



TECLOMAN

MNNSZ Konferencia 2023
December 1

About Us

TECLOMAN



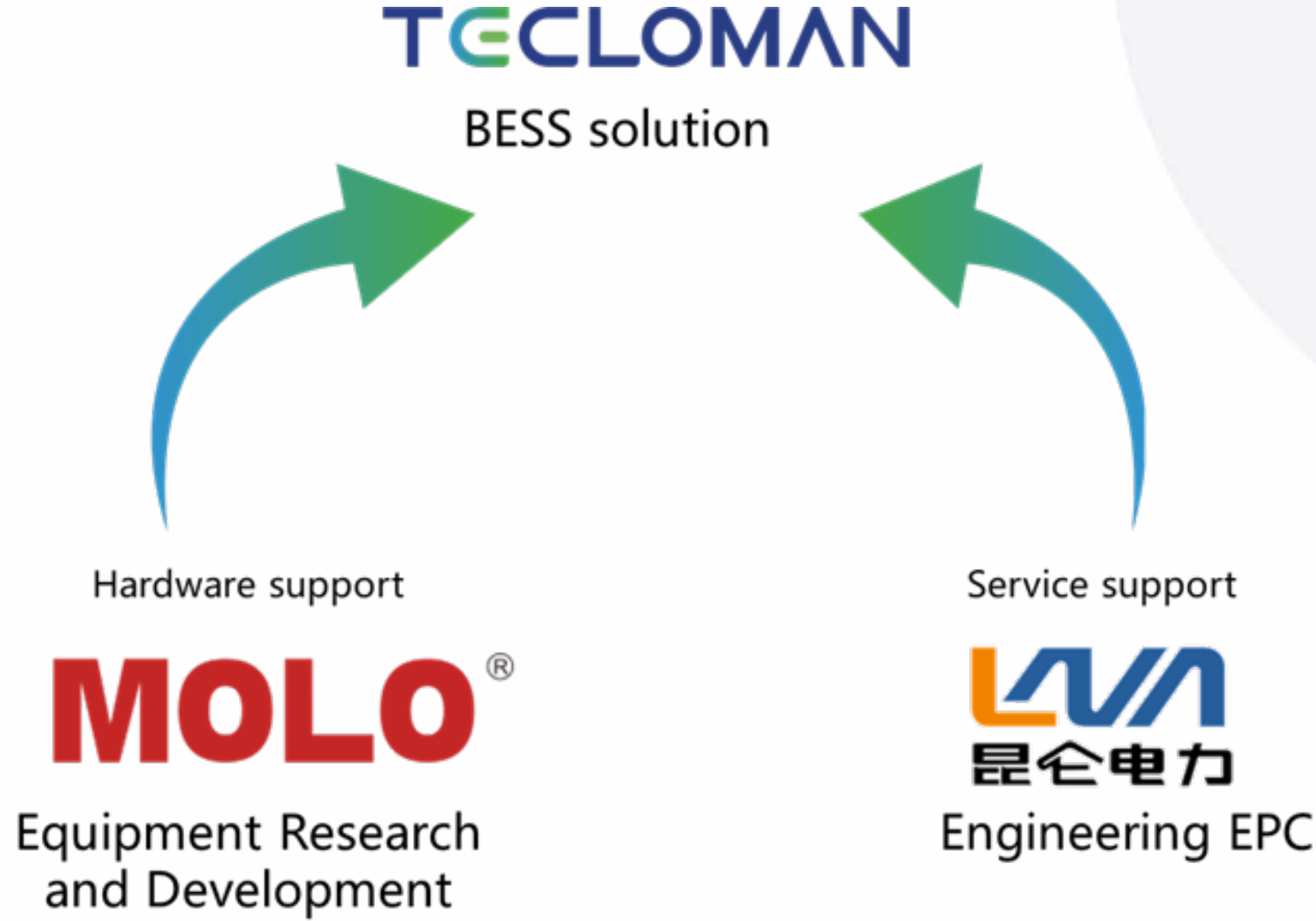
Our History

RICH EXPERIENCE WORKING WITH IN-FRONT-THE-METER AND BEHIND-THE-METER APPLICATIONS

Deeply involved for thirty years with ceaseless actions



COMPANY PROFILE



YOUR TRUSTED PARTNER

TECLOMAN

Our Footprint



20+
countries distributed

100+
urban cases

1000+
projects

Global layout

Based in Chengdu Spreading to China Global oriented

- Boost the industrial development
- Enable more people to enjoy clean energy



Our Accreditations

OUR APPROACH TO QUALITY ASSURANCE UNDERPINS OUR REPUTATION



60000m²+
manufacture base



160+
R&D Technicians



TOP20
High-tech&high-growth
companies by Deloitte



Best Industry & commerce
Energy Storage Solution
Award by CIES



108
Technical Patents



1000+
Global Employees



Best Industrial &commerce
Energy Storage Provider
Award by GEIS



Business Model
Innovation Award by
GEIS



Our Technology



Power electronics control technology

High stability excellent reliability multiple available scenarios

Millisecond-class on-grid/off-grid fast switching technology

Friendly control technology of grid
(Grid reliability improvement, and mandatory technical requirements of grid)

Load adaptation control technology



High-protection battery safety management technology

Early discovery Accurate positioning Handling as soon as possible

BMS four-level management technology

Multidimensional detection technology of fire protection

Multi-level protection technology of fire protection



Professional integration technology

High protection Authorized certification

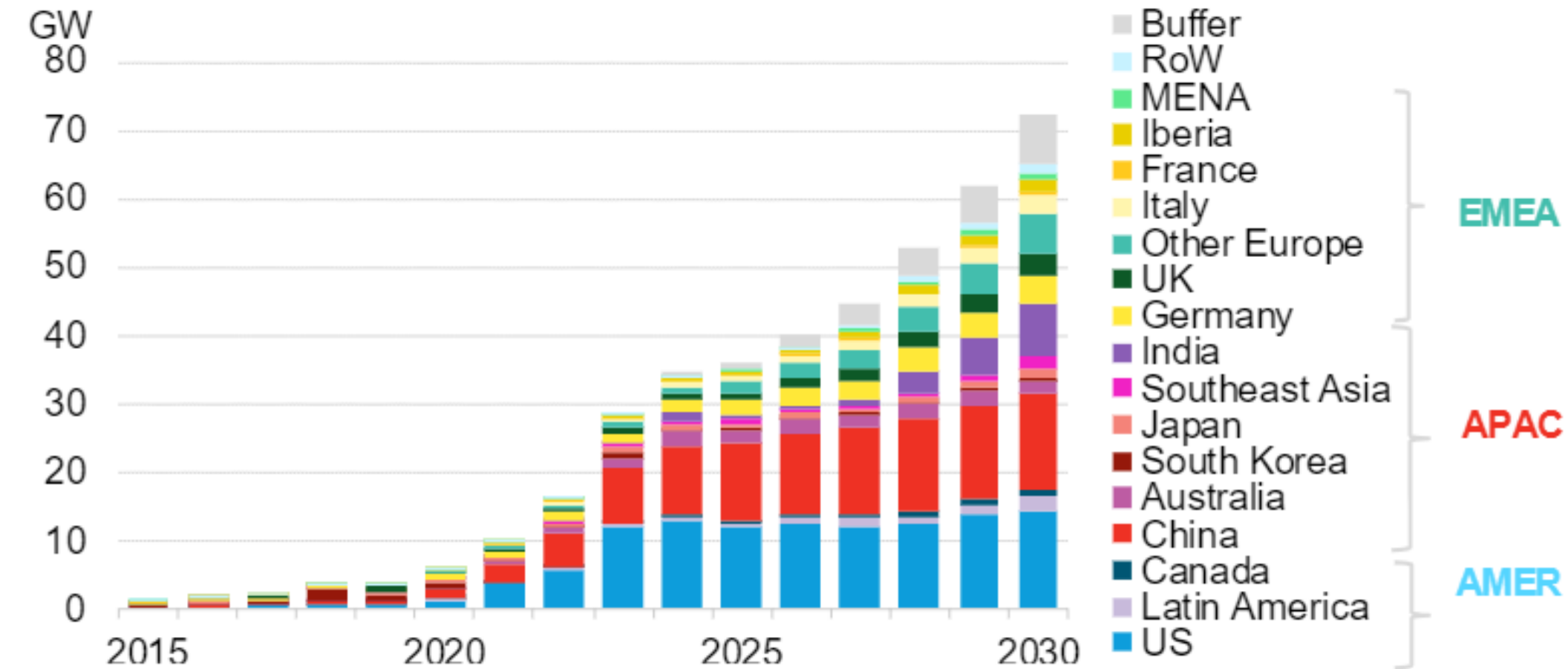
High-altitude and extreme-cold protection technology

