

The logo for Sungrow, featuring the word "SUNGROW" in a bold, orange, sans-serif font. The letters are slightly spaced out, and the 'S' and 'G' have a unique, angular design.

SUNGROW

Clean power for all

SUNGROW POWER SUPPLY CO., LTD.



Sungrow-Samsung SDI

SUNGROW

Clean power for all

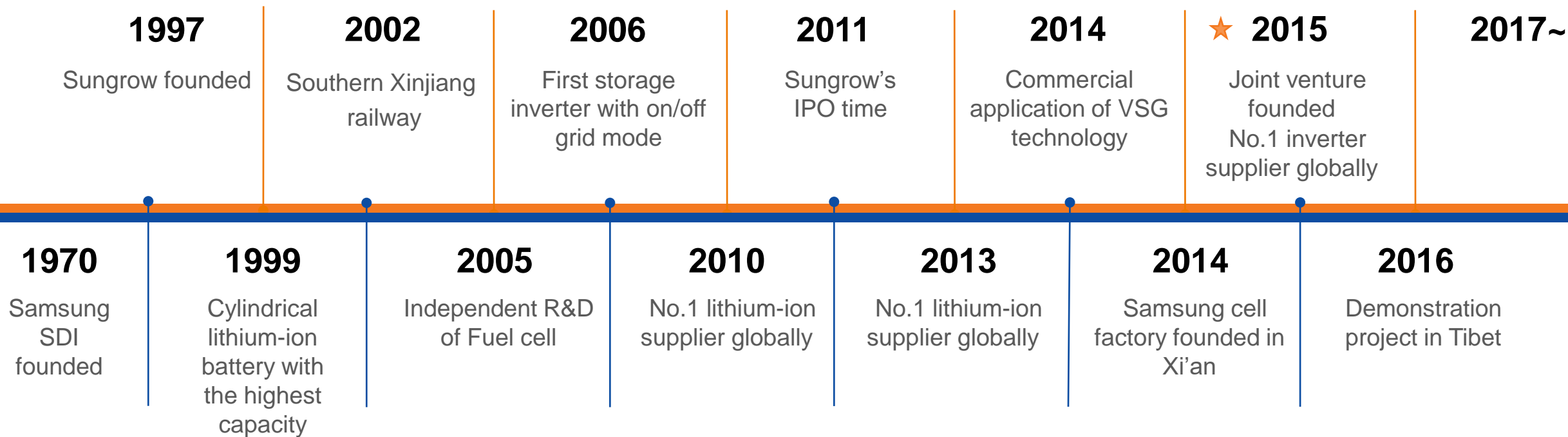
SAMSUNG

SAMSUNG SDI



Sungrow-Samsung SDI / Milestones

SUNGROW





Full-Turnkey BESS

Utility



ST5246KWH-2500HV-MV/
ST5246KWH-2500U-MV



ST2740KWH-D1250HV
+SG2500U



ST5480KWH-
SC5000HV-MV



ST2740KWH-
2500HV-MV

C & I



SC50HV



ST81KWH-50HV



ST168KWH-50HV



ST556KWH-200UD



ST548KWH-500



Commercial & Industrial BESS

- 01 C&I ESS Application Scenarios
- 02 Sungrow C&I ESS Solutions
- 03 Economic Analysis (Case Study)
- 04 Sungrow ESS References



C&I ESS Application Scenarios



C&I ESS Application Scenarios

01

**Demand
Management**

02

**Peak & Valley
Arbitrage**

03

**Maximizing
Self-
consumption**

04

Backup Power

05

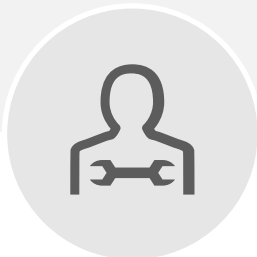
**Micro-Grid
(off-grid)**

...

Challenges & Solutions

Challenge 1

Difficult Installation and O & M



Challenge 2

ESS Safety



Challenge 3

Unstable Grid and High Electricity Price



ESS Solutions

- Small footprint
- Unified management
- Easy maintenance

- Multiple safety design of cell
- Four-level management of battery
- Fast linkage protection of the system

- On/Off-grid mode, VSG mode
- Demand Management, reduce basic capacity electricity bills
- Peak & valley arbitrage, reduce electricity bills

Sungrow C&I ESS Solutions



C&I ESS Solutions



ST81KWH-50HV



ST168KWH-50HV



SC50HV (3P4W)



ST556KWH-200UD
(100kW to 200kW with 371kWh & 556kWh options)



