IDCOL Solar Mini-grid Project: Key Features

Presented by:
Mohammad Wahidur Rahman
Sr. Vice President Unit Head (Technical), Renewable Energy
Contents

- Overview of solar mini-grid project
- Solar mini-grid projects in Bangladesh
- Key features of typical mini-grid
- Mini-grid vs. SHS and Grid
- Role of partners
- Eligibility criteria of sponsors
- Approval process of IDCOL
- Challenges and mitigation
- Success factors
Overview of Solar Mini-grid Project

- Typically refers to 100 to 250kWp small PV plants providing electricity to 500-1000 customers.
- **Progress**: 24 in operation, 3 under construction
- **Financing structure**: Equity, Loan and Grant: 20% : 30% :50%
- **Financing terms**: Interest rate: 6%; Tenor: 10 yrs; Grace period: 2 yrs;
- **Tariff**: BDT 30/ kWh (0.38 USD/kWh)
- **Funding sources**: Grant: DFID, GPOBA, KfW, USAID, ADB
  Loan: IDA, JICA
Key Features of Typical Mini-grid Project

- Located in isolated off-grid areas
- Cleared by Power Division where possibility of grid extension is remote
- Plant location is free from flood and river erosion
- Concentration of customers is high
- Possibility of day load usage
- Willingness and capability of the customers
## Mini-grid Vs. SHS

<table>
<thead>
<tr>
<th>Aspects</th>
<th>SHS</th>
<th>Mini-grid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of higher loads i.e. ceiling fans, color TV, refrigerator etc.</td>
<td>Not possible in typical SHS</td>
<td>Possible</td>
</tr>
<tr>
<td>Operation of industrial loads</td>
<td>Not possible</td>
<td>Possible</td>
</tr>
<tr>
<td>Initial investment of the customer</td>
<td>High, for system purchase</td>
<td>Low, for one time connection fee</td>
</tr>
<tr>
<td>Maintenance requirements</td>
<td>Need to be done by owner</td>
<td>Done by plant owner</td>
</tr>
<tr>
<td>Replacement of battery by customer</td>
<td>Needs to be replaced after 3-5 years</td>
<td>Not needed. Done by plant owner after 7 years.</td>
</tr>
</tbody>
</table>
Mini-grid Vs. Grid

- Grid extension in remote river and sea islands is extremely challenging
- Grid expansion is not financially feasible due to less number of customers
- Distribution line set-up is challenging due to distance from main land to islands
Role of Partners: At a Glance

- **IDCOL**: Seeks grant & loan, Provide grant & loan, Grant & soft term credit
- **Sponsor**: Supply Equipment, Pay for Equipment, Provide technical support, Pays consultancy fees, Sells Electricity, Pays electricity bills, Repayment
- **Suppliers**: Sells Electricity
- **Donors**: Seeks grant & loan
- **Customers**: Sells Electricity, Pays electricity bills
- **Consultant**: Provide technical support, Pays consultancy fees
Eligibility Criteria of Sponsor

- NGO/ limited company or of any other form as deems appropriate to IDCOL
- Capability to inject minimum equity of 20% of the project cost
- Capability to provide collateral against IDCOL loan
- In-house technical capacity for implementing and operating project
- Have a successful track-record in doing business
- Prior experience in implementing similar projects is an added advantage
<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposal Submitted to IDCOL</td>
</tr>
<tr>
<td>2</td>
<td>NOC from Power Ministry</td>
</tr>
<tr>
<td>3</td>
<td>Initial Clearance from IDCOL Board</td>
</tr>
<tr>
<td>4</td>
<td>Site Survey by IDCOL</td>
</tr>
<tr>
<td>5</td>
<td>Determination of plant size</td>
</tr>
<tr>
<td>6</td>
<td>Evaluation of Quotations</td>
</tr>
<tr>
<td>7</td>
<td>Quotation collection by borrower</td>
</tr>
<tr>
<td>8</td>
<td>Technical design and BOM by Consultant</td>
</tr>
<tr>
<td>9</td>
<td>Supplier Selection</td>
</tr>
<tr>
<td>10</td>
<td>Project Cost and financial model finalization</td>
</tr>
<tr>
<td>11</td>
<td>CRM, Credit Committee and Board Approval</td>
</tr>
<tr>
<td>12</td>
<td>Equity (20%) Injection by Sponsor</td>
</tr>
<tr>
<td>13</td>
<td>Achievement of COD</td>
</tr>
<tr>
<td>14</td>
<td>Disbursement of Grant &amp; Loan in stages by IDCOL</td>
</tr>
<tr>
<td>15</td>
<td>Verification by IDCOL</td>
</tr>
<tr>
<td>16</td>
<td>Project Cost and financial model finalization</td>
</tr>
<tr>
<td>17</td>
<td>CRM, Credit Committee and Board Approval</td>
</tr>
<tr>
<td>18</td>
<td>Equity (20%) Injection by Sponsor</td>
</tr>
<tr>
<td>19</td>
<td>Verification by IDCOL</td>
</tr>
</tbody>
</table>
Challenges

Development stage
- Selection of appropriate project site
- Lack of previous experience of sponsor in similar project
- Limited technical know-how in the market

Implementation stage
- Transportation of equipment to the project site
- Impact of seasonal variation in construction progress

Operational stage
- Slow growth in customer acquisition at the beginning
- Utilization of excess energy generated in daytime
- Excess electricity consumption against projection
- Conflict with expanding national utility grid
- Customer reaction to high tariff relative to utility tariff
Mitigation Measures

**Development stage**
- Selection of areas with high customer concentration
- Survey of potential customers on their willingness and affordability to pay
- Discussion with relevant government authority to have clearance on a site
- Technical support from international consultants under donor financing
- IDCOL’s technical support

**Implementation stage**
- Ensuring proper planning to access project site
- Proper implementation schedule designing to avoid seasonal adversities.
- Technical support and monitoring from IDCOL
Mitigation Measures

Operational Stage

- Concession on initial connection rate to encourage potential customers
- Connection of productive load e.g. rice mill, saw mill, irrigation pumps in day time
- Introduction and promotion of energy efficient appliances to reduce monthly bill
- Clear policy on integration of mini grid with national grid.
Success Factors

- Replicability
- Affordability of customers
- Suitable Location
- Sustainable demand
- Availability of funding
- Adoption of new technologies
- Clear policy

13
THANK YOU