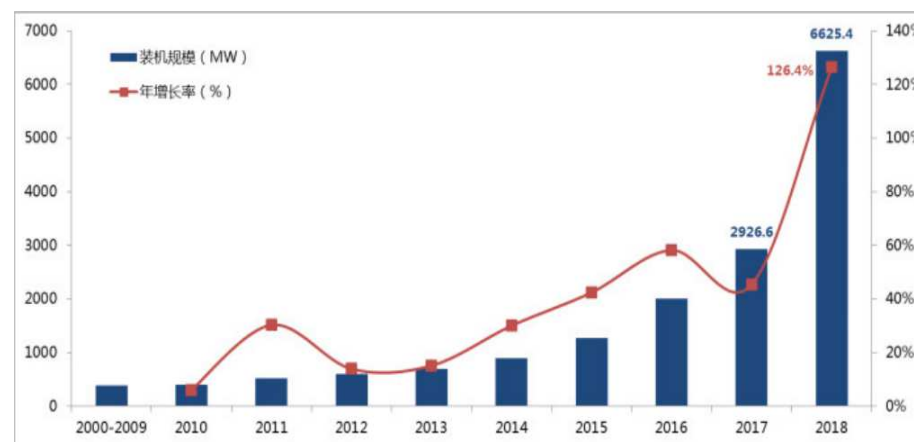


Energy Storage System

Market Analysis & Application Reference

Global Market Size

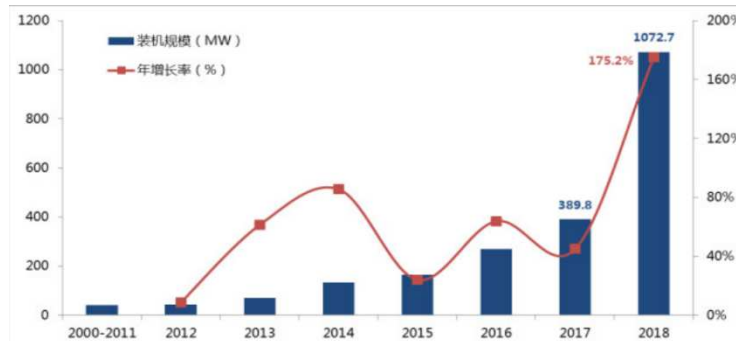


The global chemical ESS capacity is 6.6GW in 2018 which is \$1.98 Billion , growth 126% than 2017, expected to 11GW in 2020

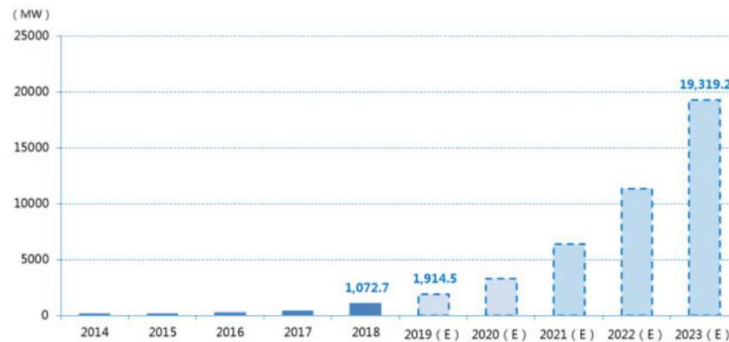
The fast-growing regions are Australia , German ,USA , England , Italy , China , Japan, North Korea and S.E. Asia

Among Whole Chem ESS , Li-thium ESS occupies 70% share . AIPG Products portfolio can find more applications in the Li-thium ESS

