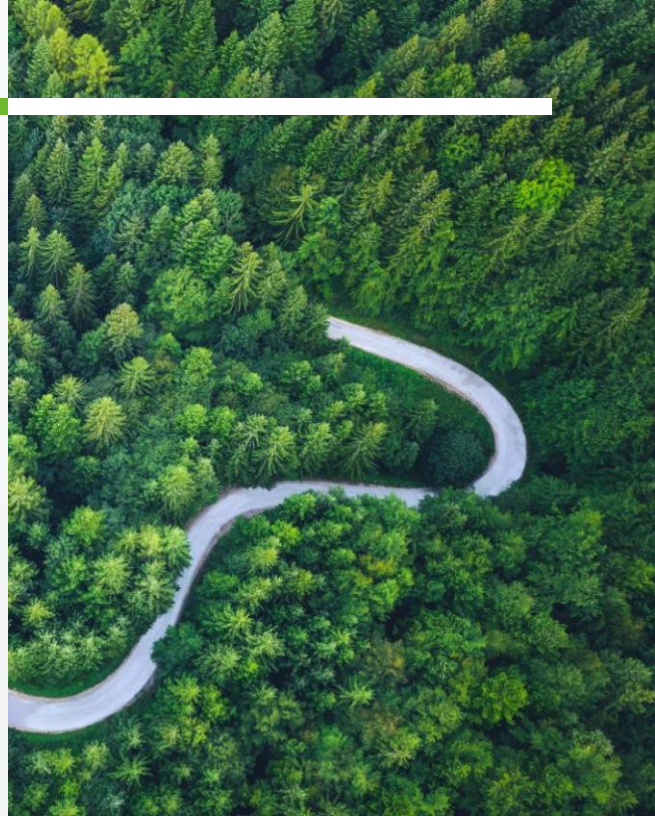

GROWATT COMPANY PROFILE



SHENZHEN GROWATT NEW ENERGY CO.,LTD

GROWATT

Content



01

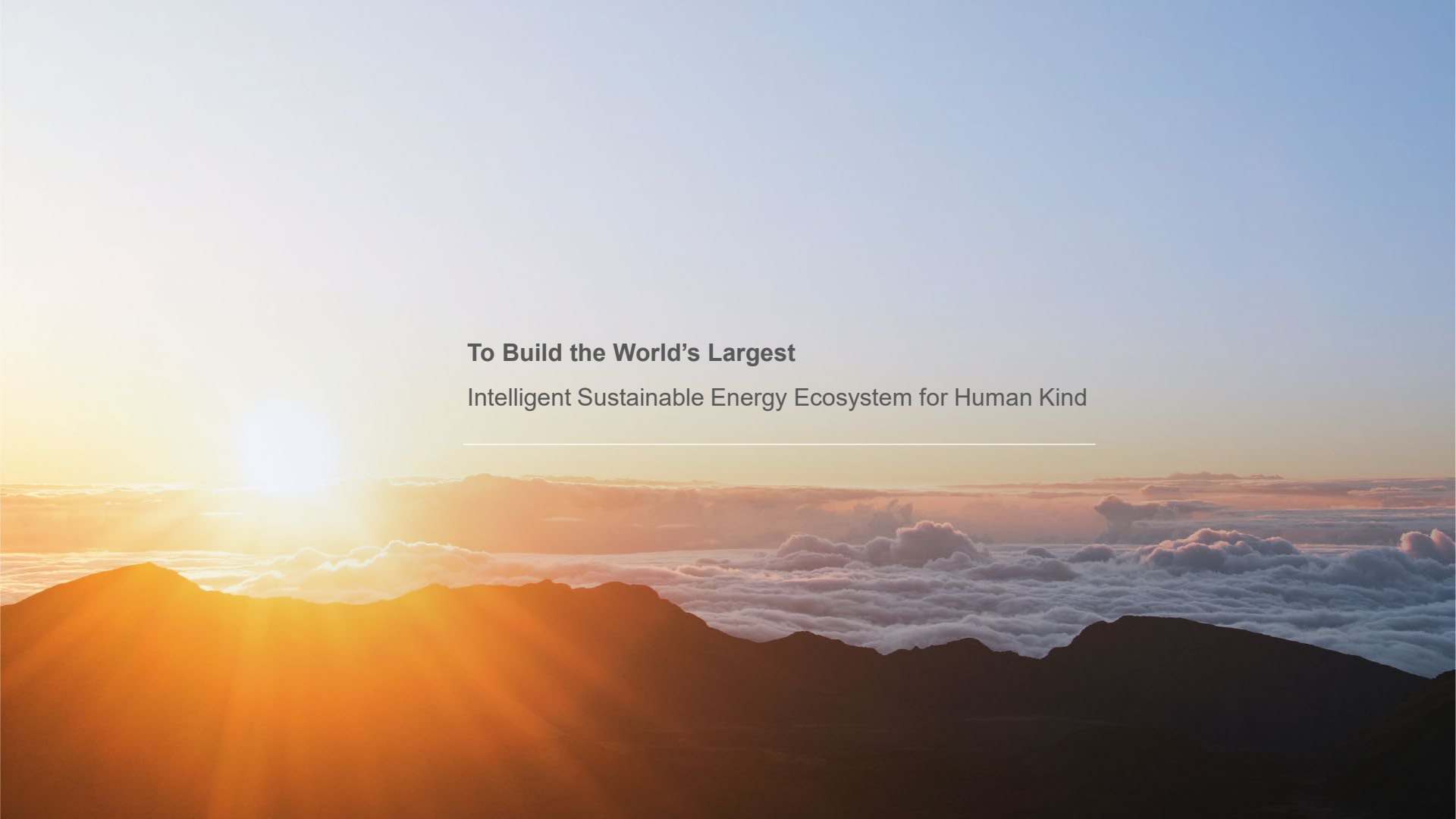
Company Profile

02

Product & Solutions

03

Global Reference



To Build the World's Largest

Intelligent Sustainable Energy Ecosystem for Human Kind

Business Focus

Growatt is a new energy enterprise dedicated to the R&D and manufacturing of PV inverters, Energy Storage and EV Charger as well as Smart Energy Management solutions.



PV Inverter

Energy Storage

EV Charger

**Smart Energy
Management**

Milestone History

2012

Launched Growatt 5000MTL inverter which received double A rating by Photon Lab.

2015

Launched residential energy storage solution

2018

Launched residential off-grid and micro-grid storage solutions

2020

Launched Growatt smart home management solution – GroHome, ranked The Smarter E Award Finalist

2022

Launched portable power station new products, Infinity 1500 won the Red Dot Award 2022 for innovative product design.

2011

Founded in Shenzhen 2011
