Gram-Prakash Securities
Scaling renewable mini-grids in rural India and providing stable electricity to millions of people

April 2017
Kellogg-Morgan Stanley
Sustainable Investing Challenge
400 MILLION
People live with little or no access to electricity in India

90%
Located in rural area

Source: IEA, 2015
KEROSENE & DIESEL
Main energy source for rural communities
Expensive and unreliable

BIOMASS
Agricultural and animal waste - widely available
Yet mostly neglected
CHALLENGES FOR STATE-GRIDS

- Geography
- Infrastructure
- Fossil Fuels
- Low Priority
A MINI-GRID IN A NUTSHELL

Gram-Prakash Mini-Grid Convertible Securities

Source: OMC
GRAM-PRAKASH SOLUTION

GRAM-PRAKASH

SPV

DEBT

LOCAL DEVELOPERS

EQUITY

CONCESSIONAL EQUITY

DEVELOPMENT

OPERATION

BIOMASS MINI-GRIDS (50-100kW)

MONTHLY PREPAYMENT

ANCHOR REVENUE

CONCESSIONAL EQUITY
VILLAGE DEVELOPMENT CRITERIA

Electricity
Used for Lighting;
% of Households

- INADEQUATE OR NO GRID
- ABUNDANT FEEDSTOK
- HIGH WILLINGNESS TO PAY
- POLICY CERTAINTY

Gram-Prakash Mini-Grid Convertible Securities
...WITH SIGNIFICANT SOCIAL IMPACT

1. 7 hours of electricity/day
2. 1000 households
3. 10 irrigation pumps; 5 shops
4. Average household income increases by 30%
5. Reducing 600,000 tones of CO2 emission/year
6. 12,000 job in O&M and supply chain
7. Additional study time 2 hours/day
8. 15% reduction in medical expense

Gram Prakash Mini-Grid Convertible Securities
RISKS AND MITIGATION STRATEGIES

FEEDSTOCK
- Contract supply with multinational agri-business
- Community co-ownership
- In-kind trade

REVENUE
- 40% from anchor users
- Mobile prepayment for households

POLICY
- Only operate where clear mini-grid policy
- Partner with reputable local companies
- Political risk insurance

O&M
- Community co-ownership
- Contract with reputable c/p
- Proven low-cost technology and design

TECHNOLOGIES
- Open to integrate other technology when cost-effective
- Currently biomass most cost-effective (LCOE at 6c-8c/kWh)
FEEDSTOCK LESS A ISSUE FOR MINI-GRIDS

IN-KIND TRADE
Biogas, fertilizer → Biomass feedstock

COMMUNITY CO-OWNERSHIP
Pass 3-5% equity in return for O&M duties

PARTNER WITH LARGE AGRI-BUSINESS
Term supply contract
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Gram-Prakash Mini-Grid Convertible Securities
Joint initiative between federal and state governments to supply electricity to all commercial and retail consumers by 2019

Ministry of Power

MNRE has set out an ambitious target to increase renewable energy generation 5X to 175GW by 2022

MNRE

Uttar Pradesh has become the first state to implement a mini-grid policy addressing private developer concerns

Uttar Pradesh
RISKS AND MITIGATION STRATEGIES

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Gram-Prakash Mini-Grid Convertible Securities
## Gram-PraKash SPV Capital Structure

<table>
<thead>
<tr>
<th>Capital</th>
<th>Target Investors</th>
<th>Sizing</th>
<th>Indicative Pre-Conversion Equity (%)</th>
<th>Indicative Post-Conversion Equity (%)</th>
<th>Base Case IRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gram-PraKash Convertible Debt</td>
<td>Institutional investors</td>
<td>$50M-$100M</td>
<td>0% (option to convert at year 5)</td>
<td>50%</td>
<td>13%-15%</td>
</tr>
<tr>
<td>Operator Equity</td>
<td>Local developers</td>
<td>$15M-$30M</td>
<td>30%</td>
<td>20%</td>
<td>19%-25%</td>
</tr>
<tr>
<td>Concessional Equity</td>
<td>Foundations Impact</td>
<td>$35M-$70M</td>
<td>70%</td>
<td>30%</td>
<td>15%-22%</td>
</tr>
</tbody>
</table>
PUSHING THE BOUNDARIES OF SUSTAINABLE INVESTING

