity as a service and hence are different from products companies who sell stand alone solar devices etc.

The biggest challenge ESCOs currently face is the access to commercial finance due to high risk perception of mini-grids

The **Smart Power initiative provides risk capital** to support ESCOs and prove business viability – with the goal of attracting commercial debt

Initial Signs of Success

- Since 2014, the Smart Power initiative has **invested in seven ESCOs across UP, Bihar & Jharkhand**
- Strong pipeline of potential **ESCOs** (domestic & multinational) are in **advanced stages of funding discussions**

#	Smart Power supported ESCOs	Plants *
1	OMC Power	55
2	Husk Power	03
3	TARAUrja	22
4	DESI Power	06
5	Freespanz	04
6	Vayam	01
7	Mlinda	04
Total		95

The initiative currently has 95 operating plants with over **28,000 customers**

95 plants with cumulative capacity of over 3 MW

The Smart Power program compliments government's '24 x 7 Power for All' mission, by creating last mile rural electrification infrastructure

Designed to function as grid interactive, last mile distribution infrastructure

Quality, reliable and safe electricity, confirming to CEA standards

Caters to productive & income generating loads such as commercial, agriculture & institutional customers

Promotes use of renewable sources of energy offsetting India's carbon footprint



Smart Power Plant,
Supaul, Bihar

However, for the mini grid sector to scale and attract both developers & investors, an enabling policy environment is a must

Recent policy development in the mini grid space, specially in the state of UP, has been encouraging, with other states expected to follow the same

National Tariff Policy

- Cabinet has approved amendment to **allow mini-grid integration** and investment security
- An appropriate regulatory framework is expected to be in place to **mandate compulsory purchase of power** into the national grid from the excess power generated by mini grids

Mini-Grid Policy - UP

- UP Cabinet has **approved the mini-grid policy** in the state
- The policy **provides an option for safe exit or integration with the national grid** in case of govt. grid becomes operational in the mini grid sites in future
- Provision to **avail state govt. subsidy** and other infrastructure related benefits



What could give the mini grid sector a boost?

1 ESCOs need to scale and demonstrate operational profitability

- Although ESCOs need to scale, however, it is also important to improve operational efficiency to secure & private sector capital and **present an investable case** for the sector

2 Further refining of government policy to de-risk the sector

- Supportive policy frameworks are now coming up, but there is still a need for **policy refinement and implementation regulations**
- Similar to UP, other States such as Bihar and Odisha should introduce measures for Mini Grid deployment and future grid interaction

3 Financing / Ease of access to subsidies and project financing

- The disbursement of **government subsidy** process should be streamlined and available to project developers in a timely manner to **reduce capex burden**
- **New financing schemes** such as credit line, low cost debt should be available to project developers
- **Faster accreditation** process by the government **for new players** entering the space should be in place

THANK YOU



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