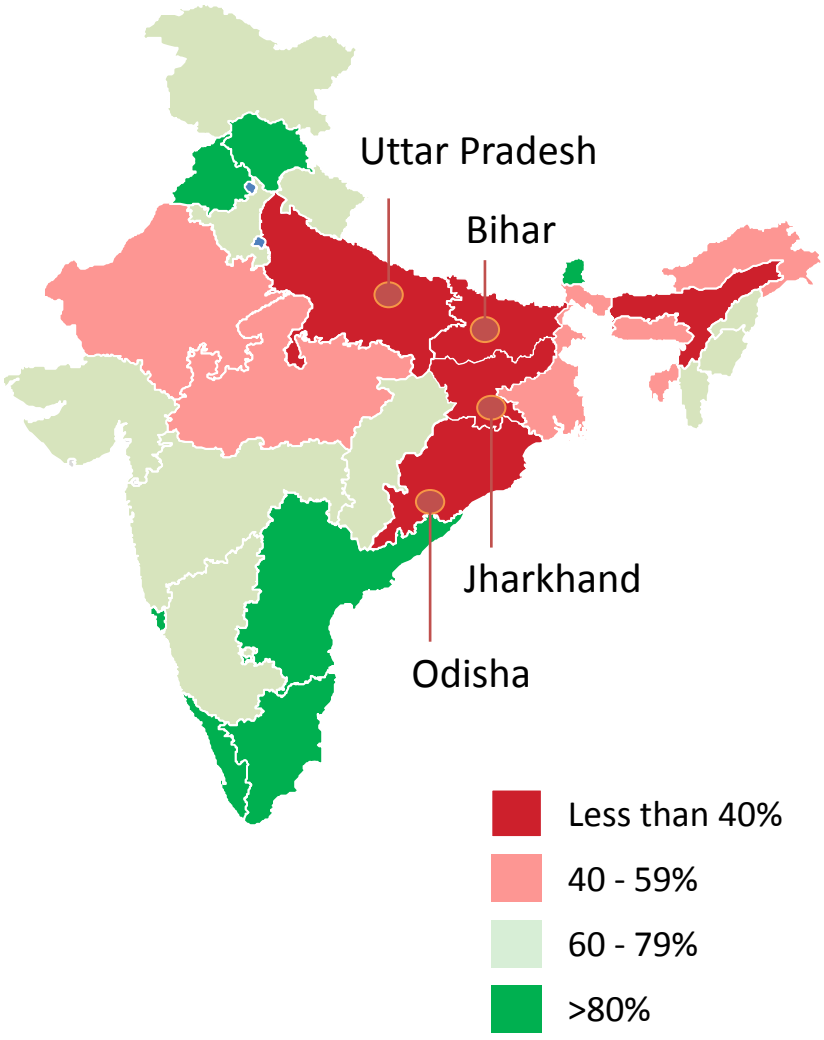
Smart Power for Rural Development

The ROCKEFELLER FOUNDATION

The Challenge

India's electrification challenge

- **Largest un-electrified population** in the world: 300+ mn people
- Even villages classified as electrified may have **as few as 10%** of households connected to the national grid
- Electricity may often be **erratic,** making it **unviable for enterprise** or agricultural use



The mini-grids opportunity

	Alternatives for grid electrification			
	Devices	**Solar Home Systems**	**Pico grids**	**Mini-grids**
Uses	Lighting	Lighting	Lighting	Lighting Enterprises Agriculture
Households covered[1]	<1 HH	1-2 HHs	~ 40 HHs	~ 200 HHs
Potential to integrate with grid	No	No	No	Yes
Price relative to existing alternatives[2]	Lower	Lower	Lower	Lower SMART POWER