Established subsidiaries in Australia and Hong Kong

2013

Established subsidiaries in US and UK

2017

Ranked among global top 10 inverter suppliers according to Frost & Sullivan.

2019

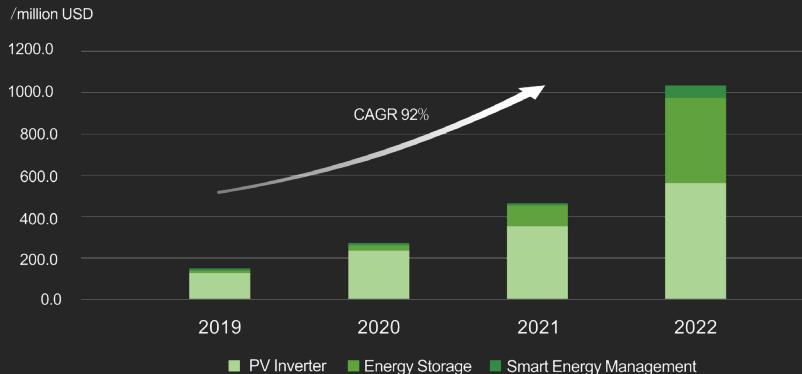
Launched MIN 2500-6000TL-XH inverter, offering the battery ready solution for solar energy storage

2021

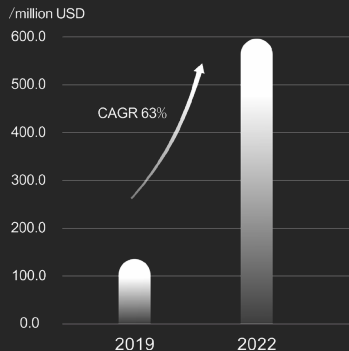
Established advanced manufacturing plant in Huizhou
Became the world's No. 1 residential inverter supplier according to Frost & Sullivan

Sustainable Growth

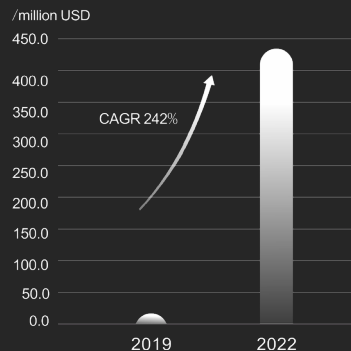
Considerable Growth in Revenue



CAGR of PV Inverter Revenue



CAGR of Energy Storage Revenue



2.1M+

Cloud users

3.1M+

Annual inverter
production capacity

180+

Countries
with systems installed

5,500+

Employees

1,100+

R&D engineers

4.6%

Revenue invested
in R&D for 2022

*By March 10th, 2023

Global Leader of PV & Energy Storage Industry

Global No.1 Residential PV Inverter Supplier by Shipment, 2022

Table 4.10 - PV inverter supplier market share estimates for residential projects

Shipments (MWac)