Key Features



- **ALL IN ONE design**



- **High Efficiency**



- **Safety and Reliable**

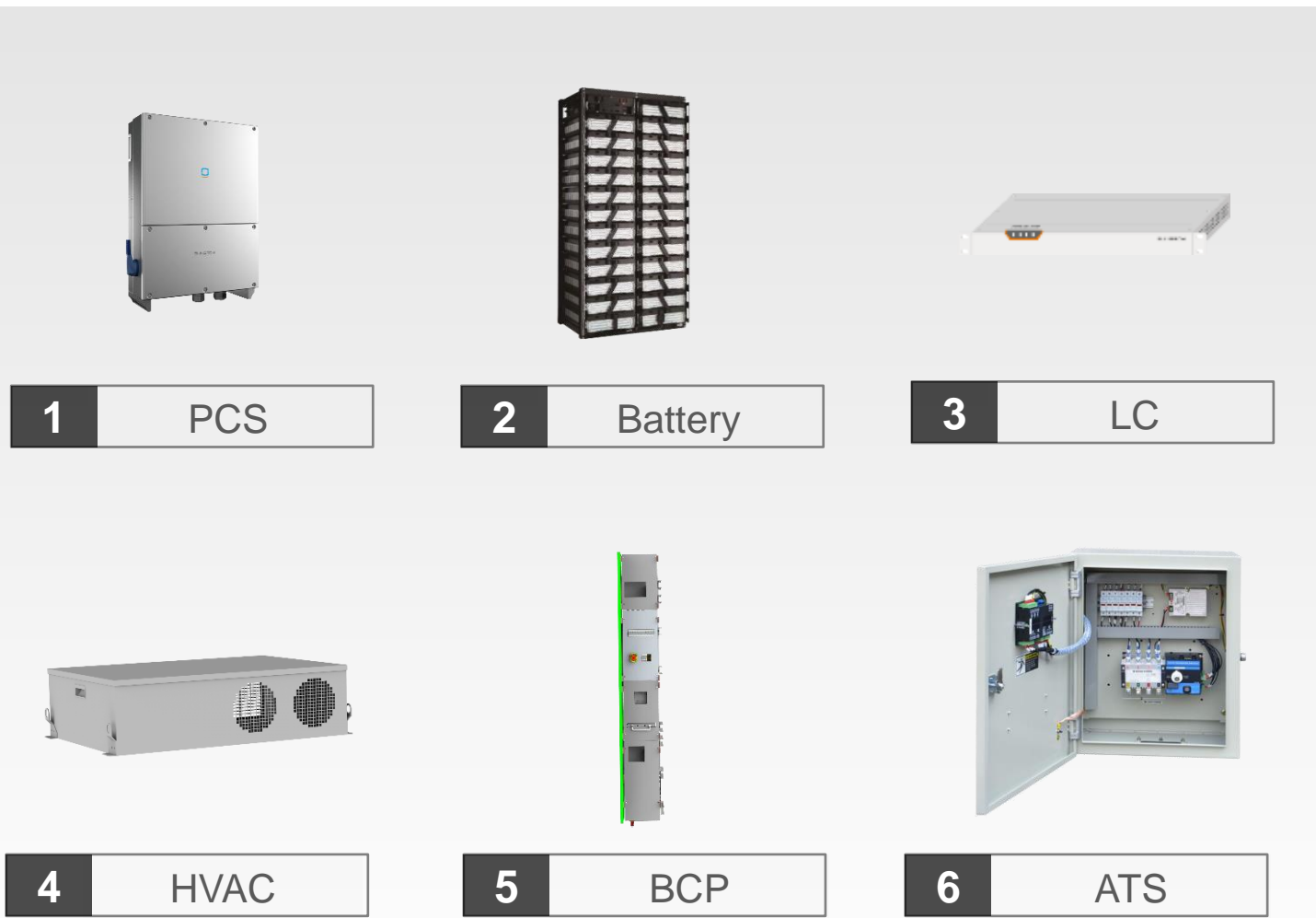


- **Intelligent**

All-in-one Design



Small footprint, less than 2m²



Weatherproof & Modular



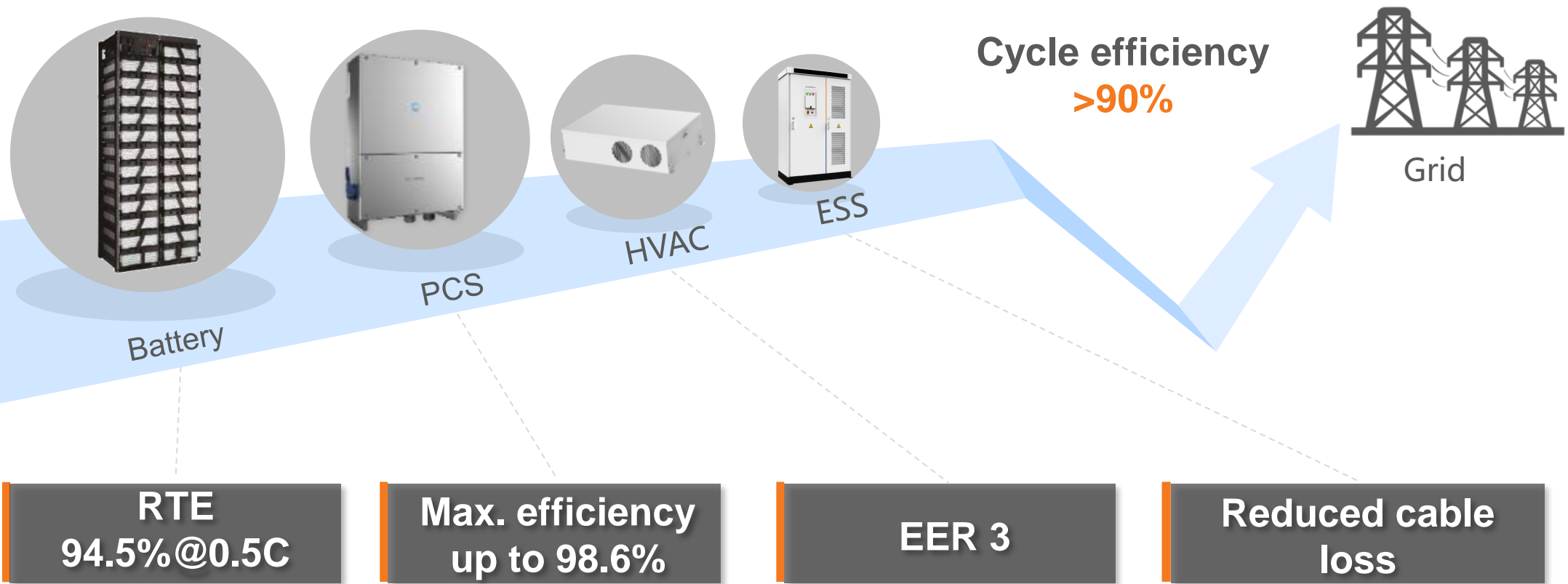
➤ IP54 protection degree

➤ C5

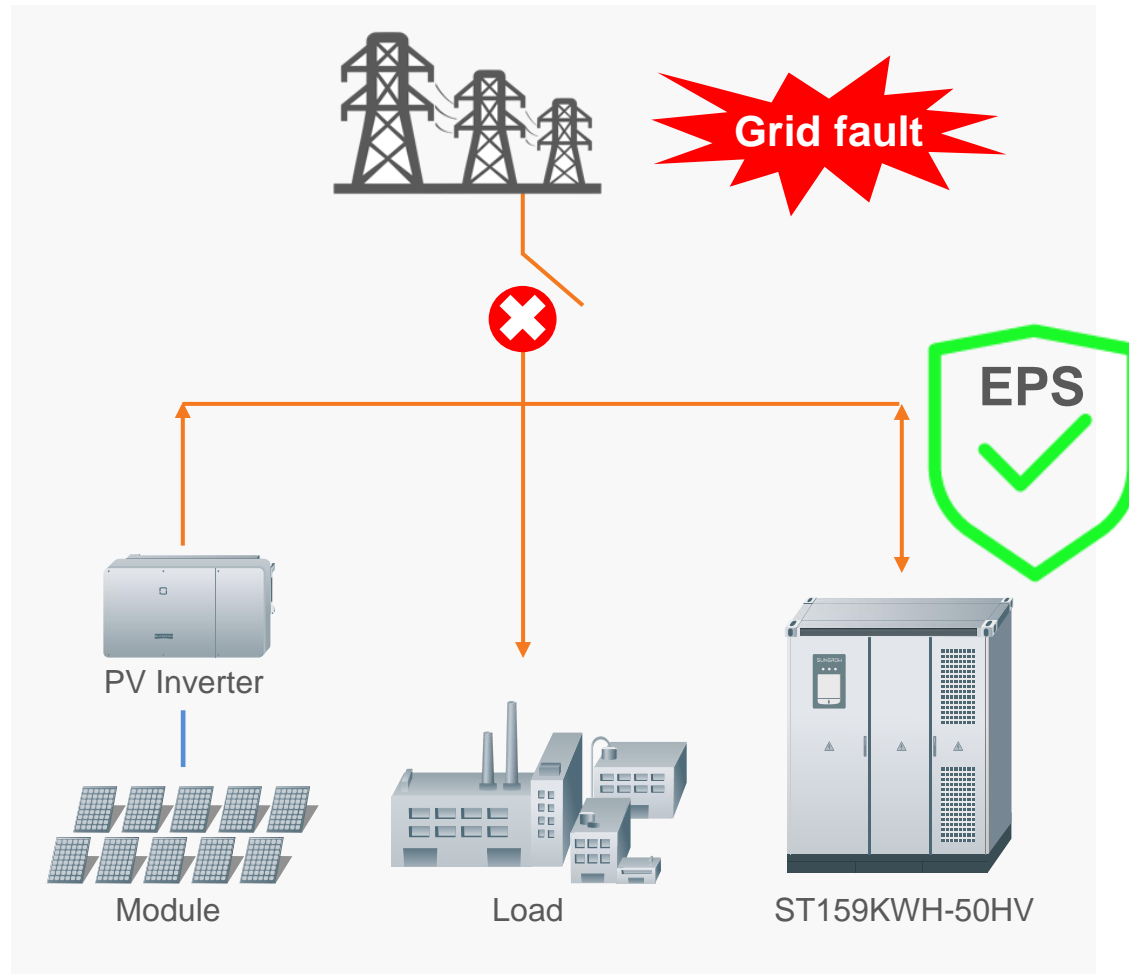


➤ Modular design

Highly Efficient

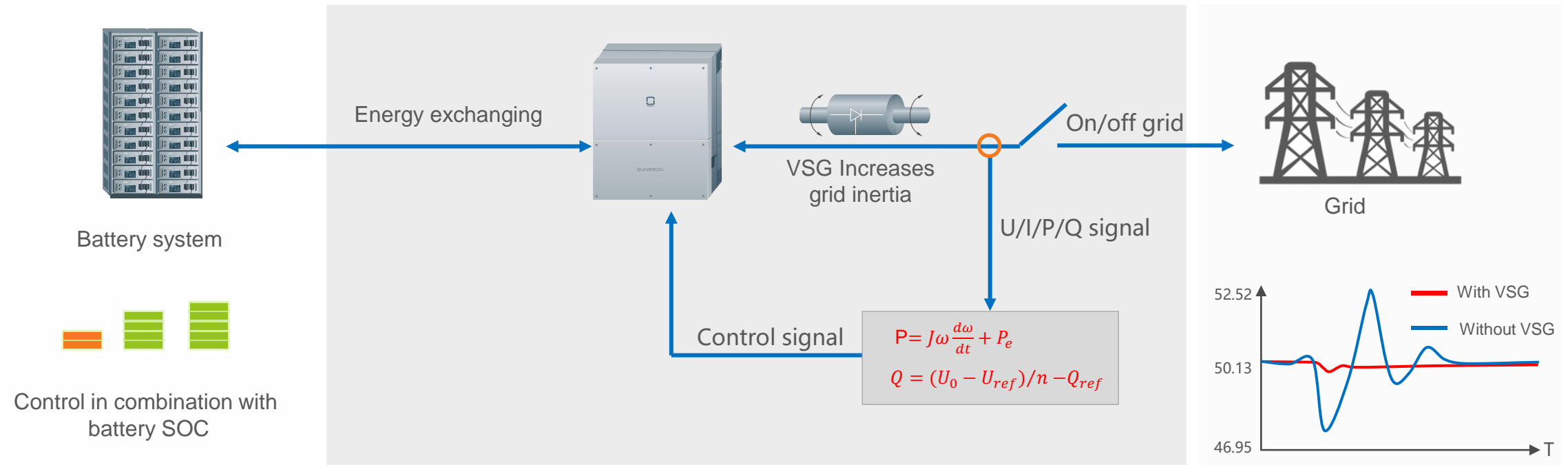


Extremely reliable



- Backup power
- Switching time < 2 seconds
