Sunshine is our business.

Project Realization leading into sustainable business

Greetje Voss / June 2012
Overview

General Information

Modules, other components and projects

Backup-System in Laos as example project

Outcome

What we are looking for
Key numbers

- German solar module manufacturer
- Production volume 2012: 350 MWp
- Turnover 2011: 293 Mio.€
- No. of employees: approx. 1,000
- Export rate: more than 60%
- International sales structure through local partners and subsidiaries

Solar Key Components

- Renusol
  - Köln
- Centrosolar Glas
  - Fürth
- Centrosolar Schweiz AG
  - Switzerland
- Centroplan
  - Gellenkirchen
- Centrosolar AG
  - Hamburg, Paderborn, Kempten
- Centrosolar Sonnenstromfabrik
  - Wischh

Integrated Systems

International Business Units

- Spain, France, Italy, Greece, USA, Benelux, UK
Solar module Production

- Product certification: IEC61215 /IEC61730/UL1730
- Periodical factory inspection VDE, TÜV and UL
- Certified Quality Management System Sonnenstromfabrik in Wismar according to ISO 9001:2008
- Certified Environmental Management System Sonnenstromfabrik in Wismar according to ISO 14001:2009
- Salt corrosion resistance test, Ammonia resistance test
- Self defined quality levels for incoming goods and supplier audits for qualification
- Inhouse testings: Pull-off-test of solder connection, climate chamber test etc.
- 5/10 years product warranty
Centrosolar as component supplier for systems and projects

- Grid connection Components
- Batteries
- Charge controllers
- Inverters
Backup System as example project
Laos goes solar

- German Embassy Vietiane, Laos
- 5,7kW Back-up system to cover the Embassy’s energy needs and, via a battery system, to supply electricity in case of a grid failure
- Customers benefit is the reduction of power consumption without affecting reliability
- Project financing by Dena solar roof program for foreign market development
- German Components

www.solarrooflaos.com
What is a Backup-System?

1. PV system
2. Grid inverter
3. Generation meter
4. Consumer
5. Bidirectional meter
6. Public grid
7. Generator
8. Battery
9. Battery inverter
## Components

### Modules S-Class Professional

<table>
<thead>
<tr>
<th>Type</th>
<th>Framed crystalline module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>Centrosolar</td>
</tr>
<tr>
<td>Power</td>
<td>190 Wp</td>
</tr>
<tr>
<td>Features</td>
<td>50 cells</td>
</tr>
<tr>
<td></td>
<td>Antireflecting glass</td>
</tr>
<tr>
<td></td>
<td>Made in Germany</td>
</tr>
</tbody>
</table>

### SMA Sunny Boy inverters

<table>
<thead>
<tr>
<th>Type</th>
<th>Transformerless Solar Inverter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>SMA</td>
</tr>
<tr>
<td>Maximum AC Power</td>
<td>5000 W</td>
</tr>
<tr>
<td>Features</td>
<td>Maximum efficiency of 97 %</td>
</tr>
<tr>
<td></td>
<td>Multi –String technology</td>
</tr>
<tr>
<td></td>
<td>Made in Germany</td>
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</tbody>
</table>
## Components

### Batteries

<table>
<thead>
<tr>
<th>Type</th>
<th>Gel-type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>Hoppecke</td>
</tr>
<tr>
<td>Capacity</td>
<td>1000 Ah</td>
</tr>
<tr>
<td>Features</td>
<td>2V cells, block</td>
</tr>
<tr>
<td></td>
<td>large cycle range</td>
</tr>
<tr>
<td></td>
<td>Made in Germany</td>
</tr>
</tbody>
</table>

### Inverters

<table>
<thead>
<tr>
<th>Type</th>
<th>Backup inverter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>SMA</td>
</tr>
<tr>
<td>Continuous energy output</td>
<td>5 kW</td>
</tr>
<tr>
<td>Features</td>
<td>switch to stand alone power in 20 ms</td>
</tr>
<tr>
<td></td>
<td>up to 8.4 kW of shortterm power</td>
</tr>
<tr>
<td></td>
<td>Made in Germany</td>
</tr>
</tbody>
</table>
Specific features of the system

- Backup-System 1-Phase, Building 3-Phases
- Communication to the user
- First Grid connected System in Laos
- Understanding with the national energy provider
- Infrastructure of the property
- Cooperation with the local partner
Outcome

- Well working system which covers the Embassy’s energy needs and which provides electricity in case of a grid failure
- Successful discussions with the energy provider and implementation of grid connected systems in Laos
- Fruitful cooperation between Centrosolar and the local partner
  - More projects realized together
  - Ongoing sustainable business cooperation
What we are looking for

- Can you give competent technical support to the customer?
- Are you a system integrator or distributor?
- Are your activities focused on the sunbelt countries?
- Do you have a local need for stand-alone systems or backup solutions?

We should talk!
Sunshine is our business.

Thank you for your attention!
Sunshine is our business.

Questions?