Potential institutional investors

Local developers

Concessional equity providers
INVESTMENT THESIS

LOW-COST PROVEN TECHNOLOGY
Market driven model with proven operating models
Underserved market results in high-potential natural monopolies

DE-RISKED FUTURE CASHFLOWS
Investment vehicle contingent on long-term agreements with top-tier strategic partners
Economies of scale reduces logistical costs associated with feedstock and O&M

PORTFOLIO DIVERSIFICATION
Trade-off between lower liquidity yet low beta
Pushes the frontier for sustainable investing with clear reportable metrics

SUPPORTIVE POLICY FRAMEWORK
Enabling policy environment with National Indian Mini-Grid Policy to be approved in April 2017
OUR TEAM AND THANK YOU

HONGFEI WANG  
*Canadian*

LINA GEDVILAITE  
*Lithuanian*

APOORVE KHANDELWAL  
*Indian*

TIM MAY  
*Australian*
THANKS TO OUR CONSULTATION PARTNERS
APPENDIX

Scaling renewable mini-grids in rural India and providing stable electricity to millions of people

April 2017
Kellogg-Morgan Stanley
Sustainable Investing Challenge
### IMPLEMENTATION TIMELINE

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Develop MOU with key counter-parties (developer, anchor PPA, feedstock provider)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fundraising with institutional investors</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Candidate village screening</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establish project vehicle, execute key contracts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target initial financial closing ($50M)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commence project development</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
## KEY INVESTMENT CASE ASSUMPTIONS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Approx. household energy consumption</th>
<th>30 KWh / month</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capex cost</strong></td>
<td>$1890 / KW</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Indicative plant size</strong></td>
<td>50-100 KW</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Capacity factor</strong></td>
<td>60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Anchor capacity utilisation</strong></td>
<td>25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Anchor tariff (PPA)</strong></td>
<td>20c / KWh</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Household access tariff</strong></td>
<td>$2.50-$3.00 / month</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Feedstock cost</strong></td>
<td>$41.28/T</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Feedstock usage (p.a.)</strong></td>
<td>259-518T</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Feedstock escalation</strong></td>
<td>5.0% p.a.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operations &amp; maintenance expense</strong></td>
<td>5% of revenues</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Marketing &amp; admin expense</strong></td>
<td>5% of revenues</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: USD figures used rather than INR for ease of comparability in prospectus
## Indicative Security Structure

