

Rural renewable energy markets in developing countries : role of entrepreneurs and their business models

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2 Agenda

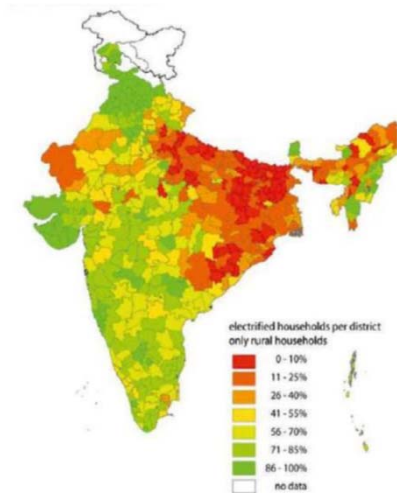
- Context
- Conceptual foundations
- Method
- Results
- Implications



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3 Context – Access to Energy

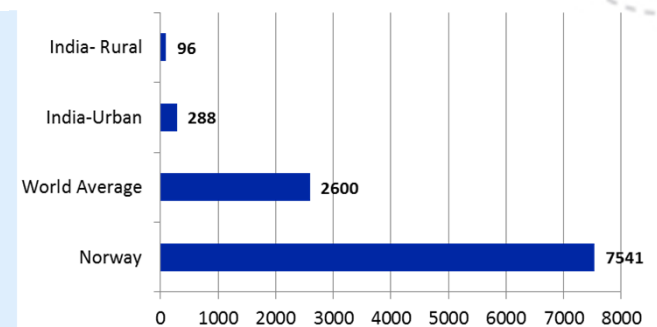
- Over 3 billion people lack access to modern energy
 - 2.7 billion rely on traditional biomass for cooking and heating
 - 1.3 billion people do not have access to electricity
- Over 80% of the energy poor live in rural areas and roughly two thirds in sub-Saharan Africa and India
 - here the population growth rate exceeds the electrification rate
- Close link between access to reliable energy and development



Large parts of Indian population still without access to electricity

- One-third of rural population without access
- Unreliable power, even where there is access
- High transmission and distribution losses (32%)
- 18,000 villages (22.5% of all villages without access) where it is too difficult or costly to extend the grid

Per Capita Annual Electricity Consumption in kWh



Source: International Energy Agency



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4 Context - The Role of Entrepreneurship

- Rural electrification and universal energy access is a priority
 - 2030, the target year for universal access to energy
- Many challenges, however
- Estimated need for investment (48 billion USD per annum) far outstrips current investment by governments and development agencies
- Entrepreneurs have a significant role to play in meeting the goal of universal access
 - How can entrepreneurs achieve sustainability and scale?



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5 Our research

- The Role of the Entrepreneur's Business Model in Shaping Nascent Markets: *Husk Power Systems and the Decentralized Renewable Energy Market in India*
 - How do entrepreneurs develop a business model to achieve sustainability and scale in the rural decentralized renewable energy market?



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6 Conceptual foundations

- **Business model and business model development by entrepreneurs**
 - Business models are a key dimension of entrepreneurial strategy
 - An effective tool offering a holistic view of how entrepreneurs create and capture value
 - Linked to performance
 - However, the ideal business model does not appear fully formed at the outset
 - Process of development through experimentation
 - Experimentation with multiple business models simultaneously
- **Market uncertainty and market driving by entrepreneurs**
 - In nascent markets characteristics of demand, supply and institutions ambiguous
 - Entrepreneurs engage in market driving to shape market characteristics to suit their model



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7 Method

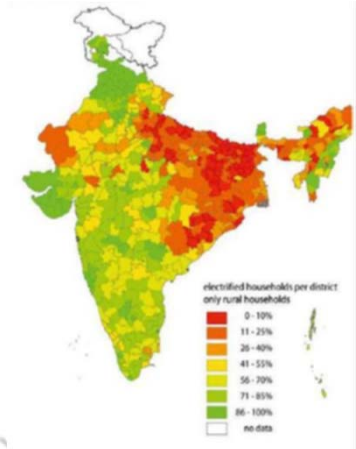
- Focus on mini-utility type electricity providers in rural decentralized renewable electricity market in India
 - Electricity Act of 2003 opened up this market for private players
 - As opposed to solar lamps or solar home systems, mini-utilities provide a local power plant based grid supply to households and businesses
- Case study design with single exemplary case
- Data collection over two field visits in 2012
 - Semi-structured interviews – management, field staff and customers (21 hours)
 - Archival data
- Analysis
 - Two cycle process of coding



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Husk Power Systems

- Started 2007, Gyanesh Pandey and Ratnesh Yadav
- 2012 - 79 power plants serving over 250 villages
- Rice husk based (single fuel) biomass gasification technology
- Located in Bihar (east India) – least developed and rice growing area
- 30 to 100 kW, each plant can supply between 300 -1000 HHs
- Top among firms that are commercially driven and fully or nearly financially viable in the ‘mini-utility’ sector (IFC, 2012)
- Won numerous business plan competitions
- 10 million US dollars raised through grants, investments and debt.
 - Shell Foundation
 - Acumen Fund



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Husk Power Systems



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Husk Power Systems



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Husk Power Systems – business models

	BOOM	BOM	BM
Offering	Service (electricity)	Product (power plant) Service (finance)	Product (power plant) Service (maintenance)
Customer	Households	Local village entrepreneur	Local village entrepreneur
Competitive strategy	Reliability of electricity (versus central grid) Quality of light (versus kerosene/diesel)	Offer a product combined with a unique service (financial loan) Close customer relationship	Offer a product combined with quality service (maintenance) Close customer relationship

Key features of the HPS business models

BOOM	Build, Own, Operate, Maintain	BOM	Build, Own, Maintain	BM	Build, Maintain
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	BOOM	BOM	BM	TOTAL
2007	2	-	-	2
2008	1	-	-	1
2009	7	-	-	7
2010	32	3	3 (PACS)	38
2011	7	17	1	25
2012	-	1	5	6
TOTAL	49	21	9	79

Sequential deployment of power plants using the different business models



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Discussion

	BOOM	BOM	BM
Time, scope and size ambitions	Prove (the technical and economic concept)	Demonstrate (short time frame, demonstrate viability to local banks)	Growth (generate capital gain for investors)

Learning within and purpose of each business model

- Refine business model
- Create conditions for the next business model
- **Vision: to create significant impact**
 - BM model
 - Faced with ambiguity, started with model that enabled most learning: BOOM
- **BOOM**
 - Work and resource intensive, but close to end consumers
 - Fine-tune technology and business systems
 - Involve locals in operations and management – train local work force
 - Excellent demonstration, training and marketing medium for the company
- **BOM**
 - Capital intensive, not scalable
 - Test and demonstrate the viability of the revenue model
 - For local entrepreneurs and for banks



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Conclusion and Implications

- In nascent markets, like the rural electricity market in developing countries, entrepreneurs
 - Need to experiment to arrive at the ‘right’ business model
 - Path dependency
 - Successful entrepreneurs use these experiments to create the ‘right’ market conditions to achieve sustainability and scale.
- More patient capital may be needed in these market conditions
 - Shell Foundation and Husk Power Systems
- Policy makers may need to look beyond subsidy support and into institutional development



Thank You!

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