

GENSTAR

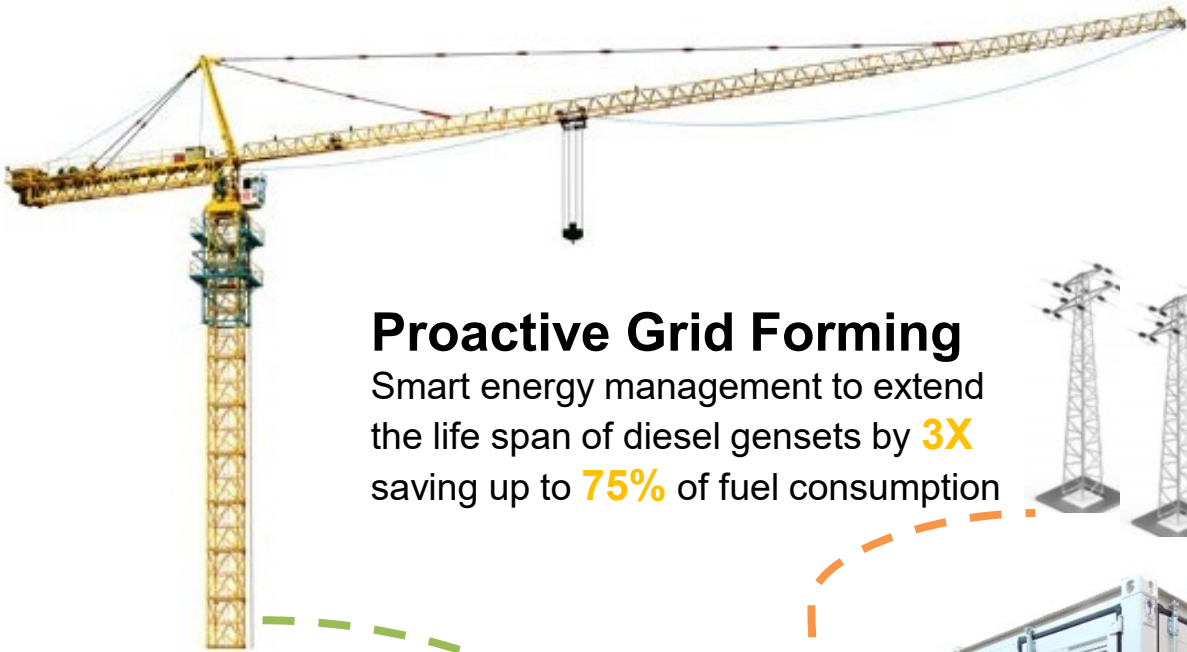
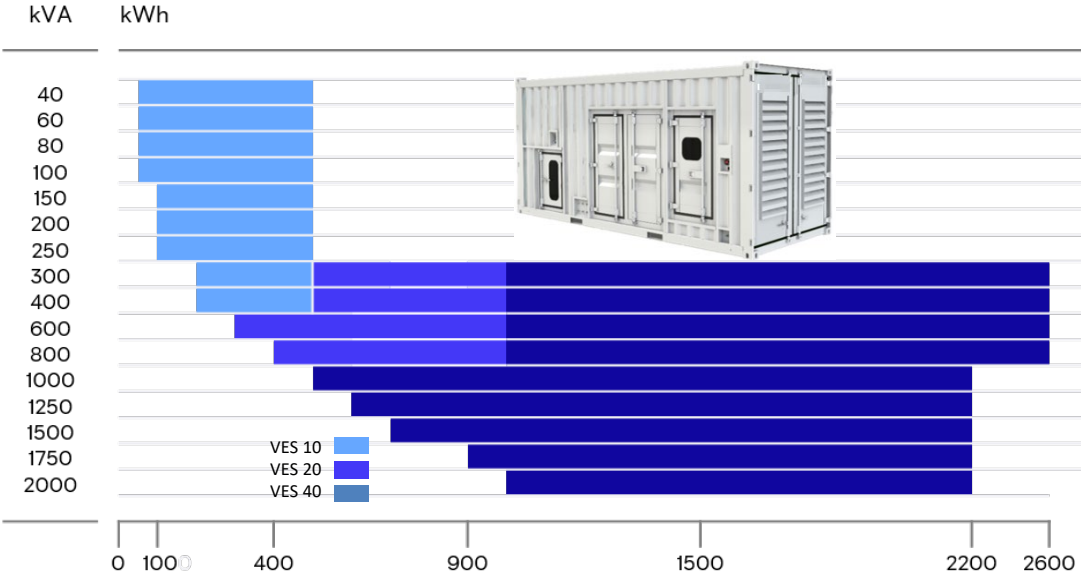
TEMIT POWER TECH (TIANJIN) COMPANY LTD.

