



**AP**systems  
ALTENERGY POWER

POWERFUL  
INNOVATION

**The Multi –Platform MLPE Technology Leader**

Proprietary and confidential Property of APsystems

# Company Introduction



- **Global provider of MLPE (module level Power Electronics) equipment for the solar PV industry**
- **Worldwide BUs and offices: USA (Seattle, San-Francisco); EMEA (Lyon - France, Rotterdam - Netherlands), China (Xiajing, Shanghai), Australia (Sydney) and LATAM (Guadalajara - Mexico)**
- **Serving customers in more than 80 countries**

# Company Introduction

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## Committed Shareholders

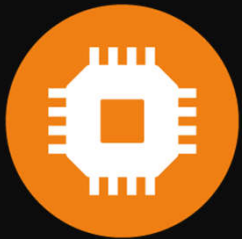
- Investment fund affiliated to TDG Holdings, a public listed company
- Investment fund affiliated to Hlead, a public listed company

Our conservative financial approach dictates that we grow profitably and organically, and these investors have offered to provide any funds necessary to expand our operations under that strategic model.



Proprietary and confidential Property of APsystems

# Company Introduction



Founded in  
Silicon Valley  
in 2009



More than 33 K  
installations  
monitored  
worldwide, over 500  
MWp in 2018



No. 2 independent  
microinverter  
supplier worldwide  
(GTM Research)



ISO 9001, ISO  
14001  
QA Certified



Technology  
protected by  
85 patents



ECU-R



ECU-C



EMA



YC600



QS1



YC1000



APsmart

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# Company Introduction

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- **Innovative:** Widest multi-modules Microinverters range both superior and unique in the solar marketplace.
- **Bankable:** Company Profitable since 2012
- **Reliable:** Designed for over 25 Year Life, APsystems inverter reliability is >99.50%
- **Proven:** 60 000+ installations WW
- **Global:** Serving customers in more than 80 countries
- **Dedicated:** Local teams across the globe dedicated to customers

# Brief History

2010

- APsystems founded as APS in Silicon Valley, USA
- Manufacturing facility opens in Jiaying

2011

- Sydney, Australia office opens
- Shanghai office opens

2012

- Seattle office opens
- Flagship product YC500 dual-module micro launches

2013

- World's first true 3-Phase microinverter YC1000 launches
- WA state warehouse & assembly location opens

2014

- Rotterdam, NL warehouse & office opens
- Melbourne, Australia office opens

2015

- APsystems surpasses 250MW installed

2016

- Strong investment in EMEA with new office opened in Lyon, France

2017

- Mexico office opens
- APsystems surpasses 400MW installed

2018

- Landmark YC600 PFC compatible launches
- ECU expands with 2 ZigBee gateways : ECU-C and ECU-R
- 550 MW Shipped

2019

- YC600 / QS1 PFC compatible /SAA FPC Launches
- RSD-PLC Launches
- Additional manufacturing capabilities to in Miao-L i- Taiwan

# Intellectual Proprietary

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- Applied patents **130**
- Patents granted **85**
- Software Copy right **3**



# Global Management



**Zhi Min Ling Ph.d**  
Chairman & CEO (Co-Founder)

Dr. Ling's career has been in the semiconductor and photovoltaic industries. He has served in executive positions at AMD, Xilinx, and Solaria Corporation. He graduated from Fudan University, earning a PhD from the University of Leuven (Belgium), and did post-doctoral work at the University of California at Berkeley.



**Dr Yuhao Luo Ph.d**  
CTO, Board member (Co-Founder)

Dr. Luo has extensive R&D experience in the semiconductor and PV solar industries. He served at Xilinx, and was director of product development for Solaria Corporation. He holds a PhD in Electrical Engineering from the University of California at Los Angeles (UCLA).



**Olivier Jacques**  
President BUs & Global EVP

Olivier Jacques has extensive experience in industrial, energy & high-tech industries. He brings solid expertise in global management & business development in international markets. Prior to joining APsystems he served as Managing Director, EMEA of Enphase Energy. Olivier has also held executive-level positions with Norgren SAS, Danfoss Drives, Schlumberger, WATTS Industries & Samsung Electronics. Olivier holds an HVAC-R engineering degree from Jean-Mermoz, three Master's Certificates and a DMSE (MBA) from ESCP Europe, & a Strategic Finance credential at HEC.

