Challenges For Solar Village Power Supply

A Field Report from Asantys Systems

By Nicolas Rohrer

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Company Introduction

Asantys Systems is your competent partner for on- and off-grid solar systems. As a system integrator we serve you from the first planning of a solar system up to the installation and maintenance. Our experienced consulting assures that we exactly meet your needs.

All Asantys Systems quotations are based on precise system sizing which allow us to identify the best suitable system for your specific need. Besides wholesaling of components we deliver and install complete turn key solar systems worldwide.

Our project team has great work experience regarding the special markets in rural areas. Currently we are exporting in more than 30 countries in Africa and Asia and are supplier of numerous international NGOs.
Motivation

Why village power supply?

Many people living in remote areas do not have access to the public electricity grid. Due to the high costs these people will hardly ever be able to enjoy electricity without the introduction of solar village power systems.

A village power system forms a micro grid among a defined area without any connection to the public grid. This micro grid delivers three phase AC power to the different private houses, schools, clinics or businesses in the village.

A solar village can therefore offer access to modern life with the comfort of power supply as we know it from urban areas!
Technologies (1)

- **Solar Home Systems (SHS) vs. centralized systems?**
  - In the past years we have seen lots of discussion what method is adequate to electrify rural areas
  - Last decades dominated by big electrification projects with classical SHS. Small standard sizes: 50-130W
  - Disadvantage: Limited applications / Cost / Maintenance structure
- **Trend 1: Big centralized systems**
  - Request constantly growing
  - Big advantage: Flexibility in application
  - Concentrated village structure necessary
- **Trend 2: Pico Systems**
  - SHS disappear slowly from the market. Medium size systems from 1-3 kWp remain. SHS are replaced by high efficient and cost effective Pico Systems
  - Pico Systems complement village power systems; remote houses cannot be connected due to high transmission cost.
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Technologies (3)

- **AC Coupling vs. DC Coupling (2)**

- **Advantage AC-Coupling**
  - Cost-performance ratio more interesting
  - Low number of devices (PV-Inverter up to 20kWp)
  - Extensions easy to install
  - Different energy sources easier to combine
  - Long distances possible
  - Installation time in the field is very important factor

- **Asantys experience:**
  Village power supply systems are getting bigger, AC-Coupling will be the standard type of installation.
Challenges (1)

1. **Finance / Refinance**
   - Initial planning & decision depend on many factors / Cost-effectiveness of the system affected.
     - Grid extension prices (variations from 5-50 €/m)
     - Diesel prices, generation price for diesel systems min. 0,50€/kWh
     - Custom advantages for solar existing?
     - Local energy prices?
       - Price difference between urban and rural areas – how to explain to population?

**Solar is competitive, but each village needs its own analysis.**
2. Logistics

- Logistics in remote areas are very difficult to manage from afar
- Limited choice of forwarders
- Very bad roads / Goods need special packing / Very long transport time
- Transport price often excessive:
  - Example Mali: Germany->Port Dakar 50 % of Dakar->Village in Mali
- No offloading/storage facilities on site
  - Asantys experience: up to 100t per village that need to be unload within 24h on site. Fork truck not available in the field / island.
  - Good stuff on site is necessary
- During installation: Everything needs to be on site / Difficult to organize missing items
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3. Installation
   - Turnkey installation to expensive, only solution is supervision of local teams
   - Intense Training needs to be done before installation
     - Expl: A single screw can shut down the system
   - Different installation standards to be considered and discussed before work starts.
   - Bad quality installation tools / installation materials available locally.
   - Cultural differences may cause problems
     - Expl: Start work early in the morning
     - Motivation of local staff
     - Organization of construction site
Challenges (4)

4. Maintenance

- Crucial issue for long-term success / Lots of projects fail due no execution of maintenance.
- Qualified team needs to stay in village to take care of solar power plants
- Maintenance team therefore needs extra training
  - Basic skills (how to handle a computer) need to be trained also
- Communication is not guaranteed, remote control not always available
  - Alternatives need to be organized if communication is not guaranteed, remote control not always available.
- Finance of maintenance needs to be calculated from the beginning
- Uncontrolled load connections: more people will be connected than planned. Danger to the system when consumption grows unexpected without extending the system.
Impressions
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The real challenge is to fight darkness in Africa.
To fight darkness and poverty we have already the technical solutions.
The market potential is nevertheless huge.

We would be happy to be your partner for electrification projects and help you with expertise and experience.
Each solar village is like a little planet!
Let us build many planets in rural space!

Contact:
Asantys Systems GmbH
Nicolas Rohrer
Hauptstraße 28
77756 Hausach
Germany
info@asantys.com
www.asantys.com