



# SUNNY ISLAND System Guide



System Solutions for Your Stand-Alone Power Supply



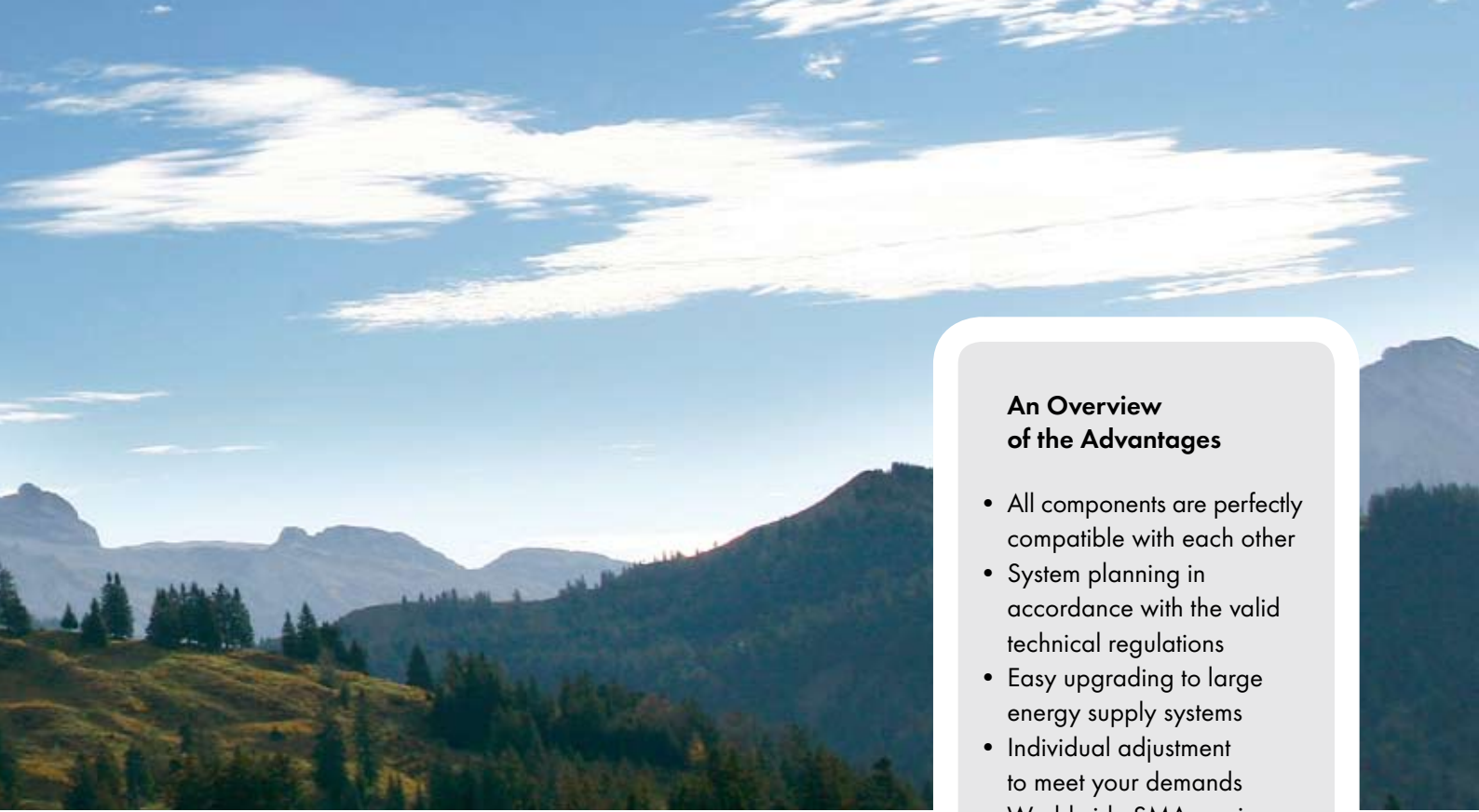
# Supplying Off-Grid Areas with Electricity

## **Simple System Planning with System Solutions from SMA**

Stand-alone power systems can easily be set up using the Sunny Island battery inverters developed by SMA. With this technology, a reliable energy supply is possible even for off-grid areas.

At first look, stand-alone power systems are as diverse as the landscapes in which they can be set up. This is because the ambient conditions determine which renewable energy source can be best applied on a case by case basis. Nevertheless, our experience gained from installing more than 1,000 stand-alone power systems worldwide has taught us that certain combinations of components are especially well-adaptable and form a solid basis for more complex systems.