# APsystems Value Chain – Eco System

## Digital PV

**Collaboration**  
Software Product

PV Power Plant

Energy Trading

Shared O&M

Block Chain

**EMA**  
Energy Mgt

**Core Competence**  
MLPE (module Level)

**Micro-Inv.**  
AC series

**RSD-OPT**  
DC Series

**Smart**  
Jbox PCBA

**Collaboration**  
Hardware Product

Home Storage

PSOC IC Chips

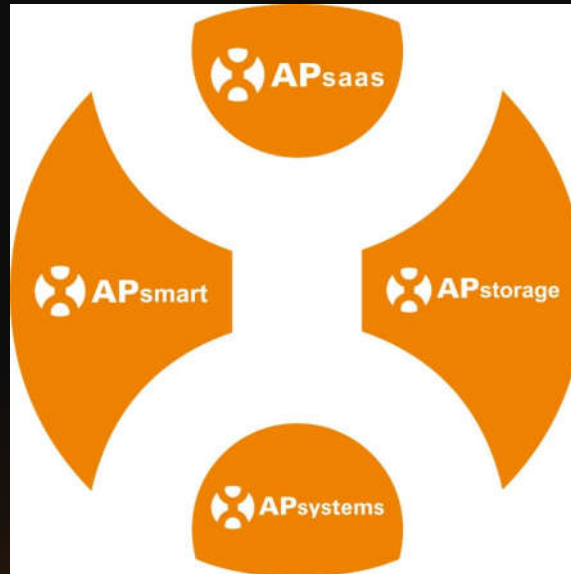


# Multi Platform MLPE Technology Leader

 **IntePower**  
浙江英达威芯电子有限公司

**MLPE Chips company**  
**APsystems and ShiLan**

**APsmart**  
MLPE DC Series  
RSD, Smart modules



**APsaas**  
MLPE + SaaS:  
EMA Software

**APstorage**  
Residential ESS

**APsystems**  
MLPE AC Series  
Microinverter

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# Microinverter Product Line Evolution



**APsystems**  
ALTENERGY POWER

POWERFUL  
INNOVATION

**YC500 SERIES**  
Dual module, up to 274W per channel  
Proven microinverter technology

**YC600**  
Dual module, Rule 21, high-output 300W per channel  
The most advanced dual module microinverter in the world

**YC1000**  
4-module, true 3-Phase  
The best selling 3-Phase micro in the world

**QS1**  
4-module, high-output 300W per channel  
Up to 300% faster installation

**NOW SHIPPING**

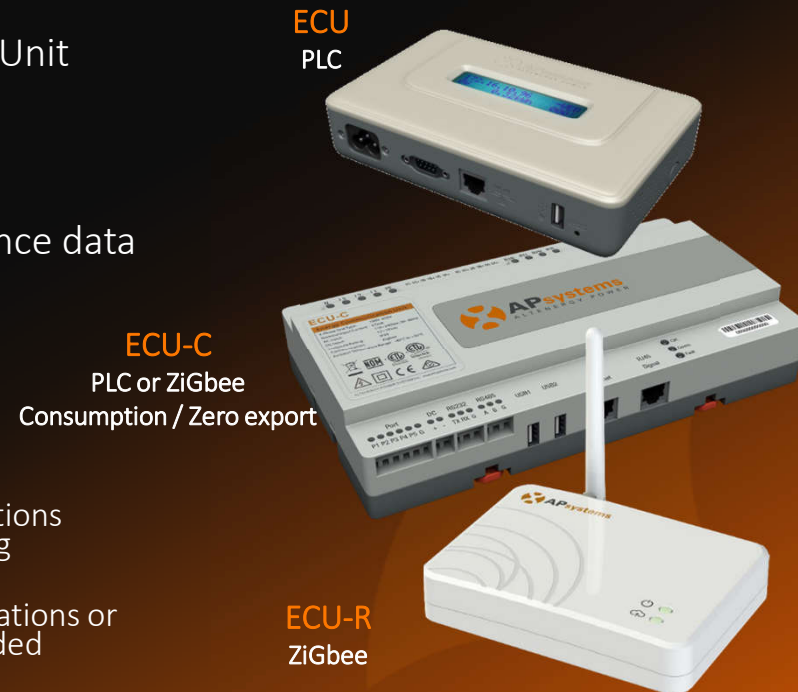
< SINGLE-PHASE >

3-PHASE >

The image shows a progression of microinverter products from left to right. On the far left is the YC500 Series, a small dual-module unit. Next is the YC600, a larger dual-module unit. In the center is the QS1, a 4-module unit with a starburst graphic above it saying 'NOW SHIPPING'. On the far right is the YC1000, a 4-module true 3-phase unit. A dashed arrow labeled '< SINGLE-PHASE >' points from the YC600 towards the QS1. Another dashed arrow labeled '3-PHASE >' points from the QS1 towards the YC1000.

# Energy Communication Unit (ECU)

- State-of-the-art Energy Communication Unit (ECU)
- Information gateway for APsystems microinverters.
- Collects and transfers module performance data in real time
- Control over each individual module for optimized performance
- 3 Key Models:
  - ECU Wi-Fi - YC500i products
  - ECU-R – YC600/YC1000 residential applications including special features for social housing applications
  - ECU-C – YC600/YC1000 commercial applications or anywhere consumption monitoring is needed





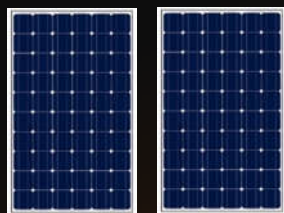
# MLPE AC Series: Microinverter



YC600

Single-Phase

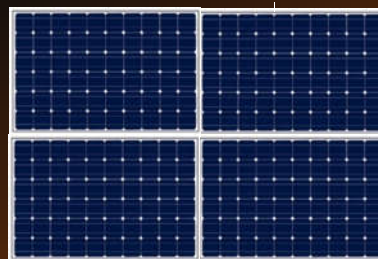
2 High Power modules  
**Reactive Power Control**