Market Growth in China

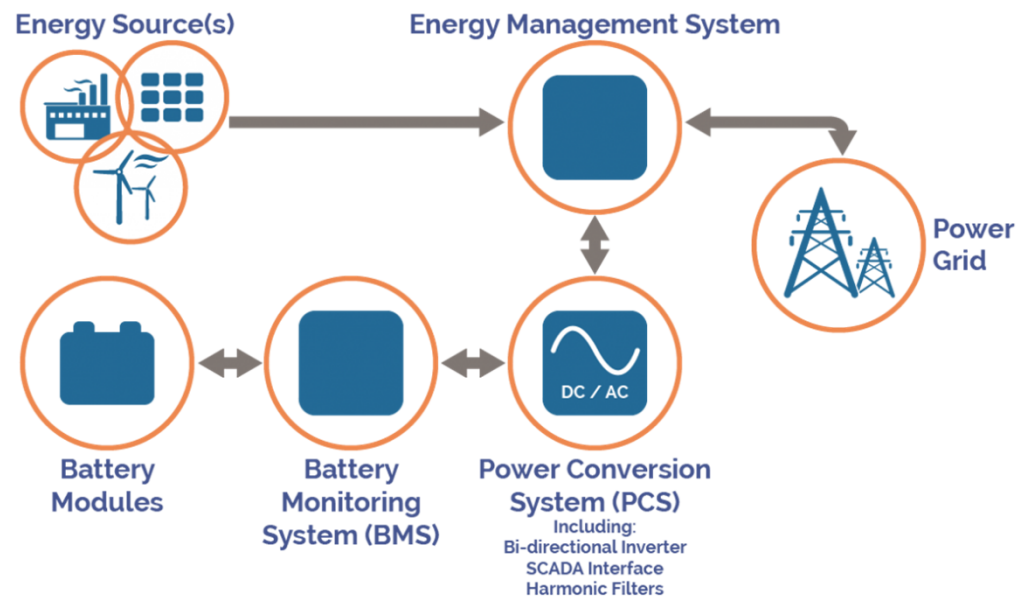


The Chinese chemical ESS capacity is 1.07GW in 2018 , growth 175% than 2017, expanding at a GAGR over 70% from 2018 , expected to 3GW in 2020.



In Chinese ESS market , the end market is mainly for Industrial and Utility , the biggest end user is State Grid.

How Energy Storage Works







Residential, Commercial & Industrial and Utility ESS

Residential		Commercial & Industrial		Utility	
IP rating	Indoor IP21	IP Rating	Indoor IP21	IP Rating	Indoor IP21
	Outdoor IP65				
Cell		Cell		Cell	
Module : Battery Pack, Hybrid Inverter		Module : Battery Pack, BMS , PCS		Module: Battery Pack, BMS, PCS, Combiner Box	
System		System		System	

Residential, Commercial & Industrial and Utility ESS

	Residential	Commercial & Industrial	Utility
End market	Oversea (EU, Australia, US)	Oversea & Domestic	Oversea & Domestic
Power range	3KWh ~ 18KWh	20KWh~ 100KWh	100KWh~ 3MWh
power connector unit quantity	4~16 pcs / set	2pcs / 10KWh	200pcs /1MWh
Rated current range	50A~100A	100A~ 160A	160A~ 350A
AIPG estimated sales Value by unit	USD\$ 100/ set	USD\$ 50 /10KWh	USD\$ 5K /1MWh

Product Application

	Battery Pack	Hybrid Inverter	PCS	System
				
MBC	✓			
Surlok Plus	✓	✓		
RJ 45	✓	✓		
Vent		✓		
H4 Bulkhead		✓		
C016		✓		
Powerlok 4.0		✓	✓	
Terminal block		✓		
Cable assembly		✓		✓

EES System Voltage



Features :

- Residential ESS
- 48V DC
- parallel connection when capacity expansion
- Normally each Battery Pack /Module use 4 pcs power connector
- Safe Voltage but lower efficiency than High voltage ESS



Features :

Residential ESS , Commercial & Industrial ESS ,Utility
120V ~ 1000V DC
Series connection when capacity expansion
Normally each Battery Pack /Module use 2 pcs power connector
Higher System Efficiency than Low voltage ESS

EES Segmentation by End Application



Renewable Energy consumption



EES Segmentation by End Application



Grid & the auxiliary market

Normally, the auxiliary market is for peak-shaving and frequency-shaving. Among them, frequency-modulation assists thermal power generation and improve power quality. Therefore, it requires a higher discharge rate for batteries, usually 2-3C, while peak-shaving is relatively low, generally about 0.5C.