Taking into consideration the size of each individual system as well as the specific ambient conditions, we have prepared for you a summary of the typical fields of application for solar energy, battery banks and diesel generators. With these system solutions we would like not only to facilitate your introduction into the area of stand-alone power supply, but also to offer you concrete support for the planning of your stand-alone systems.



### **An Overview of the Advantages**

- All components are perfectly compatible with each other
- System planning in accordance with the valid technical regulations
- Easy upgrading to large energy supply systems
- Individual adjustment to meet your demands
- Worldwide SMA service for power supply systems

### **The Easy Way to Your Stand-Alone System**

The system solutions presented in this brochure offer you the basis for constructing stand-alone power systems of a diverse range of power classes. Whether for free-standing vacation homes, remote farms or entire villages, the proposed configurations ensure a simple system design and straightforward system installation.

### **Perfect Adjustment**

The individual components are optimally tailored to one another and, together with the Sunny Island battery inverter, ensure a reliable power supply. Of course, the combinations can also be individually adjusted in accordance with your local conditions.

### **A Solid Basis**

Furthermore, the configuration proposals form a solid basis for more complex systems. The modular design provides maximum flexibility. In step with growing energy demand, additional components can be gradually integrated into the system at any time.



# SUNNY ISLAND – The Island Manager

## The Main Component of Your Stand-Alone Power Supply

The Sunny Island stand-alone inverter is the main component of each Sunny Island system. Together with a battery unit, the Sunny Island stand-alone inverter creates an AC voltage grid into which all components – from electrical appliances to power generators – can be integrated. As manager of this AC coupled grid, Sunny Island takes over all control processes and thus ensures a continuous power supply.

You can apply the Sunny Island in both one and three-phase stand-alone grids as well as upgrade the systems at any time. Modern and economical battery management ensures a maximum service life of the batteries. Due to their temperature management and excellent overload characteristics, the devices have proven especially resistant to extreme climatic conditions.

### A Smart Device

All Sunny Island stand-alone inverters can be easily combined with renewable energy components as well as diesel generators for emergency power supply. For solar connection, your best choices are the Sunny Boy and Sunny Mini Central solar inverters: their high level of efficiency and reliability are more than convincing. Consequently, they have received numerous awards.





### **SUNNY ISLAND Advantages**

- Stand-alone systems from 2 kW to 100 kW
- AC and DC coupling of energysources
- Single- and three-phase parallel connections
- Modularly expandable
- Excellent overload characteristics
- Low energy consumption
- Intelligent stand-alone management for maximum battery service life
- Easy Commissioning

# SUNNY ISLAND Set

## **Using the Sun's Energy**

Because solar energy is available all over the world, all Sunny Island system solutions are primarily based on the use of photovoltaics. Moreover, PV systems are highly adjustable and wear-resistant.

### **Examples of Individual Systems**

More than simply offering you some standard solution, with our eight basis packages we would like to provide you with a sensible basis for planning your system. All systems can be expanded and adjusted to fit your individual needs.

### **The Basis: 25 Years of Experience**

Whether in the development of grid-connected PV systems or the installation of more than 1,000 stand-alone systems, at SMA we have incorporated our vast knowledge gained through over 25 years of experience into developing system solutions. All examples are based on comprehensive research in the specific fields of application as well as for the respective energy consumption.

### **Which System Configuration is the Most Appropriate?**

The best configuration for you primarily depends on the connected loads as well as the required amount of energy. Be it for a one or three-phase

connection, the construction of your system plays an important role. Make the most of our experience with modern energy supply systems and talk to us first!

# Remote, Unattended Installations

German Lifeguard Association station, Graal-Müritz



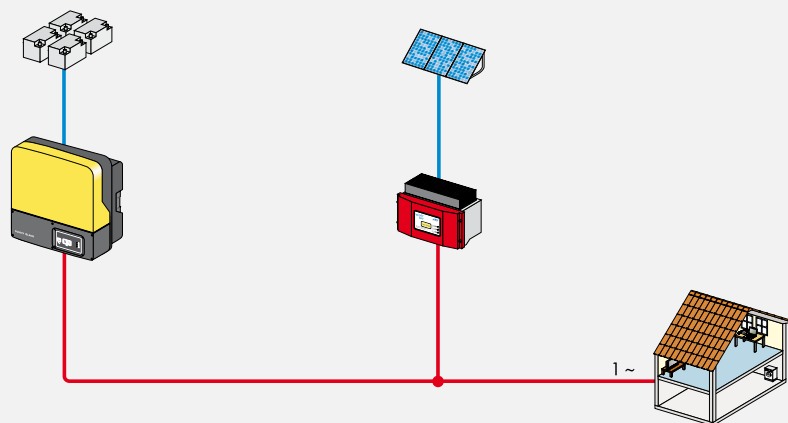


<b>Sunny Island:</b>	<b>SI 2224</b>
<b>Sunny Boy:</b>	<b>SB 1100</b>
<b>Maximum solar power:</b>	<b>1.2 kWp</b>
<b>Battery inverter power:</b>	<b>2.2 kW</b>
<b>Available energy per annum:</b>	<b>800 kWh</b>
<b>Battery bank:</b>	<b>6.72 kWh</b>
<b>Autonomous time:</b>	<b>3 days</b>

According to our experience, stand-alone systems with a performance range between 2 and 3 kW are required for remote installations or those which are left unattended for a longer period of time. In such cases, the system must not only be reliable but also be resistant to extreme climatic conditions.