YC1000

Native 3-Phase

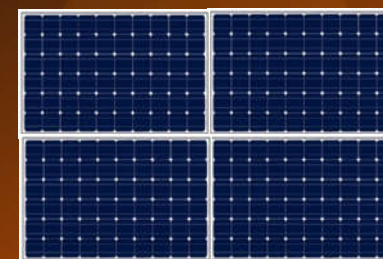
Serves 4 modules



QS 1

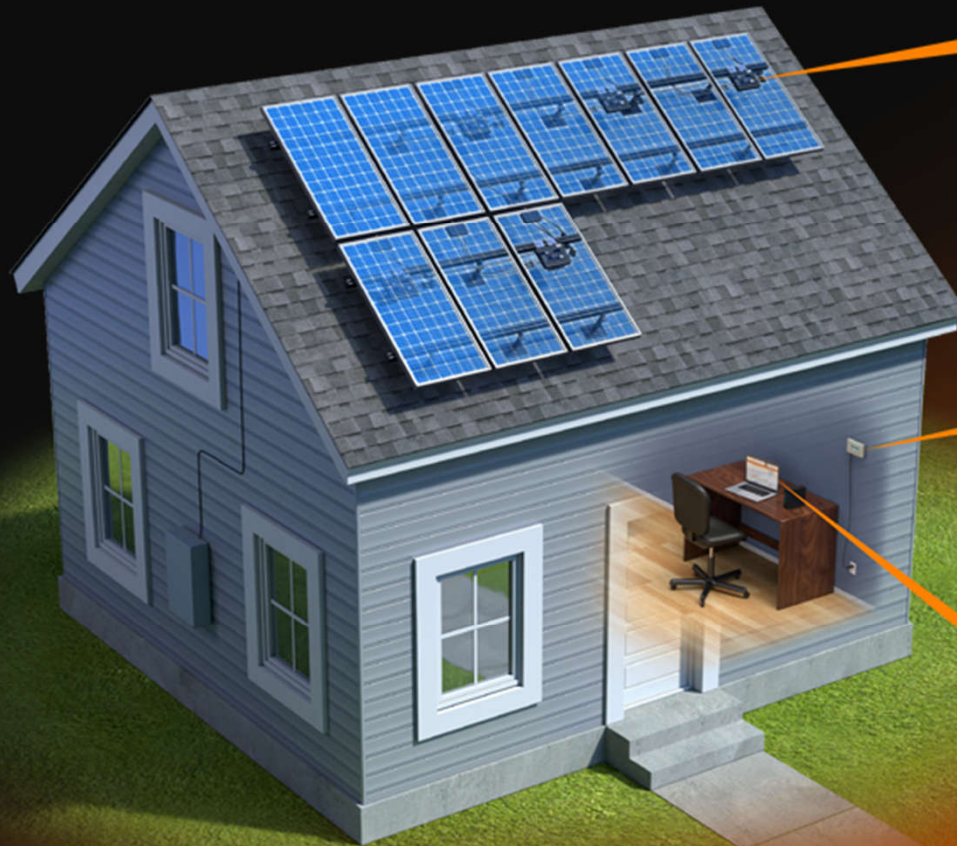
Single-Phase

4 High Power modules  
**Reactive Power Control**



# The APsystems Residential Solution

Integrates our grid-tied dual-module microinverters with intelligent networking and monitoring systems, ensuring maximum performance and efficiency of your residential solar system.