GENSTAR Intelligent Energy Storage System
Best Partner Of Diesel Generator

Expert For **Green Rental**



Super Capacity, Wide Power Range



Proactive Grid Forming

Smart energy management to extend the life span of diesel gensets by **3X** saving up to **75%** of fuel consumption



Generator



GENSTAR Energy Storage

Load

Expert For Green Rental

Best Partner Of Diesel Generator



Protect your gensets from low load operating

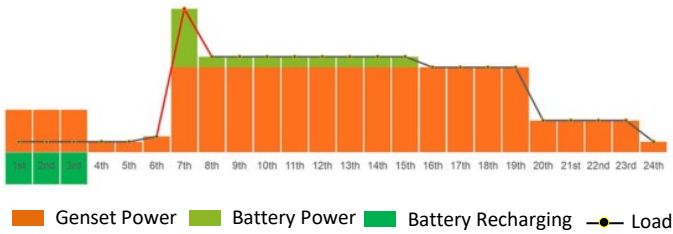


Protect your gensets from impact loads



Support your gensets to cover peak loads

Peak Shaving Operation



Reduce carbon footprint



Reduce up to 75% fuel consumption



Reduce noises

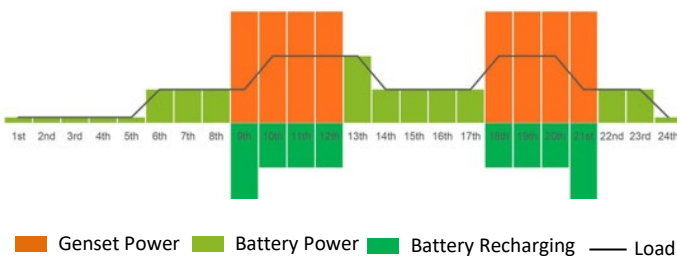


Proactive grid forming, lowering operating costs by 50%

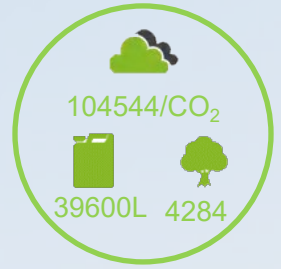


Extend the life span of your gensets by 3X

Low load Operation



GENSTAR BESS to help with potential annual saving



Tower crane

Welding machine

