Renewable Energy Technologies – CUTS International

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ONergizing Rural India
Sustainable and Equitable

Reliable and affordable energy solutions
Our Journey

Advocacy

Outreach to over 60,000 youth

2008

Policy Action

Film - Why NewCoal - gets global recognition

2009

Energy Solutions

Operations in 100 villages

2010
Energy: Capacity to Do Work
Energy
Our Basic Needs
Available Energy Sources
Renewable Energy Sources
Solar Energy

- Solar Cooking
- Solar Water Heating
- Solar Panels

- Heat Energy
- Light Energy
Solar Off-grid systems

Solar Home Lighting

Solar Home Electrification
How it works?

**Electricity from Solar Energy**

*PV Module* converts *Solar energy* into *Electricity (DC)*

- Less *Solar Energy*
  - Less *Electricity*
- More *Solar Energy*
  - More *Electricity*

Power generation changes daily

Solar Energy **→** PV Module **→** Electricity

*Input* **→** *Conversion* **→** *Output*
### Analysis of Solar Systems

#### Advantages of Solar System

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Easy and safe to operate and use</td>
</tr>
<tr>
<td>2</td>
<td>No monthly bill is applicable</td>
</tr>
<tr>
<td>3</td>
<td>Useful life span is more than 20 years.</td>
</tr>
<tr>
<td>4</td>
<td>There is no extra recurring fuel cost</td>
</tr>
<tr>
<td>5</td>
<td>Low maintenance required</td>
</tr>
<tr>
<td>6</td>
<td>Not easily damaged</td>
</tr>
<tr>
<td>7</td>
<td>Can be installed anywhere</td>
</tr>
<tr>
<td>8</td>
<td>No noise during operation</td>
</tr>
<tr>
<td>9</td>
<td>Light is cleaner, brighter &amp; safer to use</td>
</tr>
<tr>
<td>10</td>
<td>User is the owner of the system</td>
</tr>
<tr>
<td>11</td>
<td>Easily upgraded</td>
</tr>
</tbody>
</table>

#### Disadvantages of Solar System

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>High Initial Cost</td>
</tr>
<tr>
<td></td>
<td>Battery life is limited, needs regular maintenance &amp; careful use</td>
</tr>
<tr>
<td></td>
<td>User needs training for maintenance and operations</td>
</tr>
<tr>
<td></td>
<td>The energy produced depends on the number of solar panels</td>
</tr>
<tr>
<td></td>
<td>Only small D.C appliances be powered</td>
</tr>
<tr>
<td></td>
<td>Limited use of appliances in bad weather</td>
</tr>
</tbody>
</table>
**SHS (Solar Home System)**

- SHS is a small, independent DC system.
- Most efficient and economical system.
- DC Fluorescent Lights are not easily available in local markets.
## Components

### Batteries

<table>
<thead>
<tr>
<th>Lithium Ion Batteries</th>
<th>Sealed Maintenance Free Batteries</th>
<th>Lead Acid Batteries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used in Solar Lanterns</td>
<td>Used in Solar Lighting Systems</td>
<td>Used in Solar Home Electrification Systems</td>
</tr>
<tr>
<td>Capacity: 0.9 Ah - 5 Ah</td>
<td>Capacity: 2.8 Ah – 7.2 Ah</td>
<td>Capacity: 20 Ah – 150 Ah</td>
</tr>
<tr>
<td>Nominal Voltage: 3.6 Volt</td>
<td>Nominal Voltage: 6V-12V</td>
<td>Nominal Voltage: 12V – 24V</td>
</tr>
<tr>
<td>Life: 2-3 years</td>
<td>Life: 1.5-2.5 years</td>
<td>Life: 5-6 years</td>
</tr>
</tbody>
</table>
Components

Charge Controller

- Two indicators:
  a. Charging
  b. Low Battery

- Fuse provided

- Controller based on current flow.
# Components

## Lighting

<table>
<thead>
<tr>
<th>Features</th>
<th>Light Emitting Diodes (LEDs)</th>
<th>Incandescent Light Bulbs</th>
<th>Compact Fluorescents (CFLs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Span</td>
<td>More than 5000 hours</td>
<td>100-1000 hours</td>
<td>5000 hours</td>
</tr>
<tr>
<td>Watts of electricity used</td>
<td>6 - 8 watts</td>
<td>60 watts</td>
<td>13-15 watts</td>
</tr>
<tr>
<td>Durability</td>
<td>Very Durable - LEDs can handle rough use</td>
<td>Glass or filament can break easily</td>
<td>Glass can break easily</td>
</tr>
<tr>
<td>Heat Released</td>
<td>Very Less</td>
<td>High</td>
<td>Medium</td>
</tr>
</tbody>
</table>
Components