Accurate temperature control technology

JTJY (JRCC) certification

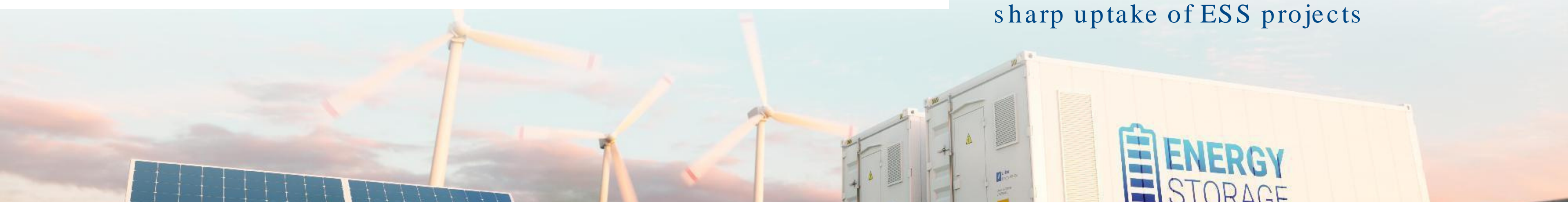
EMEA ESS market outlook

Figure 1: Global gross energy storage capacity additions by key market

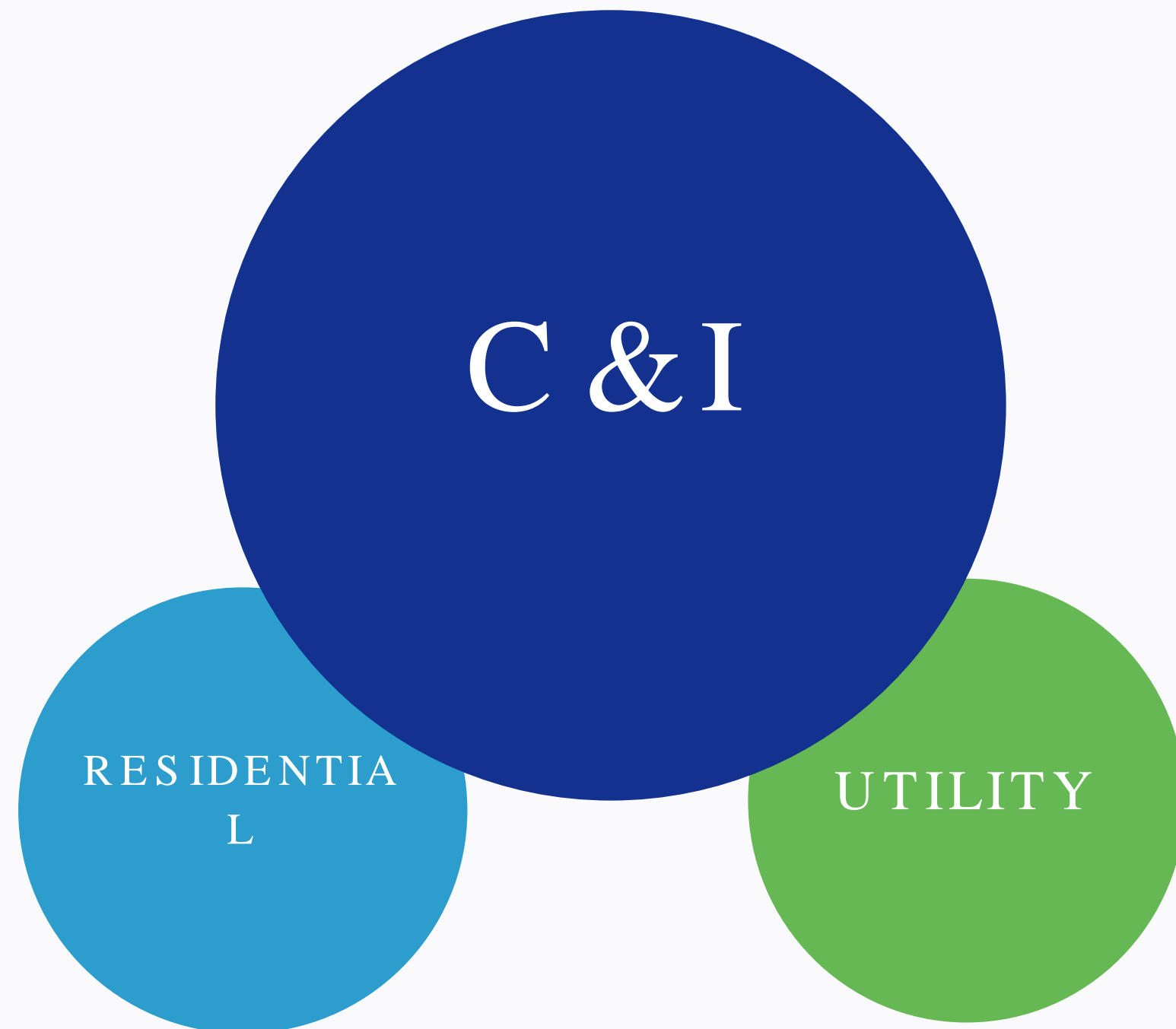


Source: BloombergNEF Note: MENA = Middle East & North Africa. We order countries according to their region group in this chart. Buffer is an estimate/headroom that is not explicitly allocated to any specific application. RoW = Rest of the World.

- ESS Global market setting for record every year, 2022 global deployment 16GW/54GWh
- EMEA Expecting 21% compound growth rate through to 2030, which means a total ESS deployment of 50GW/120GWh through to 2030
- EMEA will be representing 27% of global deployment in 2030. EU will need to work on a concrete ESS plan to help achieving the RE target 1.236GW installation by 2030. Also Africa and ME will continue to see a sharp uptake of ESS projects



Tecloman EMEA market position



- 1 Farms
- 2 Factory
- 3 Hotel
- 4 Data center
- 5 Hospital
- 6 Petrol station
- 7 Mining site
- 8 Logistic halls