- Continuous power supply
1~ 4 hours

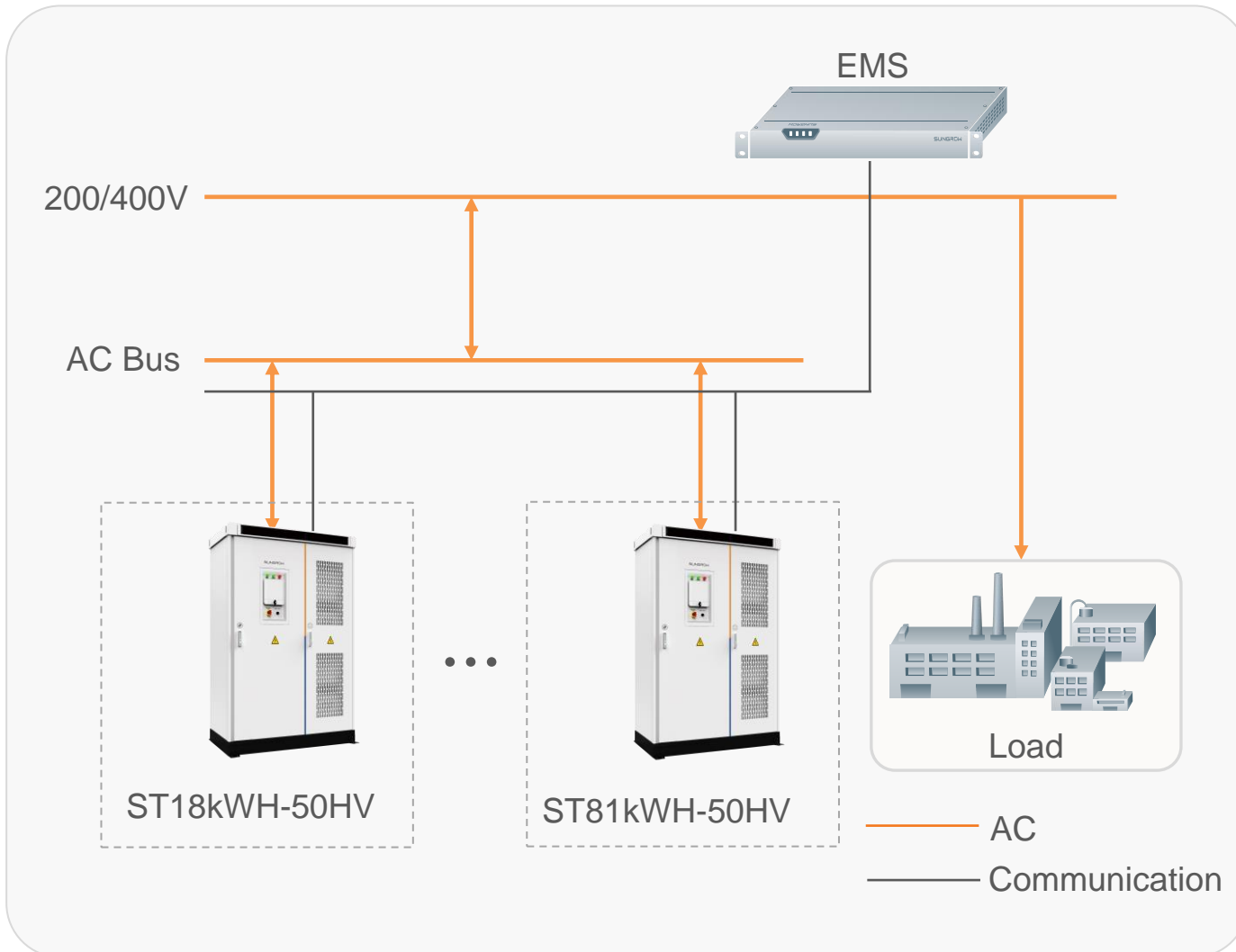
VSG Technology



On-grid VSG: Enhances power grid stability.

Off-grid VSG: Ensures stable operation of the system.

Scalable



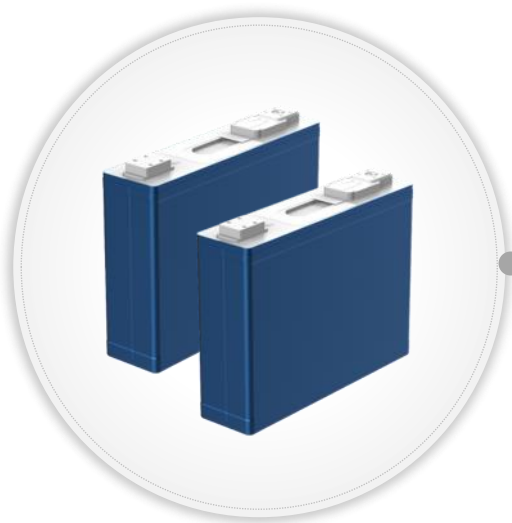
➤ Support multiple ESS in parallel

- In off-grid condition, up **to 6 ESS** units operation in parallel.

➤ Support V-F and VSG mode

- Acts as a **voltage source** to provide stable voltage and frequency for the system.

