



# Solar Solutions for Off-grid Power Supply



Clean Energy. Anywhere.



# SOLAR POWER FOR EVERYONE – ANYTIME AND ANYWHERE

More than 1.3 billion people around the globe still do not have access to electricity. The reason is simple. It is too expensive to build the infrastructure to connect them to the power distribution grid, especially in rural regions. Some communities may attempt to fill the gap with noisy, pollutive diesel generators, but rising fuel and transportation costs often make generators uneconomical.

Economic development is impossible without electricity. Health, education, and clean drinking water all depend on electric power. Ultimately, people can only produce products and services locally thus making their community more prosperous if they live in a place where they can use electricity.

## **Energy independence with solar power**

There is a simple, reliable, and low-cost solution for a decentralized energy supply: PV-powered off-grid systems. They can be used to build stable, decentralized power distribution grids in remote locations not connected to the public power grid. Furthermore, because off-grid solar power systems are efficient, require few resources, can be used worldwide and are effective in combating climate change, they help developing countries bypass the “fossil fuel era,” a fact especially true for those with large populations.

# OFF-GRID SOLUTIONS FOR SOLAR POWER SUPPLY

## **Solar home system – power for household use**

A solar home system provides basic off-grid power service for one household. This is a low-cost, easy-to-assemble PV plant consisting of only a few components. One to two solar modules, a charge controller, and a car battery supply enough electricity for the lights, television, and radio. A solar home system provides users with comfort and improved access to information, but it cannot, however, supply enough power to operate tools, machines or large buildings. It is not a commercial system and cannot be leveraged to drive local economic development.

Solar home systems are ideal for sparsely populated regions with long distances between single houses. In industrialized countries, similar technology is used for campers and small gardens not connected to the power distribution grid.

Solar home system	
<b>Benefits</b>	<ul style="list-style-type: none"><li>• Basic power supply: lights, TV, radio, etc.</li></ul>
<b>Expansion</b>	<ul style="list-style-type: none"><li>• Difficult to expand</li><li>• Not for commercial use</li></ul>
<b>Energy sources</b>	<ul style="list-style-type: none"><li>• Photovoltaics only</li></ul>

## **SMA solar off-grid systems – empowering people worldwide**

Many rural regions are too sparsely populated to justify building a central energy supply system. This is where SMA solar hybrid systems excel. They can supply buildings, factories, or even entire towns with reliable off-grid AC power using renewable energies. In contrast to solar home systems, hybrid systems can integrate other generating systems such as PV, wind, hydropower, or diesel generators, even if they are located relatively far away. Hybrid power systems can power any household appliances, electrical tools, or machines that run on standard AC power. Being modular, they can grow with users' needs at any time and that helps drive economic growth. After all, people can only establish themselves as local providers of products and services when they can operate machines and equipment locally and cost-effectively. Solar hybrid systems can be used in any location that lacks a stable power supply. In Germany, for example, they supply electricity for remote buildings such as farms, businesses, weekend homes and vacation cabins.

### **SMA solar off-grid systems**

- Reliable grid-quality power supply, worldwide
- Ideal for local economic development and growth
- PV: a regional business model that creates jobs
- Modular design enables expansions months or even years later
- Supports all generators (PV, wind, hydropower, etc.)
- Standard AC technology



## SMA SUNNY ISLAND

The Sunny Island battery inverter is the most important component of the off-grid supply system. Together with the battery array, the Sunny Island forms an independent AC power grid accessible to both energy suppliers and consumers. In addition, Sunny Island acts as the system's manager by carrying out all the control processes that maintain system stability and output. SMA hybrid systems are modular and versatile by design making them easy to install and expand to up to 300 kilowatts – anywhere in the world.



- 1 System house**  
Centralized. This is where you'll find the off-grid inverter, the batteries for intermediate storage, and, for large systems, the Multicluster Box.
- 2 Sunny Island**  
Robust and flexible. Sunny Island is a grid and battery manager that controls the off-grid system. The devices can be installed indoors as well as outdoors.
- 3 Multicluster Box**  
Modular. Off-grid systems with up to 300 kilowatts can be quickly and easily put into practice with the fully preconfigured AC distribution board.
- 4 Hydroelectric power plant**  
Flowing. New or existing hydroelectric power plants are a smart addition to the off-grid system.





- ⑤ **Windy Boy**  
Versatile. The inverter converts the direct current from water and wind power plants into grid-compliant alternating current.
- ⑥ **Diesel generator**  
Failsafe. A generator provides backup power during long periods of drought, calm winds, or low solar radiation.
- ⑦ **Wind turbine system**  
Complementary. Depending on the site, the integration of wind turbine systems can be an intelligent additional energy source.
- ⑧ **Solar electricity generator**  
Direct. The PV module produces power precisely where it is needed. Solar and wind energy complement one another in many locations through all seasons.
- ⑨ **Sunny Boy**  
Reliable. The PV inverter converts direct current from the PV module into alternating current for the grid.



## SUCCESS STORIES WORLDWIDE

### **Self-sufficient with solar power**

Two solar hybrid systems have been supplying electricity to around 850 homes in the villages of Kolondieba and Ourikela in Mali, Africa since 2011. SMA's Multicluster Technology is used to integrate a school, multiple workshops, a bakery, a hotel, and other businesses into the off-grid system. And that provides a solid foundation for the local economy to develop and grow.



### **Off-grid system reduces noise**

In 2010, an SMA hybrid system was installed on the Reao Atoll in French Polynesia in the South Pacific. The SMA system replaced a diesel generator that consumed 250 liters of fuel per day and has made life much quieter. The noiseless electricity supply offers benefits for everyone - including the island's doctor. The noise had made it difficult for him and his patients, especially expectant mothers.



### **Reliable electricity supply without a grid connection**

The SMA Solar Academy in Niestetal has been a training center and flagship project for the use of renewable energy and energy-efficient systems since 2010. The intelligent combination of various renewable energy sources and state-of-the-art technology makes sure that heating, cooling, and electricity are available at any time and without sacrificing comfort.



