

# AI BOOST Optimal Electricity Cost & Active Safety

FusionSolar Residential Smart PV Solution



**01** Company  
Introduction

**02** FusionSolar Residential  
Smart PV Solution

**03** Summary

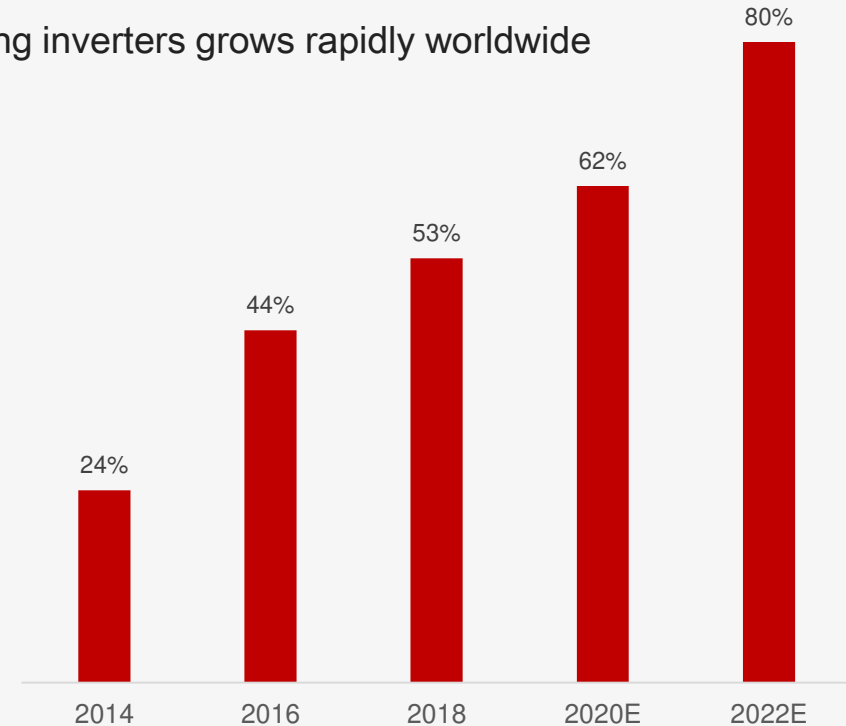
# Cumulative 130GW+ Global Shipments, Leading String Solution to become the Mainstream

The Leading Brand for Global Inverter Shipment



String Solution Becomes the MAINSTREAM in PV Industry

String inverters grows rapidly worldwide



Data Source: Third Parity Consultant Company

# Leading Smart String Solution for All PV Scenarios

## Residential

2~6kW 3~10kW



## Commercial & Industrial

12~20kW 30~40kW  
50/60kW 100kW



## Utility-scale

215kW 100kW



Smart & String for All PV Scenarios

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# FusionSolar Residential Smart PV Solution



Optimal Electricity Cost



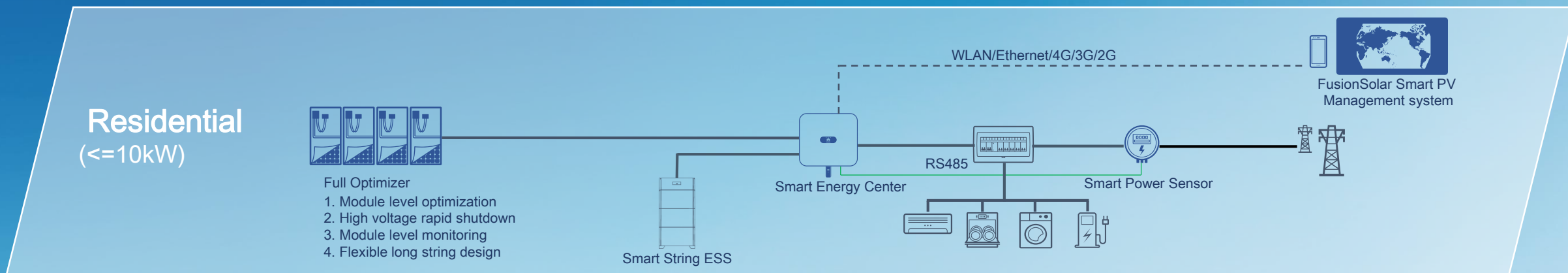
Active Safety



Better Experience



# FusionSolar Residential Smart PV Solution



**Smart Energy Center**

SUN2000-2/3/3.68/4/4.6/5/6KTL-L1

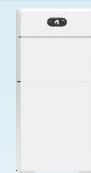
*Single Phase*



**Smart Energy Center**

SUN2000-3/4/5/6/8/10KTL-M1

*Three Phase*



**Smart String ESS**

LUNA2000-5/10/15-S0

Support 2 ESS operating in parallel, up to 30kWh



**Backup Box**

Backup Box-B0/B1



**Smart PV Optimizer**

SUN2000-450W-P



**Smart Dongle**

Smart Dongle-WLAN-FE  
Smart Dongle-4G



**Smart Power Sensor**

DDSU666-H (Single Phase)  
DTSU666-H 250A (Three Phase)