Dual module microinverters



Wireless ECU gateway



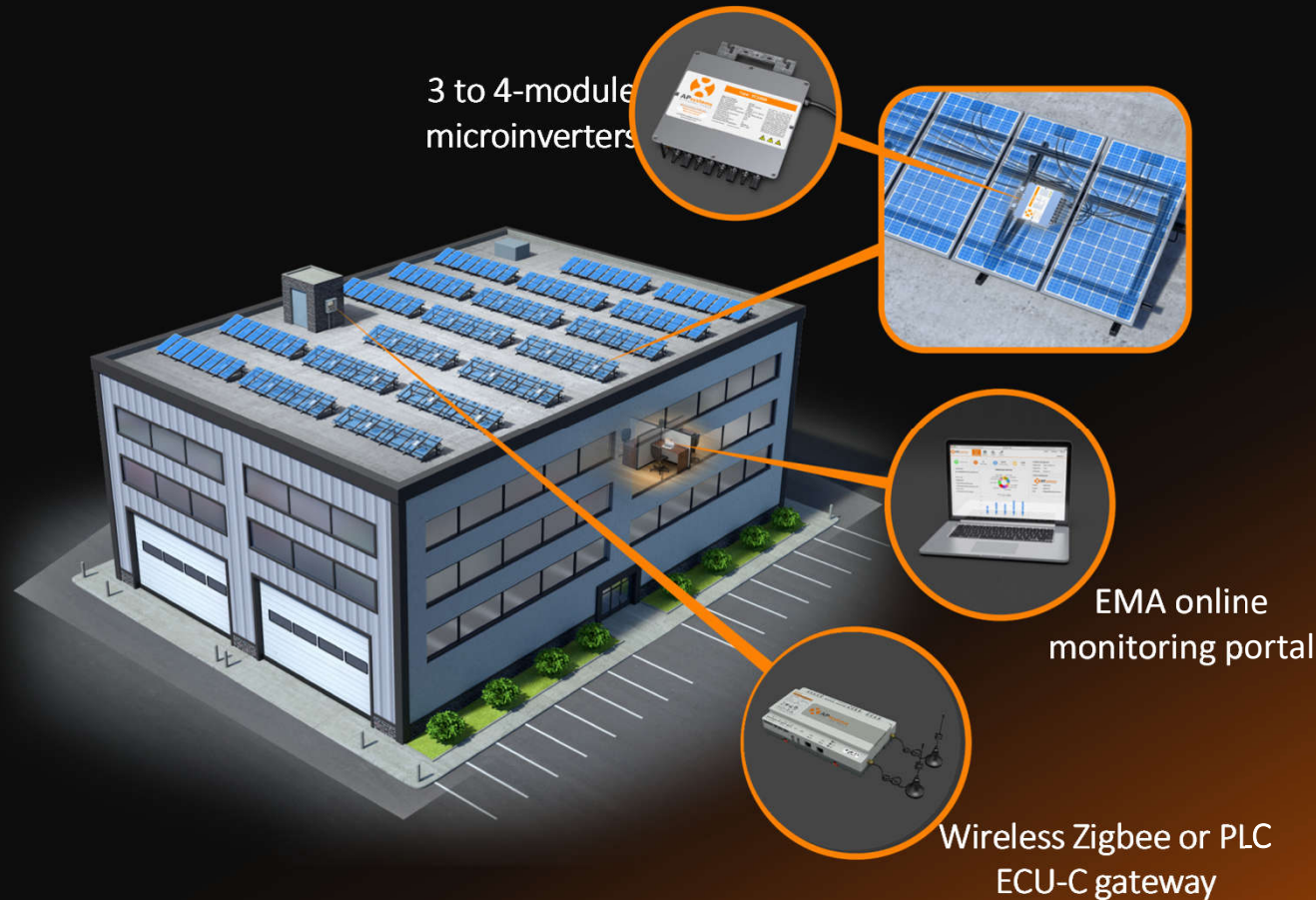
EMA online monitoring portal

# The APsystems Social Housing Solution

Integrates our grid-tied quad & dual-module microinverters addressing **high power modules** and **interactivity with the grid** on top of intelligent networking and **multi-level monitoring systems** for the **tenant** and the **housing corporation**, ensuring maximum performance and efficiency of multi-residential solar installations.

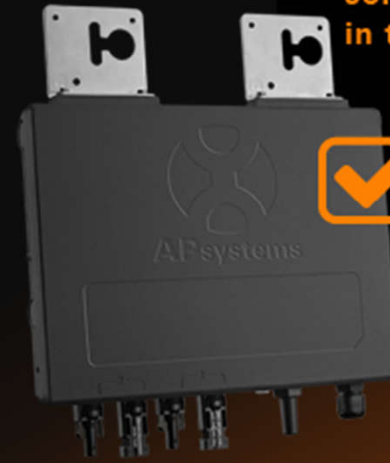


# The APsystems Commercial Solution



Integrates our True 3-phase 4-module grid-tied microinverters with our advanced gateway through a ZigBee mesh network and free online monitoring, ensuring fast and easy installation and maximum performance.

Find out why it's  
being called the  
**MOST ADVANCED**  
solar microinverter  
in the world.



 The all-new  
**YC600**

# YC600

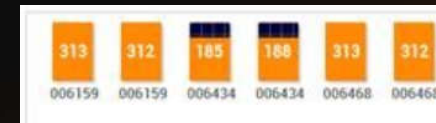
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1:2 micro-to-module ratio

Reactive Power Control (RPC)

# YC600 – Dual-module Microinverter

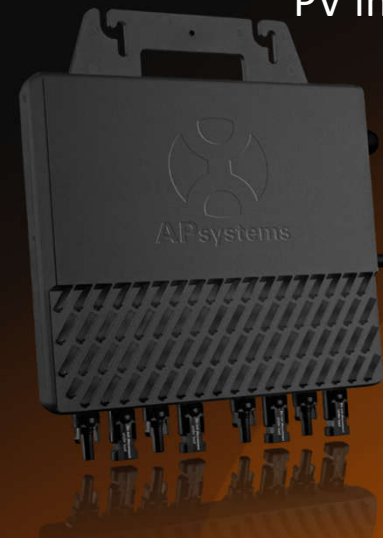
- Independent MPPT per panel
- Utility interactive with Reactive Power Control (RPC)
- Wireless Zigbee communication
- Intelligent mesh network
- Field-upgradeable FPGA design
- 96.5% CEC Efficiency, 99.5% MPPT Efficiency
- 548W continuous output power, 600W peak
- 60 and 72 cell PV panels
- DC Arc-Fault Protection
- IP67/NEMA 6 enclosure
- True MC4 connectors
- Extreme temp range (-40°C to +65°C)
- Natural convection cooled
- Ideal for high-output PV panels



