



SUNNY BACKUP System



Solar Power – Even in the Event of Grid Failure



SUNNY BACKUP System

The “Blackout Blocker”

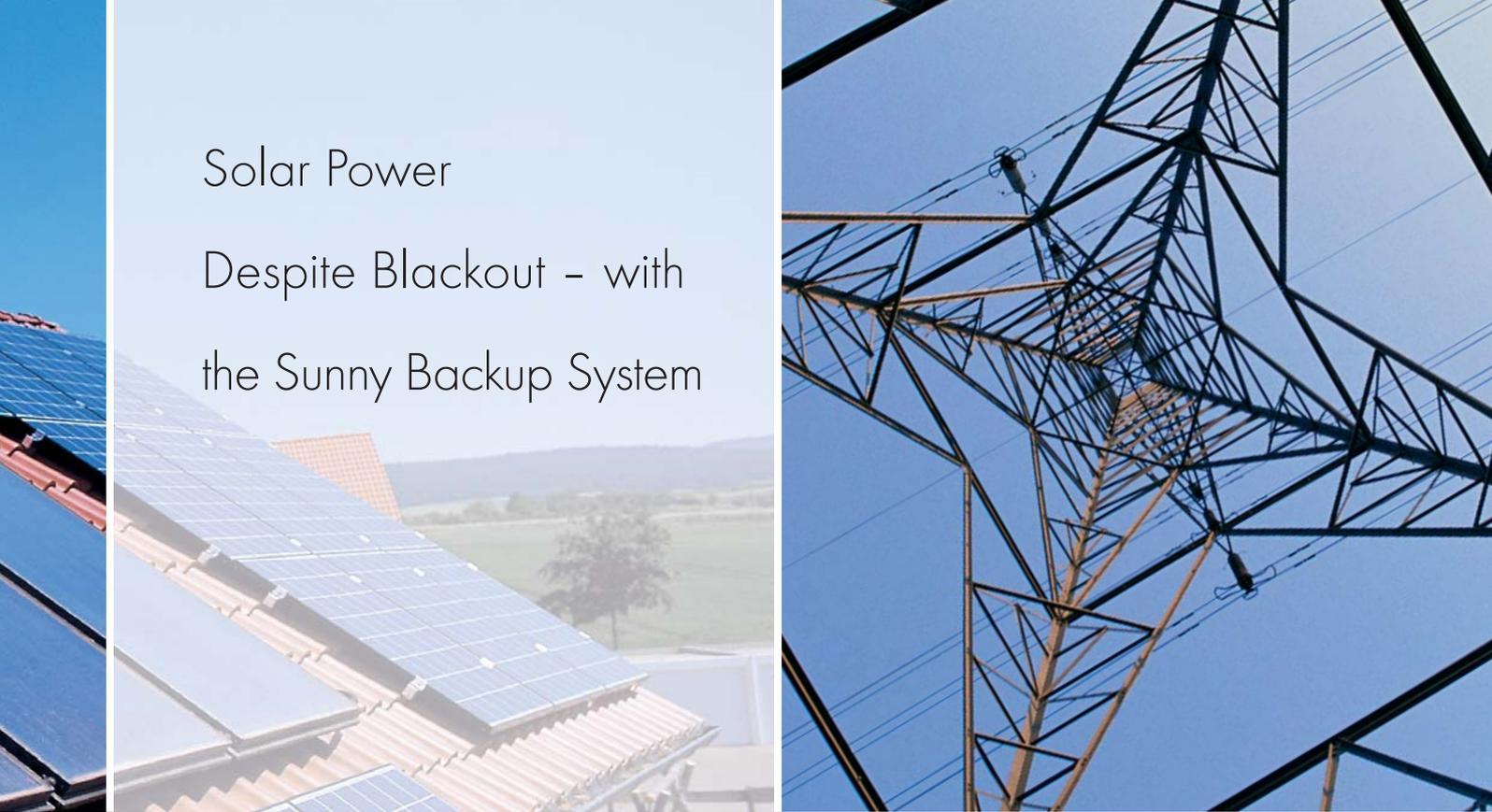
Power Outage Means: Disconnection of the PV System from the Grid

No light, no heating, no computer: today, it is very difficult to do anything without electricity. But how many solar power system operators really are aware that in the event of a power outage, the PV system is disconnected from the grid for reasons of safety? From that moment on, it ceases to provide solar power – neither for grid feeding, nor for the internal power supply. And this is all the more irritating, as the experts agree: throughout Europe, lengthy blackouts and temporary power outages are set to increase.