Li-ion Batteries



6000 Cycles



High energy density



High discharge rate



Convenient
installation &
maintenance



3-Level BMS



Excellent battery
balancing

Extremely Safe



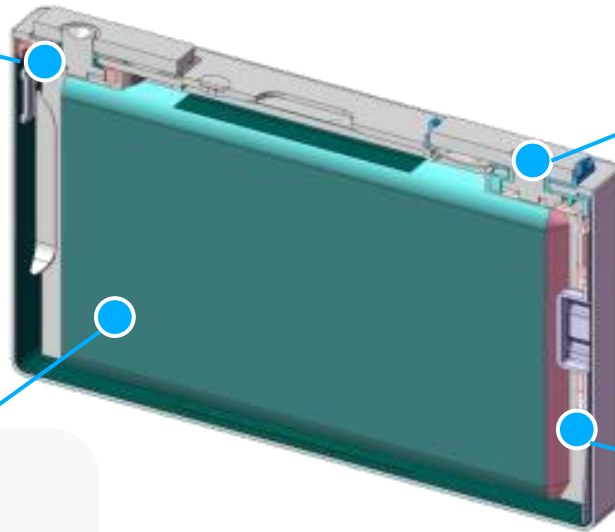
Fuse

Stop current flowing in coordination with OSD



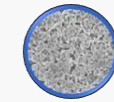
Nail safety Device

NSD can quickly reduce the large current generated at the acupuncture position to prevent local overheating



Overcharge Safety Device

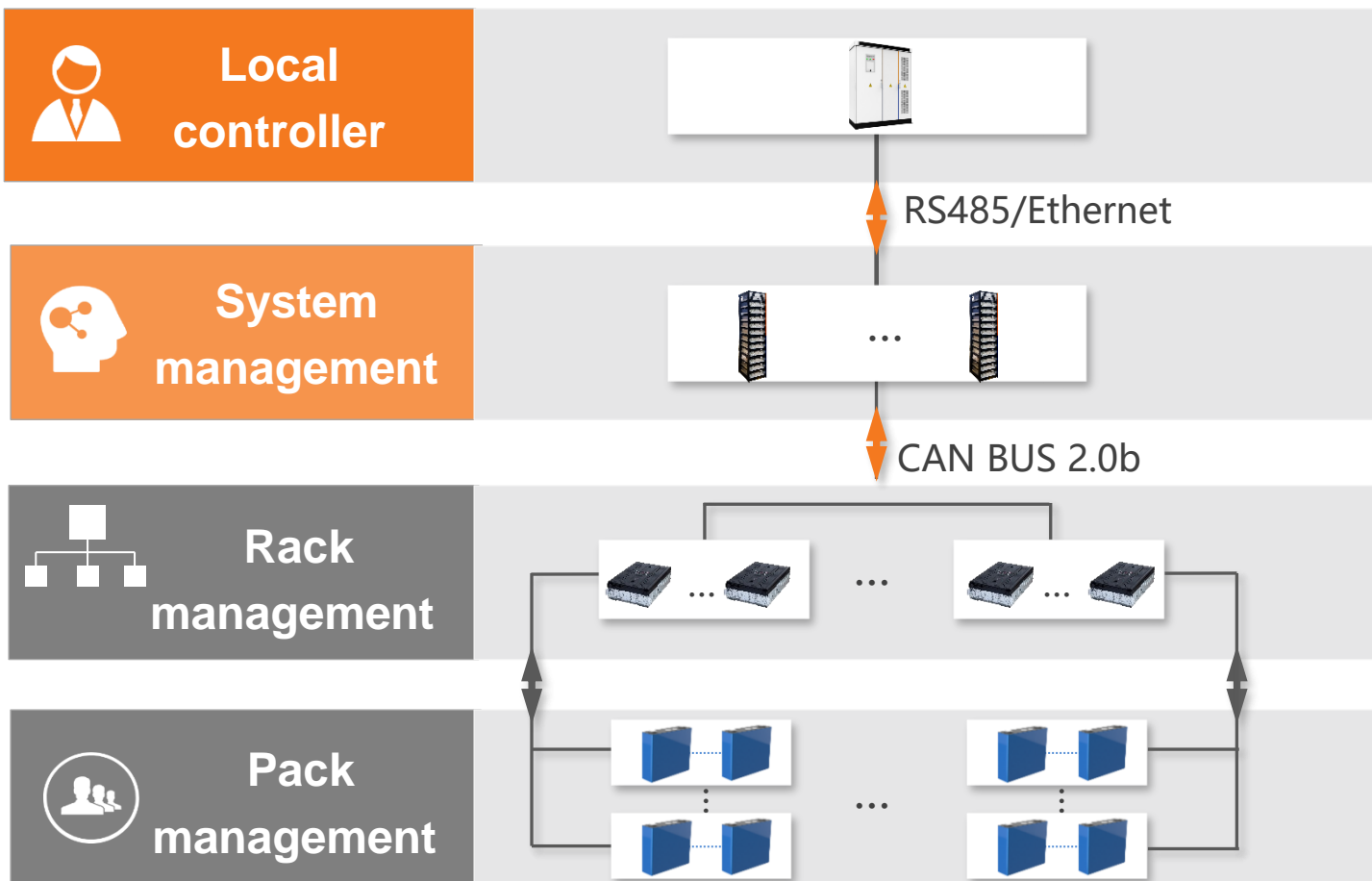
OSD can protect the cell from the overcharge risk



Safety Functional Layer

SFL can suppress the thermal runaway on anode

Four-Level Battery Management

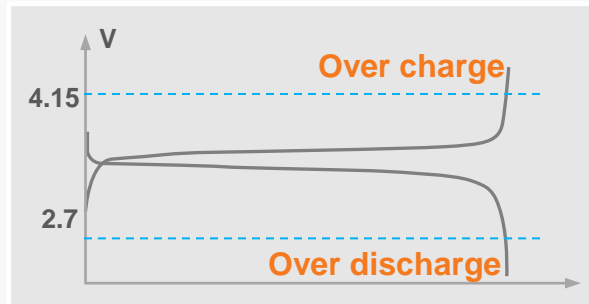


- system monitoring
 - Protection and alarm management
 - Subsystem balancing
-
- Communication between LC/EMS
 - Cooperation for multiple parallel systems
-
- Rack information sampling
 - Contactor ON/OFF
 - Rack level voltage balance management
-
- Module & Cell data sampling
 - Voltage balancing function