**Monitoring Portal**

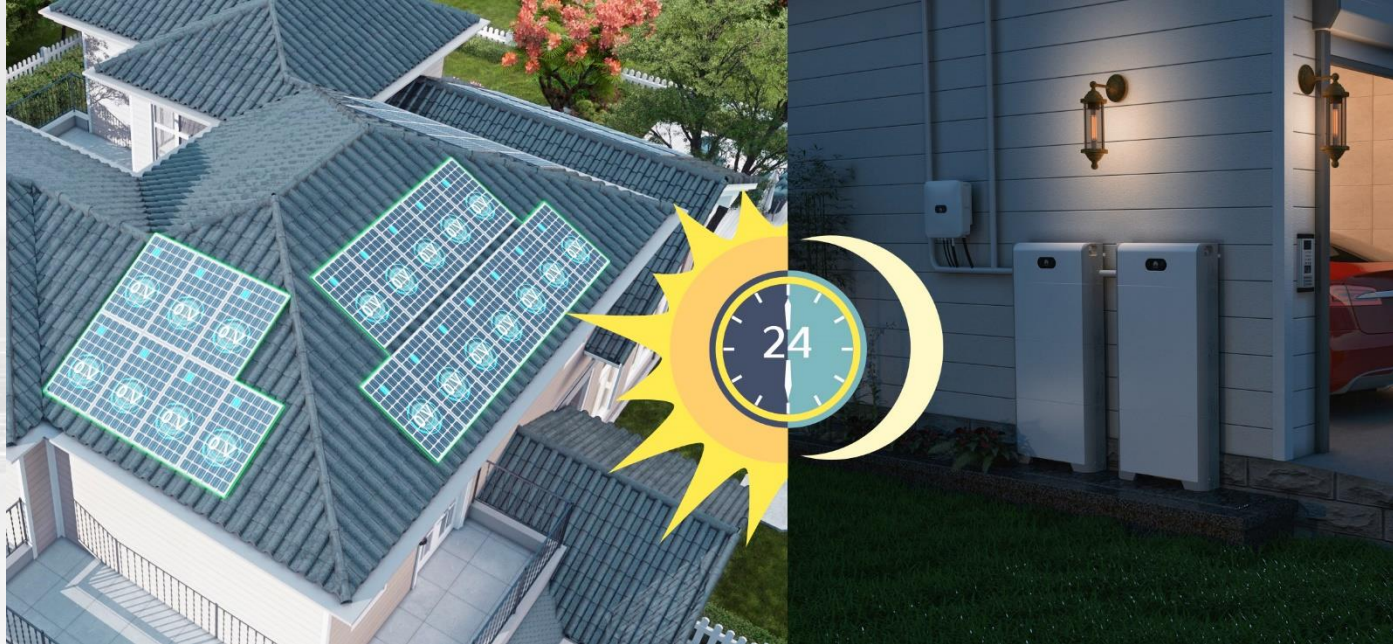
FusionSolar Cloud & APP



Optimal Electricity Cost

Active Safety

Better Experience



**Generate** more PV energy for **daytime** consumption

**Store** more PV energy for **nighttime** consumption

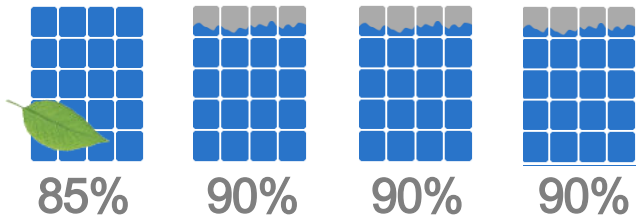
**Maximized PV Power Self-Consumption**



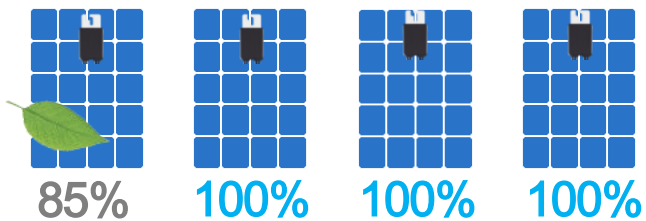
# Up to 30%

More Energy by  
Optimizing Each  
Module's Performance

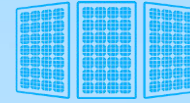
Without optimizer



With optimizer



Shading



Different Azimuth

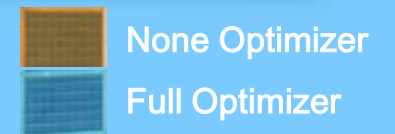
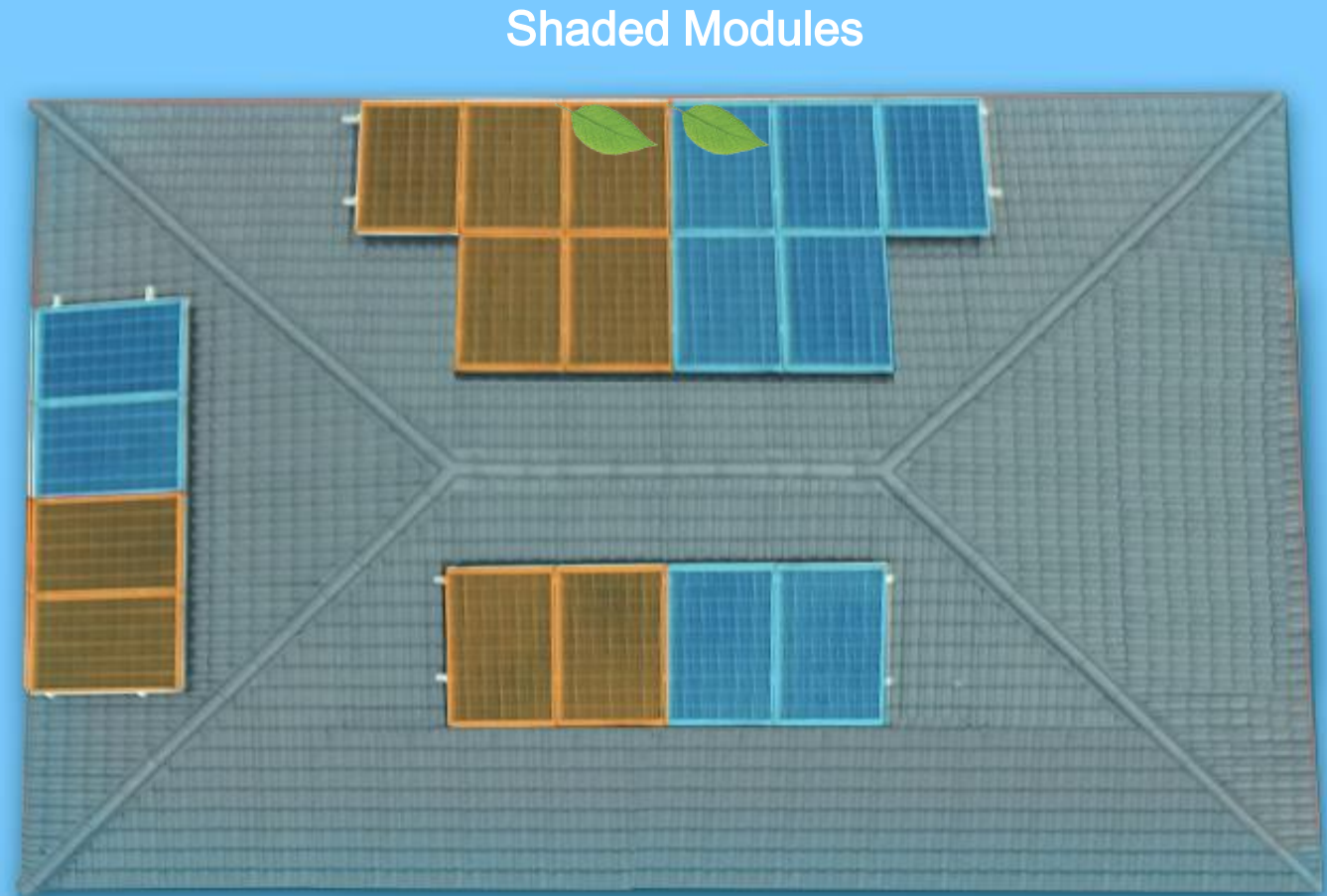
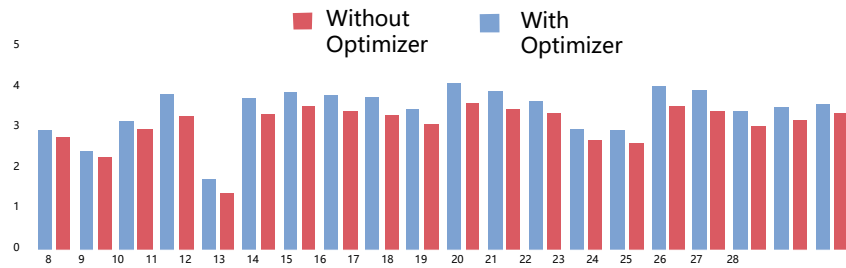


Different Tilt



# Comparison Case of Energy Yields

Full optimizer system generates average **10%-13%** more energy per day than no optimizer system

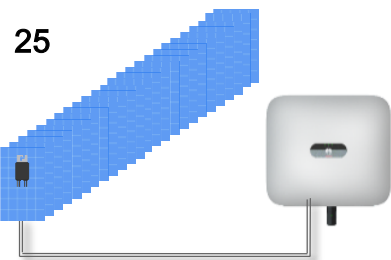
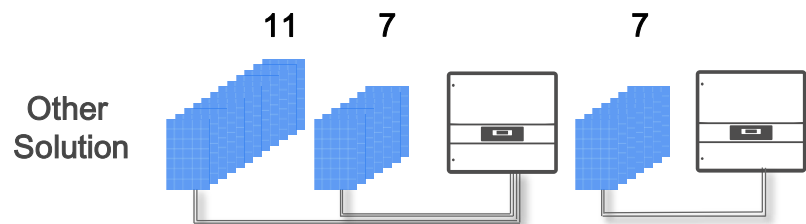