Sunny Backup Means: Electricity – Even in the Event of Grid Failure

It is precisely this supply gap which we are closing with the new “Sunny Backup system” from SMA. As of now, this can be used by any PV system owner to power important loads in a reliable and environmentally friendly way, even in the event of grid failure. Within just 20 milliseconds, the system switches to stand-alone power supply in a fully automatic manner. The Sunny Backup system can be added economically and very easily to new and existing PV systems, without impairing PV efficiency.





Solar Power

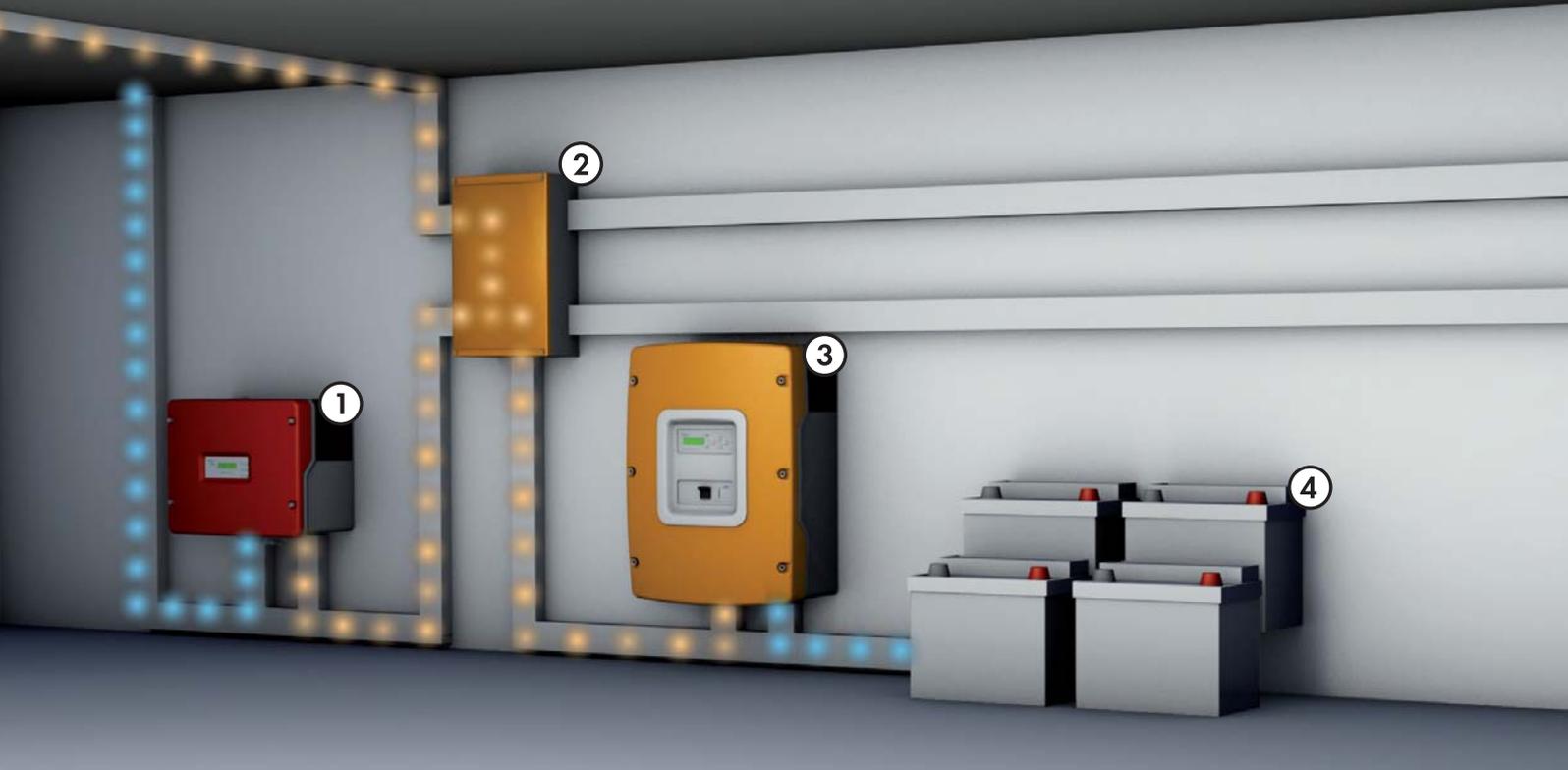
Despite Blackout – with
the Sunny Backup System

