Powering Agriculture: Affordable & Reliable Solar Water Pumping for Irrigation (Intervention & Up scaling)

Avishek Malla
President
SunFarmer Nepal
Company History

- SunFarmer’s regional Kathmandu office opened in **March 2014** and is staffed by a team of leading solar engineers.
- Our team has been involved in over **1,000 solar projects worldwide**, worth over **$1 billion**.
- SunFarmer Nepal has led over **100 projects in Nepal**, primarily in health, education, agriculture, and business.

**SUNFARMER**

- SunFarmer is **backed by SunEdison**, the largest solar energy company in the world and **Y Combinator**, a leading investor in Silicon Valley.
- We draw on solar expertise of SunEd’s ~4,000 staff.

- Experienced management team with over **$150M in closed solar energy financings**.
- Creative engineering team responsible for many “firsts” in Nepal, and design of proprietary remote monitoring system.

**Experienced Staff**
Business Model:

Motivation for Solar-Powered Irrigation
1. 60%* of farmers report insufficiency of own produce for household consumption for 4-9 months in a year.
2. < 5%* of farmers has access to pump technology for irrigation using one of the following solutions:
   - Electric pumps unreliable grid
   - Diesel pumps unpredictable supply and price, High Maintenance

*(National Census of Agriculture, Dec 2013)
Business Model

Barriers to Solar Water Pumping

• Low volume market (Hardware cost is high) 75 SWP in last decade

• Highly subsidy-driven market, not commercial

• Financial risk (cost of capital is high >18%)

• Proven market worldwide – Nepal Technological risk

• User Awareness for Technology adoption
Business Model

SF Provides consultation, carries out Site Audit & Design

Farmer(s)* Signs Water Purchase Agreement

SF builds quality SWP System

Farmer(s) make monthly payments

SF continues to monitor and maintain the system.

After 5 years the system is yours.
SF can continue to provide O&M service for a fee

*Individual or Group of Farmers
Business Model

**Progress To-Date**
- Piloted 4 systems under the Business Model proposed herein (1 group, 3 individuals)
- Projects <2 month old – 100% collection efficiency

**Learnings**
- Diesel user / irrigation unreliable – Farmers
- Motivation
- Cost reduction
- Educate farmers – solar pumping is different to diesel
- Training / awareness through demonstration for adoption (heavy lifting initial activity)
- Impact is seen immediately
### Business Model

<table>
<thead>
<tr>
<th></th>
<th>Piloting Stage</th>
<th>Up Scaling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness / promotion program</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Development cost</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Cost of Hardware</td>
<td>High</td>
<td>Decreased</td>
</tr>
<tr>
<td>Availability of Financing</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Technology Adoption</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Operational Overhead</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Initial setup cost</td>
<td>High</td>
<td>None</td>
</tr>
</tbody>
</table>
## Business Model

<table>
<thead>
<tr>
<th>Phase</th>
<th># of Projects</th>
<th>Project Cost ($)</th>
<th>Subsidy (%)</th>
<th>SF Investment (%)</th>
<th>Bank Financed (%)</th>
<th>Customer Down Payment (%)</th>
<th>Cost of Investment (%)</th>
<th>Financing Period</th>
<th>Avg. Farmer Pmt. ($/mo.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1 - Initial Rollout</td>
<td>50</td>
<td>200</td>
<td>40%</td>
<td>45%</td>
<td>0%</td>
<td>15%</td>
<td>8%</td>
<td>3 years</td>
<td>47</td>
</tr>
<tr>
<td>Phase 2 - Volume</td>
<td>200</td>
<td>640</td>
<td>30%</td>
<td>10%</td>
<td>45%</td>
<td>15%</td>
<td>8%</td>
<td>3 years</td>
<td>45</td>
</tr>
<tr>
<td>Phase 3 - Volume w/ Financing</td>
<td>1,000</td>
<td>3,200</td>
<td>0%</td>
<td>5%</td>
<td>80%</td>
<td>15%</td>
<td>8%</td>
<td>5 years</td>
<td>42</td>
</tr>
</tbody>
</table>

*In 000’
IRR to SF 16%
Thank You

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