Temperature variations, high levels of humidity and a high salt content of the air are all reasons for great care when selecting the appropriate components.

A typical application in this power class is, among others, telecommunication stations which rarely require maintenance work.



# Single-family home in Southern Europe

Private home, Spain

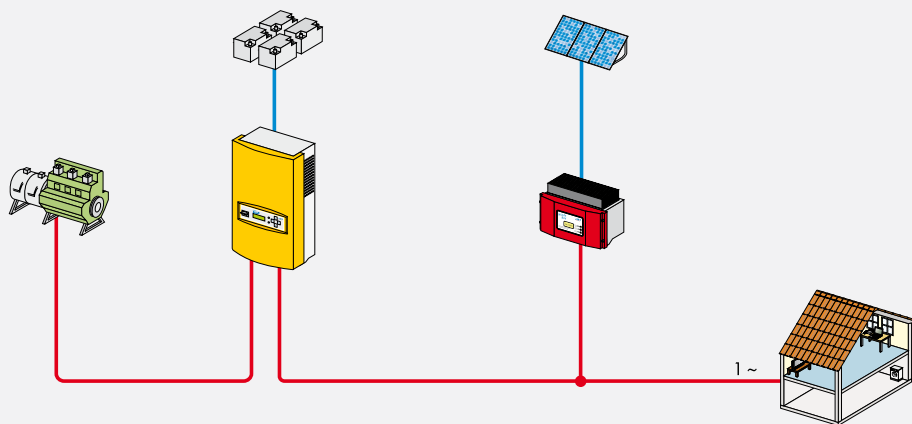




<b>Sunny Island:</b>	<b>SI 3324</b>
<b>Sunny Boy:</b>	<b>SB 1700</b>
<b>Maximum solar power:</b>	<b>1.9 kWp</b>
<b>Battery inverter power:</b>	<b>3.3 kW</b>
<b>Available energy per annum:</b>	<b>2,500 kWh</b>
<b>Battery bank:</b>	<b>14.4 kWh</b>
<b>Autonomous time:</b>	<b>2 days</b>
<b>Diesel set:</b>	<b>3 kW</b>

The system presented here is located on a private property on the island of Tenerife.

Sunny Island Sets are ideal for providing energy to remote single-family homes in Southern Europe. Because the amount of sunlight remains relatively high throughout the entire year, the PV system can ensure a sufficient energy yield. Additionally, even in the event of severe storms, the stand-alone system guarantees an exceptionally reliable power supply.



# Single-family home in Central Europe

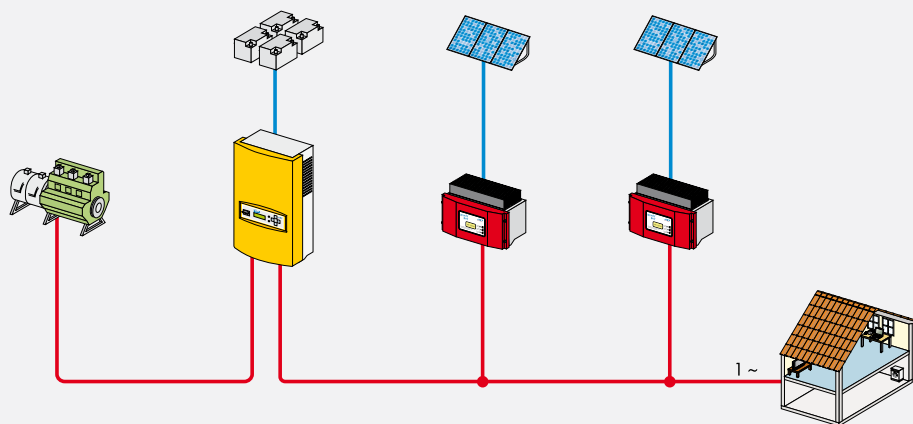
Rooftop system, Germany



<b>Sunny Island:</b>	<b>SI 4248</b>
<b>Sunny Boy:</b>	<b>2 x SB 2500</b>
<b>Maximum solar power:</b>	<b>5.8 kWp</b>
<b>Battery inverter power:</b>	<b>4.2 kW</b>
<b>Available energy per annum:</b>	<b>4,500 kWh</b>
<b>Battery bank:</b>	<b>28.8 kWh</b>
<b>Diesel set:</b>	<b>4 kW</b>
<b>Autonomous time:</b>	<b>2 days</b>

The sun is a great source of energy, even in Central Europe. Here, average annual solar irradiation is approximately 1,000 kWh/m<sup>2</sup>. This is equivalent to about 50 % of the radiation intensity of the Sahara.

