Financing Solar Minigrids:
A developer’s perspective on needs and challenges of unlocking capital

Anjal Niraula
GM, Gham Power
Gham Power: Social Enterprise with Solar-Powered Solutions

Started in 2010

2.5 MW of Solar Deployed across 2,000+ Projects
We started developing microgrids in 2013 with some key design criteria

• Co-own microgrid with local community
• Fund partially using commercial debt
• Develop a single asset class for commercial investment by bundling several microgrids together
• Use of anchor tenants – Ncell first mobile operator in Nepal who signed a Power Purchase Agreement (PPA) with a solar microgrid
• Use pre-paid metering to collect operational data + revenue collection using mobile money
Deploying 100+ kW over 10+ microgrids resulted in immediate learnings

- Revenue distribution – Bulk of microgrid revenue comes from local businesses and microenterprises (e.g. farmers, tea-shops, eateries, lodges)
- Capacity factor in earlier months hurts profitability – High latent time and underutilized capacity
- Project development is expensive given the size of project
- Seasonality of revenue – If anchor loads are seasonal, revenue is not certain
- Pairing energy with appliances (e.g. tourism/agriculture) provides more stable revenue
As a result, we modified our model to focus on two most investment-ready asset classes
Asset Class 1: Microgrids in trekking trails

Price: $50k
Size: Microgrid (~10-15 kw)
Implementation Time: 1-3 months
Bundle 3 or more in a SPV

- Regions that can attract cash
- Focus on tourism/pilgrimage sites
- Develop energy infrastructure & capacity
Trekking trails help diversify revenue streams

- Shops/organizations provide services / generate revenue
- Manage fluctuations/seasonality and diversify revenue

Communication

Telemedicine

Water-pumping
Investors have begun committing funds for trekking trail microgrids

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<thead>
<tr>
<th>Objective</th>
<th>Fund Raising program for 20 microgrids along scenic trekking trails</th>
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<tbody>
<tr>
<td>Program</td>
<td>One week cycling challenge- Annapurna Base Camp</td>
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<tr>
<td>Result</td>
<td>Created a fund with 1st tranche committed -&gt; Off-grid Renewable Energy (ORE) Fund</td>
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ORE mixes private capital with public funds and credit guarantees

- Philanthropic/public capital to minimize off-taker risk
- Credit guarantees

- Electricity sales revenue
- Operation lease revenue
- Tourism booking fee?
Asset class 2: Power Agro-Processing
Combine solar + appliance to increase farming income

- Identify sites with high potential to run profitable agro-businesses
- Pumps, Mills, and Cold Storage

Price: $2k - $10k
Size: ~3 kW
Implementation time: 1-2 weeks

Grinding Mills
Solar Refrigeration
Water Pumps
Cold Storage /Dairy
Agro-processing: Faster development, shorter financing term reduces risks

- Higher margins (low development cost, financing term of 3 years)
- Minimize chances to go wrong if businesses don’t start as projected
- Demand side management possible
- No latent time for microgrid cashflow
- Phase wise approach possible
We developed online platform to enable crowd-funding grants that help securitize private investments into projects.

Projects are marketed on the online platform.

Key metrics are automatically generated.

Up-to 30% of project cost raised as grants.

Help Harka install solar water pump in Janakpur so that he can grow tomatoes to support his family.

This project is 70% funded.
You can invest full remaining amount or select your preferred amount below.

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<th>Total pledged</th>
<th>Amount raised</th>
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<td>$5,400</td>
<td>$3,700</td>
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Key indicators:

- **Farm’s Total Income**: Rs. 2,450/yr
- **Water Requirement**: 33,411 kl/yr
- **Social Return**: $2.1/dollar funded
- **Lives Impacted**: N/A
Next Steps / How you can help

• We are
  • Securing investments through credit guarantees/insurance
  • Seeking concessional finance to test out early batch of projects; establish WTP
  • Attracting other developers and agents to develop Agro-processing projects
    • More than 2.1 million small holder farmers
    • >$300m market only for Agro-processing

• Our target: Develop and deploy $20 million worth of projects in 5 years

• Need help spreading the word to more grant foundations and impact investors (both debt and equity)