| 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Company Name | 2022 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|-------------------------|---------------|
| - | 7 | 8 | >15 | >15 | 15 | 6 | 4 | 2 | 4 | 3 | 1 | 1 | Growatt | 12.0% |
| - | 3 | 3 | 5 | 5 | 7 | 3 | 5 | 7 | 3 | 4 | 3 | 2 | Enphase Energy | 11.2% |
| - | >15 | 15 | 9 | 7 | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 3 | SolarEdge | 10.3% |
| - | >15 | >15 | >15 | >15 | >15 | >15 | >15 | >15 | >15 | >15 | 11 | 4 | Deye | 6.9% |
| - | >15 | >15 | >15 | >15 | 10 | 8 | 6 | 6 | 6 | 7 | 7 | 5 | Ginlong | 6.6% |
| - | >15 | >15 | >15 | >15 | >15 | >15 | >15 | >15 | 12 | 10 | 5 | 6 | Huawei | 6.5% |
| - | >15 | >15 | >15 | >15 | 11 | 7 | 3 | 8 | 10 | 6 | 4 | 7 | GoodWe | 6.1% |
| - | >15 | >15 | >15 | >15 | >15 | >15 | 10 | 5 | 7 | 9 | 10 | 8 | Sungrow | 6.0% |
| - | 1 | 1 | 1 | 3 | 1 | 1 | 2 | 3 | 2 | 2 | 6 | 9 | SMA | 5.4% |
| - | >15 | >15 | >15 | >15 | >15 | >15 | >15 | >15 | 9 | 8 | 9 | 10 | SOFAR | 4.6% |
| - | 4 | 10 | 11 | 10 | 8 | 4 | 7 | 4 | 5 | 5 | 8 | 11 | Fronius | 3.9% |
| - | >15 | >15 | >15 | >15 | >15 | >15 | >15 | >15 | >15 | >15 | 12 | 12 | Hoymiles | 2.8% |
| - | >15 | >15 | >15 | >15 | >15 | 15 | 13 | 14 | >15 | >15 | 15 | 13 | SolaX Power | 2.7% |
| - | >15 | >15 | >15 | >15 | >15 | >15 | >15 | 15 | 15 | 15 | 13 | 14 | APsystems | 2.4% |
| - | - | - | - | - | - | - | - | - | - | - | - | - | Others | 12.6% |
| | | | | | | | | | | | | | Total MW Shipped | 38,964 |

S&P Global
Commodity Insights

Global Top 4 PV Inverter Supplier by Shipment, 2022

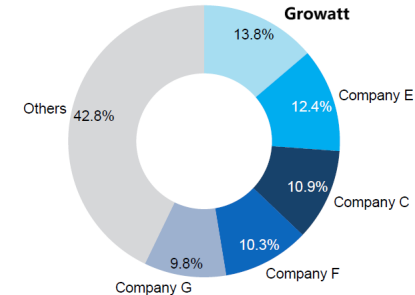
Table 4.5 - World PV inverter supplier market share estimates

Shipments (MWac)

| 2022 | Company Name | 2022 |
|-------------------------|-------------------|----------------|
| 1 | Sungrow | 23.6% |
| 2 | Huawei | 22.2% |
| 3 | Ginlong | 4.8% |
| 4 | Growatt | 4.7% |
| 5 | SMA | 3.4% |
| 6 | Power Electronics | 3.3% |
| 7 | SolarEdge | 3.2% |
| 8 | Sineng Electric | 3.1% |
| 9 | GoodWe | 2.6% |
| 10 | SOFAR | 2.3% |
| | Others | 26.7% |
| Total MW Shipped | | 326,557 |

S&P Global
Commodity Insights

Global No.1 User-side Storage Inverter Supplier by Shipment



Source: Frost & Sullivan Analysis

Global Top Brand

EUPD Research

TOP BRAND PV SEALS

EUROPE



AFRICA



THE AMERICAS



ASIA PACIFIC



Sustained High Investment in R&D that Brings Technology Breakthroughs

\$48M

R&D Expense
of 2022

\$100M

Cumulative R&D
Investment of 2019-2022

73%

CAGR of 2019-2022
R&D Investment

*By end of 2022

Achieved Patents 167+

PHOTON Lab

2014 20KTL3-HE, Double A+ rating

TUV Rheinland Quality Award

2018 MAX 80K ranked No. 1 for commercial inverters

The Smarter E

2020 GroHome ranked The Smarter E Award

pv magazine Award

2020 MIN-XH inverter won pv magazine AWARD 2020

TUV Rheinland Quality Award

2020 ARK Battery ranked No. 1 of BESS for home use

Solar Power World Top Products in US

2021 MIN-XH-US inverter and ARO-XH battery

pv magazine Award

2022 APX HV battery won pv magazine AWARD 2022

Advanced Manufacturing Center

Annual Capacity of 3.1 Million Inverters and 400K Battery Packs
Highly Automated Production Line
Execute Growatt 5-Steps Quality System



Global Presence

42 Representative Offices and Warehouses. Products installed in more than 180 countries or regions worldwide.



★ Headquarters ● Representative sites ▲ Factory

PV Inverters

Growatt provides a wide range of smart PV solutions for residential, C&I and utility-scale solar plants. Growatt's smart string PV inverters, capacity ranging from 0.75kW to 253kW, along with Online Smart Service(OSS) platform achieve higher yields and provide superior safety and smarter O&M for customers.