Tecloman vision: Empowering sustainable energy transition for the world

Tecloman BESS Solutions Safe, Smart, Sustainable



Introduction
Of
TECLOMAN ESS Products

CONTENT

1: C&I BESS Solution

2: Standard Containerized
BESS Product

3: Utility-scale Battery Cabinet

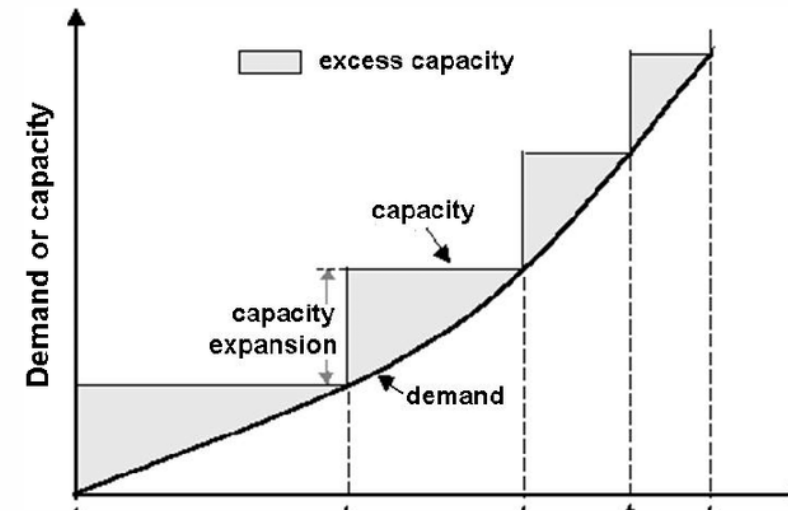
4: Newly-launched

1. Commercial & Industrial Products

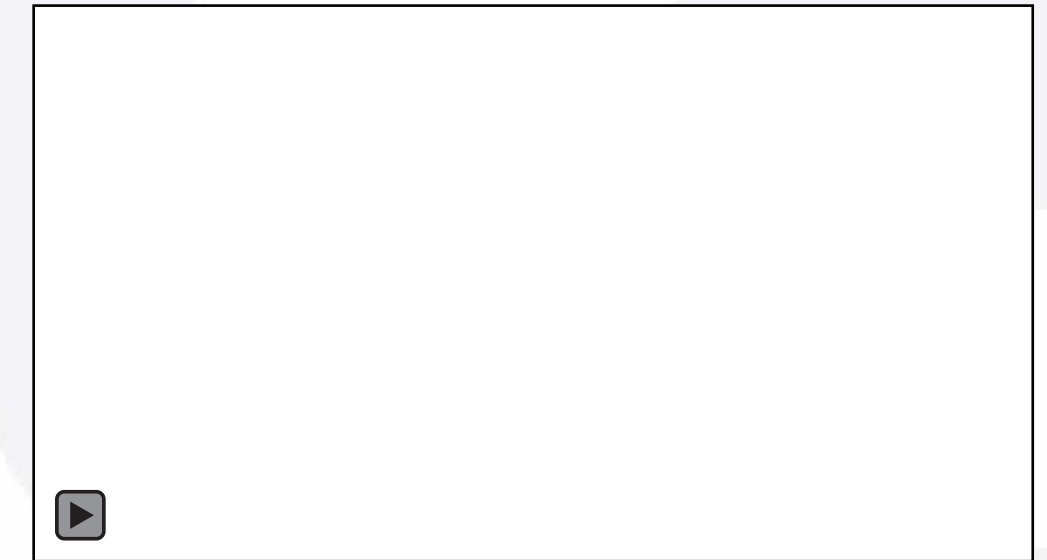
Application Scenarios



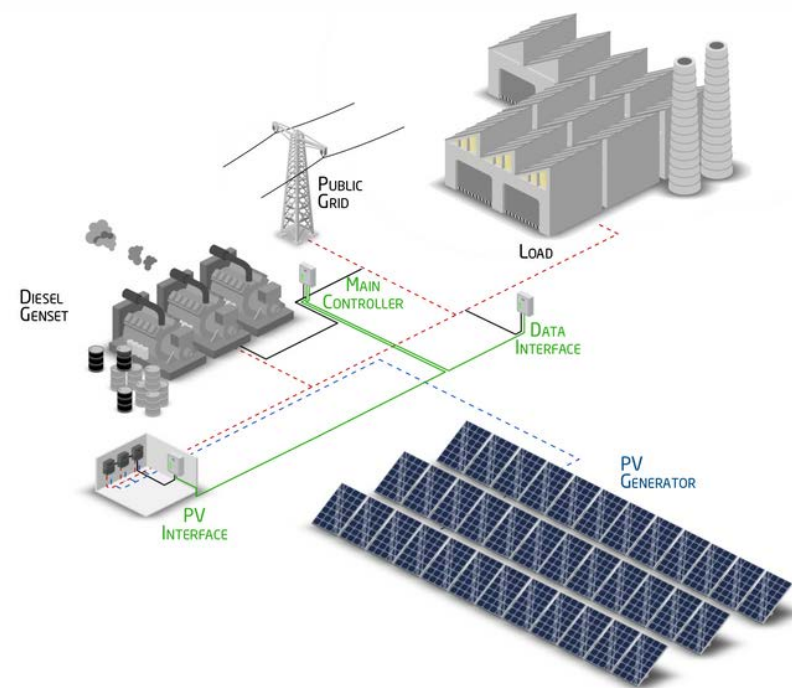
Peak Shaving



Capacity Expansion



Load Shifting



PV + ESS



Low Voltage Support

Energy Bank



- Energy Battery, PCS, BMS, FSS and intelligent temperature control function integrated in one standardized container, enables easy installation.
- Completely independent structural design between battery and electrical components, enables safe & stable system performance.
- **High energy density, small footprint.**

Energy Bank - Parameters

Model	Energy Bank TESS-30-100	Energy Bank TESS-60-100	Energy Bank TESS-100-215
AC Side (on-grid)			
Rated Power	30kW	60kW	100kW
Rated Voltage	400V		
Rated Current	43A	87A	144A
Voltage Range	360~440V		
Rated Frequency	50/60Hz		
THDi	<3%		
Power Factor	0.8 leading~0.8 lagging		
AC Output	3 / N / PE		
Overload Capacity	110% constant, 120% 1min		
DC Side			
Battery Voltage Range	313~403V	313~403V	672~864V
Battery Capacity	100.35kWh	100.35kWh	215.04kWh
Max. Charging Power	30kW	60kW	100kW
Max. Discharging Power	30kW	60kW	100kW
Max. Charging Current	100A	140A	140A
Max. Discharging Current	100A	140A	140A
General			
Noise Level	≤65dB @ 1m		
Protection Degree	IP54		
FSS	PERFLUORO, FK5112		
Cooling Method	Forced air cooling + AC		
Operating Temperature	-25°C ~+55°C		
Relative Humidity	0~95%, without condensing		
Max. Altitude	4000m(>2000m derating)		
Dimension	1000*1000*2200mm	1000*1000*2200mm	1545*1000*2350mm
Weight	1350kg	1350kg	2459kg
Display	Touch Screen		
Communication	RS485 / LAN		

Energy Bank



Energy Bank



Certificates & Compliance – Energy Bank



System :

EN/IEC 61000-6-2:2019, EN/IEC 61000-6-4:2019, IEC 62477-1:2012/AMD1:2016, EN 62477-1:2012/A1:2017, VDE-AR-N 4105:2018-11, DIN VDE V 0124-100(VDE V 0124-100):2020-06, EN 50549-1: 2019;

Battery :

UL1973, UL9540A, IEC61629, UN38.3, GB/T36276-2018, ROHS, MSDS;

Module :

GB/T36276-2018, IEC61629, UN38.3, EMC.



- Modular design, flexible configuration, easy for installation and maintenance
- Real-time energy management and monitoring, for photovoltaic power generation, energy transfer, energy storage battery charging and discharging
- Battery, PCS, EMS, FSS and MTTP input (optional) integrated, access to PV power generation available

Parameters (PV access available)