	No Optimizer	Full Optimizer
<b>PV Module</b>	2,205 Wp	2,205 Wp
<b>Optimizer</b>	N/A	9x SUN2000-450W-P
<b>Inverter</b>	1x SUN2000-2KTL-L1	1x SUN2000-2KTL-L1

# More Modules

with Long & Flexible String Design

## Comparison Case



·Max. **200%** DC/AC oversizing for SUN2000- 5KTL-L1 & 10KTL-M1


	SUN2000-2-6KTL-L1	SUN2000-3-10KTL-M1
Maximum DC power per string	5,000 W	10,000 W



# Smart String ESS

## with Energy Optimizer

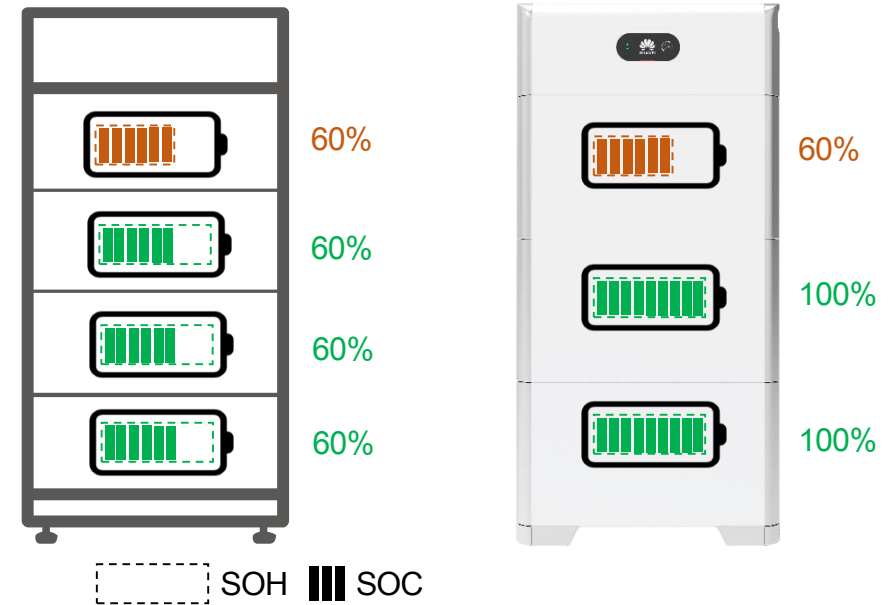
 A string of battery modules for flexible expansion

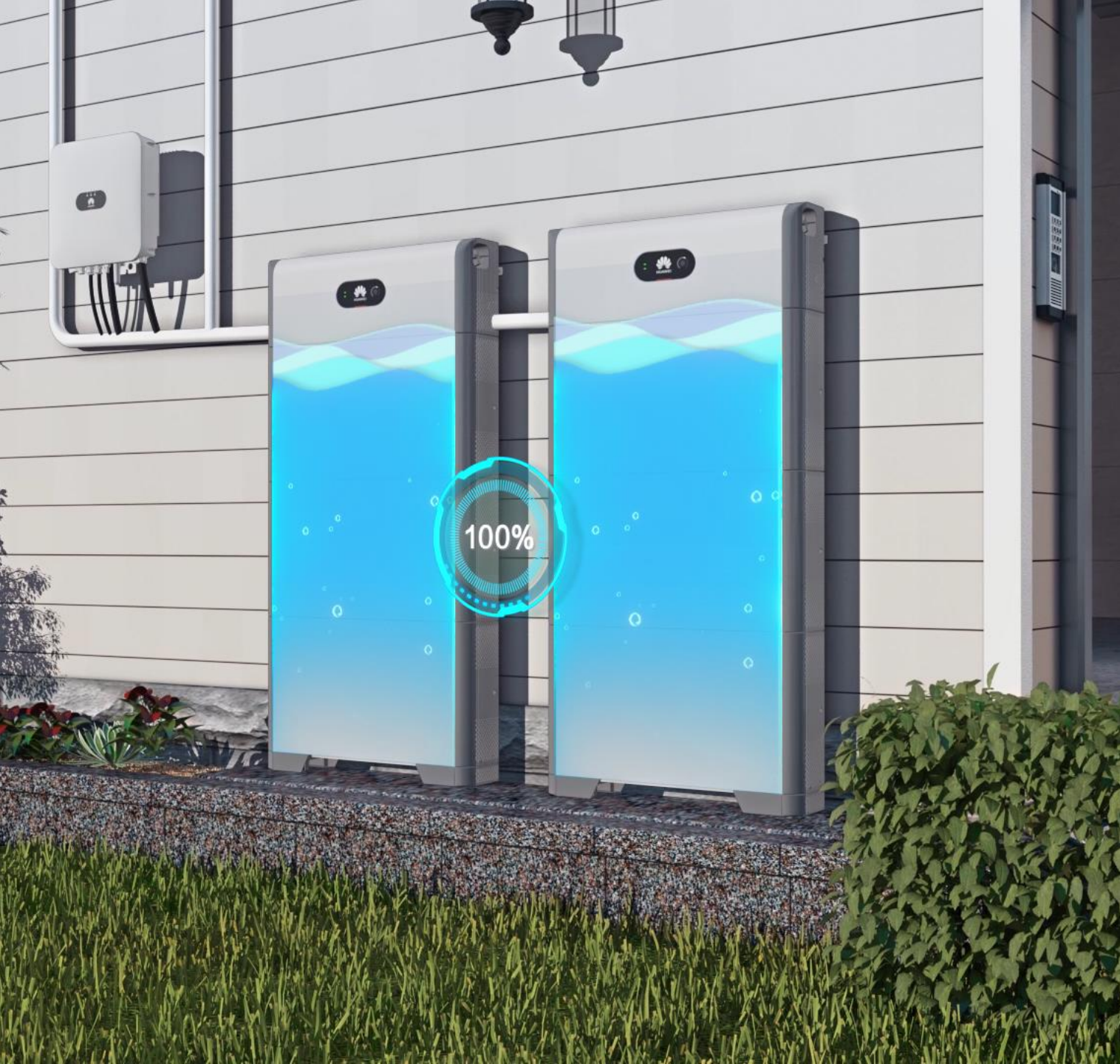
 Energy optimizer to manage charge/discharge per module independently, supports new and old battery module mixed in one system without usable energy restriction



LUNA2000-5/10/15-So  
Smart String ESS Solution

Other Modular Battery





# 5-30kWh ESS

## 50kg Battery Module

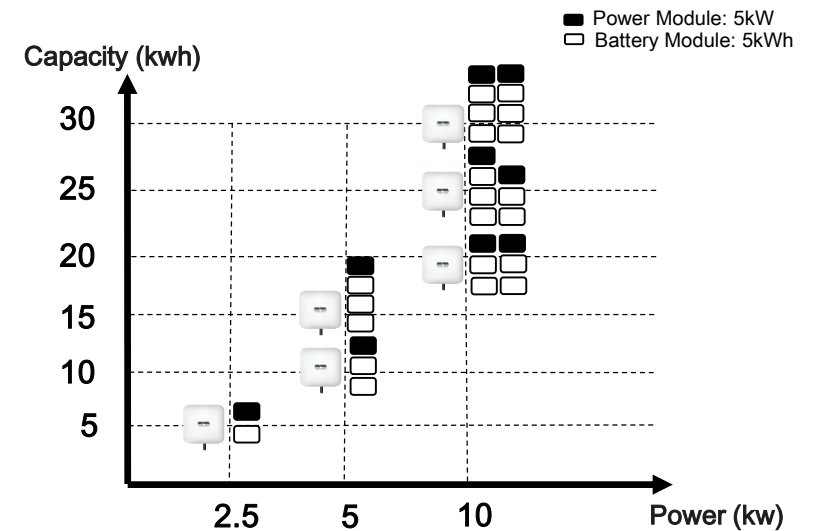
Easy for two people installation without extra lift tools

## 100% DoD

100% depth of discharge, use as much energy as you pay for

## Parallel Operating

Supports Max 2 Storage System Operating in Parallel, 5-30kWh



# 2x POWER

## Battery Ready

### For More Energy

A 5KTL inverter allows **5KW** full power AC output plus **5KW** full power battery charge.