# QS1

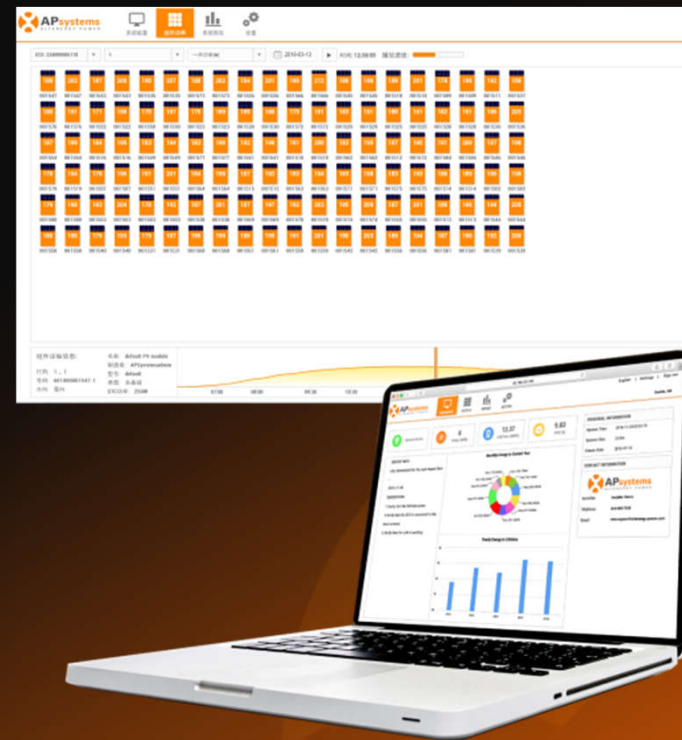
- **Single phase microinverter with independent MPPTs**
- **The highest peak output power With 1200 W**
- **3 X Faster transmission speed Robust ZigBee communications**
- **IP67/NEMA 6 enclosure**
- **Unbeatable cost efficiency and installation time**
- **Accommodates panels from 200w-365Wp+**

The game  
changer in the  
PV industry



# Why APsystems QS1?

- ✘ 4 Independent MPPT;
- ✘ Wider MPPT tracking range: 22-48V;
- ✘ Potting for Reliability: improved heat dissipation and component protection;
- ✘ True MC4;
- ✘ ZIGBEE Mesh communication – No need of repeater;
- ✘ Robust Energy Monitoring & Analysis (EMA) interface;
- ✘ IOS & Android Apps availability.



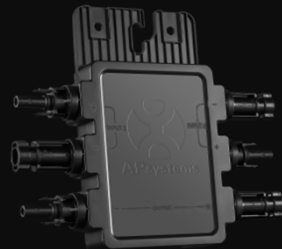
# APsmart MLPE DC Series: Optimizer & RSD