Model	THESS-30-63 THESS-30-114 THESS-30-129 THESS-30-143 THESS-30-157	THESS-60-114 THESS-60-129 THESS-60-143 THESS-60-157	THESS-90-229 THESS-90-258 THESS-90-286 THESS-90-315	THESS-120-229 THESS-120-258 THESS-120-286 THESS-120-315	THESS-150-344 THESS-150-387 THESS-150-430 THESS-150-473
DC Side (Battery & PV)					
Max. PV Open Circuit Voltage	1000V DC				
Rated PV Power	30kWp	60kWp	90kWp	120kWp	150kWp
Max. PV Power	1.1~1.4 times rated				
PV Voltage Range	400V~750V DC			500V~750V DC	
Max. PV Current	100A	200A	200A*2	200A*2	200A*3
PV MPPT No.	1	1/2	2/3	2/4	3/5
Battery Voltage Range	352V~600V				
Available Battery Capacity	63.35kWh 114.69kWh 129.02kWh 143.36kWh 157.70kWh	114.69kWh 129.02kWh 143.36kWh 157.70kWh	229.38kWh 258.05kWh 286.72kWh 315.39kWh	229.38kWh 258.05kWh 286.72kWh 315.39kWh	344.06kWh 387.07kWh 430.08kWh 473.09kWh
Max. Charge Power	33kW	66kW	100kW	132kW	165kW
Max. Discharge Power	33kW	66kW	100kW	132kW	165kW
Max. Charge Current	100A	200A	300A	400A	500A
Max. Discharge Current	100A	200A	300A	400A	500A
General					
Noise	<75dB (A) @1m				
Operating Temperature	-25°C~+55°C				
Cooling	Forced air cooling + AC				
Relative Humidity	0~95%, non-condensing				
Max. Altitude	3000m, >3000m derating				
Switching time between on/off grid mode	no more than 10ms				
Communication	RS485 / CAN / LAN				

Parameters (no PV access)

Model	THESS-30-63 THESS-30-114 THESS-30-129 THESS-30-143 THESS-30-157	THESS-60-114 THESS-60-129 THESS-60-143 THESS-60-157	THESS-90-229 THESS-90-258 THESS-90-286 THESS-90-315	THESS-120-229 THESS-120-258 THESS-120-286 THESS-120-315	THESS-150-344 THESS-150-387 THESS-150-430 THESS-150-473
AC Side (on-grid)					
Rated Power	30kW	60kW	90kW	120kW	150kW
Rated Voltage	400V				
Rated Current	43A	87A	130A	173A	217A
Voltage Range	360~440V				
Frequency	50/60Hz				
THDi	<3%				
Power Factor	0.8 leading~0.8 lagging				
Wire Connection	3 / N / PE				
AC Input	33kVA	66kVA	100kVA	132kVA	165kVA
AC Side (off-grid)					
Rated Power	30kW	60kW	90kW	120kW	150kW
Rated Voltage	400V				
Rated Current	43A	87A	130A	173A	217A
THDu	no more than 2%				
Frequency	50/60Hz				
Overload Capacity	110% 10mins, 120% 1min				

Modular PV + ESS



Certificates & Compliance – Modular PV + ESS



CE, MEA, PEA, EN6100-6-4:2007+A1:2011, EN61000-6-2:2005,
EN62109-1:2010, EN62109-2:2011, EN 50549-1:2019.

2. Containerized BESS Product (20ft/40ft)

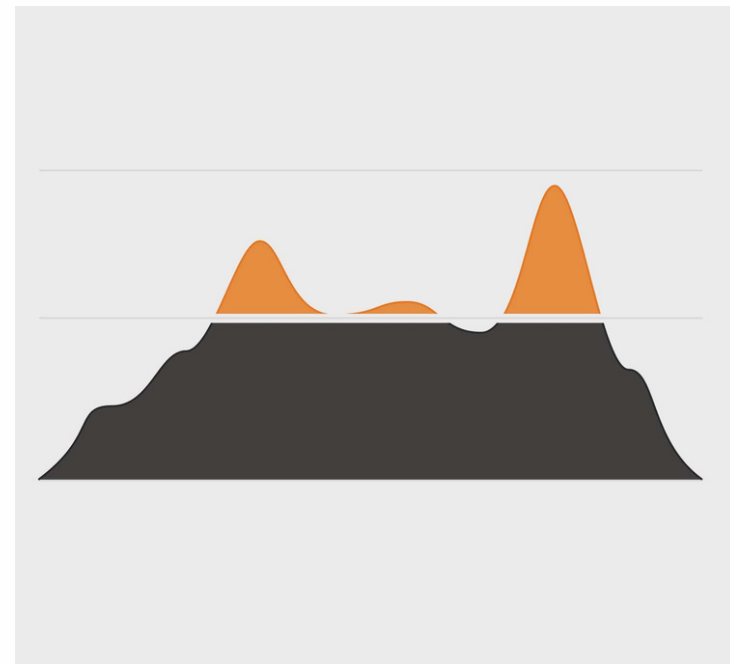
Containerized BESS



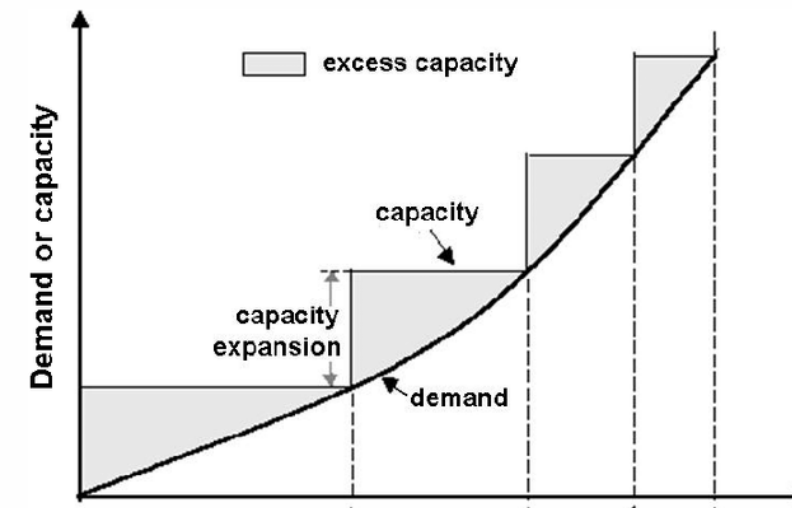
- The system integrates PV access and energy storage technology, FSS, intelligent temperature control system within a standard 20ft or 40ft container.
- Pre-installation of the AC&DC connection work, no extra wiring required on site, low construction cost, easy installation and operation.
- **Maximum capacity up to 1250kW / 2150kWh, flexible configuration and meet multiple application requirements.**