#### More Daytime Consumption

- Inverter output full power for daytime energy consumption

#### More Nighttime Consumption

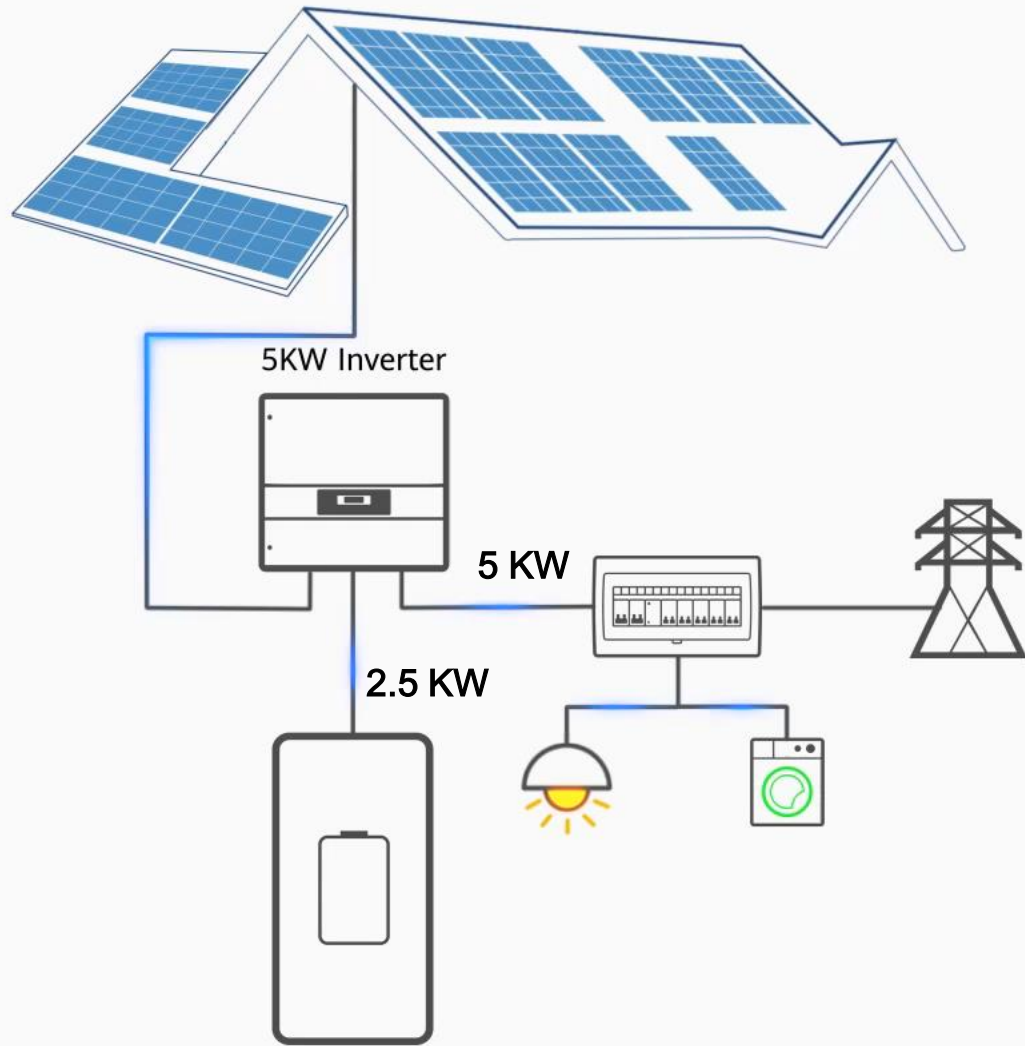
- Inverter charges ESS at full power for more nighttime energy consumption