EES Segmentation by End Application



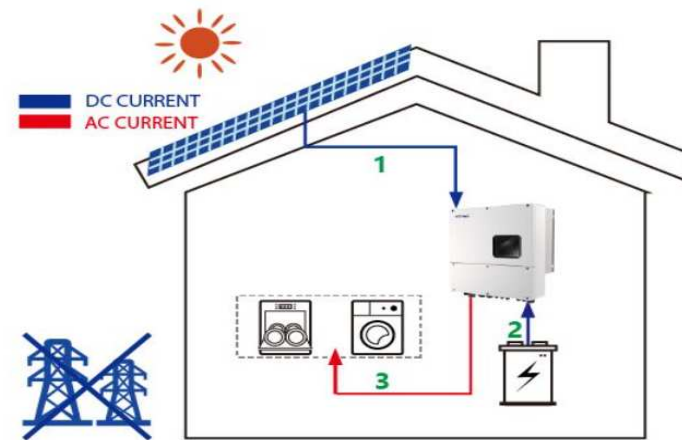
User-side ESS



EES Segmentation by End Application



Off grid and Island ESS



Major Player



Success Story Reference



CUSTOMER: PYLON
PRODUCT: SURLOK PLUS 5.7 & 8.0mm
APPLICATION: Residential & Commercial ESS
PROGRAM VALUE: \$1000K



Panasonic

CUSTOMER: Panasonic
PRODUCT: SURLOK PLUS 10.3mm
APPLICATION: Commercial ESS
PROGRAM VALUE: \$200K





CUSTOMER: LG Chem
PRODUCT: SURLOK PLUS 5.3mm Customized
APPLICATION: Residential storage
PROGRAM VALUE: \$500K





CUSTOMER:
PRODUCT:
APPLICATION:
PROGRAM VALUE:

ALPHA
SURLOK PLUS 5.7 & 8.0mm
Residential & Commercial ESS
\$500K



DYNAVOLT TECH.
猛獅科技

CUSTOMER: Dynavolt
PRODUCT: SURLOK PLUS 10.3mm
APPLICATION: Commercial & Industrial ESS
PROGRAM VALUE: \$100K



Narada 南都

CUSTOMER: Narada Power
PRODUCT: SURLOK PLUS 8.0mm
APPLICATION: Comercial&Indurstrual ESS
PROGRAM VALUE: \$300K





CUSTOMER: ZTT ESS
PRODUCT: SURLOK PLUS 10.3mm
APPLICATION: Commercial & Industrial ESS
PROGRAM VALUE: \$300K





CUSTOMER:
PRODUCT:
APPLICATION:
PROGRAM VALUE:

AKASOL Germany
SURLOK PLUS
Comercial ESS
\$100K



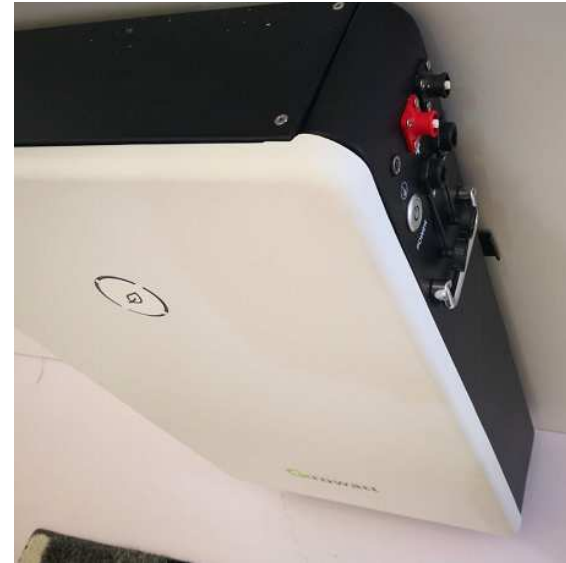


CUSTOMER: Soltaro
PRODUCT: SURLOK PLUS 5.7mm
APPLICATION: Residential & Commercial ESS
PROGRAM VALUE: \$100K



Growatt 古瑞瓦特

CUSTOMER: Growatt
PRODUCT: SURLOK PLUS 5.7mm
APPLICATION: Residential ESS
PROGRAM VALUE: \$100K



invt 英威腾

CUSTOMER: INVT
PRODUCT: SURLOK PLUS 5.7mm
APPLICATION: Residential & Commercial ESS
PROGRAM VALUE: \$100K





CUSTOMER:
PRODUCT:
APPLICATION:
PROGRAM VALUE:

Sermatec
SURLOK PLUS 5.7mm
Residential & Commercial ESS
\$100K



SOLUNA™

CUSTOMER: Soluna
PRODUCT: SURLOK PLUS 5.7mm
APPLICATION: Residential & Comercial ESS
PROGRAM VALUE: \$100K