Residential



Commercial & Industrial



Utility Scale

Residential Products

Micro Inverter



NEO 2000M-X
(2kW)

Single Phase



MIC 750-3300TL-X
(0.75-3.3kW)



MIN 2500-6000TL-X/XH
(2.5-6kW)

* Also have 3-11.4kW models for America

Three Phase



MOD 3000-10000TL3-X/XH
(3-10kW)



MOD 10-15KTL3-X
(10-15kW)



MLPE & String

Full range solution for MLPE
and String level PV system



Safe & Reliable

Type II SPD, AFCI, Fuseless



Smart & Flexible

Online remote service
Future proofed battery ready

C&I, Utility PV Products

Commercial and Industrial



MID 15-25KTL3-X
(15-25kW)



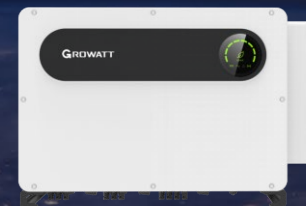
MID 30-50KTL3-X
(30-50kW)



MAC 30-70KTL3-X LV/MV
(30-70kW)



MAX 50-150KTL3-X LV/MV
(50-150kW)



MAX 185-253KTL3-X HV
(185-253kW)



Optimal LCOE
Multiple MPPTs
Higher DC/AC Ratio
Support Bi-Facial Modules
.....



Safe & Reliable
Type II SPD, AFCI, Fuseless



Smart Maintenance
I/V curve scan
One-click diagnose
Online remote service

Energy Storage System

Growatt's 'Solar + Storage' package solution can be used in various scenarios including new installation and retrofit, covering residential, commercial and industrial diverse applications. Its capacity ranges of 2.5kW-1MW/2.56kWh-2MWh and customers can have warranty for the whole system. Growatt energy storage system also supports access to VPP (Virtual Power Plant) and IoT devices, could provide 24-hour uninterrupted clean energy, maximize PV self-consumption and return for customers.

Growatt smart micro-grid system capacity range of 2-300kW/2.56-600kWh, can utilize multiple power sources and support diverse electrical loads. It's an ideal independent energy solutions for isolated islands and remote areas where there's limited or even no access to the grid.



Residential Energy Storage Products

Battery Ready Storage



MIC 0.75-3.3KTL -XH
(0.75 – 3.3kW)



MIN 2.5-6KTL -XH
(2.5 – 6kW)



MOD 3-10KTL3 -XH
(3 – 10kW)



MID 11-30KTL3 -XH
(11 – 30kW)



MIN 3-11.4KTL -XH-US
(3 – 11.4kW)

Single Phase



SPH 3-6KTL BL-UP
(3 - 6kW)



SPA 1-3KTL BL
(1 – 3kW)



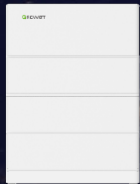
SPH 4-10KTL3 BH-UP
(4 – 10 kW)



SPA 4-10KTL3 BH
(4 – 10kW)

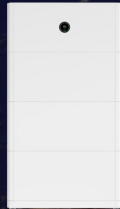
Three Phase

HV Battery



ARK XH Battery System
(Module: 2.56kWh)

Range 2 - 10 pcs
(5.12KWh-25.6KWh)



APX HV Battery
(Module: 5kWh)

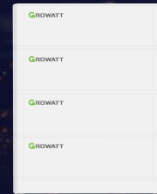
Range 1-6 pcs
(5 - 30kWh)



ARO HV Battery System
(Module: 3.3kWh)

Range 2 - 6 pcs
(6.6KWh-19.8KWh)

LV Battery



ARK LV Battery System
(Module: 2.56kWh)

Max. 10pcs
(2.56KWh-25.6KWh)



GBLI6532
(Module: 6.5KWh)

Max. 8pcs
(6.5KWh-52KWh)

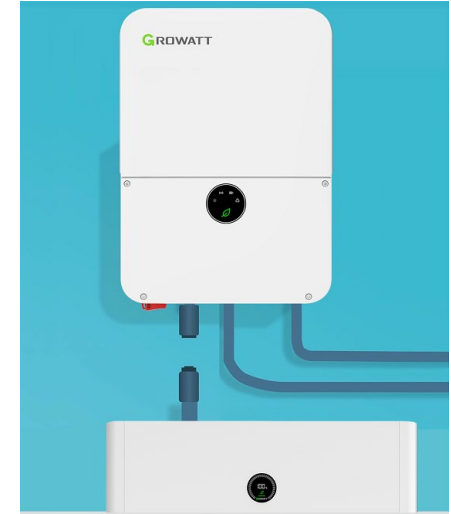
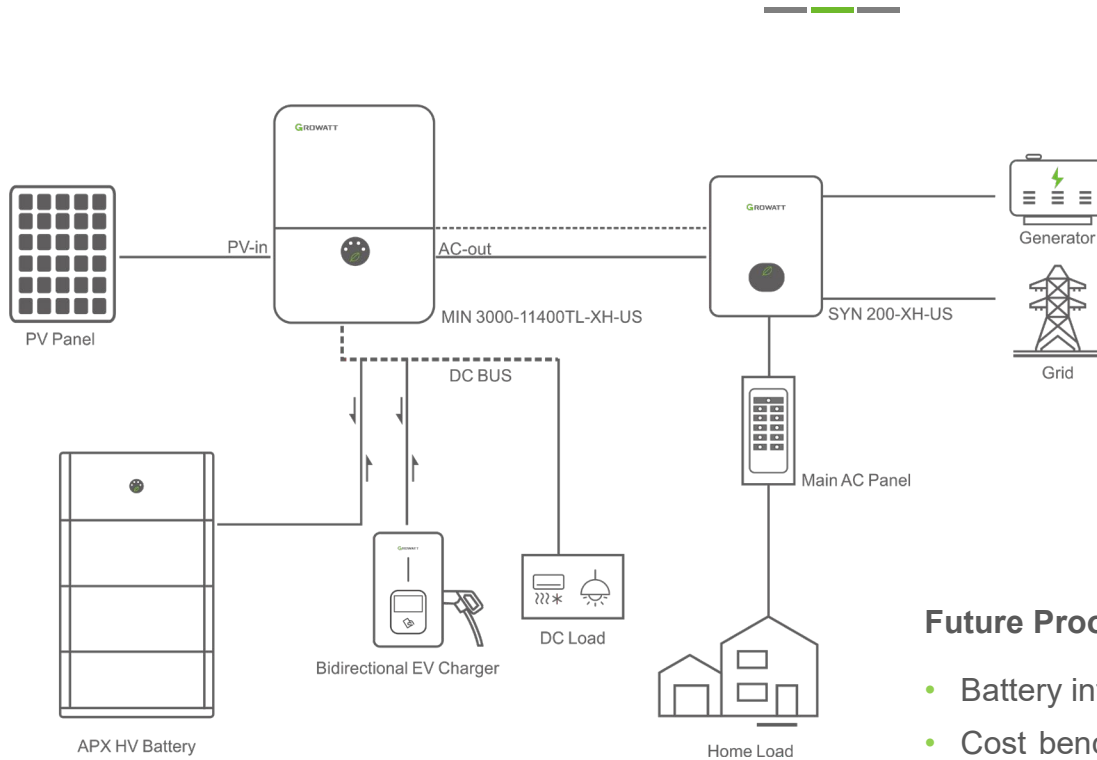
HV Battery



