DRE mini-grids opportunity in India: pathways to scale

Nov 13, 2017
cKinetics is a Sustainability Innovation, Project Development & Capital Advisory firm that aims to catalyze change through market driven approaches.

We believe we are in the midst of a new economic order being shaped...

We operate here...

Linear Production and Consumption Systems
- Increasing requirement of resources to meet growing consumption needs

Pressure on access and management of basic resources
- Operating Environment

Today’s legacy economy driven by underpriced resources is unsustainable

The increasing gap is forcing a systemic change in the production and consumption systems

Emergence of a Sustainability Economy
- Closed loop systems
- Decentralized production and consumption
- Resource conservation and efficiency
- Shifting consumption patterns
- New principles for access to resources

We have expertise in...

- Decentralized Renewable Energy
- Smart Resource Efficiency
- Sustainable Materials

OFFERINGS WORK AREAS

Information solutions that create insight
- Market intelligence and industry benchmarks
- Collaborative intelligence
- Innovation networks

Advisory and Consulting that creates action
- Project development
- Systems design and engineering
- Program design and rollout
- ESG and impact reporting

Innovation Capital that provides a multiplier effect
- Accelerator to identify innovations
- Energy Development Finance- market making through venture debt

cKinetics Fast facts
- Project development of close to 200+ energy access mini-grids; piloting discom interactive models
- 20 MWp+ rooftop based mini-grids
- Operational footprint in 6 countries
We are morphing into a future where DRE sources are becoming a part of the mix. DRE mini-grids a core component of the future.

Drivers

- Energy access: rural villages and communities
- Resilience and onsite renewables integration for industrial and commercial settings
- Replacement of diesel based systems in remote islands
- Renewables competitive at end-user tariff level across most segments in the country
Future necessitates a smart infrastructure and innovative business models

• Imperatives
  – 175 GW Renewable (incl. 40 GW rooftop) targets as part of India’s INDC
    • 20 million households injecting energy into the grid is going to make the grid different and complex
  – Electric Mobility Mission, which targets 6-7 million electric vehicles on the roads by 2022
  – 100 Smart Cities initiative

• Consequently Grid changing
  – Role and implications of storage (non-utility scale vs. utility solutions); Hybrid Inverters
  – Large scale footprint of bi-directional distribution system
  – Advanced Metering Infrastructure

• Building blocks
  – National Smart Grid Mission (lessons from the initial pilots): Universal access; < 10% AT&C losses
  – Time of use tariff regime
  – Demand response and mandatory rooftop generation for large customers
  – National Standard for Smart Meters: 100 million smart meter rollout over the next 5-7 years
Even as conversation is building, different archetypes evolving

<table>
<thead>
<tr>
<th>Segment</th>
<th>Archetypes</th>
<th>Gaps to be plugged</th>
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<tbody>
<tr>
<td>C &amp; I</td>
<td>• Self-owned</td>
<td>• Site selection at scale: Identification and validation of rooftop sites and</td>
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<td></td>
<td>• RESCO under net metering</td>
<td>associated pre-requisites to ensure rapid deployments</td>
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<td>• Complete turnkey energy managers</td>
<td>• Framing standardized credit assessment approaches for RESCO and aggregator</td>
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<td>financing</td>
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<td></td>
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<td>• Transaction and legal structuring for innovative financing models and</td>
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<td>intermediary structures</td>
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<td>Energy Access</td>
<td>• Anchor customer model (B2B+C); 50 KW+</td>
<td>• Standardized site selection process and demand estimation</td>
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<td>products</td>
<td>• Grid interactivity with discom; micro-utility</td>
<td>• Validation on underlying economics and off-takers</td>
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<td>• Small, standardized systems under 5kW (B2C) – interconnected/ exchange of</td>
<td>• Alignment with ground partners for consumer engagement /service as also</td>
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<td>energy</td>
<td>initial load development</td>
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<td>• Monitoring and management of remote assets and collection</td>
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**Diagram: Capital requirement to meet**
- Immediate energy requirement (553MW)
- Total electricity requirement equal to state average (4628MW)
- Total electricity requirement equal to national average (7,629MW)

**Source:** cKinetics: Financing Decentralized Renewable Energy Mini-Grids in India
Enabling market needs standardization and long term policy direction

- **Standardization of transaction documents**
  - Power Purchase Agreements (PPA)
  - Request for Proposal (RFP)
  - O&M Contract documents
  - Trustee Agreements
  - Trust & Retention Account (TRA)

- **Risk Mitigation Mechanisms**
  - Technological risks
  - Financial risks
  - Project implementation risks
  - Power off-take risks
  - Quality issues
  - Performance & efficiency risks

**Programmatic linkages focused on:**

- Enabling a strong domestic debt market
- Pooling of capital into specialist financing intermediaries
  - Credit Enhancement Pools /First Loss Default Guarantees
- Pre-requisites
  - Unit level economics
  - Performance and Standards
  - Project development approach a key differentiator
- Partial Insurance support
Innovative approaches needed to overcome traditional investment barriers

Gaps /barriers based on primary interactions with key FIs

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<tr>
<td>A</td>
<td>Limited information and validation on bankability and impact of business models</td>
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<tr>
<td>B</td>
<td>Small ticket size investment (leading to high transaction cost)</td>
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<tr>
<td>C</td>
<td>Transaction structuring skills and legal robustness seen as missing</td>
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<td>D</td>
<td>Management of remote assets and collection concerns</td>
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<td>E</td>
<td>Execution ability of DRE companies on proposed plans</td>
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<td>F</td>
<td>RESCO model preferred but lack of established track record of RESCO</td>
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Market Needs

- Portfolio preparation support
- Payment Security Mechanism / Portfolio level guarantee constructs
- Project Financing with venture debt characteristics

Sample size: 20+ investors /lenders
Mini-grid archetypes

Archetypes
- Stand-alone Private model
- State scheme/licensee oriented or aligned system
- Distribution Franchisee model
- BOOT construct

Interventions
1. Rural ESCO
2. Existing Rural/Social Business Enhancement
3. Utility diversification

Clusters
Type A: Established Demand (Anchor load + Local industrial anchor load + DG replacement for MEs + HHs)
Type B: Foreseeable Demand (Anchor load + evolving micro enterprises + HHs)
Type C: Anchor loads or MEs + HHs