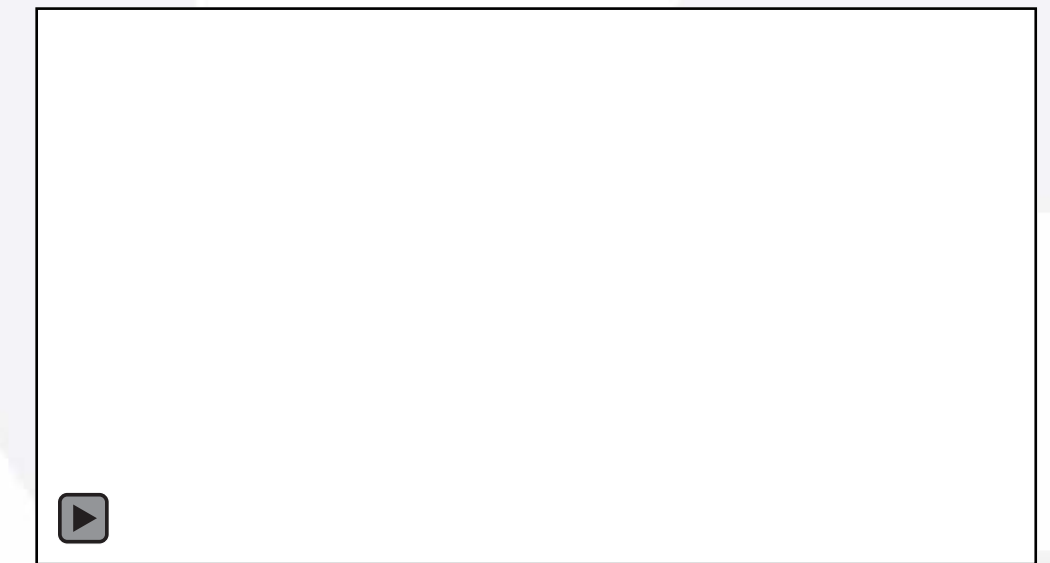
Application Scenarios



Peak Shaving



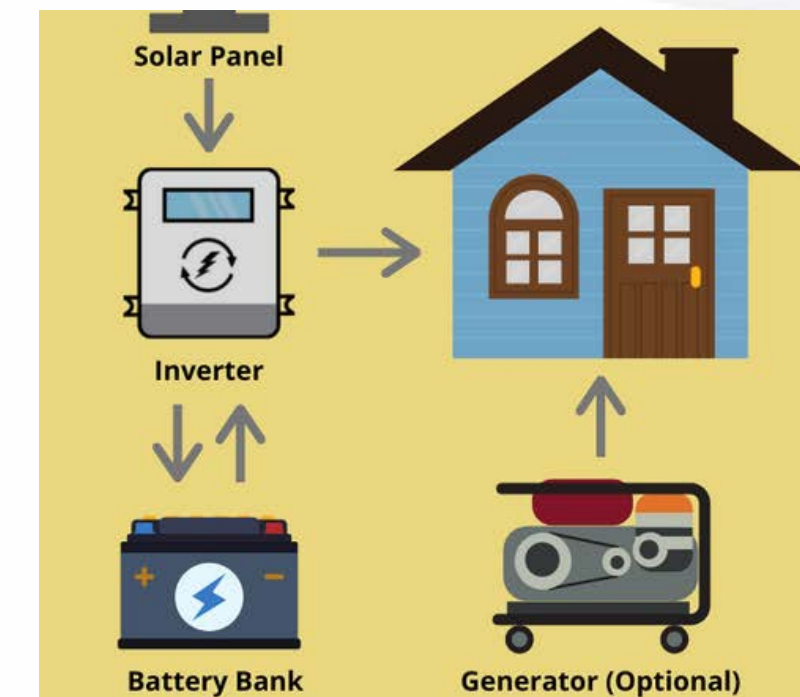
Capacity Expansion



Load Shifting



Renewable Power Optimization



Off-grid Power Supply

Parameters (PV access available)

Model	THESS-500-1003 THESS-500-1505 THESS-500-2007	THESS-630-1290 THESS-630-1935	THESS-1000-2007	THESS-1250-2150
DC Side (Battery & PV)				
Max. PV Open Circuit Voltage	1000V DC			
Max. PV Power	550kWp	660kWp	1100kWp	1100kWp
PV MPPT Voltage Range	200~800V DC			
PV MPPT No.	10	12	20	20
Battery Voltage Range	627V~850V			
Available Battery Capacity	1003.52kWh 1505.28kWh 2007.04kWh	1290.24kWh 1935.36kWh	2007.04kWh	2150.4kWh
Max. Charge Power	550kW	693kW	1100kW	1375kW
Max. Discharge Power	550kW	693kW	1100kW	1375kW
Max. Charge Current	794A	1000A	1588A	1985A
Max. Discharge Current	794A	1000A	1588A	1985A
General				
Noise	<75dB (A) @1m			
Operating Temperature	-25°C~+55°C			
Cooling	Forced air cooling + AC			
Relative Humidity	0~95%, non-condensing			
Max. Altitude	4000m, >2000m derating			
Build-in Transformer	YES			
Switching between on/off grid mode	Optional			
Communication	RS485 / CAN / LAN			

Parameters (no PV access)

Model	THESS-500-1003 THESS-500-1505 THESS-500-2007	THESS-630-1290 THESS-630-1935	THESS-1000-2007	THESS-1250-2510
AC Side (on-grid)				
Rated Power	500kW	630kW	1000kW	1250kW
Rated Voltage	400V			
Rated Current	722A	909A	1444A	1804A
Voltage Range	360V~440V			
Frequency	50/60Hz			
THDi	<3%			
Power Factor	-0.9 leading~0.9 lagging			
Wire Connection	3 / N / PE			
AC Side (off-grid)				
Rated Power	500kW	630kW	1000kW	1250kW
Rated Voltage	400V			
Rated Current	722A	909A	1444A	1804A
THDu	no more than 2%			
Frequency	50/60Hz			
Overload Capacity	110% constant, 120% 1min			

ESS CASE – Spain: 20ft Containerized BESS



ESS CASE – Belgium: 40ft Containerized BESS



ESS CASE – Belgium: 40ft Containerized BESS



Electrical Room

ESS CASE – Belgium: 40ft Containerized BESS



Battery Room

Certificates & Compliance –20/40ft Containerized BESS Product



System :

CE/EN 61000-6-4:2019, EN 61000-6-2:2019, EN 62477-1:2012+A1:2017, EN62109-1:2010, EN 50549-1:2019, C10/11;

Battery :

UL1973, UL9540A, IEC61629, UN38.3, GB/T36276-2018, ROHS, MSDS;

Module :

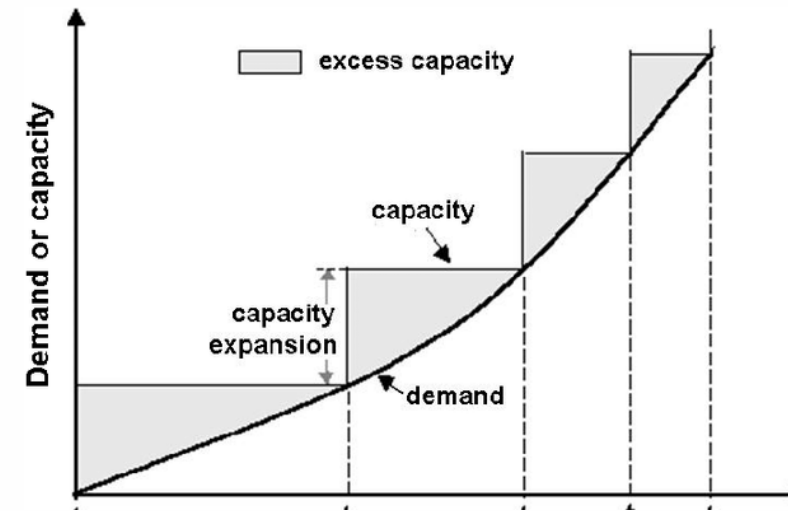
GB/T36276-2018, IEC61629, UN38.3, EMC.