Other loads

• Appliances with lowest power consumption are given preference

• Appliances that run directly on 12 or 24 Volts DC
Inverters

- Used to Convert DC Power to AC Power
- Any appliance can be used with a solar home system
- Choose Appliances that consume less power
ONergy Product Offerings

- Home Electrification Systems
- Solar Portable Light
- Solar Home Lighting
- Solar Water Heaters
- Solar Inverter Solution
- Solar Street Light
# Product Description

## Individual Equipments

<table>
<thead>
<tr>
<th>Item</th>
<th>Price Range</th>
<th>Details/queries about performance</th>
<th>Pay-back period</th>
<th>Lifespan</th>
<th>Warranty/ Government Subsidy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar Lantern</td>
<td>1500 – 3000</td>
<td>LED – 100-150 lumen. CFL – 150 – 300 lumen</td>
<td>1 year</td>
<td>2 years</td>
<td>6m – 1yr</td>
</tr>
<tr>
<td>Solar lamp</td>
<td>650 - 2000</td>
<td>LED – 30 – 100 lumen</td>
<td>1 year</td>
<td>2 – 5 years</td>
<td>1yr</td>
</tr>
<tr>
<td>Solar Mobile/camera/other equipments Battery Charger</td>
<td>500 - 2000</td>
<td>Charging directly through panel or through battery. Available in different sizes</td>
<td>1 year</td>
<td></td>
<td>1 yr</td>
</tr>
<tr>
<td>Solar Fan</td>
<td>800 - 1500</td>
<td>12W - 18W</td>
<td>2-4 years</td>
<td>6 months</td>
<td>comes along with solar home system</td>
</tr>
<tr>
<td>Solar Water Heater</td>
<td>16000 above</td>
<td>Temperature - 60-70 degrees</td>
<td>2.5 yrs</td>
<td>10 yrs</td>
<td>1 yr</td>
</tr>
<tr>
<td>Solar pumpset</td>
<td></td>
<td>Available in different sizes. However, this has not been successful</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Home Power Systems

<table>
<thead>
<tr>
<th>Solar Home Power system DC</th>
<th>10000 above</th>
<th>Run time in hours</th>
<th>2-3 yrs</th>
<th>10 yrs</th>
<th>5 yrs</th>
<th>30 - 40%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar run Home Power System AC/ solar inverter based system</td>
<td>50000 above</td>
<td>Capacity 200W and above. Runs current loads and appliances</td>
<td>3-5 yrs</td>
<td>10 yrs</td>
<td>5 yrs</td>
<td>30%</td>
</tr>
</tbody>
</table>
Business Model

Value Chain

Awareness + Training

Renewable Energy Center

→

Rural Entrepreneurs/NGOs/MFIs

→

Servicing/Consumer Financing

Households
Competitive Advantage

Building an ecosystem

- Experienced partners
- Affordability
- Customization
- Complete energy solutions
- Service infrastructure
- Wholistic approach
Small Product

- Unbreakable
- Waterproof
- 10-20 Times Brighter than Kero
- Battery Life - 3-5 Years

Sun King
- Price - Rs 850

Sun King Pro + Mobile Charge
- Price - Rs 1600
Financing Scheme – Pay As You Go

1. Make a small initial payment (10-20%). Sign contract and system is installed.
2. No fixed monthly charge.
3. Buy energy credits, and pay only based on usage. Higher usage will lead to free electricity faster.
4. System will not work unless you purchase energy credits.
5. 80% of payments for energy are credited towards permanent unlock code. Higher top-up values will lead to lower total costs.
Bank Financing Model

**SELCO 40C**
- Price: Rs 9990
- Down Payment: Rs 2498
- EMI: 169 for 5 yrs

**SELCO 75C**
- Price: Rs 17170
- Down Payment: Rs 4293
- EMI: 293 for 5 yrs
Partners and Supporters

Awards and Recognition

Media
Let’s ONergize Rural India