Stand-Alone Power Supply: the Future Has Already Begun

The basis of this SMA innovation is more than 25 years' experience in the development of award-winning technologies – for grid-connected PV systems, as well as for over 1,000 stand-alone grids implemented around the world. The Sunny Backup system, a "synthesis" of grid-connected operation and stand-alone grid operation, is based on sophisticated SMA technology which guarantees you a very high degree of user reliability, as well as easy installation. The Sunny Backup system is not only equipped with the first backup inverter to be certified in accordance with the German standard DIN VDE 0126-1-1, but is also available as a completely pre-configured kit solution for three different power classes.

Sunny Backup System: Your Customers Will Want to Have It

Power outages can have terrible financial consequences, especially for companies – unless you have extended the PV system with the Sunny Backup system. In agricultural enterprises, cow barn ventilation and heat lamps will continue to be powered reliably. In refrigeration rooms, hotels, supermarkets and guesthouses, operations continue without any harm to reputation, and without expensive interruptions in the cold chain. And in single-family homes the heating, oven, PC and lighting all function without interruption, with the same quality of supply as during normal operation. This makes the Sunny Backup system the optimal stand-alone solution for PV system operators – and for anyone who would like to become such an operator.



Solar Power – Even in the Event of Grid Failure

How the Sunny Backup System Works

Components

- ① Solar inverter
- ② Automatic Sunny Backup-switching device
- ③ Sunny Backup 5000
- ④ Sunny Backup Battery Set

Fast and Reliable

The starting point is the PV system: during normal operation, one or more Sunny Boys feed the solar power generated by the PV system into the public grid, with high efficiency. Only in the event of a grid fault or failure does the Sunny Backup system become active. The switching device disconnects the PV system and the loads from the grid in compliance with the appropriate standard. While the system is switched to the domestic grid, the battery continues the loads' power supply after just 20 milliseconds. And the Sunny Backup 5000 functions as a "system manager", coordinating all switching operations such as disconnection from the grid, and transfer to the PV system, for example. Thus, every grid failure is compensated reliably.

Economical and Innovative

In parallel to this, the PV system acts as energy source for the direct supply of loads, and for battery charging. Due to the integration of the PV system, a small and therefore low-cost battery can be implemented, as it is usually only needed to bridge the night hours. With this combination of PV system and battery, the loads can be supplied with energy over long periods of operation, even in the event of a power outage. One of the prerequisites for this is consistent use of AC coupling in order to enable smooth interplay between the Sunny Backup and the solar inverters.

Simple and Flexible

Almost any PV system can be easily retrofitted with the Sunny Backup system. No special additional knowledge (standards, directives, battery technology etc.) is required for the installation. And with the innovative kit solution, we have minimized the costs of installation and planning, as well as the logistics with your specialist. Choose one of the kits, according to the size of the system; installation is the same for all kit versions.

Efficient and Intelligent

As soon as the public grid is available again, the Sunny Backup switches back to grid operation automatically and without interruption, then leaves the grid-feeding PV system to its "colleague" the Sunny Boy once again. By the way, this does not impair the efficiency of the PV system at all, because the operator can continue using the inverter which has been optimized for the grid connection.

Sunny Backup Set Versions

» **Small/Medium**

for systems up to 5.7 kW

» **Large**

for systems from 10 to 30 kW

» **Extra Large**

for systems from 30 to 110 kW



Sunny Backup Installation, Very Simple in 5 Steps:

1. Installation of the Sunny Backup 5000 inverter and the switching device
2. Installation of batteries, laying of battery cables, and connection to the Sunny Backup
3. Connection of Sunny Backup, Sunny Boys, and selected loads to the switching device on the AC side, and connection of the switching device to the main distribution unit (meter board)
4. Adjustment of the Sunny Boys' parameter settings for stand-alone grid operation
5. System check, as well as activation and configuration of the Sunny Backup according to the commissioning instructions



Power outage

For How Long Can the Sunny Backup System Bridge a Power Outage?