## Optimizer OPT700

- Single Panel Optimizer
- Single Panel Monitor
- Single Panel shutdown

2016



## Dual Rapid Shutdown OPT700-RS

- Single Panel Monitor
- Single Panel Shutdown

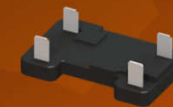
2018



## RSD-PLC Sunspec complied

- Single Panel Shutdown

## Jbox Replaceable RSD block



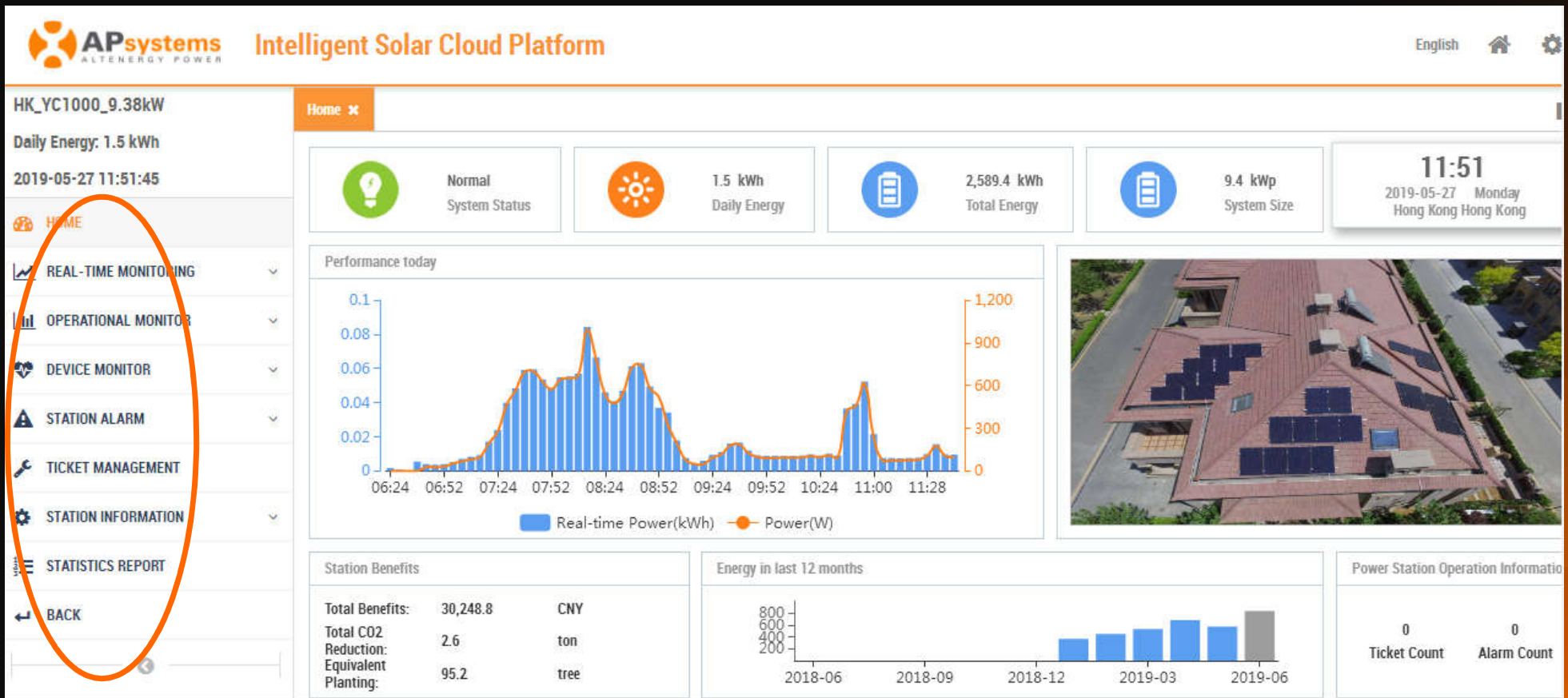
2019

# Smart Module (Replicable RSD Block)



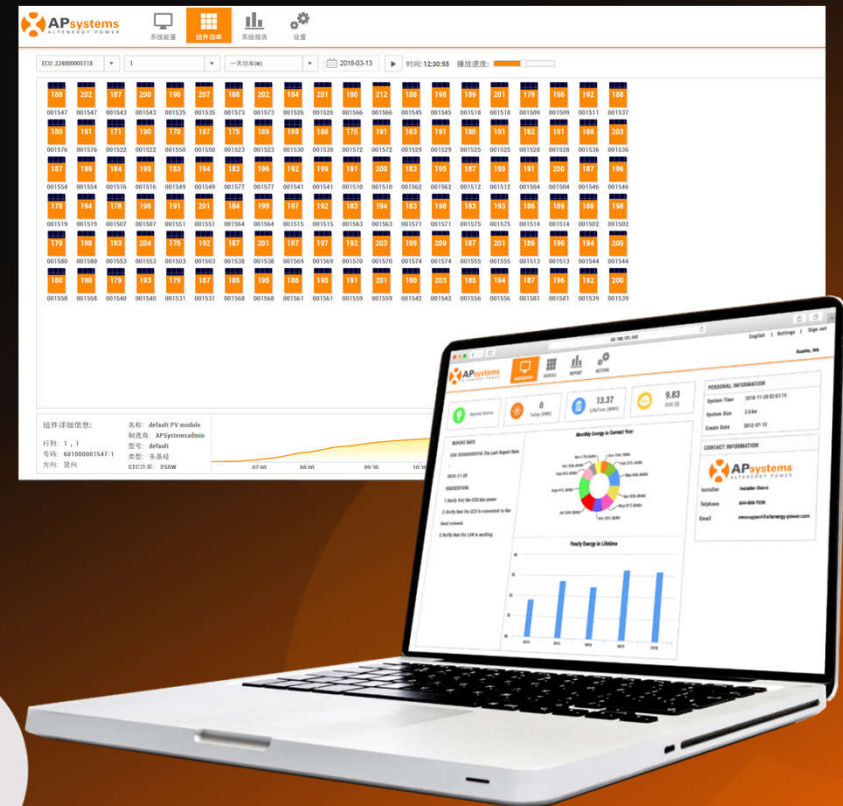
- IntePower Proprietary Chip
- IP0112Q RSD Control chip and PCBA

# APsaas MLPE PV Plant Smart O&M Platform



# Energy & Monitoring Analysis (EMA)

- Robust Energy Monitoring & Analysis (EMA) interface
- Advanced web-based software
- Detects and alerts user to any performance issues
- Module-level monitoring
- Applications suite to commission, monitor and fasten installation time available on IOS & Android devices.