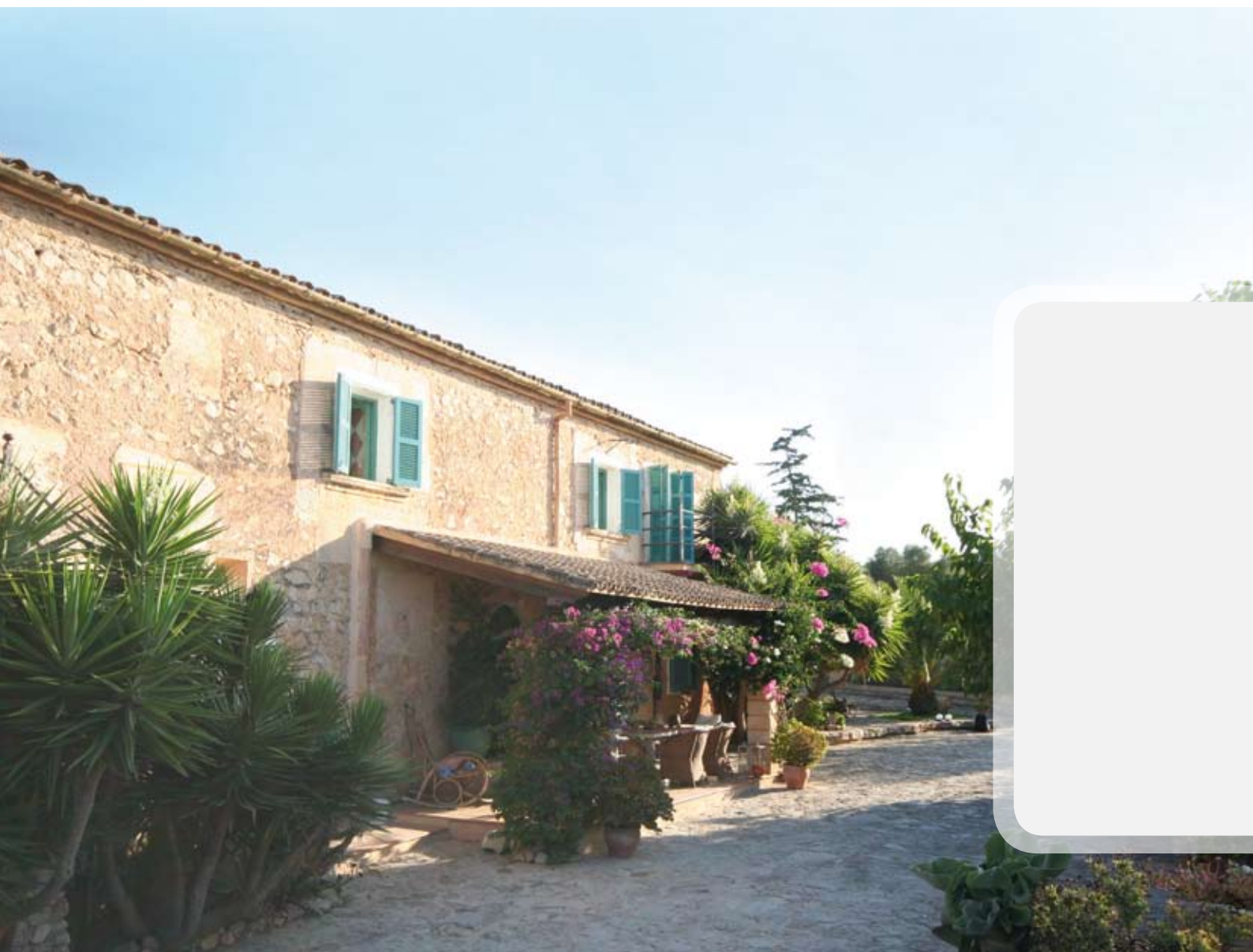
Using statistics, it is very simple to calculate the average energy consumption of a single-family home in Central Europe. Consequently, it is very easy to put together the appropriate system. In Germany, the average annual energy demand of a family of four is between 4,000 and 5,000 kWh. Depending on the location and the orientation, a stand-alone system operator will need a solar module surface of approximately 40 square meters.