3. Utility

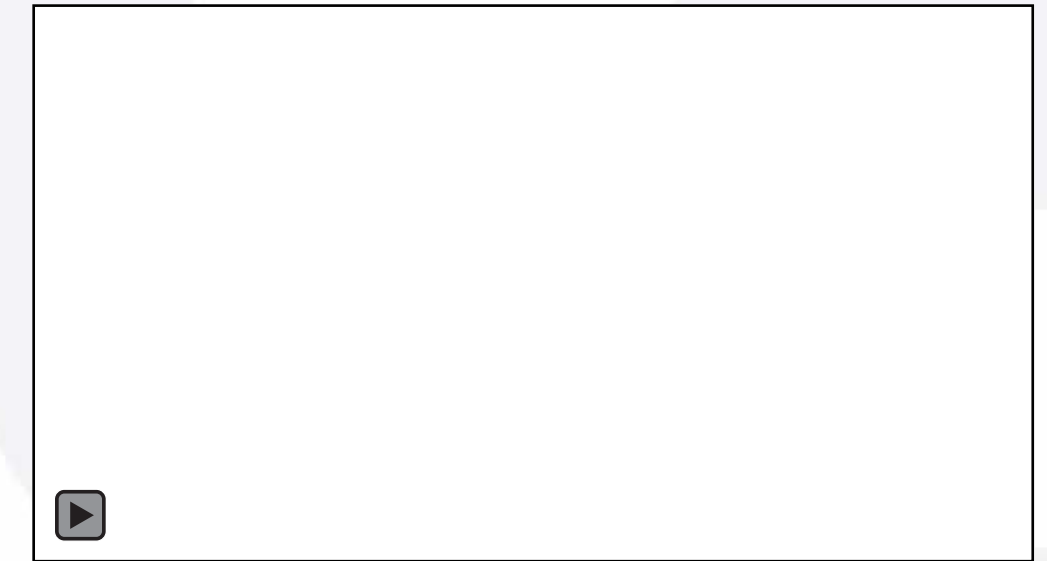
Application Scenarios



Peak Shaving



Capacity Expansion



Load Shifting

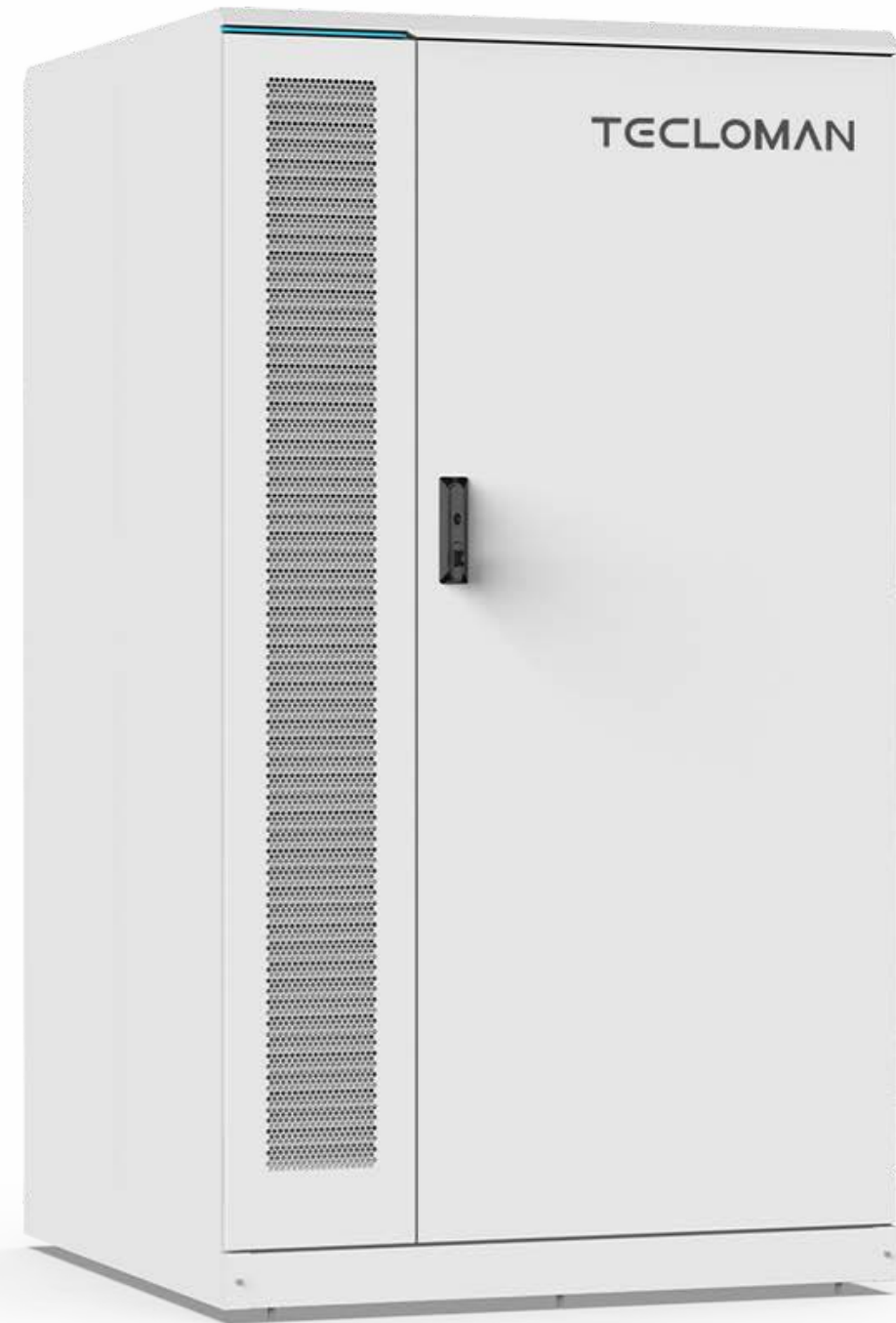


Renewable Power Optimization



Grid Support

Outdoor liquid-cooled Battery Cabinet



- IP 54, outdoor installation, easy operation & maintenance
- Intelligent BMS system, enabling real-time monitoring function
- Higher energy density, smaller footprint, lower site installation cost.
- Advanced liquid cooling technology, cell temperature difference $\leq 3^{\circ}\text{C}$
- 372kWh 1500V system, flexible configuration for different utility projects.

TRACK-1500-372 - Parameters

Model	TRACK-1500-372
Cell Type	LFP280
Group Mode	1P416S
High-voltage Box	PDU-1500-280-F1
Rated Voltage	1331.2V
Voltage Range	1206.4V~1456V
Rated Capacity	372.736kWh
Rated Charge & Discharge Power	186kW
Rated Charge & Discharge Current	140A
Max. Continuous Charging & Discharging Current	280A
Charge & Discharge Efficiency	≥95%
Battery Cluster Internal Resistance	≤20mΩ
Cycle Life	≥6000 cycles (0.5P, 25°C, 80%EOL, 90%DOD)
Operating Temperature	Charge: 0~55°C; Discharge: -20~55°C
Storage Temperature	15~35°C
Relative Humidity	0~90%RH
Altitude	<4000m (>2000m derating)
Self-power consumption/month	≤3%
Cooling	Liquid cooling
Manufacturing Process	Laser welding
Communication	CAN, RS485, dry contact
Dimension (W*D*H)	1300±5mm*1300±5mm*2300±5mm

ESS CASE – UK 12MWh



ESS CASE – UK 12MWh





Battery :

EN/IEC60529:2013, IEC62619:2022, BS/EN/IEC61000-6-2:2019,
BS/EN/IEC61000-6-4:2019, BS/EN/IEC62477-1:2021,
ANSI/CAN/UL1973:2022, ANSI/CAN/UL9540A:2019, FCC-SDoC, UN38.3,
UN3480, MSDS;

Module :