Fast Linkage Protection

PCS integrated charge and discharge management

PCS immediately stop protection



Over temperature

Battery power down

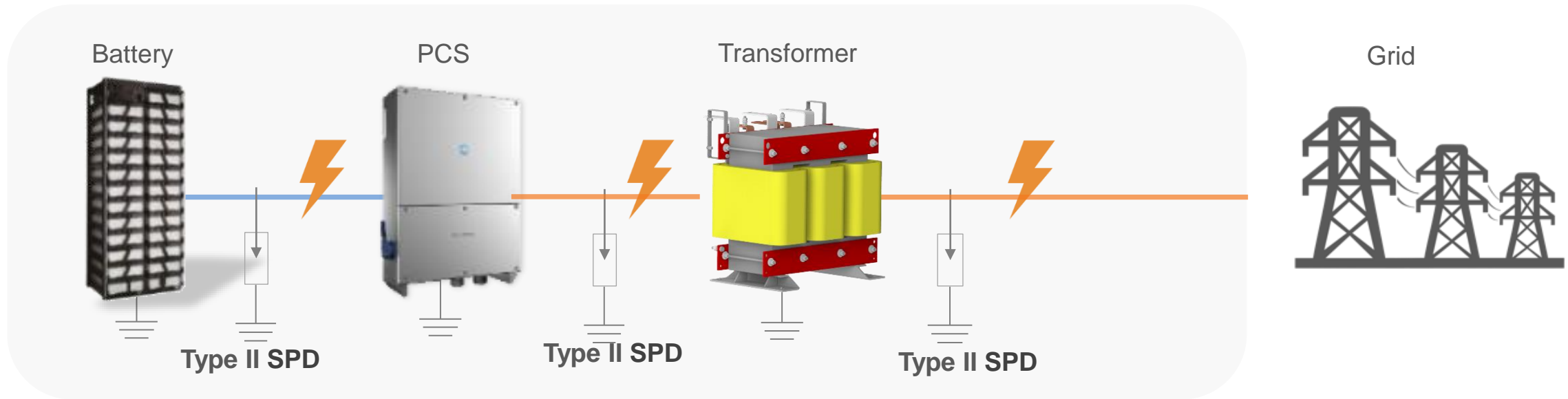
Over voltage

Under voltage

Relay adhesion

BMS failure

Surge & Ground Protection



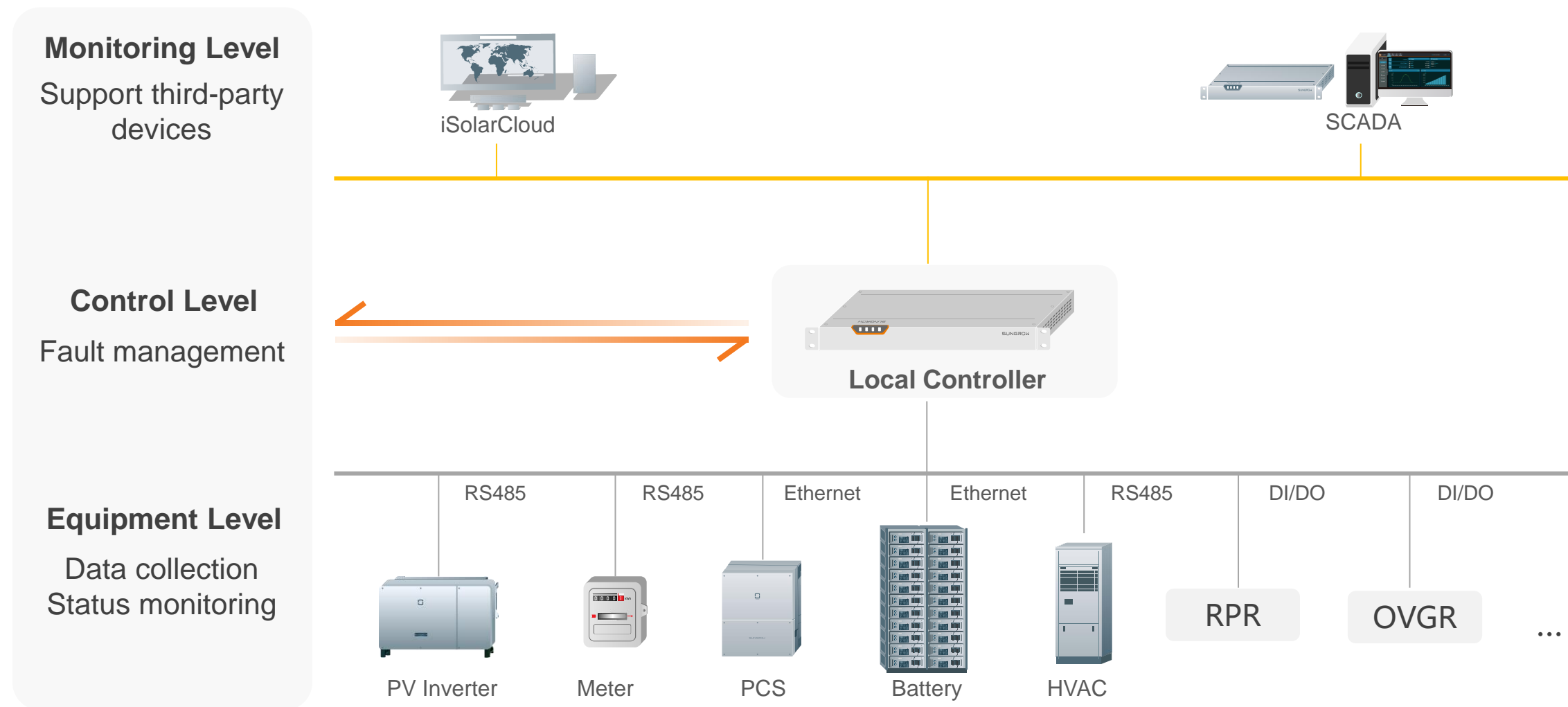
Surge protection

To suppress external residual voltage, lightning electromagnetic pulses, and common mode voltage.

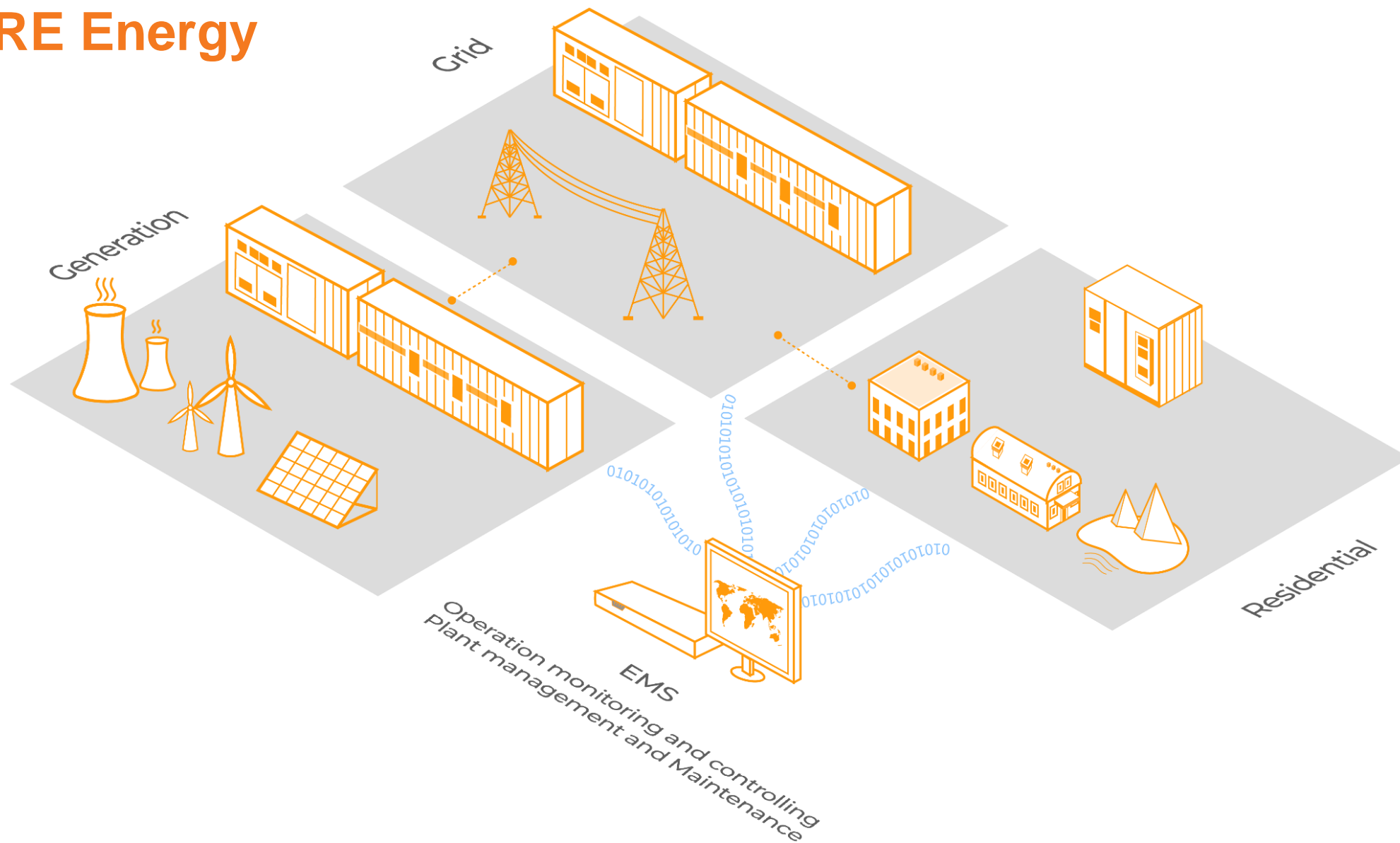
Ground protection

To ensure the normal operation of the device.