# Other PV + Storage Solution



10 KWp PV

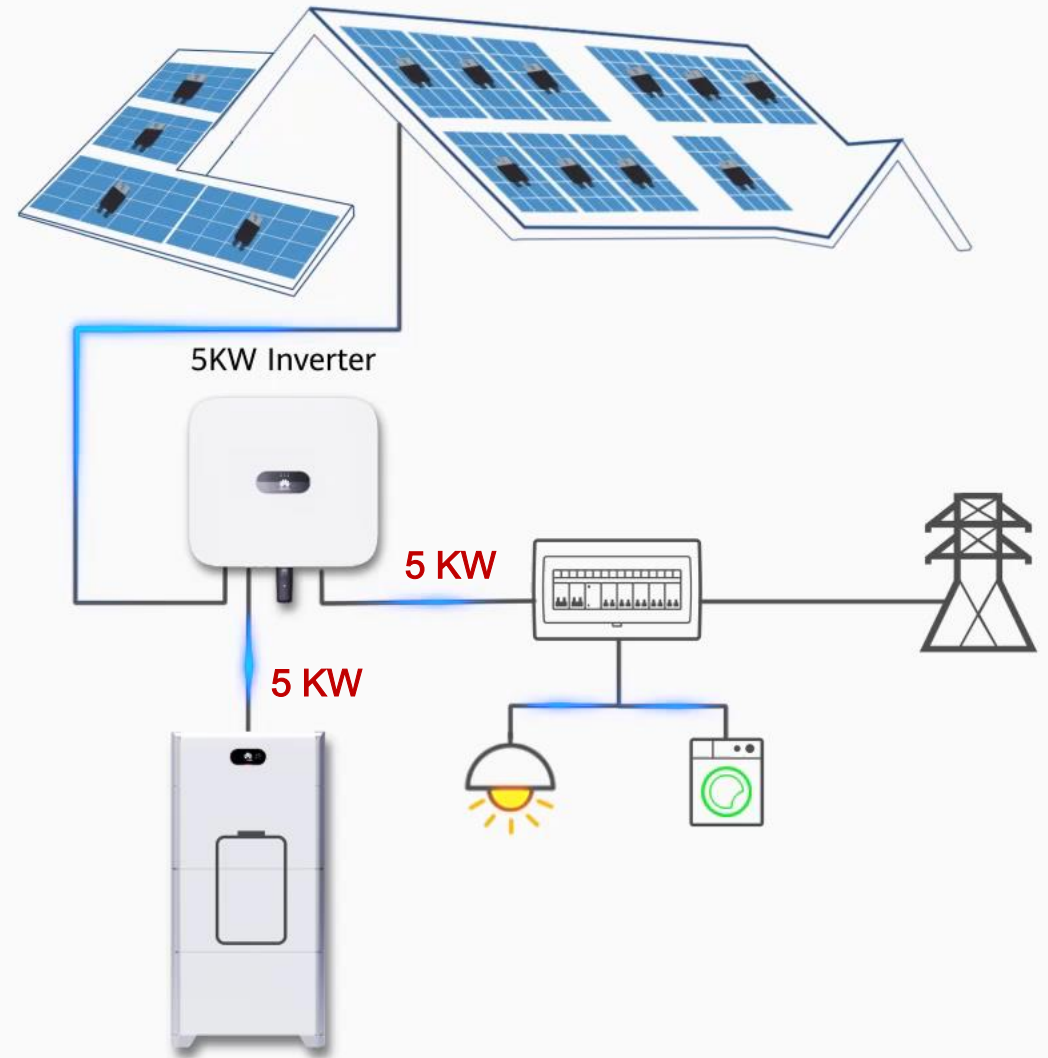


Battery Energy: 15 kWh

# HUAWEI 2x POWER Battery Ready



10 KWp PV



Battery Energy: 15 kWh



Optimal Electricity Cost

**Active Safety**

Better Experience



# Electric Arcing Is Threatening the Safety of PV System & Underlying Buildings

## What is it?

- electrical breakdown of air that produces an prolonged electrical discharge

## What causes Electric Arcing?

- Unreliable soldered joints within modules
- Broken PV cables
- Loosen PV connectors

## What is the harm?



Can reach temperature of over 3000°C & easily start a fire



## Arc Detection Challenges



Arc noise is generally weak and only accounts for 0.1% of the normal current signal, it is difficult to detect and often leads to missing detection



Inverter/Loads/Grid interference signals, as well as spectral overlay with normal current signal leads to faulty detection

# AI Powered

## Active Arcing Protection

### What is AI Powered AFCI?

- HUAWEI inverter keeps self-learning new arc feature to accurately protect system from arc fault, even under complex noise



Self-learning new arc features with AI model



Accurate arc fault detection via local neural network algorithm



Speedy arc fault protection by inverter shutdown in 0.5s

Arc Feature  
Self-learning

Accurate Arc  
Fault Detection

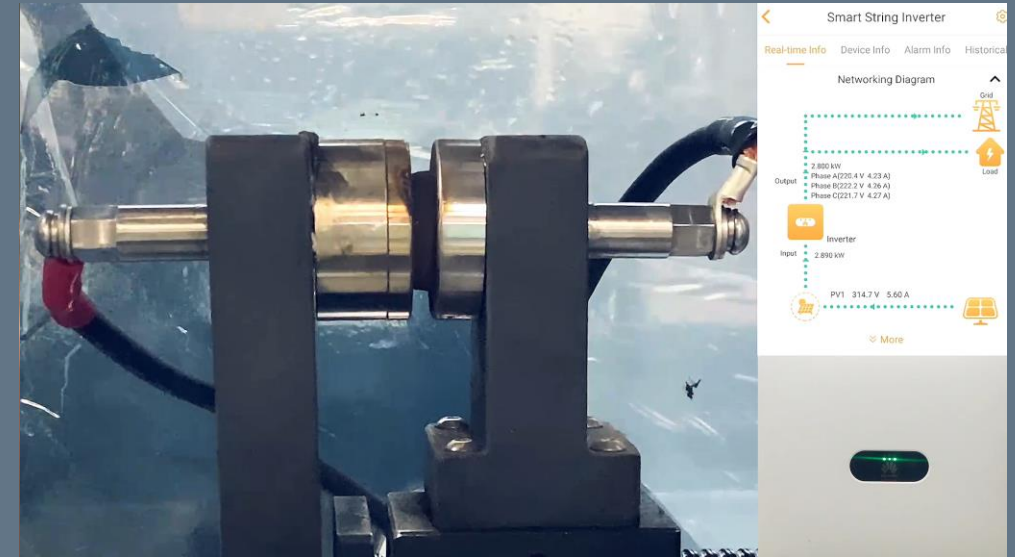
Speedy Arc  
Fault Interruption

Pinpoint Arc  
Fault Positioning

AFCI disabled, arcing continuously posing fire risks



VS



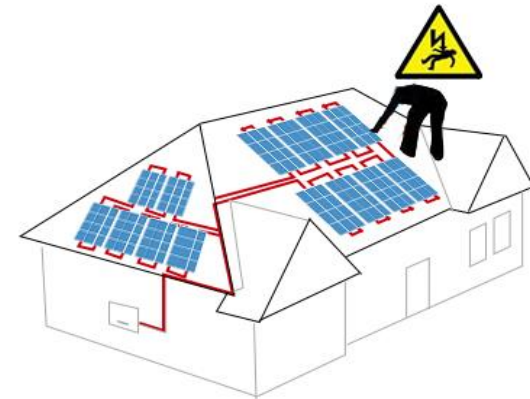
AFCI function enabled, arcing extinguished in < 0.5sec

PV Arcing with/without AFCI Comparison

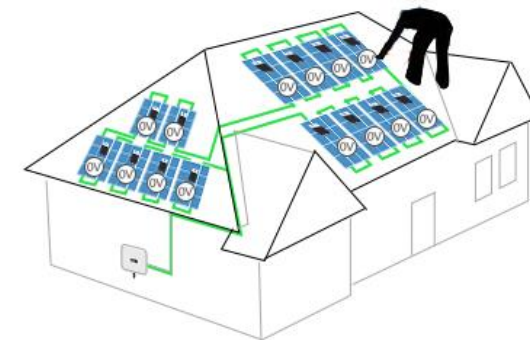


# Safe House

## with Smart PV Optimizer



Without optimizer: High DC voltage when system shuts down




With optimizer: Each optimizer outputting 0V when system shuts down



# Pinpoint

## Arc Fault Positioning for Easier Troubleshooting

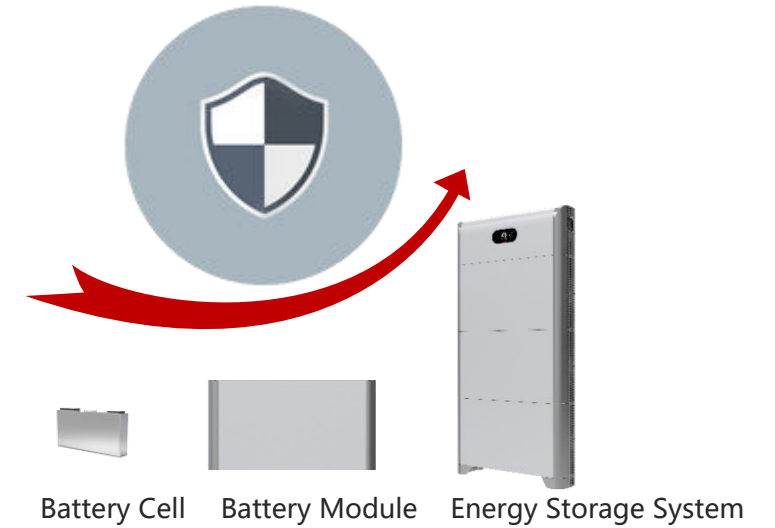
 Saving 80% onsite troubleshooting time and cost with accurate arc fault positioning

\* Manually detection of DC arc fault in a 10KWp residential system usually costs 5hrs. Pinpoint arc fault position report lead to resolve the problem within 30 mins.