ANSI/CAN/UL9540A:2019, UN38.3

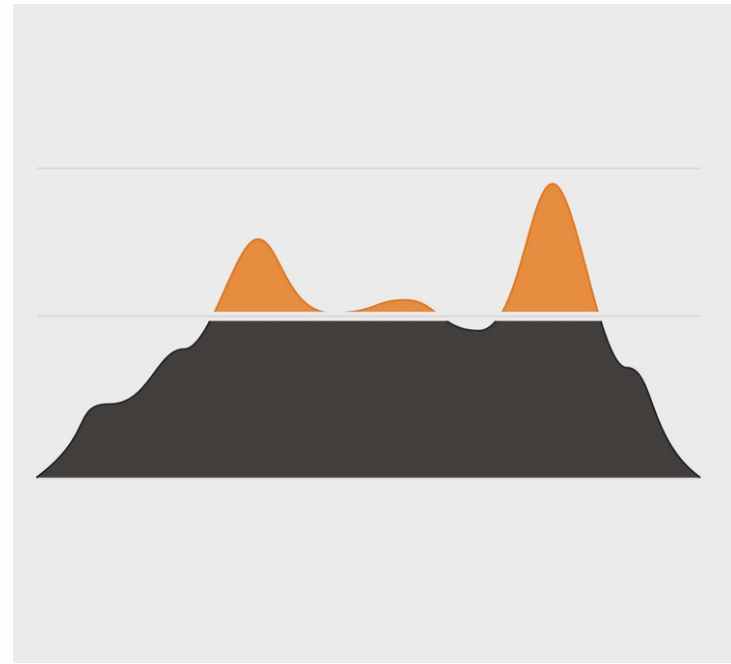
Newly-launched

Power Cubox

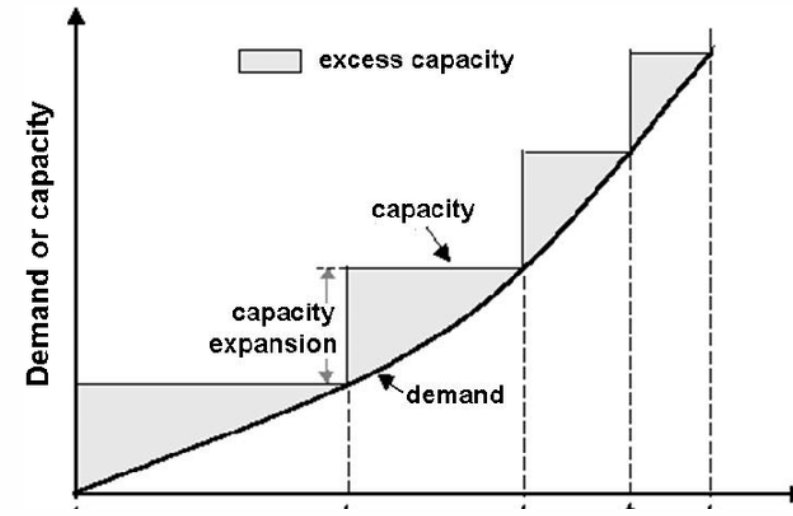


- 10ft or 20ft containerized power supply device, 500kWh to 1500kWh per container, enables flexible configuration, easy transportation and installation.
- Compact structural design enables high power density. Battery, PCS, BMS, FSS, and EMS integrated, enables stable operation and real-time monitoring.
- On/off grid working mode, compatible with multiple application scenarios
- Configured with diesel generator, can power the critical load, reduce the consumption of fossil fuel, lower the cost and emission.
- Low operating noise level ($\leq 60\text{dB}$), zero emission, quiet and environment-friendly.

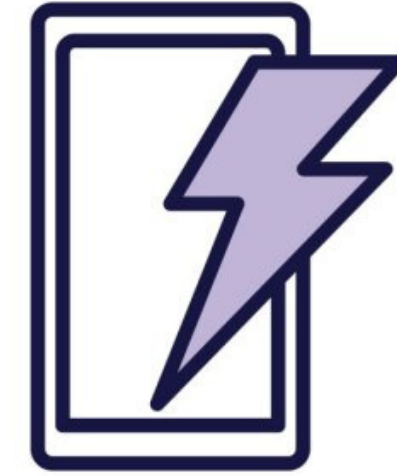
Application Scenarios



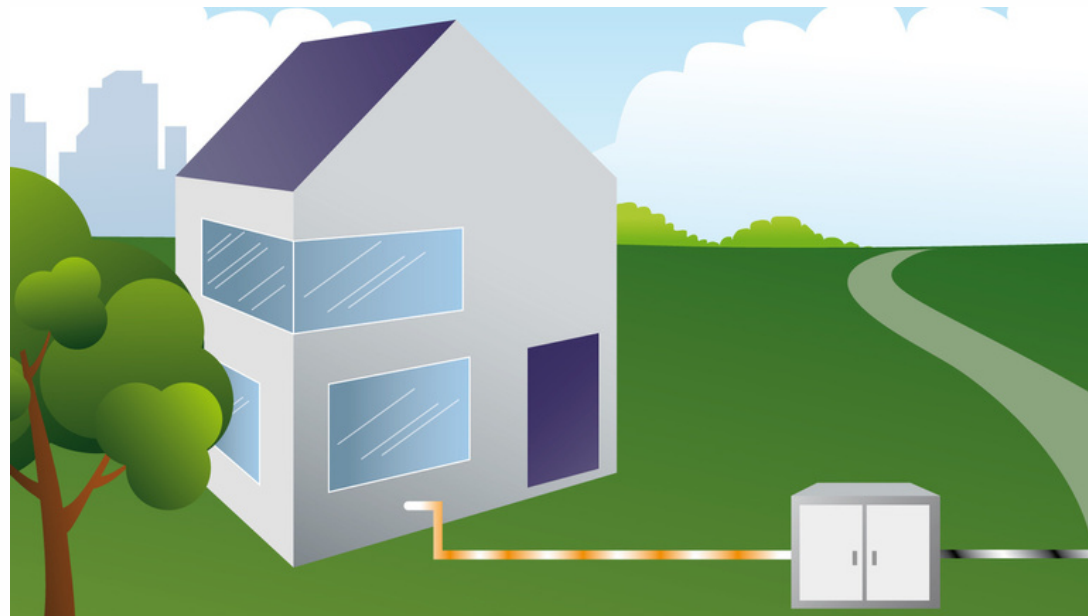
Peak Shaving



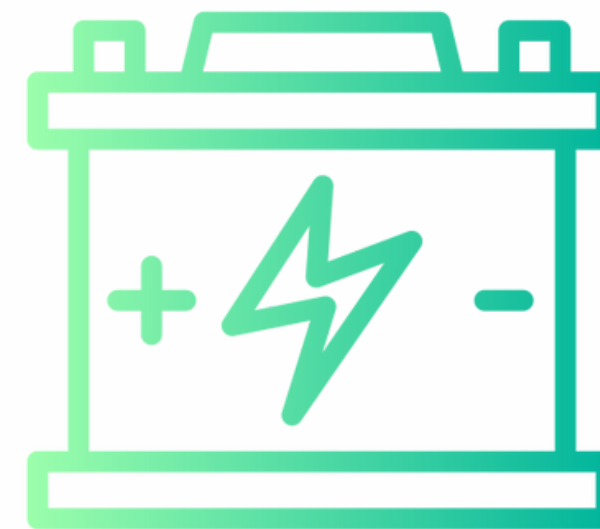
Capacity Expansion



Emergency Power Supply



Backup Power



Mobile Power Supply

Power Cubox - Parameters

Model	TVSS-250-559	TVSS-250-602	TVSS-250-645	TVSS-500-1304	TVSS-500-1404	TVSS-500-1505
Rated Capacity	559kWh	602kWh	645kWh	1304kWh	1404kWh	1505kWh
Battery Cell	LFP 3.2V 280Ah					
Rated Power	250kVA			630kVA		
Output	3W+N+PE					
Input Voltage	340~440V					
Allowable Input Frequency	50/60Hz ±5Hz					
Rated Input Current	361A			909A		
Power Factor	±0.99					
Overload Capacity	110% constant, 120% 1min					
On/off-grid switching	YES					
Rated Output Voltage	400V					
Rated Output Frequency	50/60Hz					
Output Voltage Deviation	≤2%					
Output Voltage Unbalance Degree	≤1%					
THD of Output Voltage	≤3%(resistive load only)					
Cooling	Air cooling + AC					
Communication	RS485, CAN, Ethernet					
HMI	Touch Screen					
Remote Data Monitoring	YES					
Cloud Platfor Access	YES					
Operating Temperature	-15°C~50°C (>45°C, derating)					
Allowable Humidity	≤95%, non-condensing					
Altitude	<4000m (>2000m derating)					
Weight	≤11000kg			≤20000kg		
Dimension(W*D*H)	2991*2438*2896mm (10ft)			6058*2438*2896mm (20ft)		
FSS	Perfluorohexanone automatic fire extinguishing device, active protection, with temperature sensor, smoke detector, carbon monoxide detector					



PCS :

EN/IEC61000-6-2:2019, EN/IEC61000-6-4:2019, EN/IEC62477-1:2022,
EN50549-1:2019, C10/11:2021, GB/T34120-2017, GB/T34133-2017;