# Villa

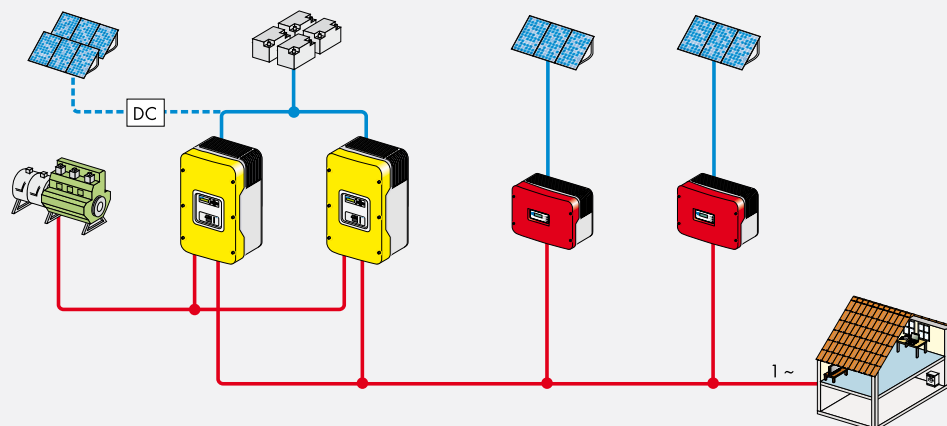
Mallorca, Spain



<b>Sunny Island:</b>	<b>2 x SI 5048</b>
<b>Sunny Boy:</b>	<b>2 x SB 3800</b>
<b>Maximum solar power:</b>	<b>7.5 kWp</b>
<b>Battery inverter power:</b>	<b>10 kW</b>
<b>Available energy per annum:</b>	<b>10,000 kWh</b>
<b>Battery bank:</b>	<b>38.4 kWh</b>
<b>Diesel set:</b>	<b>8 kW</b>
<b>Autonomous time:</b>	<b>1 day</b>

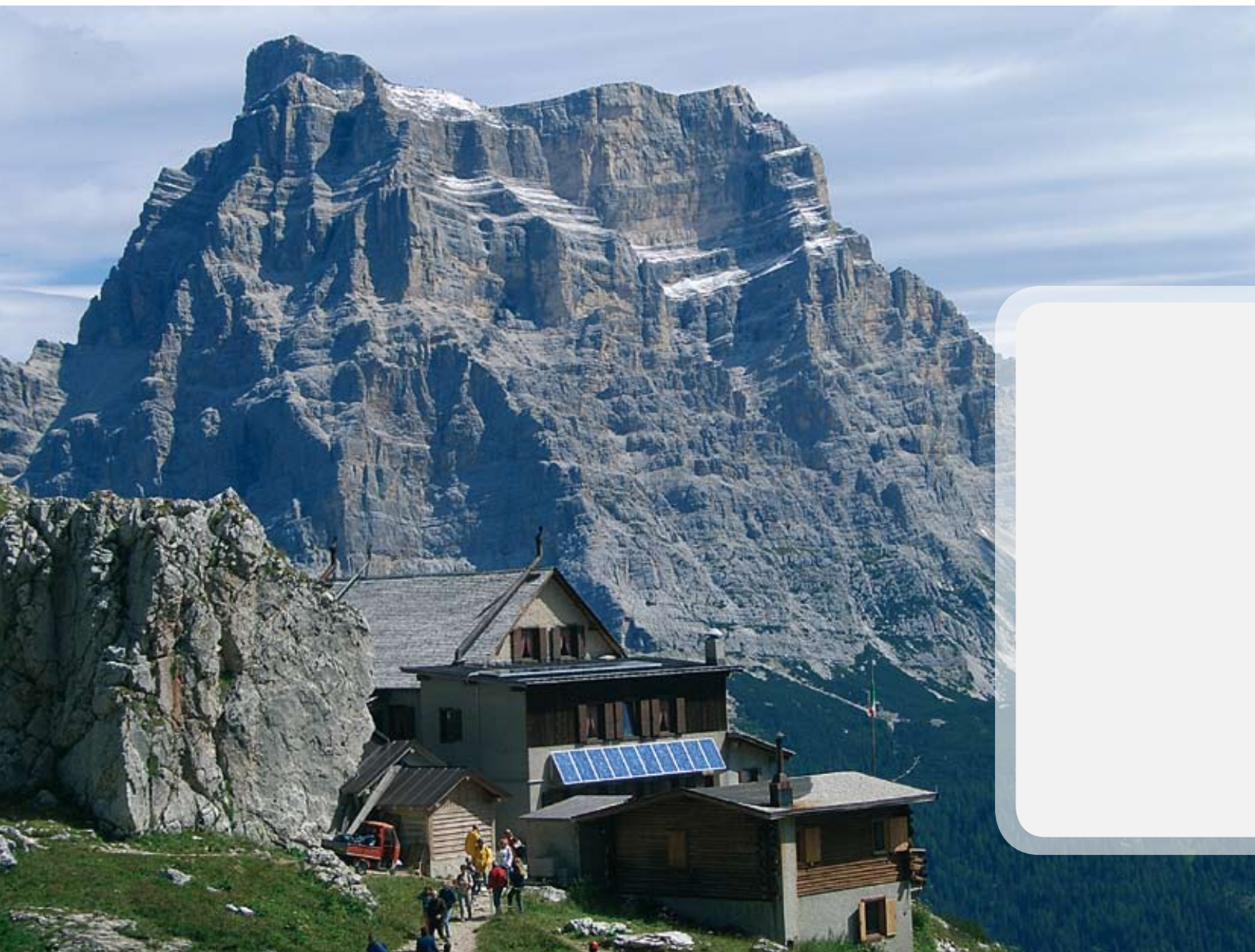
More than anything else, a typical Spanish vacation villa requires one thing: a lot of energy. This energy is primarily required for lighting, air-conditioning systems and electronic devices. Pleasure is important especially during the holidays and therefore it is also possible to operate swimming pools for example.