ARK HV Battery System
(Module: 2.56kWh)

Range 3 - 10 pcs
(7.68KWh-25.6KWh)

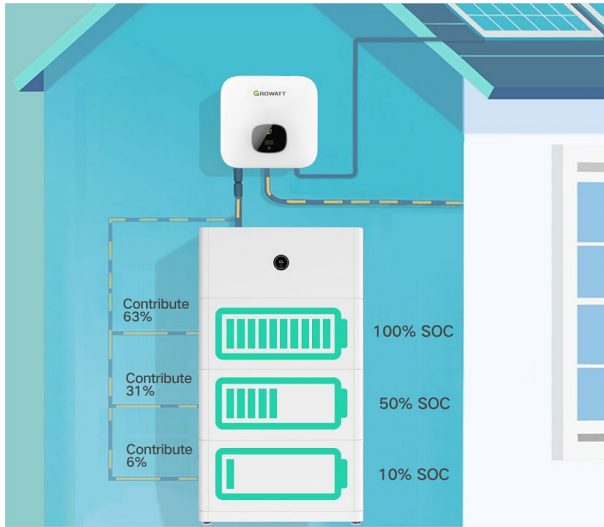
Battery Ready PV System for Your Home



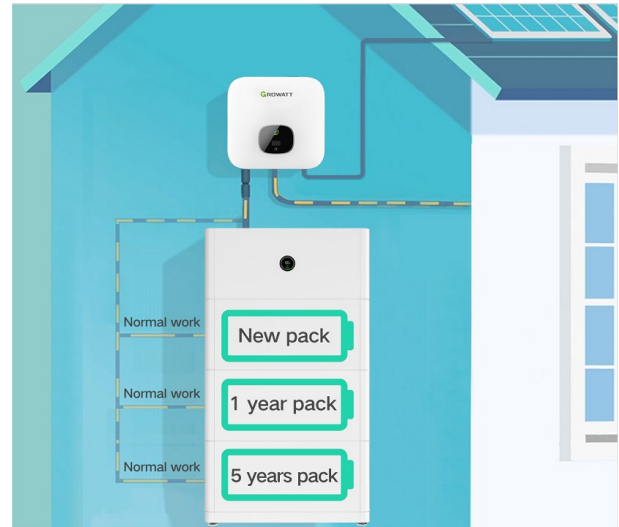
Future Proof Battery Ready

- Battery interface ready, Plug & Play, easy installation
- Cost benchmark with the traditional on-grid inverter, no additional retrofit cost, lock down energy storage customers as early as when they install their first PV system.

Battery Ready PV System for Your Home



✓ Mixed packs of different capacity



✓ Mixed packs of new and old batches

Battery Soft-switching Parallell Connection Technology

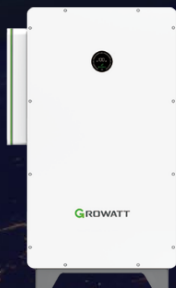
- Built in pack level power optimizer, support different capacity (SOC 0-100%) of battery packs mixed in one system.
- Mixed battery packs of new and old batches, bring the expansion flexibility, easy sales, easy installation and maintenance.