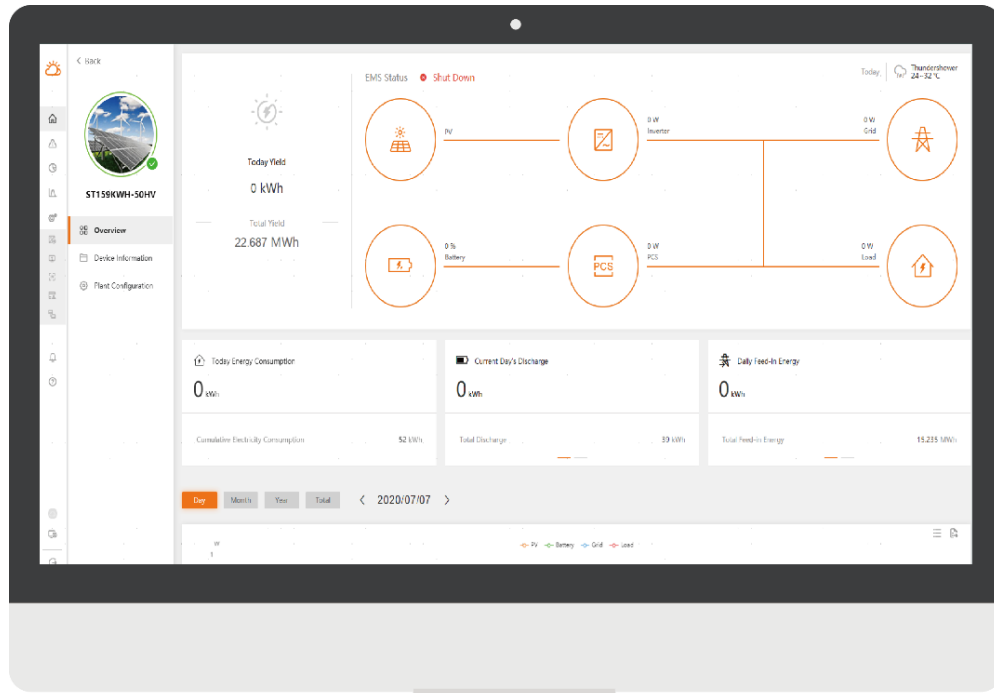
Unified Communication



IoT for RE Energy



Sophisticated Monitoring



Local-SCADA

Operation
monitoring

Production
management

Plant
maintenance

system
management



Remote-iSolarCloud

Data presentation

Quantitative evaluation

Regional management

Integrated management

Hierarchical management

O&M

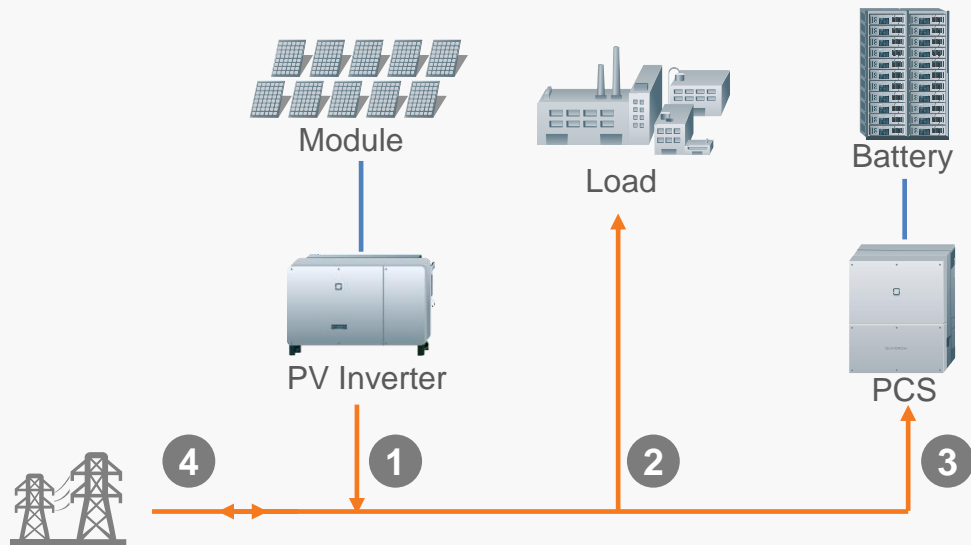
Economic Analysis (Case Study)