Average annual energy demand for such loads is often between 6,000 and 15,000 kWh a year. As a result, a high-performance solution with two Sunny Island SI 5048 connected in parallel is necessary.



# Alpine hut/Guest house

Veneto region, Italy

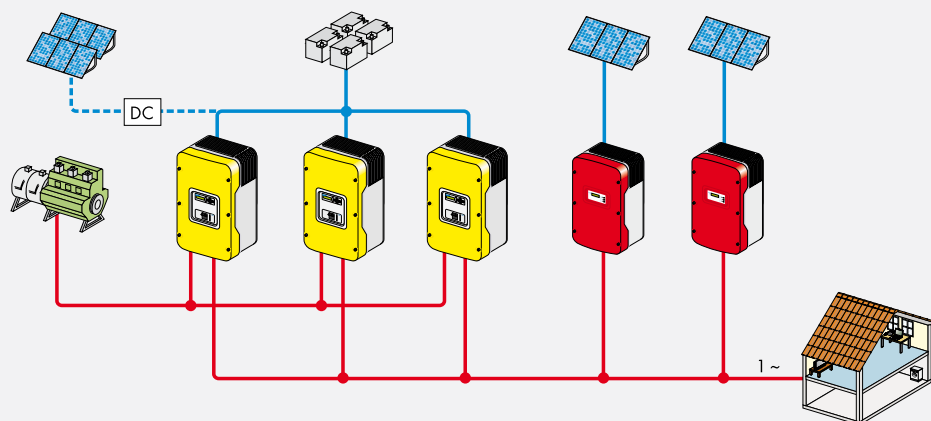




<b>Sunny Island:</b>	<b>3 x SI 5048</b>
<b>Sunny Mini Central:</b>	<b>2 x SMC 6000A</b>
<b>Maximum solar power:</b>	<b>12 kWp</b>
<b>Battery inverter power:</b>	<b>15 kW</b>
<b>Available energy per annum:</b>	<b>15,000 kWh</b>
<b>Battery bank:</b>	<b>57.6 kWh</b>
<b>Diesel set:</b>	<b>8 kW</b>
<b>Autonomous time:</b>	<b>1 day</b>

Each year, an increasing number of hikers are enjoying the beauty of the mountains. Subsequently, over the last few decades a large number of small alpine huts have been transformed into real guest houses. During the main season, these accommodations can house up to 400 guests; quite a challenge for an energy supply system.

More recently, alongside diesel sets, an increasing number of diverse renewable energy sources are being used in mountain resorts. Advantageously for both man and nature, they are clean and make little noise. They are furthermore perfectly suitable for reliably supplying lights and electric appliances far away from the public utility.