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Indicative Baa/Ba grade convertible debt security (once operational)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security Size</td>
<td>US$100M, sufficient to catalyze 2,000 projects in villages at 50% leverage</td>
</tr>
<tr>
<td>Target return</td>
<td>12% -15% (local currency)</td>
</tr>
<tr>
<td>Management fees</td>
<td>1.0% + 20% return over 8% (where access impact targets are achieved)</td>
</tr>
<tr>
<td>Fund Maturity</td>
<td>20-25 years</td>
</tr>
<tr>
<td>Term</td>
<td>10 years, with option to convert to equity after 5 years. Subsidized equity capital willing to accept additional economic dilution in event of conversion (still likely to receive 15%+)</td>
</tr>
<tr>
<td>Interest rate</td>
<td>6.4% (10 year Indian govt bond rate)</td>
</tr>
</tbody>
</table>
| Underlying asset | • Income generating mini-grids are pooled to form SPV.  
• Primary revenue counterparty (25% capacity allocation) to be investment grade Telco firms  
• Strong partnership with preferred operators within target States with successful projects underway  
• Fund expected to invest in 5-10 separate SPVs (across various States and operating technologies) |
<p>| Hedging | Product will remain unhedged |</p>
<table>
<thead>
<tr>
<th>Factor category</th>
<th>Indicative assessment</th>
<th>Indicative credit score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predictability of cashflows (30%)</td>
<td>About 40% of expected cash flow stream is based upon contracted or hedged cash flow.  Some risk of fuel supply; fuel supplier is rated below investment grade.</td>
<td>Ba/B</td>
</tr>
<tr>
<td>Competitiveness/Regulatory Support (15%)</td>
<td>Generally supportive regulatory framework for renewable generation from central government, regional jurisdiction or rate setting authority, but support could erode over time due to a change in law or supportive regulation.</td>
<td>Ba</td>
</tr>
<tr>
<td>Technical Risks / Vendor Profile (10%)</td>
<td>Recognized vendor has direct experience with this technology and has successful performance history. Warranties for bio-mass plants in place for [10] years.</td>
<td>Baa</td>
</tr>
<tr>
<td>Quality of O&amp;M Contractual Framework (10%)</td>
<td>O&amp;M contract with recognized operator, but limited support can be expected if performance problems persist.</td>
<td>Ba</td>
</tr>
<tr>
<td>Key financial metric (35%)</td>
<td>DSCR of 2.7x-2.9x over security life under Base Case</td>
<td>A</td>
</tr>
<tr>
<td>Overall assessment</td>
<td></td>
<td>Baa/B</td>
</tr>
</tbody>
</table>

Source: Internal analysis, Moody’s Ratings Methodology: Power Generation Projects, Dec 2012
HOUSEHOLD PAYMENT REMAINS UNCONTRACTED

-5.0% 0.0% 5.0% 10.0% 15.0% 20.0% 25.0%

$1.00 $2.00 $3.00 $4.00

MONTHLY HOUSEHOLD ACCESS FEE (USD)

Expected monthly access fee range (implied 8.5c-10.2c/kWh)

- Operator equity
- Subsidised equity
- Convertible debt
Comparative technology economics

Levelized cost of electricity, US cents/kWh

- Solar PV
- Mini-wind
- Biomass gasifier
- Micro-hydro
- Diesel generator

Main Assumptions

<table>
<thead>
<tr>
<th>Technology</th>
<th>Capex $/kW</th>
<th>Useful life Years</th>
<th>Capacity factor %</th>
<th>Fuel costs $/ton</th>
<th>WACC at 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar PV</td>
<td>4,800*</td>
<td>20</td>
<td>20</td>
<td>n.a.</td>
<td>15</td>
</tr>
<tr>
<td>Mini-wind</td>
<td>3,300</td>
<td>20</td>
<td>18</td>
<td>n.a.</td>
<td>15</td>
</tr>
<tr>
<td>Biomass gasifier</td>
<td>3,800</td>
<td>20</td>
<td>80</td>
<td>32*</td>
<td>15</td>
</tr>
<tr>
<td>Micro-hydro</td>
<td>3,000</td>
<td>25</td>
<td>20</td>
<td>n.a.</td>
<td>15</td>
</tr>
<tr>
<td>Diesel generator</td>
<td>850</td>
<td>8</td>
<td>80</td>
<td>0.98</td>
<td>15</td>
</tr>
</tbody>
</table>

* Capacity factors vary considerably among locations and have significant impact on plant economics, especially for solar PV or Micro-hydro

- Biomass power cost is mainly driven by fuel cost; small plants are fueled with local feedstock, usually at a cheaper price compared to market

- Difficult access to credit can increase the overall cost, particularly for capital-intensive ones, like Solar PV, Mini-wind, or Micro-hydro

Source: IFC, ESMAP, World Bank, McKinsey analysis

- WACC at 10%
- 20% premium price over the residential PV prices in Europe
- Heat content at 2 MW/h/ton (wood after falling at 55% moisture)
Potential market sizing

Population in segment
- > 75 million
- 50 - 75 million
- 25 - 50 million
- 10 - 25 million
- <10 million

Source: ITT