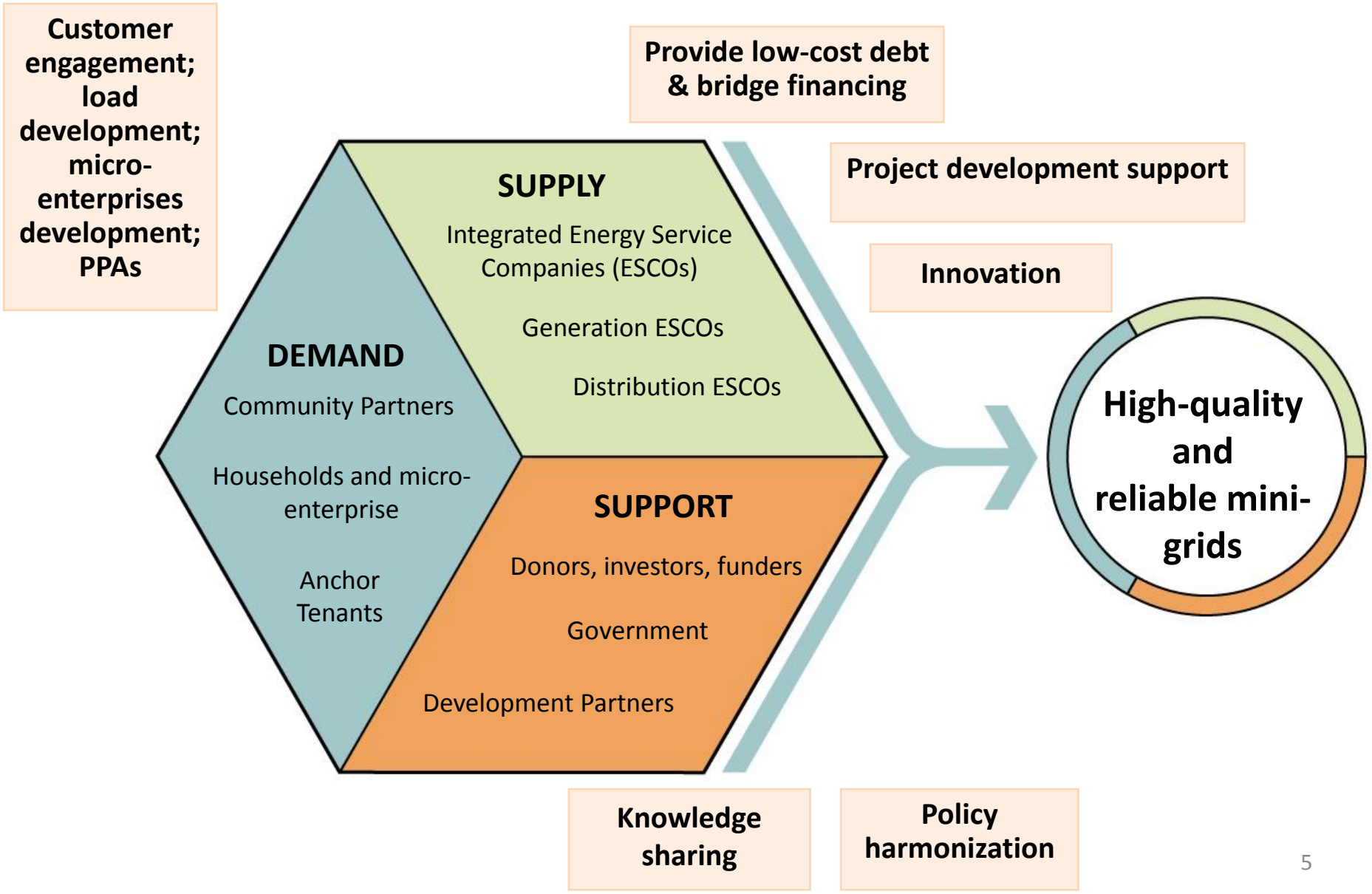
- **Promotes economic development** c
- **Serves an entire village**
- **Provides last mile resilience to national power system**
- **Larger plants result in significant cost reduction**

Electrify 1,000 villages in India by 2018

Invest $75 mn

Create a new intermediary organization – Smart Power India

Smart Power for Rural Development Initiative



What ESCOs want

Activities	ESCOs
Project Development e.g. Detailed Energy Survey	●
Community Engagement e.g. Entry point community engagement	◑
Load Development	
Electricity packages and tariff structure	◕
Micro-enterprise Development	●
Collection of connection charges	◑
Scalable partnerships	
Anchor Load (Telecom Towers) PPAs	◑
Alternate Load Development (ATMs etc)	◕
Financing	
Government subsidy access	?
Loan and bridge financing	●