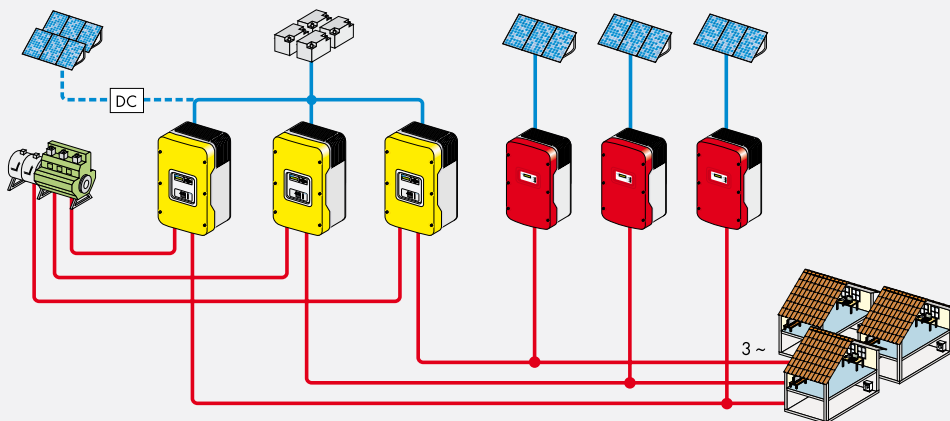
# Farm

Turkey stall in Leofels, Germany



<b>Sunny Island:</b>	<b>3 x SI 5048</b>
<b>Sunny Mini Central:</b>	<b>3 x SMC 5000A</b>
<b>Maximum solar power:</b>	<b>15 kWp</b>
<b>Battery inverter power:</b>	<b>15 kW</b>
<b>Available energy per annum:</b>	<b>20,000 kWh</b>
<b>Battery bank:</b>	<b>120 kWh</b>
<b>Diesel set:</b>	<b>20 kW</b>
<b>Autonomous time:</b>	<b>2 days</b>

The Sunny Island system offers remote farms an economical alternative to a grid connection. Depending on the location, integration into the public grid is often times linked to high costs or is not even possible in the first place. For example, a hog-feeding farm in the northern German town of Hardegsen was equipped with a stand-alone power system. And, as another example, in the southern German town of Leofels, solar energy is used to supply energy to the turkey stall shown above.





# Scientific Research Stations

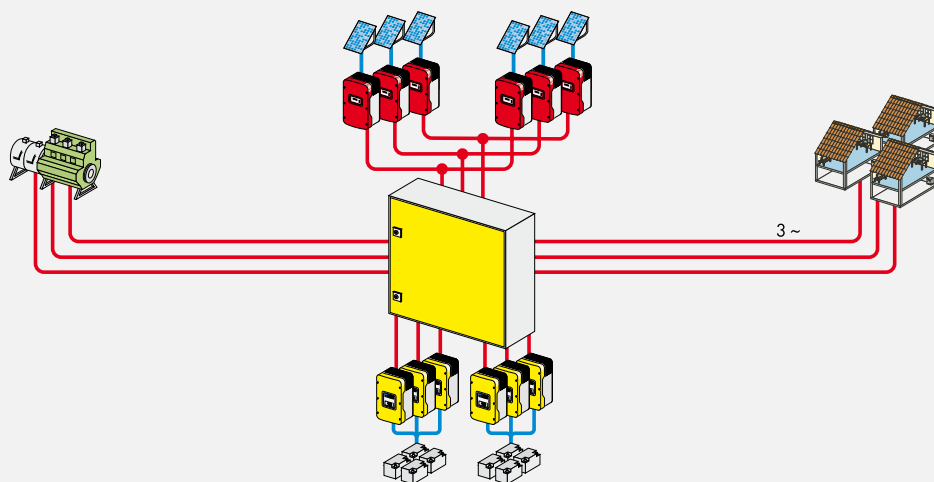
Andes Observatory, on the border between Chile and Argentina



<b>Sunny Island:</b>	<b>6 x SI 5048</b>
<b>Sunny Mini Central:</b>	<b>6 x SMC 5000A</b>
<b>Maximum solar power:</b>	<b>30 kWp</b>
<b>Battery inverter power:</b>	<b>30 kW</b>
<b>Available energy per annum:</b>	<b>25,000 kWh</b>
<b>Battery bank:</b>	<b>192 kWh</b>
<b>Diesel set:</b>	<b>24 kW</b>
<b>Autonomous time:</b>	<b>2 days</b>

Many scientific research stations are located far away from public grids. Especially when dealing with the observation of flora and fauna, a Sunny Island System is the perfect solution. For instance, a chimpanzee observation station in West Africa has been equipped with a PV system and several Sunny Island systems.

In order to offer the ideal solution for research stations with a high energy demand, we have combined six Sunny Island systems with six Sunny Mini Centrals. In this manner, it is not only possible to ensure a basic supply for the research station but also for large scientific instruments as well, such as those needed to move large telescopes at observatories.