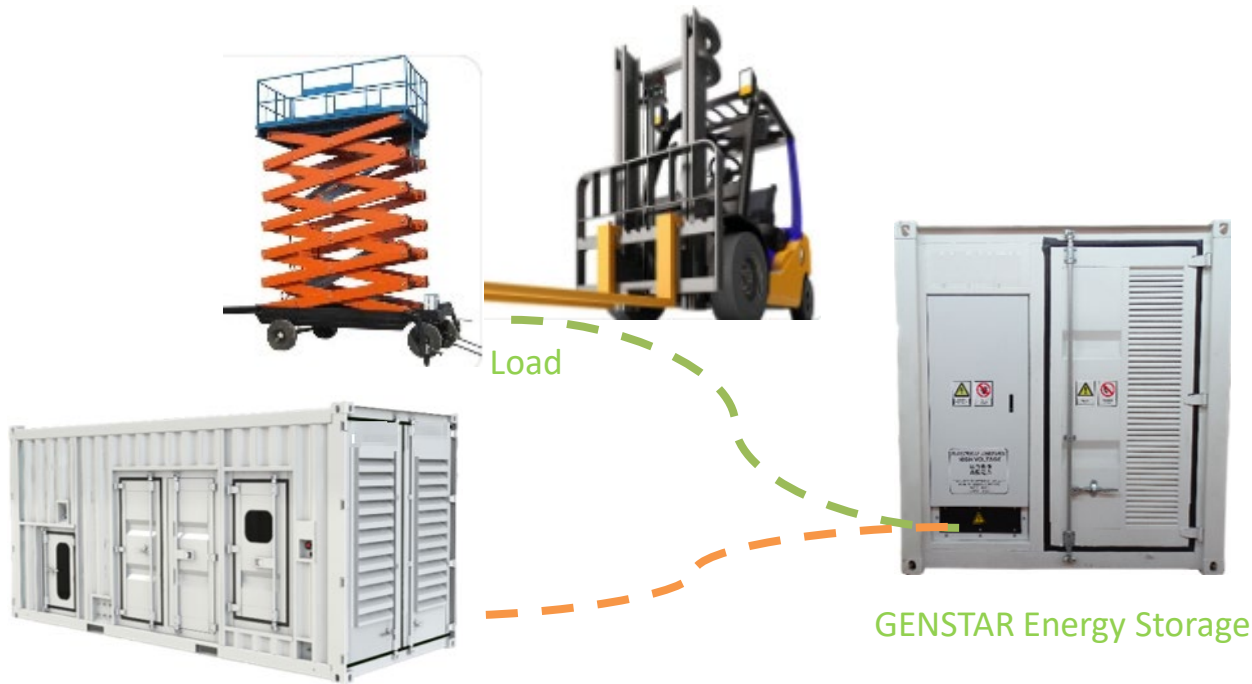
Rubber tire gantry

Lifter



Expert For Rental

Your Off-grid Energy Pilot



Max. 3 units in Parallel



6000
Life Cycles

2 years
Warranty

proactive
Grid Forming

50% Lower
Maintenance Costs

EMS
Smart Cloud

Applications



Municipal
engineering



Construction



Mining



Events



Sports &
Games



Bridges,
Roads &
Ports

ALL-IN-ONE Robust Structure



IP54 Indoors & Outdoors

■ Solid structure, great durability

■ Anti-theft protections

■ Anti-corrosion

■ Wind proof

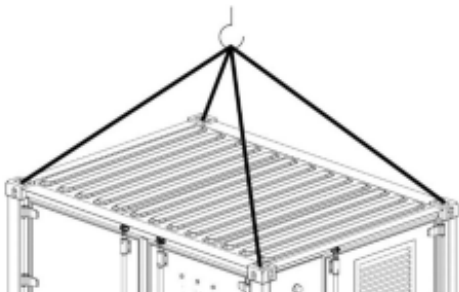
■ Anti-corrosion

■ Highly mobile

■ Remote upgrading, diagnoses and maintenance

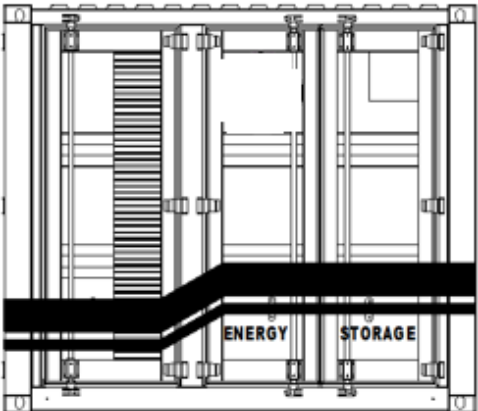
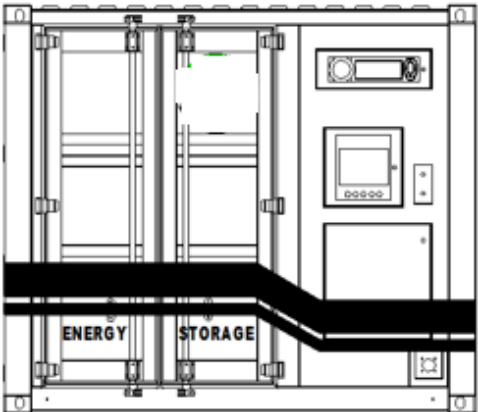
■ Easy maintained HVAC systems design

Easy Transportation and Storage



■ Single lifting point

■ Stackable





Why do high voltage all-in-one battery energy storage systems have more advantages over low voltage systems ?

