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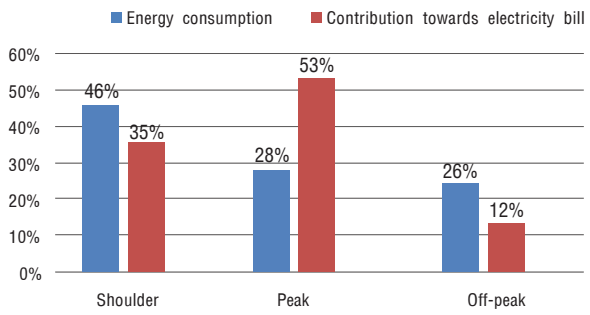
Residential Energy Storage System

SH5K+ PV ESS

Green and Effective

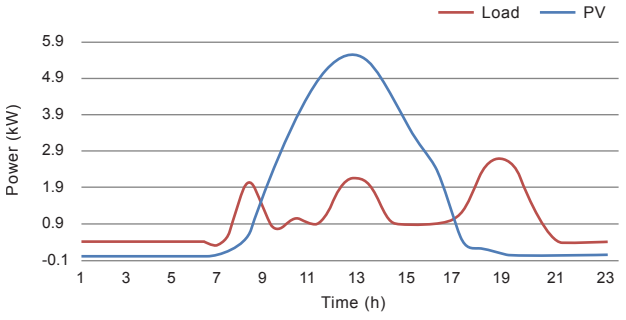
Why Do You Need the PV ESS (Photovoltaic Energy Storage System)?

Facing with the challenges of record-low feed-in tariffs and utilities enforcing zero exports, consumers suffer not only from an ever-increasing electricity prices, they also make very little from selling off excess green power or absolutely nothing at all to meet the zero export restriction.



Premium charged during peak period

Electricity used in peak times can place a strain on the grid network, that is why some utilities charge premium during peak period. The average power consumption of a typical household for instance, 28% of its usage during peak period would contribute to 53% of the total electricity bill.



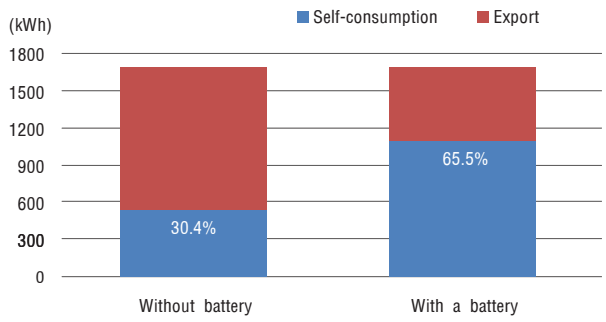
Mismatch of PV generation and load consumption

In the above scenario, families are much better off financially by installing a PV power generation system. But the consumption period of household loads does not match the output period of PV power generation well, as shown in the figure.

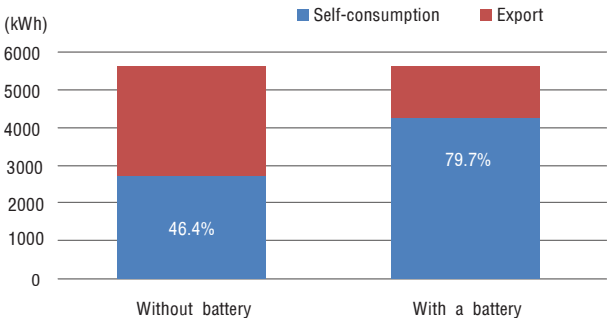
Benefits of SH5K+ PV ESS

Sungrow SH5K+ PV ESS is an ideal choice to facilitate the self-consumption of PV power by storing excess power into the battery.

Self-consumption increased by 35.1% with 6.4 kWh battery
Project 1 in Australia, Jan 2016



Self-consumption increased by 33.3% with 6.4 kWh battery
Project 2 in Australia, Oct 2015



System Solution

SH5K+ PV ESS

If the household loads and the PV power generation curve are well matched, a battery module may not be required or could be installed later.