# Village Power Supply

Yunnan Province, China

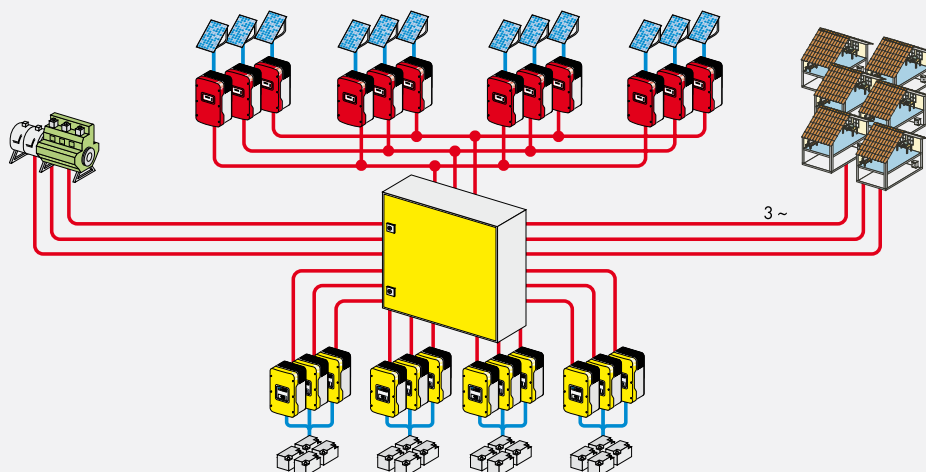




<b>Sunny Island:</b>	<b>12 x SI 5048</b>
<b>Sunny Mini Central:</b>	<b>12 x SMC 5000 A</b>
<b>Maximum solar power:</b>	<b>45 kWp</b>
<b>Battery inverter power:</b>	<b>60 kW</b>
<b>Available energy per annum:</b>	<b>25,000 kWh</b>
<b>Battery bank:</b>	<b>288 kWh</b>
<b>Diesel set:</b>	<b>35 kW</b>
<b>Autonomous time:</b>	<b>2 days</b>

For many of us it's not even imaginable: life without electricity. Yet for 1.6 billion people of the world this is everyday life. These people mostly live in remote areas where a public grid connection is impossible due to the long transmission routes and associated costs thereof.

Our example shows a Sunny Island system in the Yunnan Province in southwest China. Twelve Sunny Island and 12 Sunny Mini Central supply over 1000 people with clean energy.



# Extremely Adaptable

## Flexible Incorporation into a Wide Range of Systems

The modular construction of Sunny Island sets provides maximum flexibility in the supply of electricity to off-grid areas. All the components required for the use of solar, wind or hydropower as well as battery banks or fuel cells can be integrated into the system without any difficulty. Subsequently, the sets can be optimally adjusted to fit the geographical particularities.

### Always the Right Components

Alongside solar inverters, we also offer a comprehensive range of standard products: The Windy Boy inverter for wind turbine systems, the intelligent dump-load controller Smart Load 6000 as well as the Hydro Boy inverter for fuel cells and low DC voltages. In doing so, we assure you

high-quality components for a reliable power supply.



# Everything Under Control

## With System Monitoring by SMA

If it has to do with data technology, you've found the right partner at SMA. You can choose from our wide variety of products for the monitoring of your Sunny Island System: From the reliable system monitoring with the Sunny Boy Control to the internet-based monitoring with our high performance Sunny WebBox data

logger or the comprehensive performance analysis with help from the Sunny SensorBox.

### Monitoring from Anywhere in the World

As the monitoring of stand-alone systems is so important, we are happy to inform you in detail about our

wide variety of solutions. Stand-alone energy supply systems are often times located in remote regions and only rarely do system operators have the possibility to control them on site. The internet dream team Sunny WebBox together with the Sunny Portal are your perfect monitoring solution. Together the two allow the

operator to check his system from anywhere in the world, and to react immediately in the case of a fault.



## Additional Information

We have put together the most important SMA informational brochures to better help you become informed on certain topics regarding the Sunny Island Sets. Please contact our Sunny Island Hotline Team under the number +49 561 9522 399 if you have any further questions.



### **SUNNY FAMILY 2008/2009**

Here you will find all SMA products, including components for stand-alone power supply systems as well as solar data technology.



### **Supplying Off-Grid Areas with Electricity: Products for Decentralized Power Supply**

Our "Off-Grid" catalogue will inform you in detail as to the application of stand-alone power supply systems and their design. In addition, you will also find important information about the Sunny Island series.



### **SUNNY ISLAND 5048 – The Best Solution for Stand-Alone Grids**

This brochure provides you with detailed information on the Sunny Island 5048.



### **Everything Under Control – with Solar Data Technology from SMA**

Whoever wants comprehensive information about solar data technology from SMA should read this brochure.



### **Animated film "Supplying Energy to Remote Areas"**

This impressive 8 minute animated film shows the outstanding possibilities which exist with the configuration of a stand-alone power supply system on the basis of the AC coupling developed by SMA together with the Sunny Island as its system manager.



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