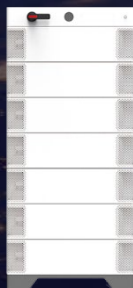
C&I Energy Storage System

Smart energy management for your business

50kW ~ 300kW ESS



WIT 50~100K-HU/AU



APX Commercial Battery

210kW ~ 1MW ESS



WIS 210KTL3



ACE 209H-X1 Battery System



Industrial ESS



Commercial ESS

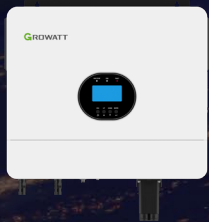


Community ESS

Micro-Grid Storage System

Gain the fully energy independence

2kW ~ 30kW Off-grid ESS



SPF 6000ES Plus



SPF 3000/6000T
HVM/DVM-G2

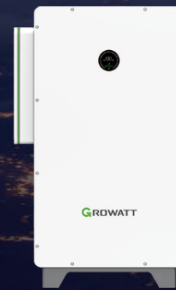


SPH 10KTL-HU



AXE 5.0L Battery

50kW ~ 300kW Micro-grid ESS



WIT 50~100K-HU/AU



APX Commercial Battery



Residential Off-grid ESS



Micro-grid System for Isolated Islands



Network Microgrid for C&I

Growatt Energy Storage System

Guarantee your 24/7 uninterruptable green energy with best whole system



Whole system supplier
Whole system warranty



Superior Safety
LFP Battery, multi-level protections



Smart Management
Remote monitoring & online service



Future Proofed
Ready for VPP & IoT devices



Portable Power Station

Green energy for your outdoor living



VITA 550
(660W/538Wh)
US/EU/AU/CN models



INFINITY 1300
(1800W/1382Wh)
US/EU/AU/CN models



reddot winner 2022

INFINITY 1500
(2000W/1512Wh)
US/EU/AU/CN models



INFINITY 2000
(2400W/2000Wh)
US/EU/AU/CN models



INFINITY 3600
(3600W/3600Wh)
US/EU/AU/CN models



Outdoors



Home Backup



Professionals

Smart EV Charger

Growatt's smart EV charger can be used in various scenarios including residential and commercial. Its capacity ranges of 3-22kW AC charger and 20/40kW DC. With the highlighted GroHome system and PV linkage charge mode, users can remotely control and charge their EVs with 100% clean power.



EV Charger Products

AC EV Charger



THOR 03/07AS-S, THOR 03/07AS-P
(230Vac, 3/7kW)



THOR 11/22AS-S, THOR 11/22AS-P
(400Vac, 11/22kW)



THOR 9/12AS-P-US
(240Vac, 9/12kW)

DC EV Charger



THOR 40DS-P, THOR 40DD-P
(DC, 40kW)



Charge with 100% Solar

Integration with existing & new-installed PV system



Suitable for All Brand EVs

Compatible with Tesla, BMW, Renault, Nissan, BYD ...



Smart Management

Remote Control and Smart Scheduling thru the Shinephone APP



Strong Security

IP65, 6mA DC Fault Current Protection, Overload/Short Full Protection

Smart Energy Management

Growatt's smart energy solution is built upon Big Data, AI and IoT. By using multi-point data monitoring and smart cloud platform, it supports the prediction of energy generation and consumption and can achieve smart management and distribution of energy. It's the ideal solution to provide clean energy for households and businesses.



Smart Monitoring & Maintenance



Smart Home



Smart Facility

Smart Monitoring & OSS Cloud

Over 2.1 millions end users active on Growatt cloud

- ◆ One-click diagnosis
- ◆ 24*7 online scanning & failure report
- ◆ Remote parameter setting
- ◆ Remote firmware upgrading

Diverse Monitoring Devices



Shine
WiFi/GPRS/4G



ShineLAN-X



ShineLink



ShineMaster/-4G



Smart Energy
Manager

Smart Monitoring Platform & OSS



ShinePhone APP



ShineServer



Online Smart Service (OSS)

Smart Home

GroHome

is a smart home system that integrates solar, energy storage, smart EV charger, water heater controller, VPP interface and IoT devices to increase a household's rate of PV self-consumption, also support the prediction of energy generation and consumption based on Big Data and AI technology, allowing you to enjoy the new lifestyle of green, comfort and smart.

100% Green Energy Powering Your Home.

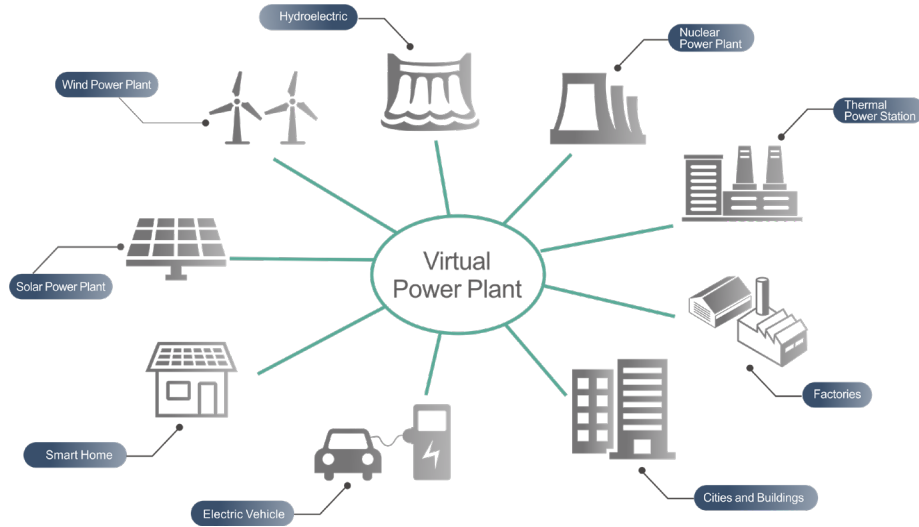


GroHome Product Family

Powering your home smarter



VPP for Smart Energy



- **VPP** (Virtual Power Plant) is a platform to virtualize and balance dispersed power supply resources, multiple distribution routes, and various demand centers.