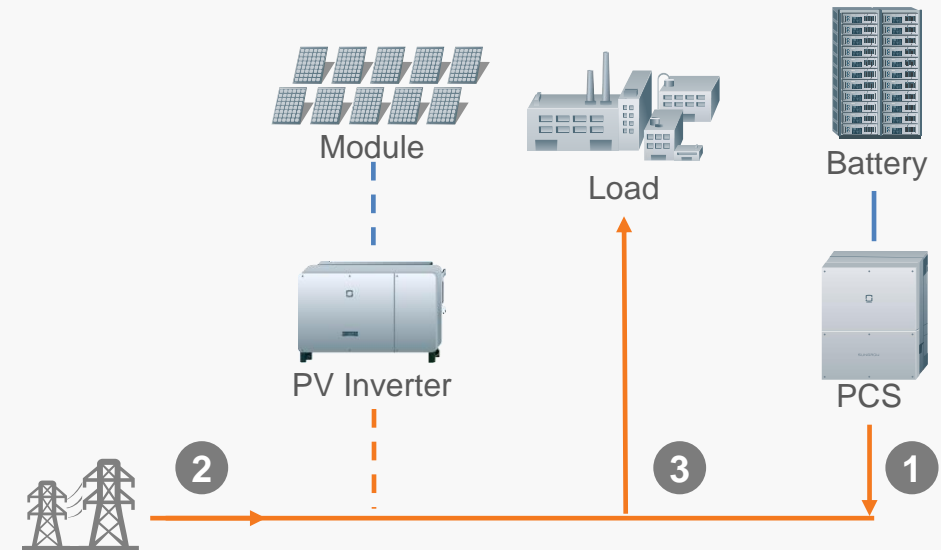
Maximising Self-Consumption



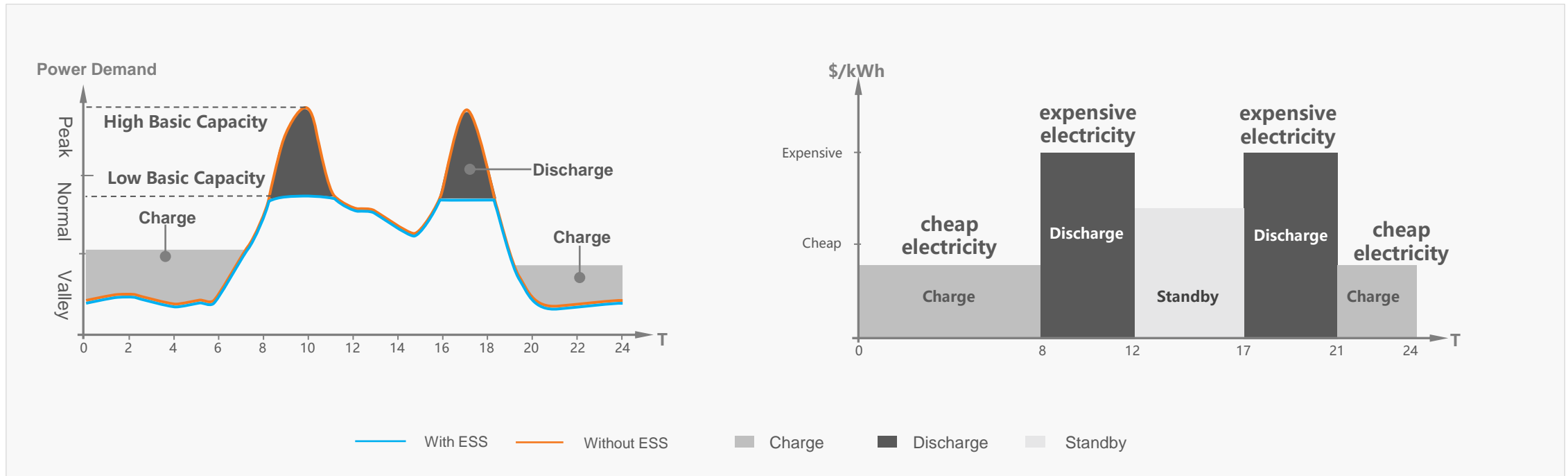
In the daytime



In the evening



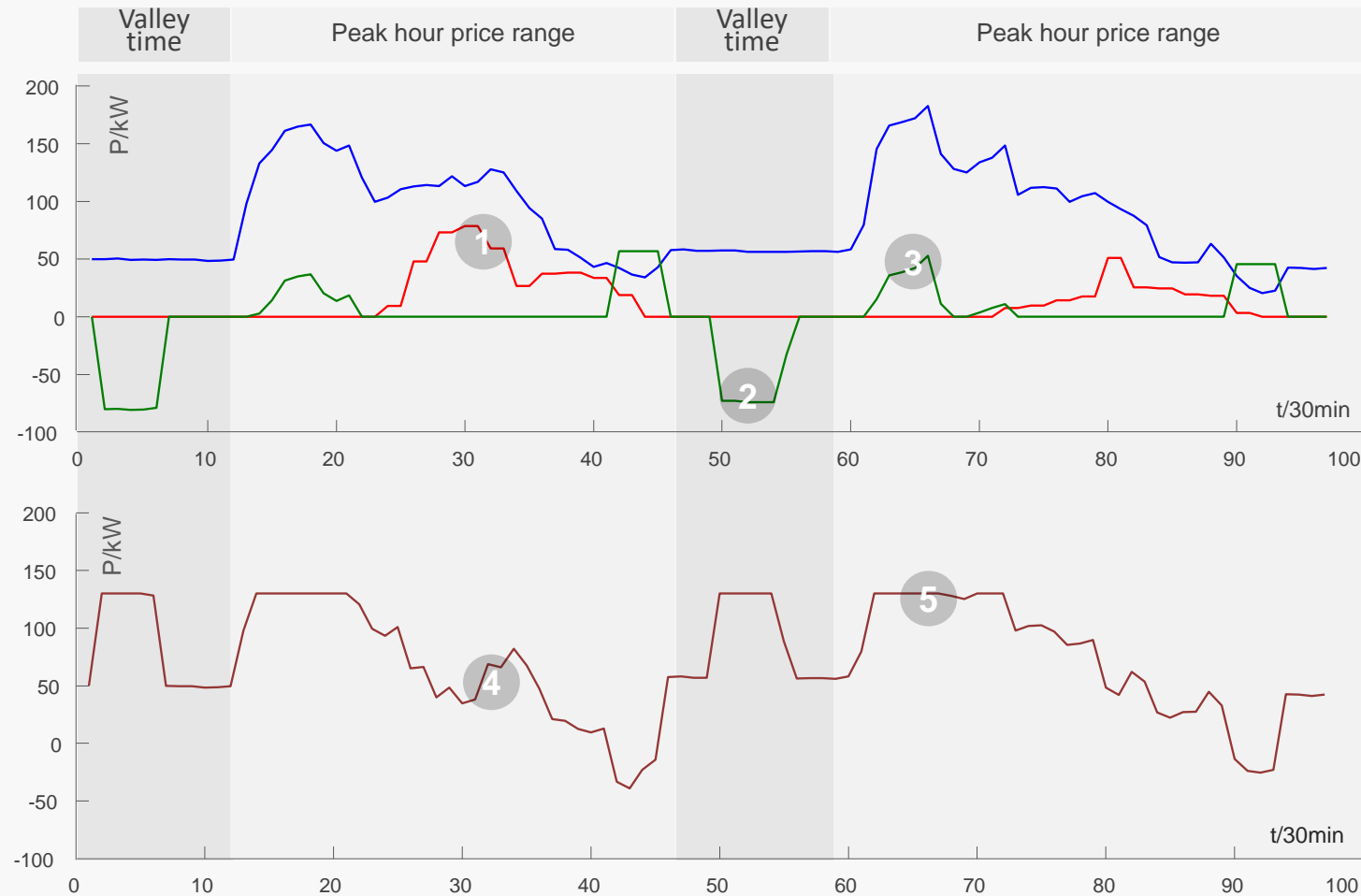
Arbitrage & DCM



- Energy storage system will reduce power demand capacity at peak.
- Gain the benefits through valley time charging and peak time discharging.

Note: The above data is for reference only.

Economic Analysis (AU Shopping Centre)



Project configuration:

- PV 375kW
- ESS 150kW/219kWh

ESS control:

- Charging during valley time, discharging during peak time, high load compensation
- The battery is charged and discharged once a day

Electricity policy: Ergon Energy Retail

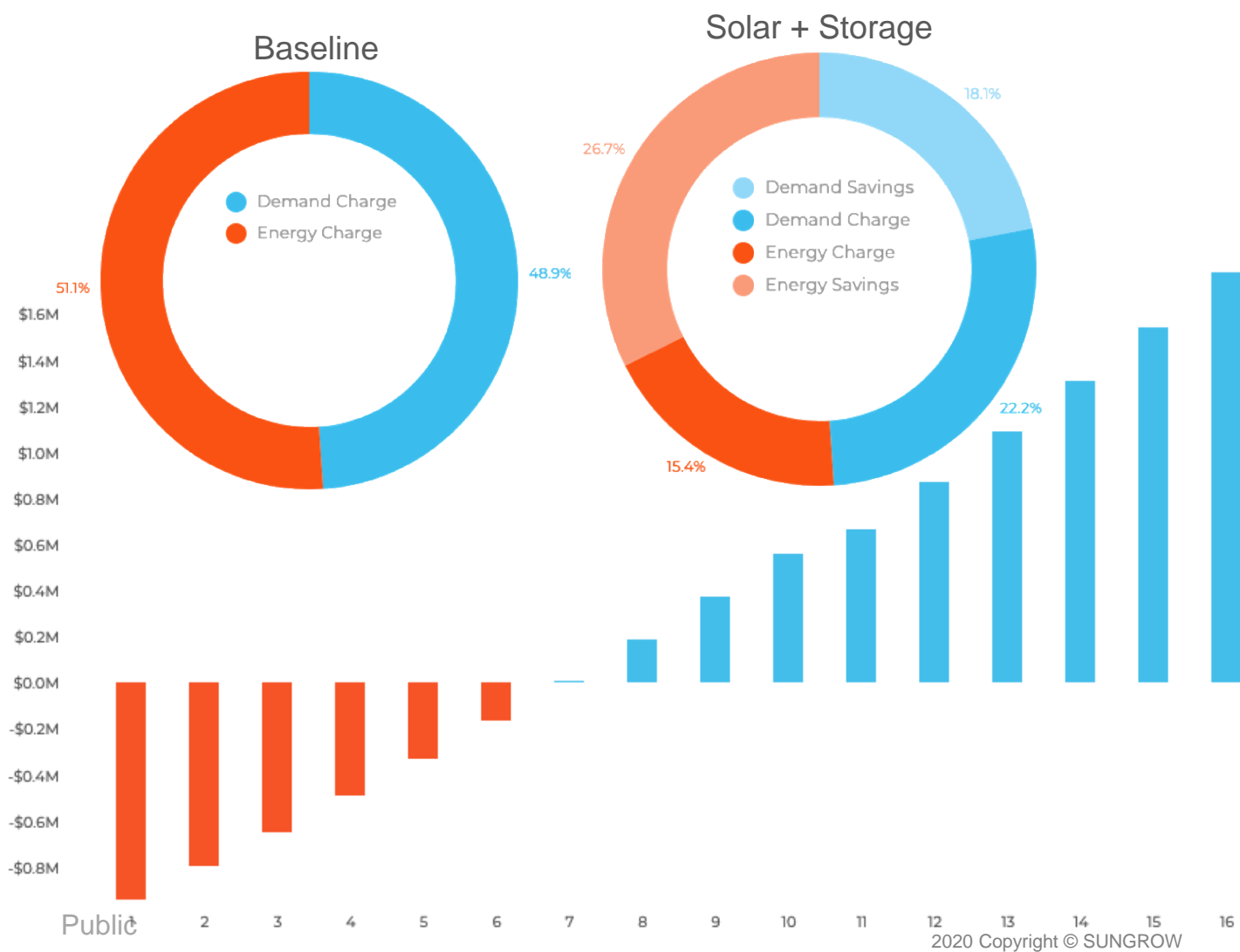
Energy (\$/kWh)