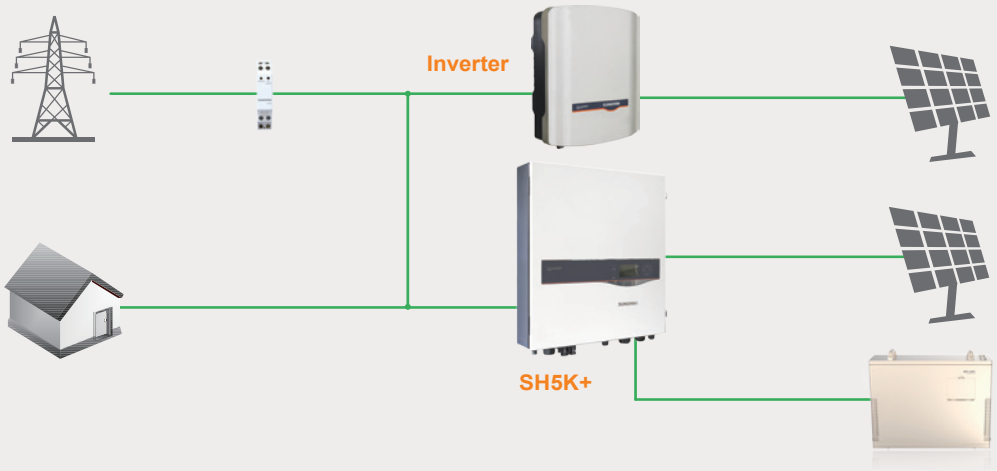
Zero-export System

The SH5K+ PV ESS installed with the meter provided could be configured to a zero-export system.

In this system, the inverter output will adjust to match the load consumption power continuously to restrict the export power.
The export power threshold can be set ranging from 0 to 5000 W. If the threshold value is set to 5000 W, all excess power will be exported to the grid.

Retrofittable System

The SH5K+ hybrid inverter is compatible with any single-phase PV grid-connected inverters. An existing PV system can be retrofitted to be a PV ESS with the addition of SH5K+.



Example:

Rated power of the existing PV panel: 2 kW
Rated power of the new PV panel: 2 kW to 4 kW
In the system, when an export power above zero is detected by the meter, the SH5K+ PV ESS will charge the battery. The charge energy may be from the existing PV panel or the new PV panel. Thanks to the energy management function of the SH5K+, the self-consumption of the new system will be greatly improved.

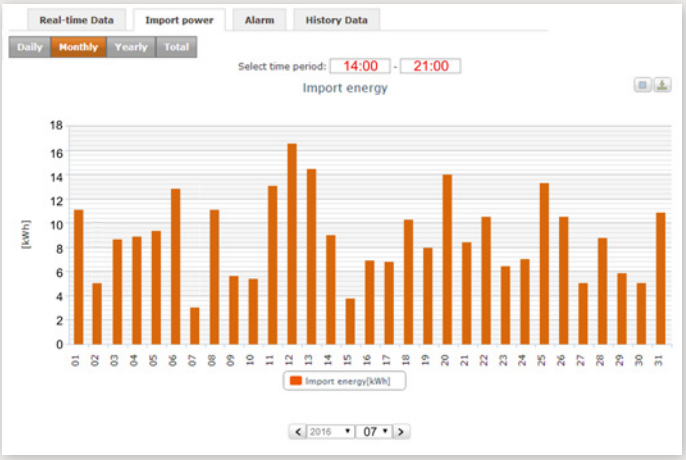
Backup System

With the backup box STB5K connected into the PV ESS, the system is capable of operating as an off-grid system to ensure an emergency power supply for emergency loads in the event of a grid interruption or blackout.

System Function

Load Import Power Recording

In addition to the daily, monthly, annual and total data of power generated, the SH5K+ PV ESS is capable of recording power imported from the grid during peak tariff period. This allows the customers to sensibly select an appropriate size for the battery based on its own consumption history.



For instance, on the “Monthly” interface of “Import power”, user may select the time period 14:00-21:00 to view the corresponding import energy.

Battery Usage Time Settable

Maximize the return of investment by matching battery usage to peak tariff period. The users will have the options to configure:

- √ On Weekdays (from Monday to Friday) or at weekends (Saturday and Sunday)
- √ Two time periods for each option

Battery Forced Charge

User can charge the battery during off-peak tariff time or set the forced charge time according to the analysis of load power recording.
If the energy demand of the household during 7:00 am-9:00 am is 2 kWh, set the forced charge time to be 1:00 am-7:00 am with the target SOC of 40% (battery capacity 6 kWh).
The SH5K+ PV ESS will charge the battery until its SOC reaches 40% before 7:00 am, so as to ensure the energy demand in 7:00 am-9:00 am.