 Less power loss because of shorter system tripping



# 3-Layer Protection



## Cell Level Protection

- Lithium iron phosphate cell for safe and stable performance

## Pack Level Protection

- 8 sensors per pack to supervise operating status

10kWh Battery	HUAWEI	A	B
Sensors per pack	3 x 8 = 24	3	4 x 4 = 16

## System Level Protection

- Faulty pack auto isolation, touch safe
- Compliance to the most rigorous safety standard VDE2510

# No Worry About Power Outage

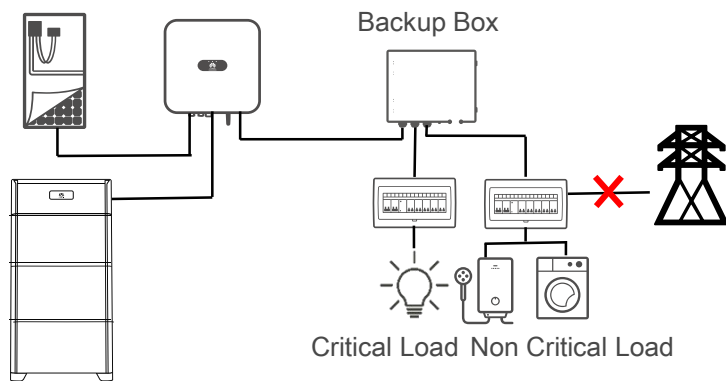
## With Backup Power



System switches to backup mode to supply emergent power to critical load automatically when power outage



Smart string ESS supports black start from blackout to restore system operating





Optimal Electricity Cost

Active Safety

**Better Experience**



# Sleek Design - Waterfall

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Smart String ESS  
LUNA2000-15-S0

Sleek Design -  
Snowbergs surround the lake

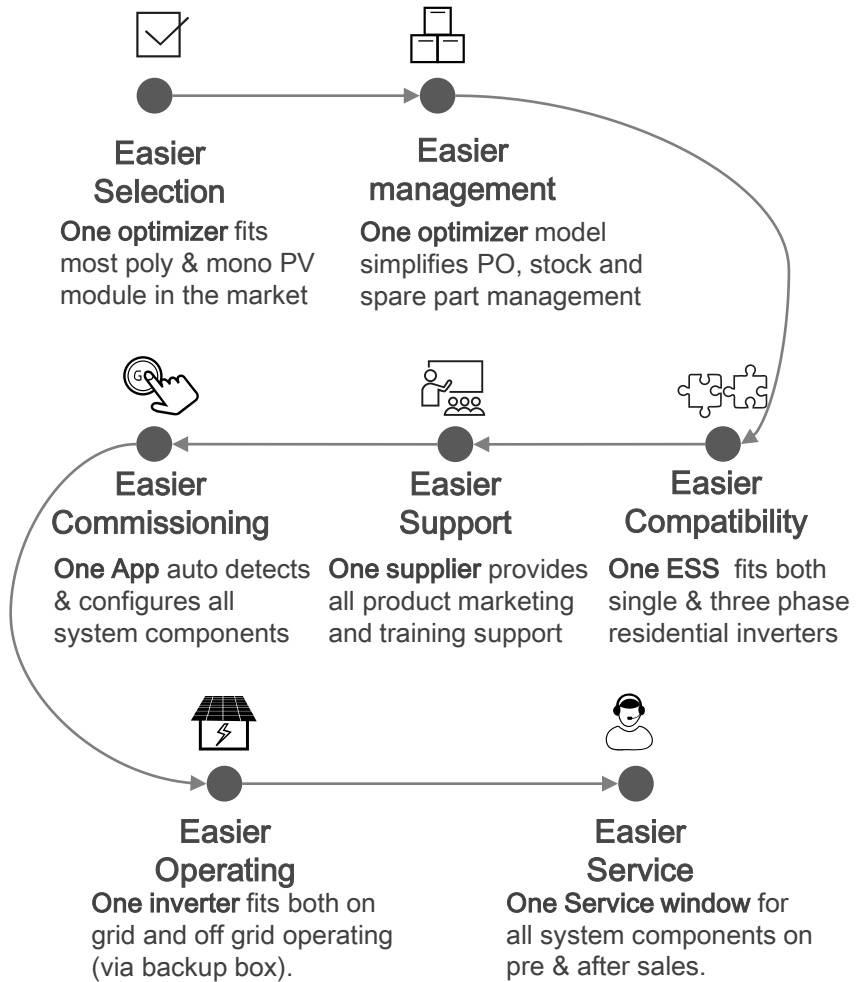
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Smart Energy Center  
SUN2000-2-5-KTL-L1

# One-Fits-All

## Solution, Easier Business



### 1. One Optimizer



### 2. One Battery



### 3. One Inverter



## One-Fits-All

### 4. One APP



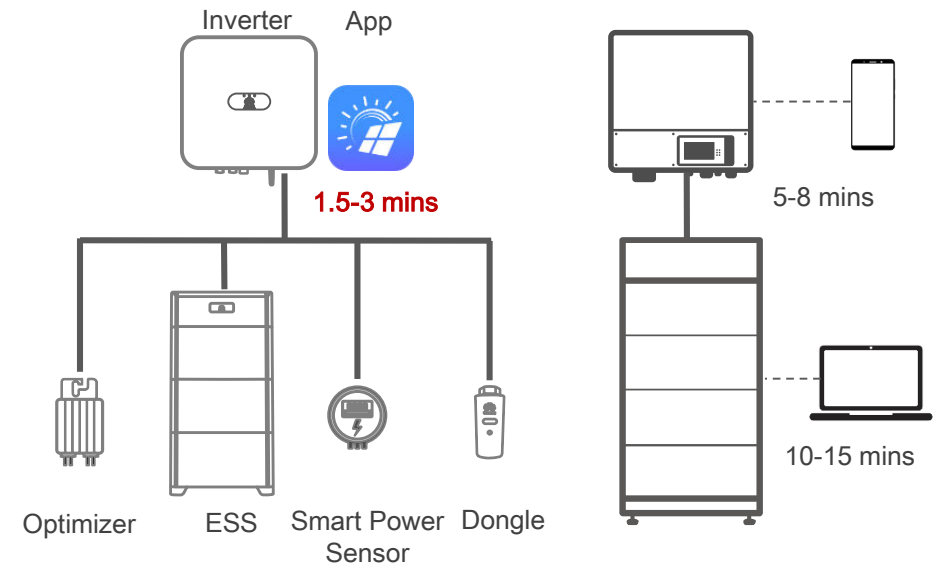
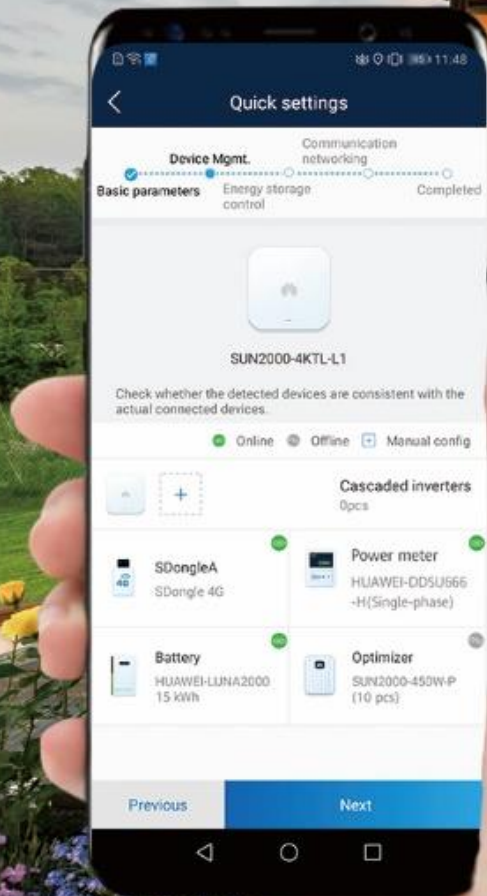
### 5. One Service Window