Example: 5 kW PV System on a Single-Family Home

Typical electricity consumption:
4000 kWh/year divided by
365 days = 11 kWh/day

If comfort is reduced (no heavy laundry loads, regulated television viewing, and "simple" kitchen), consumption decreases by approximately 50 %
= **5.5 kWh** for lighting, heating and oven.

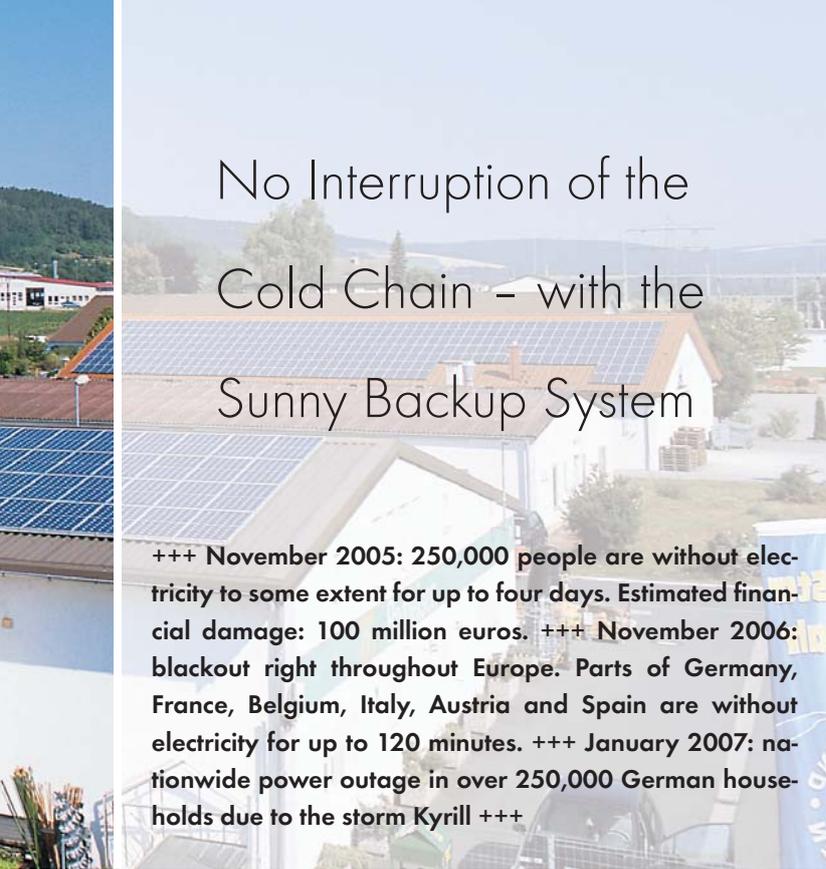
Battery size:
 $140 \text{ Ah} \times 48 \text{ V} = 6.7 \text{ kWh}$
approx. 80 % thereof utilizable
= **5.4 kWh**

This allows a four-person family to have electricity for one full day, solely from the battery, and without "additional supply" from the PV system. If

the output of the PV system is included, the equation works out as follows: based on Central Germany's average solar irradiation in summer of 3.7 kWh/kWp, and with a system output of 5 kW, at least 18 kWh/day are supplied. This certainly covers the daily consumption, so that upon inclusion of all efficiencies without limitation of energy consumption, unrestricted operation is possible.

And How About the Winter?

In December, the PV system provides just 0.6 kWh/kWp, i.e. with a 5 kW system output, around 2.5 to 3 kWh are available each day. Based on the battery size mentioned above, this allows for a power outage to be bridged reliably for 2 or 3 days, even in winter.