Season	TOU Periods	Cost
Annual	Non-Time of Use	\$0.1379

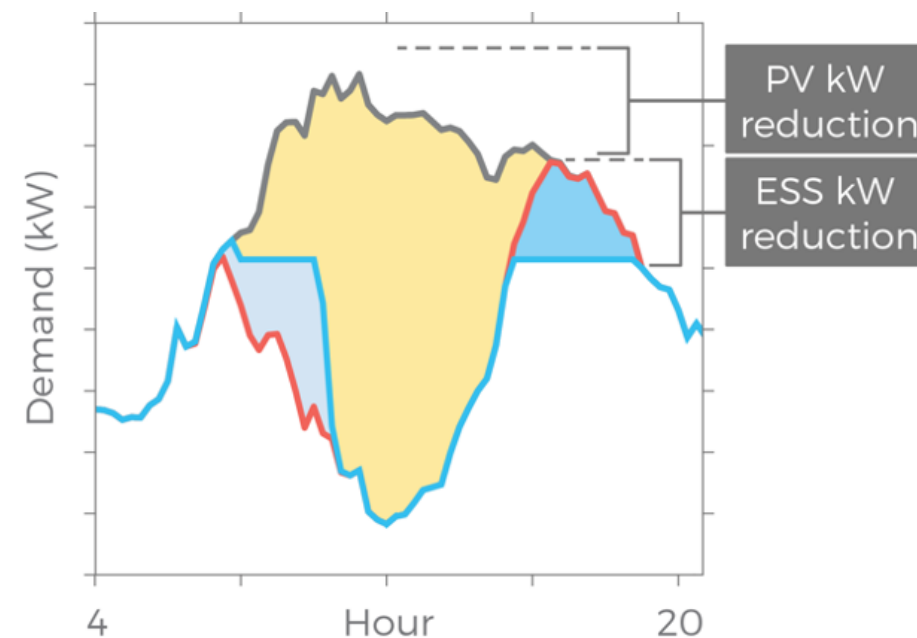
Demand (\$/kW)

Season	TOU Periods	Cost
Annual	Annual Monthly Max	\$29.73

Economic Analysis (AU Shopping Centre)



Key Metrics	
Project Term	15 yrs
Project Payback	6.1 yrs
IRR	15.3%
NPV	AUD 736,651
CAPEX	AUD 800k



Sungrow C&I ESS References



Proven Expertise

**23 years' power electronic
conversion technology**

3kW~6.9MW flexible matching
100GW+ inverter global shipments



**5 years' experience in Li-ion
battery technology**

NCM and LFP dual routes
0.5C to 4C rate battery



**1000+ ESS integration
experience**

Highly integrated ESS
ESS solutions for **main scenario**



Global Deployment

1000+
ESS Projects

0
Safety accidents



AU Project



COD	2018
Location	WA, Australia
Capacity	PV 500kW + ESS 755kWh
Feature	<ul style="list-style-type: none">• Micro-grid application, turnkey solution for PV + ESS + diesel generator application, improving power supply stability and reducing diesel consumption.

AU Project



COD	2019
Location	QLD, Australia
Capacity	PV 100kW / + ESS 411 kWh +EMS
Feature	<ul style="list-style-type: none">• Turnkey solution, peak-shaving & ramp rate control

AU Project



COD	2019
Location	SA, Australia
Capacity	PV 250kW + ESS 548 kWh
Feature	<ul style="list-style-type: none">• Turnkey solution, peak-shaving & ramp rate control

Overseas Project



COD	2017
Location	Bahamas
Capacity	ESS 250kW/1370kWh
Feature	<ul style="list-style-type: none">• Micro-grid application, the first success of micro-grid application in North America.• Strict design, safety and reliability, UL certification passed.

Overseas Project



COD	2018
Location	California, USA
Capacity	(250kW/548kWh) * 60
Feature	<ul style="list-style-type: none">• ST548KWH-250 was used extensively for the first time in North America.• Peak shaving application. UL9540 Certification Passed.

Overseas Project



COD	2018
Location	Arizona, USA
Capacity	(250kW/548kWh) * 2
Feature	<ul style="list-style-type: none">• Peak shaving application.

Overseas Project



COD	2016
Location	Cambodia
Capacity	ESS 1MW/2.7MWh
Feature	<ul style="list-style-type: none">• Replace the diesel oil with renewable energy to supply electricity, clean and environment-friendly;• Improve the electric energy quality and save electric cost;• DC coupled, continuous supply power, seamless switchover;• Electricity supplied by renewable energy at first, and supplemented with city power, and with the backup of diesel generator. Lower carbon tax.

Overseas Project



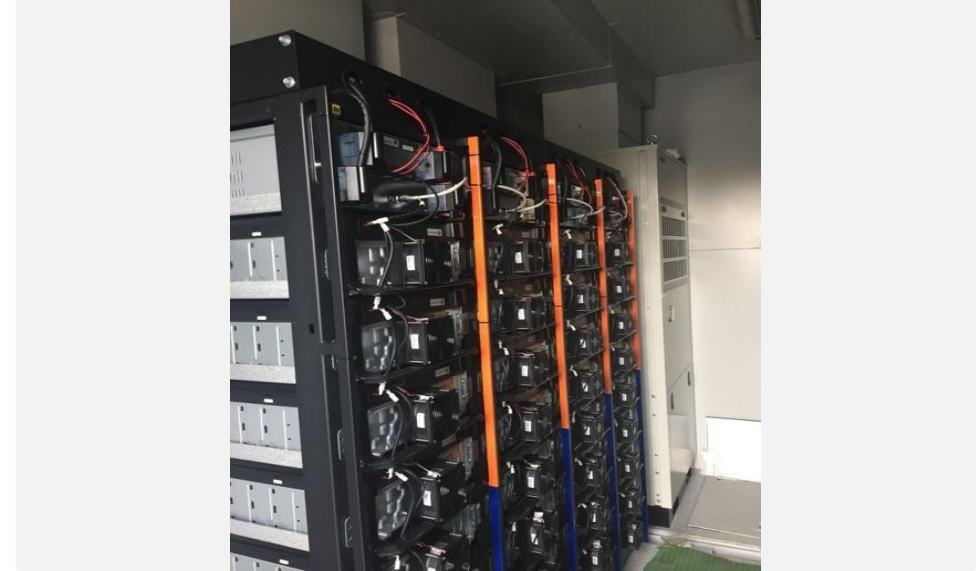
COD	2016
Location	Maldives
Capacity	20pcs* (100kW PCS+100 kWh Li battery), 7pcs* (250kW PCS + 250kWh Li battery), 4pcs* (500kW PCS + 500kWh Li battery)
Feature	<ul style="list-style-type: none">Seamless switchover between PV and diesel generation, improves the power quality and stability considerably; Save the cost on diesel oil, help with the electricity load for residents' life and work.

Overseas Project



COD	2019
Location	Malaysia
Capacity	50kW/343kWh
Feature	<ul style="list-style-type: none">• Micro-grid system consisting of PV, ESS and DG

Overseas Project



COD	2019.Q2
Location	Thailand
Capacity	PV 1.2MW + ESS 548 kWh
Feature	<ul style="list-style-type: none">• Sungrow first ESS project

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