EFFICIENCY

High voltage systems are generally more efficient at storing and delivering energy than low voltage systems. This is because higher voltage systems can use smaller wires and components, resulting in less resistance and energy loss, based on $P=V*I$, when the power is same, the higher the voltage, the less the current (I), less the loss of energy, and thus the wire of the machine is thinner (lighter).

SCALABILITY

High voltage systems can be more easily scaled up or down than low voltage systems. This is because higher voltage systems require less physical space to store the same amount of energy, making them more suitable for large-scale commercial or industrial applications.

COST

High voltage systems can be more cost-effective than low voltage systems in certain applications. This is because high voltage batteries require fewer cells and less wiring, resulting in lower material and installation costs.

FLEXIBILITY

High voltage systems can be used with a wider range of equipment and applications than low voltage systems, making them more versatile and adaptable to changing energy needs.

Smaller wires

Fewer cells

More compact

Less wiring

Lower costs

More versatile

Model lists & Specifications

Technical Parameters					
System Parameters	Energy storage system model		VES 10 Mini	VES 10 Pro	VES 10 Max
	Maximum power output	kW	120	240	400
	Energy storage capacity	kWh	126	253	450
	Rated voltage AC	VAC	400/230		
	Rated frequency AC	Hz	50/60		
	Rated voltage DC	VDC	704		
	Input current (grid/ diesel)	A	20-150	20-360	20-500
	Rated output current	A	173	346	577
	Maximum output current	A	217	432	722
	Noise level @1m (free Field)	dBa	<75		
	Operating temperature	°C	-20 ~ 50		
	Dimensions	mm	2991 x 2438 x 2591		
	Weight	kg	4000	6500	8500
	Protection rating		IP54		
	Corrosion resistance rating		C5		
Battery rack	Battery model		2P20S	2P20S	2P20S
	Battery type		LFP	LFP	LFP
	Cell specifications		3.2V180Ah	3.2V180Ah	3.2V180Ah
	Battery module		11.52kWh	11.52kWh	11.52kWh
	Number of modules		11	22	40
	Charge/ Discharge rate		1C	1C	1C
	Depth of discharge		100%		
	Cycle (Charge & discharge)	Cycles	≤6000		
	Cooling method		Air-conditioning		
Bi-directional converter	Current distortion		<3%		
	Voltage distortion		<1.5%		
	DC component		<0.5%		
	Overload capacity		1.25 times, 30s		
	Seamless switching time		<4ms		
	3-phase unbalanced load carrying		100%		
	3-phase equalization		Support		
	Different battery types		Support		
	Connection method		3-phase 4-wire		

Model lists & Specifications

Technical Parameters					
System Parameters	Energy storage system model		VES 20 Mini	VES 20 Pro	VES 20 Max
	Maximum power output	kW	630	800	1000
	Energy storage capacity	kWh	633	829	1012
	Rated voltage AC	VAC	400/230		
	Rated frequency AC	Hz	50/60		
	Rated voltage DC	VDC	700-1200		
	Input current (grid/ diesel)	A	20-1250	20-1600	20-2000
	Rated output current	A	909	1150	1444
	Maximum output current	A	1000	1280	1600
	Noise level @1m (free Field)	dBa	<75		
	Operating temperature	°C	-20 ~ 50		
	Dimensions	mm	6060 x 2438 x 2591		
	Weight	kg	15100	19150	22050
	Protection rating		IP54		
	Corrosion resistance rating		C5		
Battery rack	Battery model		2P20S	2P20S	2P20S
	Battery type		LFP	LFP	LFP
	Cell specifications		3.2V180Ah	3.2V180Ah	3.2V180Ah
	Battery module		11.52kWh	11.52kWh	11.52kWh
	Number of modules		55	72	88
	Charge/ Discharge rate		1C	1C	1C
	Depth of discharge		100%		
	Cycle (Charge & discharge)	Cycles	≤6000		
	Cooling method		Air-conditioning		
Bi-directional converter	Current distortion		<3%		
	Voltage distortion		<1.5%		
	DC component		<0.5%		
	Overload capacity		1.25 times, 30s		
	Seamless switching time		<4ms		
	3-phase unbalanced load carrying		100%		
	3-phase equalization		Support		
	Different battery types		Support		
	Connection method		3-phase 4-wire		