BENEFITS

Demand Response

Peak load reduction, reduced operation of peaker plants, and low carbon emissions

Reductions in electricity prices, benefiting all customers

Financial compensation for DR participants



Energy Storage Systems

Financial benefits of utilising off-peak energy stored and used during peak periods

Enabling smooth RE power output for submitting generation bids



EV Charging Asset

Peak shaving using energy stored in fully charged EVs

Financial benefits for EV users to feed energy to the grid



RE Generation

Grid independence

Energy trading for both peak power and base load generation

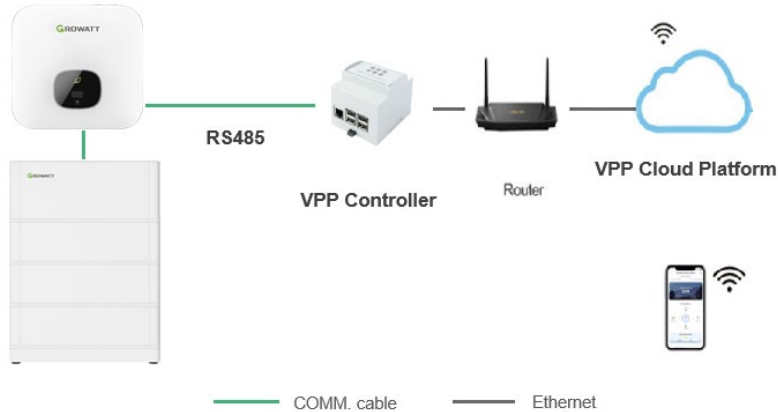


- Renewable Energy starts to dominate the global energy market, smart management of distributed energy is becoming inevitable.
- **VPP Benefits:** financial compensation for Demand Response participants to support grid (Australia and EU many countries already have commercially successful DR programs that incentive renewable energy customers), Energy Storage System peak shaving, financial benefits for EV users to feed energy to the grid, energy trading of RE Generation.

Growatt Solutions for VPP

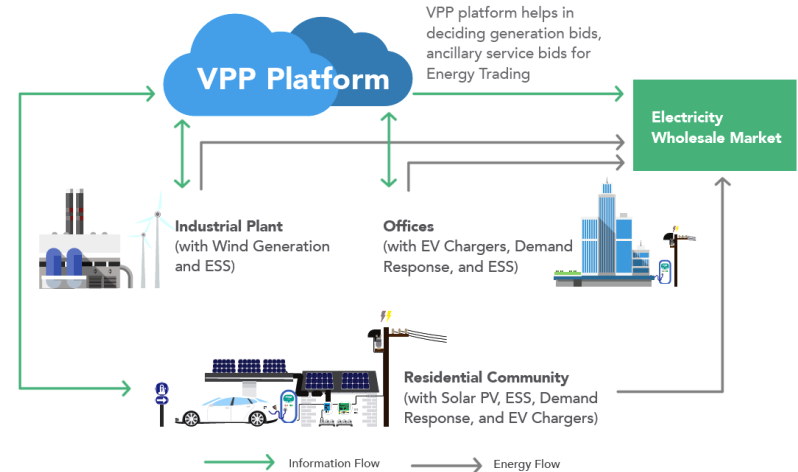
Distributed Smart Energy System

Growatt solar and energy storage system support access to VPP easily, could gain more returns thru Demand Response, energy trading, peak shaving etc.



VPP Platform

Growatt also provide the VPP Platform solution for VPP operators, support them to build the VPP program in the market, which is the control center to achieve the electricity smart distribution, Demand Response and energy trading etc.



Future of VPP

Growatt strong R&D team and big data technology will focus on the continuous innovations on the future VPP Platform: Self learning and Intelligence, Real time – integrate weather data and market prices, Predictive – the best energy strategy.



Global Reference



Growatt 10 years sustainable service, Australia

5000MTL (installed 10 years ago), 2pcs MIN 5000TL-X (newly installed to extend capacity)