SH5K+

Flexible

- For new and existing systems
- Compatible with both lithium-ion and lead-acid batteries

Reliable

- Integrated high-frequency isolated battery charge/discharge circuit with the voltage of 48 V and maximum charge/discharge current of 65 A
- Protection rating at IP65 (dust-proof and water-proof)
- Off-grid emergency power supply with the capacity of 3000 W in battery mode

Integrated and Intelligent

- Integrated energy management system and DI/DO function
- Integrated active power limitation and reactive power regulation function
- Multiple communication options via RS485/ Ethernet/Wi-Fi/CAN

PV Input Data

Max. PV input power	6500 W
Max. PV input voltage	600 V
Startup voltage	125 V
Nominal input voltage	360 V
MPP voltage range	125 V – 560 V
MPP voltage range for nominal power	260 V – 520 V
No. of MPPTs	2
Max. number of PV strings per MPPT	1/1
Max. PV input current	20 A (10 A / 10 A)
Max. current for input connector	12 A
Short-circuit current of PV input	24 A (12 A / 12 A)

AC Input and Output Data

Max. AC input power	3000 W
Nominal AC output power	4990 W
Nominal AC ouput current	21.6 A
Max. AC output apparent power	5000 VA
Max. AC output current	21.7 A
Nominal AC voltage	230 Vac
AC voltage range	180 Vac – 276 Vac (this may vary with grid standards)
Nominal grid frequency	50 Hz
Grid frequency range	45 Hz – 55 Hz (this may vary with grid standards)
Total Harmonic Distortion (THD)	< 3% (of nominal power)
DC current injection	< 0.5% (of nominal current)
Power factor	> 0.99 at default value at nominal power (adj. 0.8 overexited/leading–0.8 underexited/ lagging)

Protection

Anti-islanding protection	Yes
AC short circuit protection	Yes
Leakage current protection	Yes
DC switch (solar)	Optional
DC fuse	No
Overvoltage protection	III

Battery Data

Battery type	Li-ion battery / Lead-acid battery
Battery voltage	48 V (32 V – 70 V)
Max charge / discharge current	65 A / 65 A

System Data

Max. efficiency	>97.7%
Max. European efficiency	>97.2%
Max. charge / discharge efficiency	>94.0%
Isolation method (solar)	Transformerless
Isolation method (battery)	HF
Ingress protection rating	IP65
Night power consumption	<1 W
Operating ambient temperature range	-25 ℃ – 60 ℃ (>45 ℃ derating)
Allowable relative humidity range	0% – 100%
Cooling method	Natural convection
Max. operating altitude	2000 m
Display	Graphic LCD
Communication	2 x RS485, Wi-Fi (optional), CAN, Ethernet
Analogue input	PT1000
Power management	1 x Digital Output
Earth alarm	1 x Digital Output, Email, Buzzer inside
DC connection type	MC4
AC connection type	Clamping yoke connector
Certification	AS4777, AS/NZS3100, IEC 62109-1, IEC62109-2, IEC 62619, IEC 62040, EN 61000-6-2/-3

Mechanical Data

Dimensions (W x H x D)	447 mm x 510 mm x 150 mm
Mounting method	Wall-mounting bracket
Weight	20 kg

Backup Data

Nominal voltage	230 Vac (±2%)
Total hamonic factor output voltage	4% (full load)
Frequency range	50 Hz (±0.2%)
Switch time to emergency mode	10 s
Power factor	0.8 overexited/leading – 0.8 underexited/lagging
Max. output power (battery + solar)	5000 W / 5000 VA
Max. output power (battery only)	3000 W / 5000 VA

STB5K (Backup box)

Max input/output current	25 A
Nominal AC voltage	230 Vac – 240 Vac
AC voltage range	180 Vac – 275 Vac
Operating ambient temperature range	-25 ℃ – 60 ℃*
Power consumption	< 3 VA / 2 W
Dimensions (W x H x D)	220 mm x 230 mm x 90 mm
Mounting method	Wall-mounting bracket
Weight	2.6 kg

* The AC voltage ranges from 180 Vac to 250 Vac when the operating ambient temperature is 50℃ – 60℃.

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