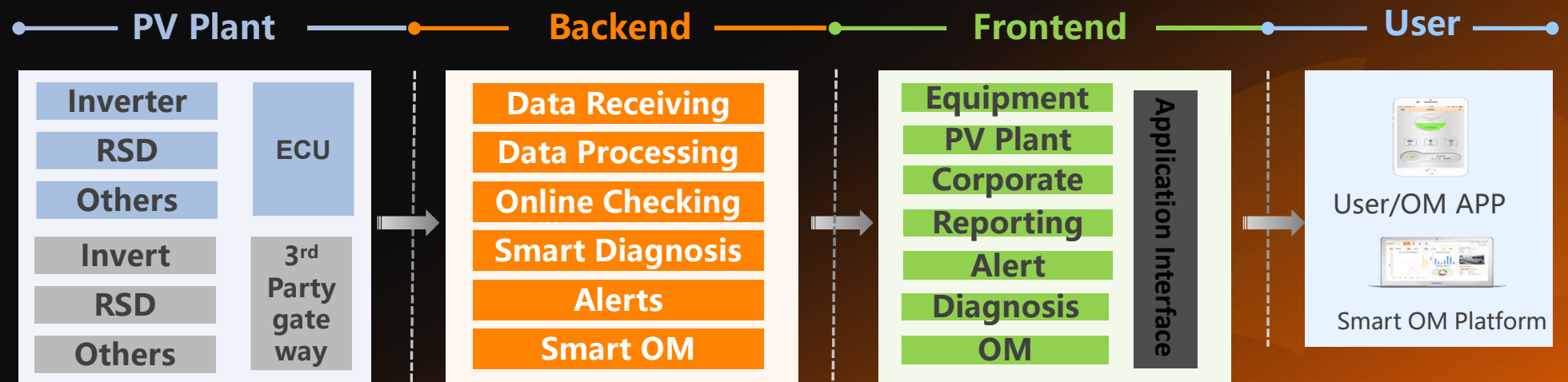


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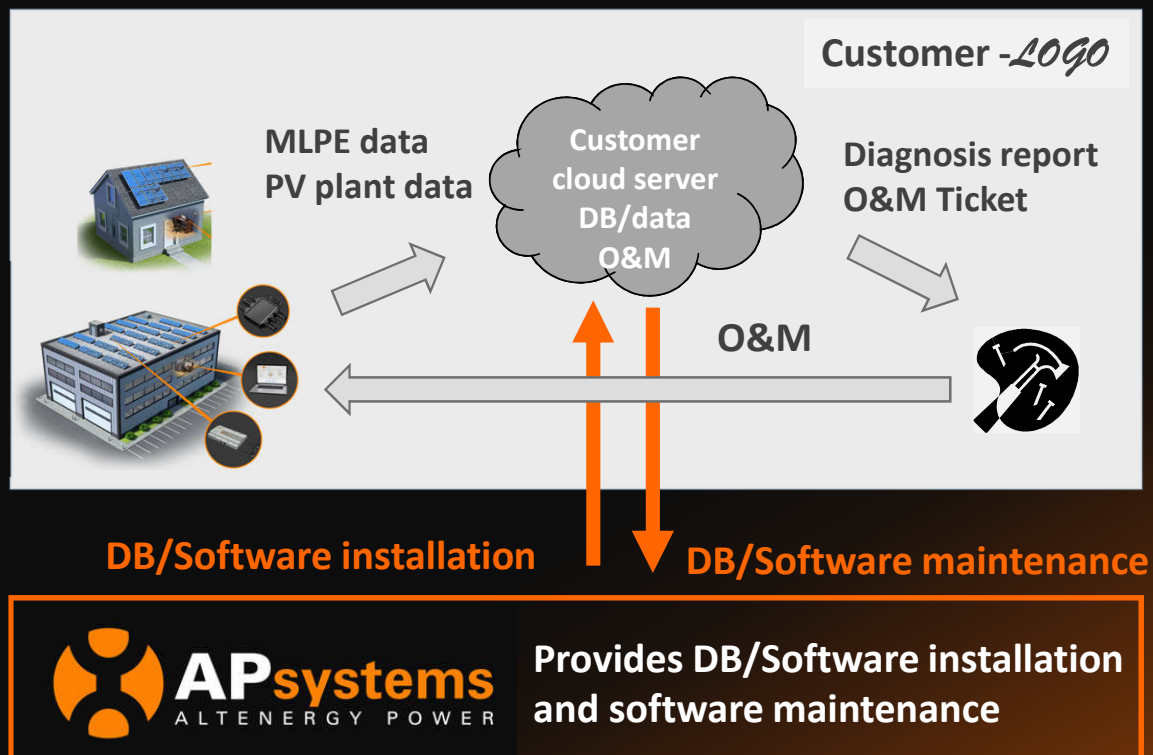
# APsaas+ MLPE Monitor to Smart PV Plant O&M Platform

MLPE monitor produces huge amount of data which is hard to use.

APsaas+ MLPE monitor data, with PV plants other equipment data, big data and AI techniques, fault diagnosis, issue maintenance ticket