No Interruption of the Cold Chain - with the Sunny Backup System

+++ November 2005: 250,000 people are without electricity to some extent for up to four days. Estimated financial damage: 100 million euros. +++ November 2006: blackout right throughout Europe. Parts of Germany, France, Belgium, Italy, Austria and Spain are without electricity for up to 120 minutes. +++ January 2007: nationwide power outage in over 250,000 German households due to the storm Kyrill +++



An Overview of Your Advantages

With the Sunny Backup system, we offer you a highly efficient and reliable stand-alone solution for the event of grid failure.

An almost uninterrupted power supply is guaranteed by fully automatic switching within 20 milliseconds, even at night, or if the house's occupants are on vacation.

Another advantage: implementation of this system has no influence on the efficiency of the PV system. You profit from the added reliability, with unchanged system efficiency.

Without difficulty, you can integrate the Sunny Backup system into new and existing PV systems, and extend it in a modular manner if required.

The possibility of parallel and/or 3-phase connection of multiple Sunny Backup inverters allows the construction of systems between 5kW to approximately 100kW. Based on the principle of AC coupling, these can be extended modularly later. Sunny Backup is not restricted to new systems, nor to a particular range of power outputs, and thus has diverse implementation possibilities.

The system is completely pre-configured and easy to install.

With the innovative kit solution for various system sizes, you can realize the Sunny Backup system without major installation costs.

You profit from attractive market entry conditions.

Every PV-system owner may be interested in an SMA backup solution, and is thus a potential user. Over 340,000 SMA inverters installed in Germany alone - and 25 years of technology leadership - form a solid basis for successful market entry.

Interested in Additional Information?

You will find more valuable facts about the Sunny Backup system at www.SMA.de/EN/Backup

Technical Data:

	Sunny Backup Set M	Sunny Backup Set L	Sunny Backup Set XL
General			
Number of phases	1-phase	3-phase	3-phase
Nominal voltage / nominal frequency	230 V / 50 Hz	3 x 230 V / 400 V / 50 Hz	3 x 230 V / 400 V / 50 Hz
Number of Sunny Backup 5000s (SBUs)	1	3	6 / 9 / 12
Switching device (AS box)	AS box M	AS box L	AS box XL
PV system			
Nom. AC PV output / AC PV current	5.7 kW / 25 A	30 kW / 3 x 44 A	110 kW / 3 x 160 A
Independent disconnection device per DIN VDE 0126-1-1	yes	yes	yes
Loads			
Nom. power / current during grid operation	8 kW / 35 A	44 kW / 3 x 63 A	110 kW / 3 x 160 A
Max. backup power (permanent / 30 min. / 1 min.)	5 kW / 6.5 kW / 8.4 kW	15 kW / 19.5 kW / 25.2 kW	2/3/4x(15 kW/19.5 kW/25.2 kW)
Battery			
Type	absorbed glass mat battery (AGM)	absorbed glass mat battery (AGM)	absorbed glass mat battery (AGM)
Nominal voltage (bank / block)	48 V / 12 V	48 V / 12 V	48 V / 12 V
Energy / capacity (C10)	6.7 kWh / 142 Ah	13.4 kWh / 284 Ah	2/3/4 x (13.4 kWh / 284 Ah)
Number of blocks	4	8	2/3/4 x 8
Service life (according to EUROBAT)	> 12 years	> 12 years	> 12 years
Mechanical data			
SBU (width / height / depth in mm)	467 / 612 / 235	467 / 612 / 235	467 / 612 / 235
AS box (width / height / depth in mm)	600 / 600 / 210	600 / 600 / 210	1000 / 1000 / 300
Battery per block (width / height / depth in mm)	498 / 230 / 177	498 / 230 / 177	498 / 230 / 177
Weight per (SBU / AS box / battery block)	63 kg / 35 kg / 54.5 kg	63 kg / 45 kg / 54.5 kg	63 kg / 130 kg / 54.5 kg
Ambient conditions			
Ambient temperature (SBU, AS box)	-25 °C to +50 °C	-25 °C to +50 °C	-25 °C to +50 °C
Protection rating according to DIN EN 60529 (SBU, AS box)	IP30 / IP65	IP30 / IP65	IP30 / IP65
Accessories			
Cables (battery connection up to 3 m / communication)	included	included	included
Generator connection	optional (8 kW)	optional (30 kW)	optional (110 kW)

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