Model lists & Specifications

Technical Parameters					
System Parameters	Energy storage system model		VES 40 Mini	VES 40 Pro	VES 40 Max
	Maximum power output	kW	1200	1600	2000
	Energy storage capacity	kWh	1260	1800	2200
	Rated voltage AC	VAC	400/230		
	Rated frequency AC	Hz	50/60		
	Rated voltage DC	VDC	700-1200		
	Input current (grid/ diesel)	A	20-1550	20-2000	20-2500
	Rated output current	A	1732	2309	2887
	Maximum output current	A	2165	2887	1600
	Noise level @1m (free Field)	dBa	<75		
	Operating temperature	°C	-20 ~ 50		
	Dimensions	mm	12192 x 2438 x 2591		
	Weight	kg	TBA		
	Protection rating		IP54		
	Corrosion resistance rating		C5		
Battery rack	Battery model		2P20S	2P20S	2P20S
	Battery type		LFP	LFP	LFP
	Cell specifications		3.2V180Ah	3.2V180Ah	3.2V180Ah
	Battery module		11.52kWh	11.52kWh	11.52kWh
	Number of modules		110	154	198
	Charge/ Discharge rate		1C	1C	1C
	Depth of discharge		100%		
	Cycle (Charge & discharge)	Cycles	≤6000		
	Cooling method		Air-conditioning		
Bi-directional converter	Current distortion		<3%		
	Voltage distortion		<1.5%		
	DC component		<0.5%		
	Overload capacity		1.25 times, 30s		
	Seamless switching time		<4ms		
	3-phase unbalanced load carrying		100%		
	3-phase equalization		Support		
	Different battery types		Support		
	Connection method		3-phase 4-wire		

Construction/Rental

Lifter

Rated power: 3*11kW

Operation current: 60kW - 60%*150min
33kW - 40%*150min

Operation: 10h/day with 75%, 25 times
* 3mins/da, Consuming 79,200L fuel
per year.

Diesel Only

■ Diesel +BESS

Built-in EMS automatically controls operation. Genset runs at rated power, BESS operates in parallel during peak load. Fuel consumption is reduced to 39,600L per year.



GENSTAR Diesel Genset
Rated Power **40kW**

GENSTAR BESS
40kW - 80kWh

 **10h/day running**

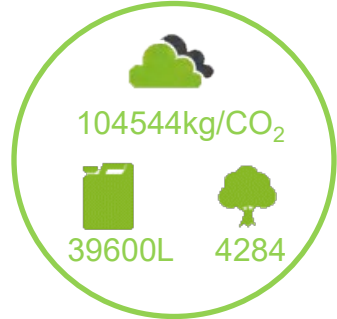
↓ 50.0%
GENSET+GENSTAR
COMBO
Fuel & CO₂
Reduction Ratio

100%
Genset
Average
Load

40kW
Genset
Average Output

\$ 35.2K
Annual
Potential Saving

1.4Y ROI



**Annual
Potential Saving**

Ports



Lifter

Operation: 100,000 containers per year,
with average fuel consumption of 1.2L
per container.

Diesel Only

400KW diesel generator to run a Rubber
Tired Gantry Crane

■ Diesel +BESS

48kW diesel generator operating with BESS, saving 78,00L per year.



Plan A:

 **LiFePO4**

GENSTAR Diesel Genset
Rated Power **48kW**

GENSTAR BESS
400kW - 300kWh

↓ 65%
GENSET+GENSTAR
COMBO
Fuel & CO₂
Reduction Ratio

\$ 79 .8K
Annual
Potential Saving

1.5Y ROI

Plan B:

 **Lithium-Titanate**

GENSTAR Diesel Genset
Rated Power **48kW**

GENSTAR BESS
400kW - 100kWh

↓ 61.5%
GENSET+GENSTAR
COMBO
Fuel & CO₂
Reduction Ratio

\$ 81.8K
Annual
Potential Saving

10 months ROI

Lithium-titanate Battery Power Solutions VS LiFePO4 Battery Power Solutions

Battery	LFP	LTO
Power Intensity Per Size (Wh/L)	190 - 280	90-115
Power Intensity Per Weight (Wh/kg)	140 -160	70-90
Cyclelife	6000 @ 0.5C	20000 @ 4C
Safety	Great	Highest
Performance @ Low Temperature	-20° C, 30%-40% fading below 0° C	-50° C,
Performance @ High Temperature	≤55° C	>60° C
SOC	20% - 95%	0-100% (to 0V)
Energy Efficiency	0.5C 91%	4C >92%
Charging/Discharging Speed	Hours	Minutes