# SaaS+ : Private Cloud and Customization

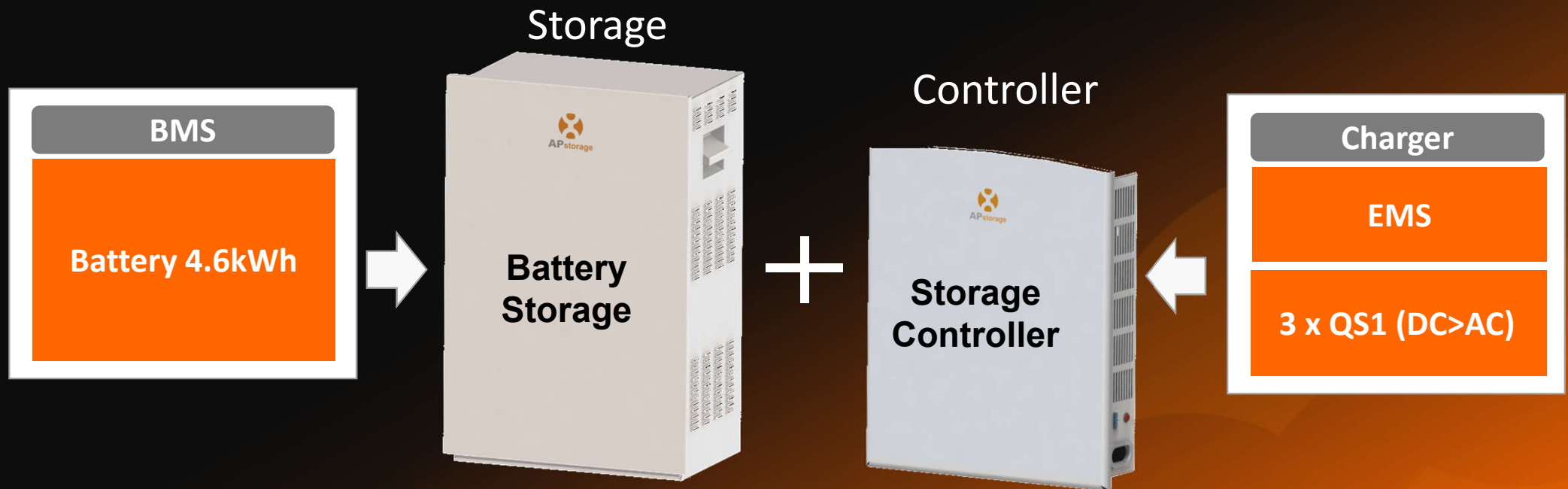


## APsaas provides flexible software business model

- Customer private server (local or rental cloud server) and customization in software GUI and features.
- Software customization and installation fee, yearly software maintenance fee.

# **APstorage** To be released in Q4 2019

- AC Coupled ESS
- 2 SKUs: 4.6 - 9.4 kWh
- Modular - All in one
- Rated Output 3.2 KW
- Max Output 4.5 KW
- 10 YEARS / 4K cycles

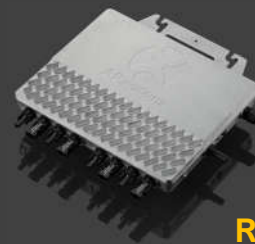


# INNOVATION COMMITMENT



**YC1000 World's 1st  
Native 3-phase,  
Module-Level  
Monitoring, IP 67**

**2016**



**QS1, IP67  
4 MPPTs,  
Reactive Power Control**



**YC600,  
IP67, 2 MPPTs,  
Reactive Power Control**

**2018/2019**



**And....**



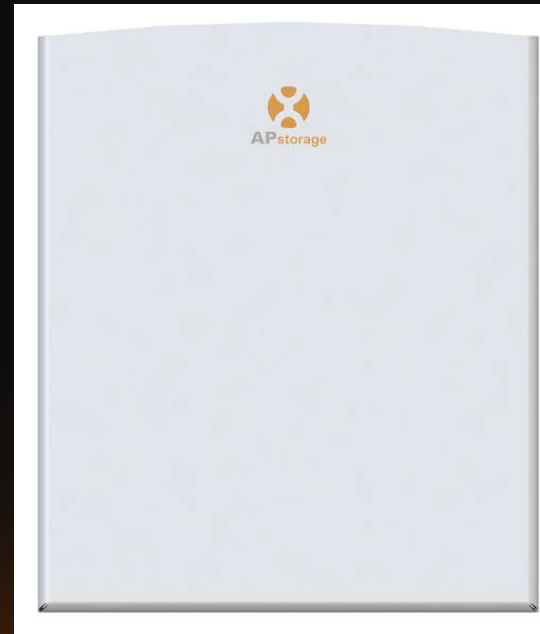
# 3-Phase Quad

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## QT2 vs YC1000-3

- Q “Quad” T “Three phase” 2 “2<sup>nd</sup> generation”
- 4 MPPT vs 1 MPPT
- Smart inverter functions (Reactive power control)
- Power: 1500Wac vs 1130W (new upgraded version)
- Peak efficiency: 96.5% vs 95%

# Energy Storage System



- AC Couple Battery System
- Capacity: 2.5 – 10KWh
- Modular All in one
- Output: 3200W

# Single Phase Duo DS3 & Quad QS2

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## DS3

- D “Dual” S “Single phase” 3 “3<sup>rd</sup> generation”
- Power: 800Wac vs 600Wac (YC600)

## QS2

- Q “Quad” S “Single phase” 2 “2<sup>nd</sup> generation”
- Power: 1500Wac vs 1200W (QS1)

A world map in shades of gray and black, overlaid on a dark background. Several orange circular markers with a white cross-like pattern are placed on the map, indicating specific locations in North America, Europe, Asia, and Australia. The background transitions from dark gray to a bright orange gradient on the right side.

# Thank You

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