# Auto Detection of All System Devices

All inverter connected devices can be automatically detected in FusionSolar app

	HUAWEI Solution	Other Solution
System Setting up Duration	<b>1.5-3 mins</b> (Device Auto Detected in App)	15-20 mins (Seperated Apps or web tools to add devices manually)



## <5sec

### Module Auto-Mapping

Operating Steps	HUAWEI Solution	Other Solutions
2D barcode paste on template	Same	Same
Physical layout creation	<5sec (AI powered)	6.5min (manual)
Total configuration time	<1min	6.5min

@15KW system with 40 pcs of PV modules

Saving **86%** configuration time compared with other solutions

# Flexible Communication & Power Control for All Scenarios



## WLAN-FE Dongle

2 in 1 smart dongle, flexible communication option at Home



## 4G Dongle

Independent and stable operation, without location and communication constraints



Social Housing



Power Purchase Agreement



Apartment Roof

No Fuse or Other Quick-wear Parts,  
Inverter Touch Free



No Fuse



No LCD



No Button

Natural Cooling Verified by  
Telecom & Solar Application\*



\* For 3-10KTL inverter models

TUV verified: annual failure rate < 0.5%  
Inverter availability up to 99.996%

Station Phase II,  
200 units, 963 running days

Failure Rate:  
**0.189%**

Station Phase III,  
4939 units, 583 running days

Failure Rate:  
**0.252%**

Station Phase IV,  
1790 units, 207 running days

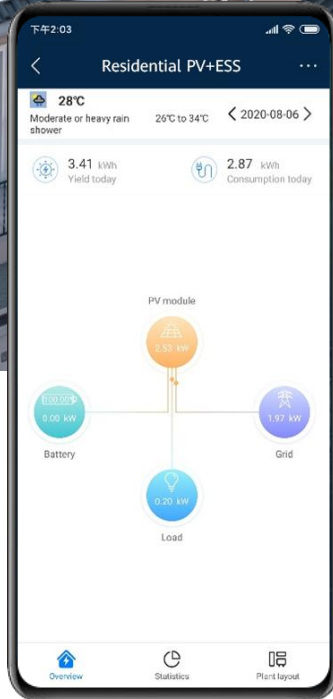
Failure Rate:  
**0.390%**



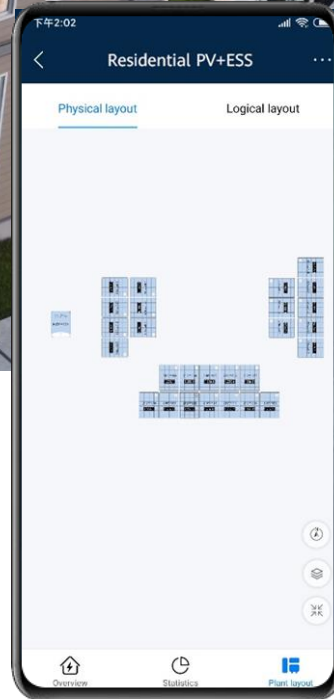
High efficient thermal design  
to ensure low temperature  
within enclosure



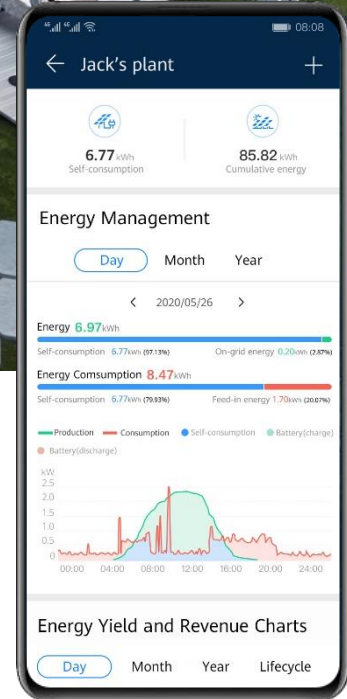
- **Visible Power Flow**
- **Module-Level Monitoring**
- **Statistical Indicator**



Real-Time Power Flow



Module Level Monitoring



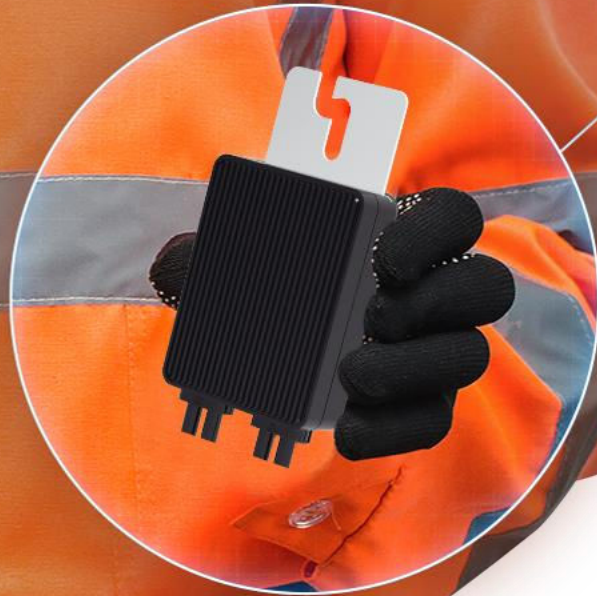
Self-Consumption & Sufficiency Indicator



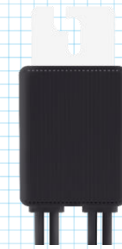


# 50% Smaller

Palm Fit for Comfortable Holding, Thanks to Compact Design Philosophy



50%



0.24L

(71x138x25mm)

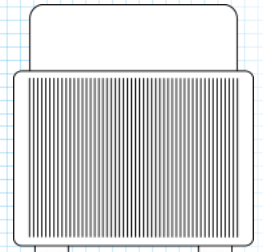
Huawei 2<sup>nd</sup> Gen.



0.47L

(125x150x25.2mm)

Huawei 1<sup>st</sup> Gen.



0.54L

(128x152x28mm)