LTO vs LFP BESS Solutions for Power Plant Case Study

Power Plant Power: 1000MW
 BESS of about 3% - 10% of the installed capacity (32MW - 100MW) is generally configured for frequency regulation.



Project	LTO (4C)	LFP (1C)	Note
Theoretically	32MW/8MWh	32MW/32MWh	3% of the Power Plant Capacity
Energy Efficiency	86%	78%	DC side
Initial Investment	32MW/9.3MWh	32MW/41MWh	Excess Capacity
	6.7M	9.4M	
Cyclelife	20000	5000	
Capacity Fading	0.3/20000Wh/cycle	0.3/5000Wh/cycle	70% EOL
LCC (Life Cycle Cost)	0.0000236USD/Wh	0.0000454USD/Wh	LTO is 50% of LFP
	0.0000059USD/W	0.0000454USD/W	LTO is 1/8 of LFP

Advantages of GENSTAR Energy Storage

Item	Summary	
Appearance	<ul style="list-style-type: none"> ■ Solid structure, great durability; ■ Anti-theft protections; ■ Anti-collision, windproof; ■ Highly mobile 	Robust and reliable design: Heavy duty hinges, high strength skid frame; Galvanised frame (optional)
		IP54
		Anti-theft features: Antitheft hinges and door lockers, wind hooks
		Enduring anti-corrosion canopy: Powder coating with 3 years warranty. (5 years optional)
Application scenarios	<ul style="list-style-type: none"> ■ Expert For Rental ■ Best partner of gensets, ■ Your off-grid energy pilot 	Best Pal of Genset, off-grid
Power range	<ul style="list-style-type: none"> ■ HV system with high efficiency, ■ Up to 4C fast charging and discharging (fully charged in 15min-2h) 	0.5C: 30-60, 50-100, 100-200, 250-400 1C: 60-60,100-100,300-300 2C: 200-100 4C: 400-72
		110% long-term overload supported, 120% for 10min, 150% for 200ms
		0.5C, 1C, 2C, 4C
		< 2h
	Grid, Genset, PV	
Transportation and Storage	<ul style="list-style-type: none"> ■ Single lifting point; ■ Forklift hole and drag hole; ■ Stackable 	Single lifting eye. Optional slings for containerized models
		Forklift pockets
		Stackable

Advantages of GENSTAR Energy Storage

Item	Summary	
Warranty and Service	<ul style="list-style-type: none"> ■ product warranty, 10 years performance warranty 	2 years product warranty, 10 years performance warranty
	<ul style="list-style-type: none"> ■ Easy for maintenance, lowering operation & maintenance cost by 50% 	Remote upgrading, diagnoses and maintenance; Easy maintained HVAC systems design.
Product features	<ul style="list-style-type: none"> ■ Proactive grid forming capability, smart energy management; ■ 6 max for parallel, switch mode in milliseconds; ■ GENSTAR MORE POWER CLOUD monitoring, remote operation and maintenance; ■ Long life span, low noise; ■ Extending life span of diesel gensets by 3X, saving up to 75% of fuel consumption ■ Customized options 	Proactive grid forming capability; Extending life span of diesel gensets by 3X, saving up to 75% of fuel consumption
		< 20ms
		Circuit Breakers and Earth leakage Relay, Earth pin (grounding rod not included)
		3p 4w
		LFP 6000 cycles DOD @90%, EOL 70% @ 10 years
		GENSTAR Power Cloud (Remote configuration, maintenance & diagnostics) / WEB Portal / 3G/4G Remote Communication, Dual SIM Modem/Router.
		6
		Low Noise
		GENSTAR BESS solution offers advanced customized options, either utilizing air cooling or liquid cooling, based on project requirements or ambient temperature conditions.

GENSTAR

※ Subject to alteration due to technological advance.

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