Assumptions

1. All plants are to be of 30kW capacity as per the business model

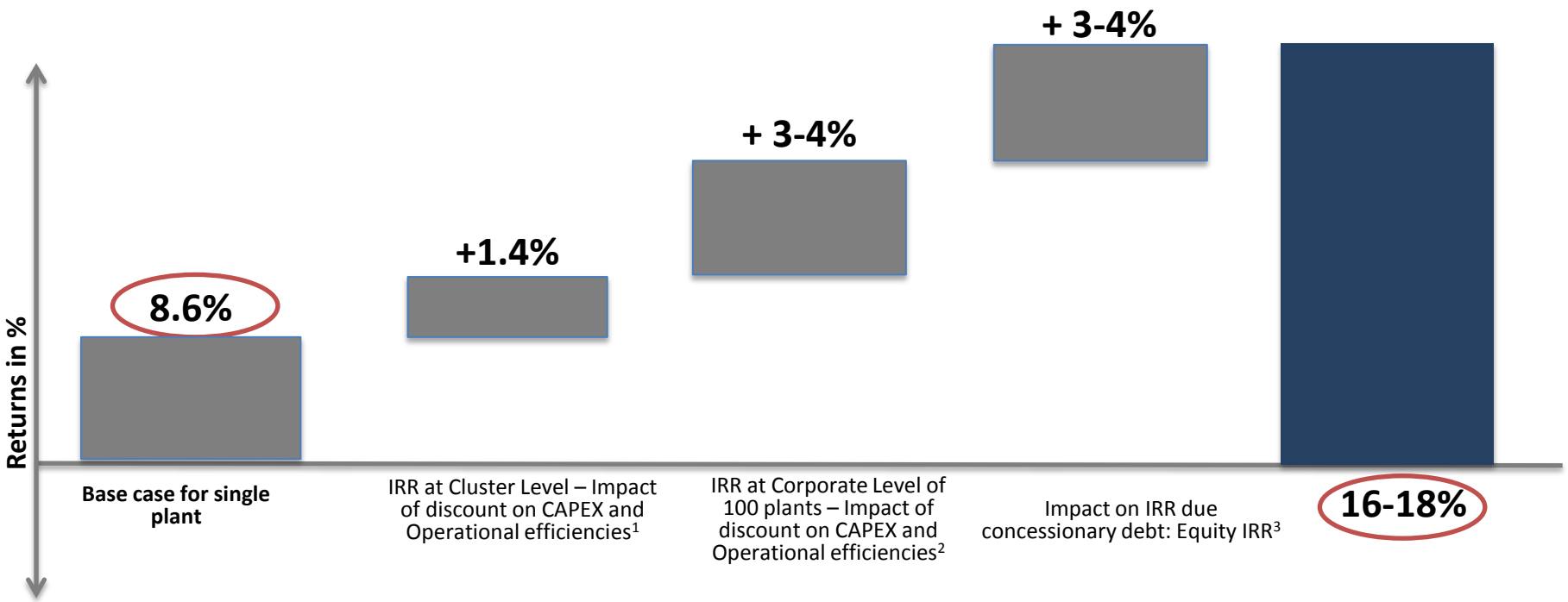
Extent of support to be offered by SPRD

● Full ◕ High ◑ Med ◔ Low

Current status

- **30 mini-grids** with **3 ESCOS** in Uttar Pradesh and Bihar
- **1,279+ customers**
  - 611 households
  - 583 shops
  - 80 micro-enterprises with motors & appliances
  - 4 institutional loads e.g. ATMs and banks
- **100 mini-grids with 5-6 ESCOs** by end of December 2015

A tough model to crack



Returns from a single plant with subsidy	Impact on IRR with discounts from bulk purchasing and more efficient manpower usage from clustering	Impact on IRR with discounts from bulk purchasing, manpower utilization and overheads being optimized at corporate level	**Equity IRR with concessionary debt**

1 Clustering at 20 plants
2 Corporate level assumes clustering, in this case 5 clusters of 20 plants each

What we learned

1. **High demand** from shops: 200+% more than targeted
2. **Reduce CAPEX cost** by 20% will increase IRR from 8.6% to 14.5%
3. Clustering plants and operating at scales **increase IRR by 4-6%**
4. Significant impact on **livelihoods** will require new and expanded businesses
5. Collaboration/ joint planning with government at state and national levels is crucial

A call for partnerships

- Need at least 20,000 mini-grids; **$1.5 billion**
- This requires:
  - Concessionary debt
  - Innovations to drive down CAPEX
  - Partnerships to accelerate micro-enterprise development
  - Policy coordination for grid-interactivity

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Smart Power India

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