Similar Optimizer

# Screw-less

Innovative AC and Comm.  
Port for Easier Connection



Free of uncovering for better protection and higher reliability



Screw-less wiring and directly bolt-in in only 10s



Standardized wiring to eliminate mis-operation, safe & reliable

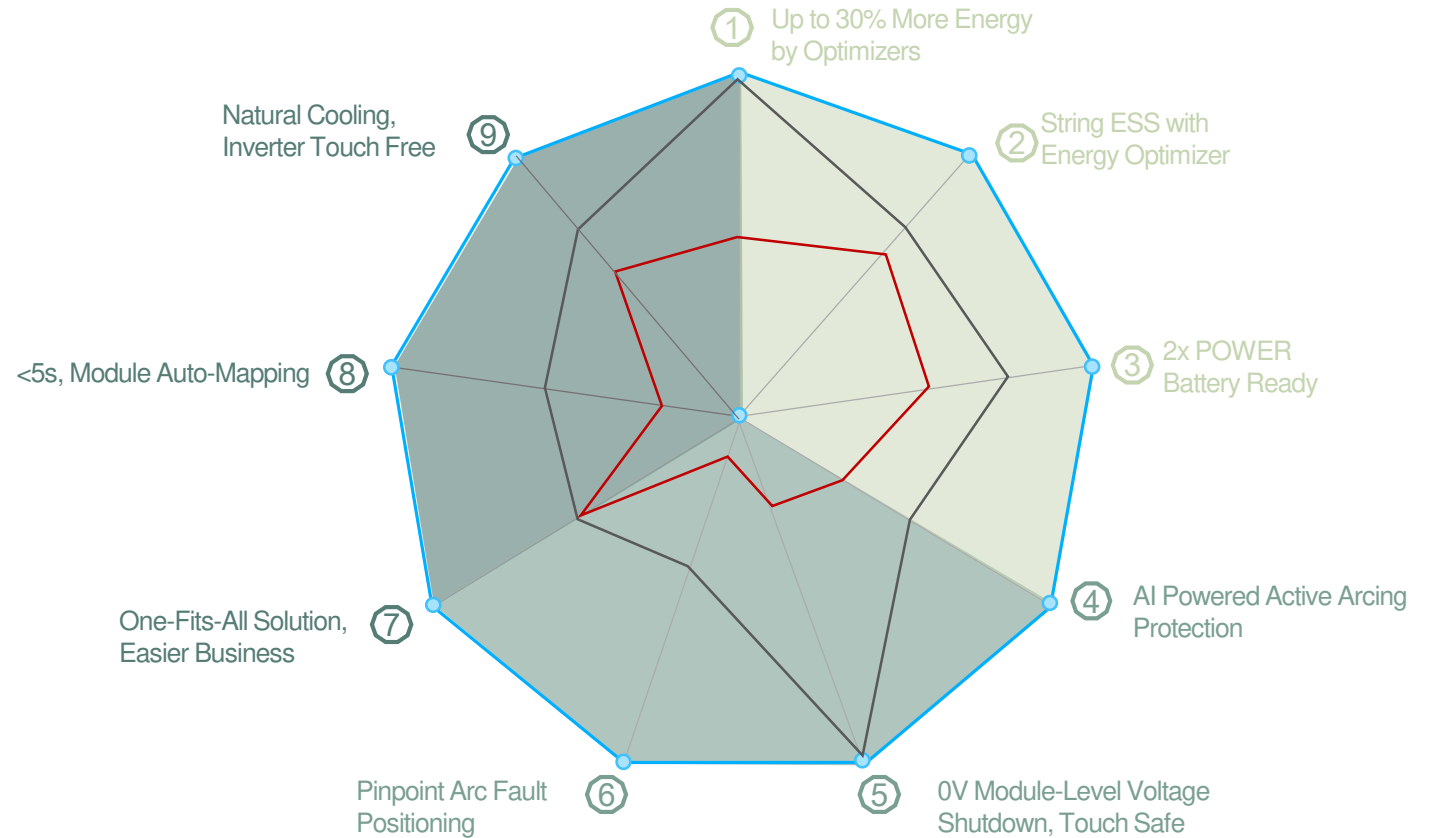
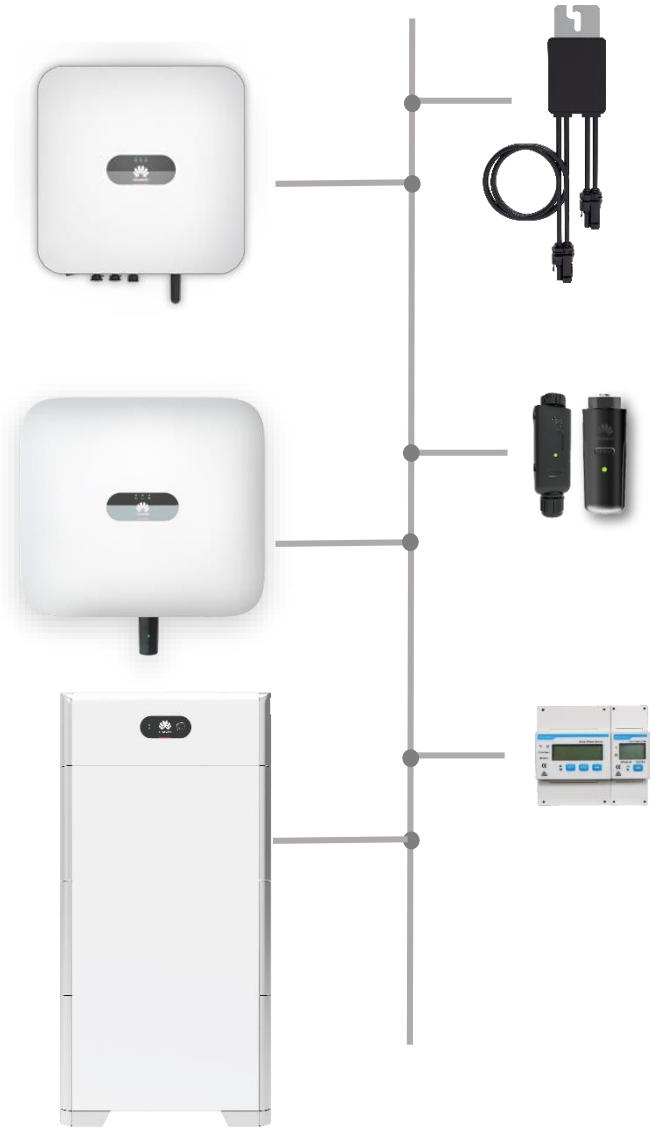


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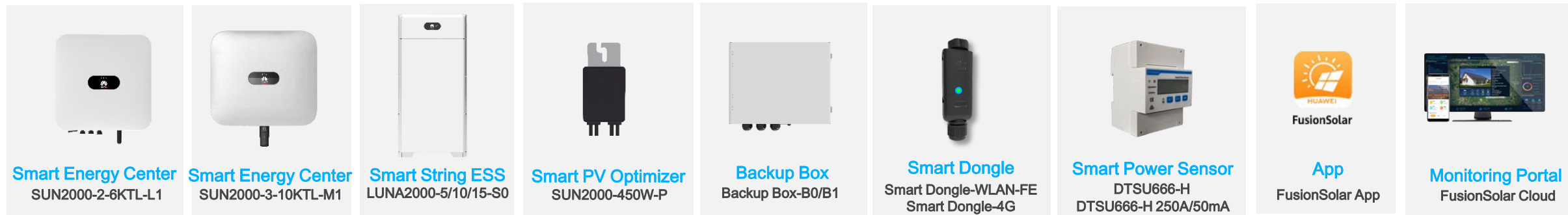
**02** FusionSolar Residential  
Smart PV Solution

**03** Summary

# Nine Innovative Features of Solution



- Huawei Solution
- A Other Optimizer Solutions
- B Other Inverter Solutions



Main Feature Difference	SUN2000L-2-5KTL	SUN2000-2-5KTL-L0	SUN2000-2-6KTL-L1	SUN2000-3-10KTL-M0	SUN2000-3-10KTL-M1
Available Time for Shipment	Already Available	Already Available	Already Available	Already Available	Already Available
Compatible with HUAWEI new optimizer SUN2000-450W-P			√		√
LG Chem battery compatible	√		√		
HUAWEI LUNA2000 string battery compatible	√ *		√	√ *	√
WLAN-FE dongle compatible			√	√	√
4G dongle compatible		√	√	√	√
Active arc fault protection			√	√	√
Pinpoint arc fault positioning			√		√
Integrated PID recovery					√
Backup function availability			√ *		√ *

\* Available in 2021 Q1

# Thank you.

把数字世界带入每个人、每个家庭、  
每个组织，构建万物互联的智能世界。

Bring digital to every person, home, and  
organization for a fully connected,  
intelligent world.

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