15KW
Adelaide , Australia

19.5KW Residential PV System in Australia

MIN 5000TL-X



5KW Residential PV System in Uberlândia, Brazil

MIN 5000TL-X





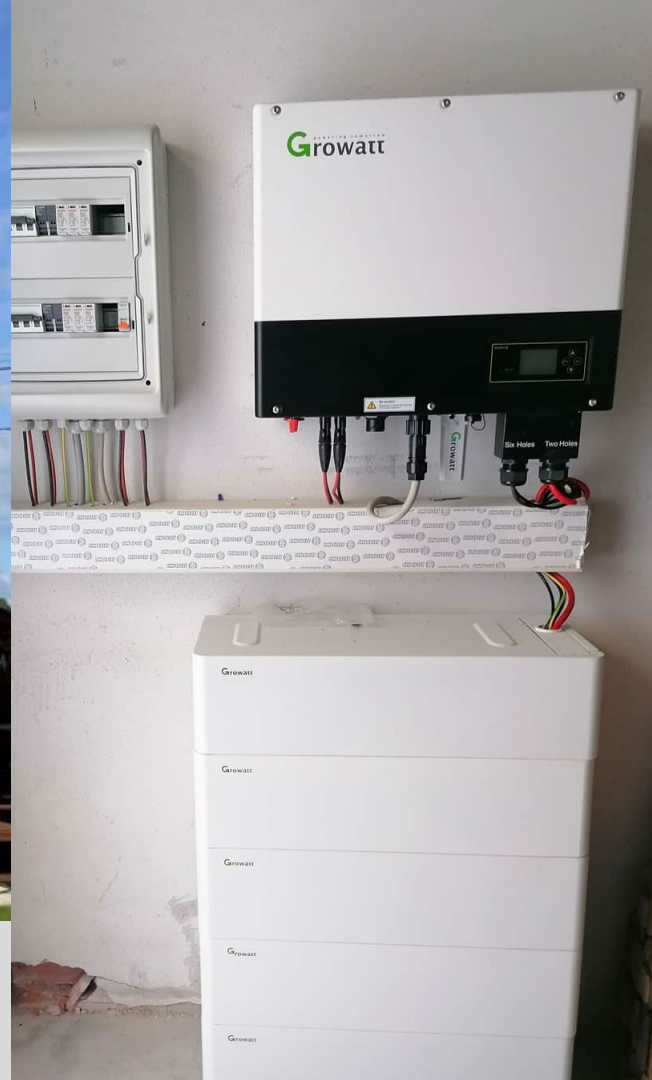
3kW/6.5kWh Residential ESS in South Australia

SPA 3000TL BL + GBLI 6531 Battery



5kW/12.8kWh Residential ESS in Italy

SPH 5000 + ARK LV Battery





5kW/13kWh Residential ESS + 7kW EV Charger in Italy

SPH 5000 + GBLI 6532 *2 + THOR 07AS-P

15kW Residential Off-grid System in South Africa

SPF5000TL-HVM-P



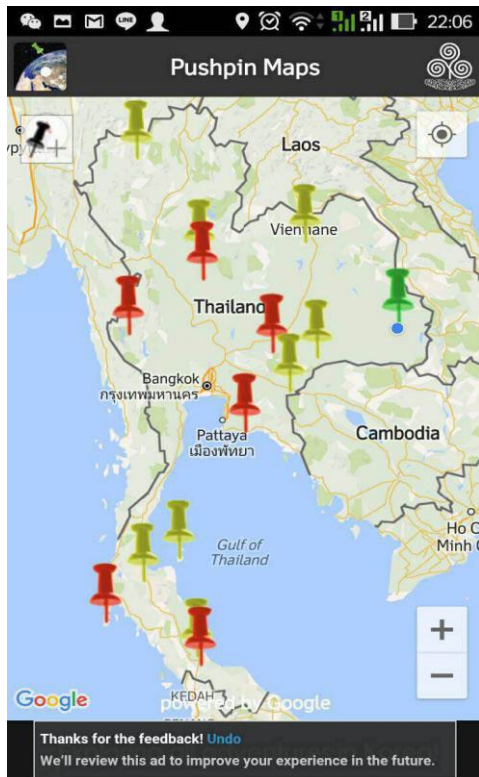
5kW Residential Off-grid System in Philippines

SPF 5000 ES + ARK 10.24kWh Battery



100kW Micro Grid Solution in Thailand

Growatt 100KW micro-grid storage system was installed in 15 bases of Royal Thai Airforce across Thailand



500KW Solar Rooftop, Netherlands



MAX 60KTL3 LV x 8 Units



1MW Solar Rooftop Owner by SPM (Ratchaburi), Thailand



Growatt 40000 NS x 21 Units



1MW Solar Rooftop Netherlands



► **Growatt 15pcs MAX 60KTL3 LV**

1.1MW C&I Rooftop Project in Vietnam

MAX 110KTL3-X LV * 10



1.2MW C&I Rooftop Project in Switzerland

Growatt 40000TL3-NS, Growatt 30000TL3-S



2.5MW C&I Rooftop Project in Fujian, China

MAX 60KTL3 LV



3MW Solar Farm, Maldives



▶ 93 x 30KTL3-S & 27 x 11KTL3-S

3MW Solar Farm, Ninh Thuan, Vietnam



4MW Solar Plant, Anhui, China



► **Growatt 40KTL3-NS x 100**



5MW Ground Solar Plant in Ukraine

MAX 50KTL3 LV



5.5MW Solar Plant Maharashtra, India



Plant Owned by Kirloskar
(60K-HE)



10MW Ground Solar Plant Gansu, China



▶ MAX 60KTL3 LV



90MW Solar Farm EA, Thailand



▼
Growatt 2000TL3-HE



100MW Foxconn Hill Solar Farm



▶ **Growatt 4000TL3-NS**
Henan, China

127MW Ground Solar Plant, EA, Thailand

► Growatt CP500



THANKS



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 Growatt New Energy