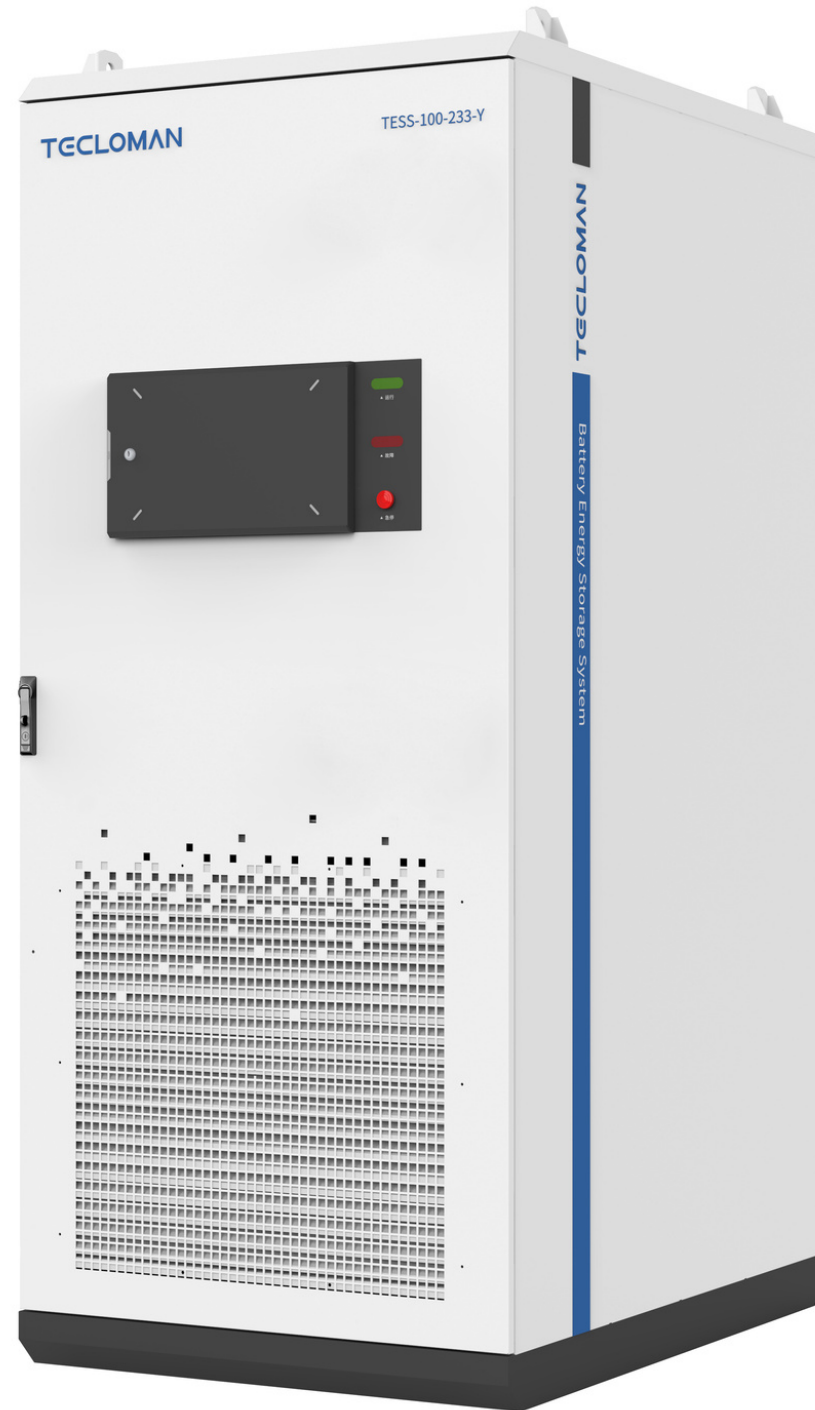
Battery :

IEC62619:2022;

Module :

EN/IEC61000-6-2:2019, EN/IEC61000-6-4:2019, GB/T36276-2018, UN38.3,
UN3480, MSDS.

Liquid-cooling BESS Cabinet - TESS-100-233-Y

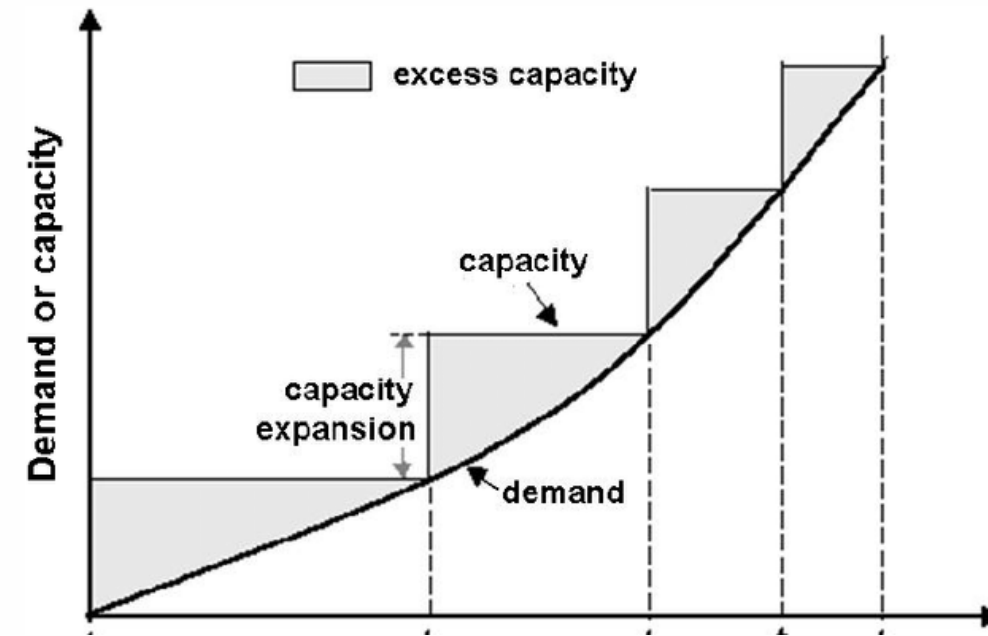


- Battery, PCS, EMS, FSS and liquid-cooling system integrated in one standardized container, all-in-one design.
- Modular design, flexible configuration, easy for installation and maintenance.
- On/off grid working mode, compatible with multiple application scenarios
- Advanced liquid cooling technology, battery cell temperature difference $<3^{\circ}\text{C}$.

Application Scenarios



Peak Shaving



Capacity Expansion



Load Shifting

TESS-100-233-Y - Parameters

Model	TESS-100-233-Y
AC Side (on-grid)	
Rated Power	100kW
Rated Voltage	230/400Vac, 3P+N+PE
Max. Continuous Input Current	158A
Frequency	50Hz
THDi	5%
Power Factor	0.8 CAP~0.8 IND
Battery Side	
Voltage Range	650~949V
Rated Voltage	832V
Battery Capacity	233kWh
Cell Type	LiFePO4
Cycle Life	no less than 6000 cycles (0.5P, 25°C, 80%EOL, 90%DOD)
Charge/Discharge Efficiency	no less than 95%
Max. Charging/Discharging Current	165A
General	
AC/DC Start Time	no more than 65dB @ 1m
Protection Functions	Over/under voltage, Over current, High/low temperature, SOC too high/low, Low insulation impedance, Short circuit protection, etc.
Cooling Method	Air cooling + Liquid cooling
Operating Temperature	-30°C~+60°C(>45°C derating)
Max. Altitude	3000m
FSS	Aerosol + C6F12O(optional) fire extinguisher
Max. Efficiency	92% (Auxiliary power is not included)
IP Rating	Touch Screen
Dimension(W*D*H)	1000*1400*2350mm
Weight	2500kg
Communication	RS485, CAN, Ethernet, Modbus, TCP/RTU
Noise	RS485 / LAN

TESS-100-233-Y

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Certificates & Compliance – TESS-100-233-Y



System:

EN/IEC 61000-6-2:2019, EN/IEC 61000-6-4:2019, IEC 62477-1:2012/AMD1:2016, EN 62477-1:2012/A1:2017, VDE-AR-N 4105:2018-11, DIN VDE V 0124-100(VDE V 0124-100):2020-06, EN 50549-1: 2019;

Battery:

UL1973, UL9540A, IEC61629, UN38.3, GB/T36276-2018, ROHS, MSDS;

Module:

UL9540A, IEC61629, UN38.3, FCC, EMC, EN62477-1, IEC60529.

Thanks