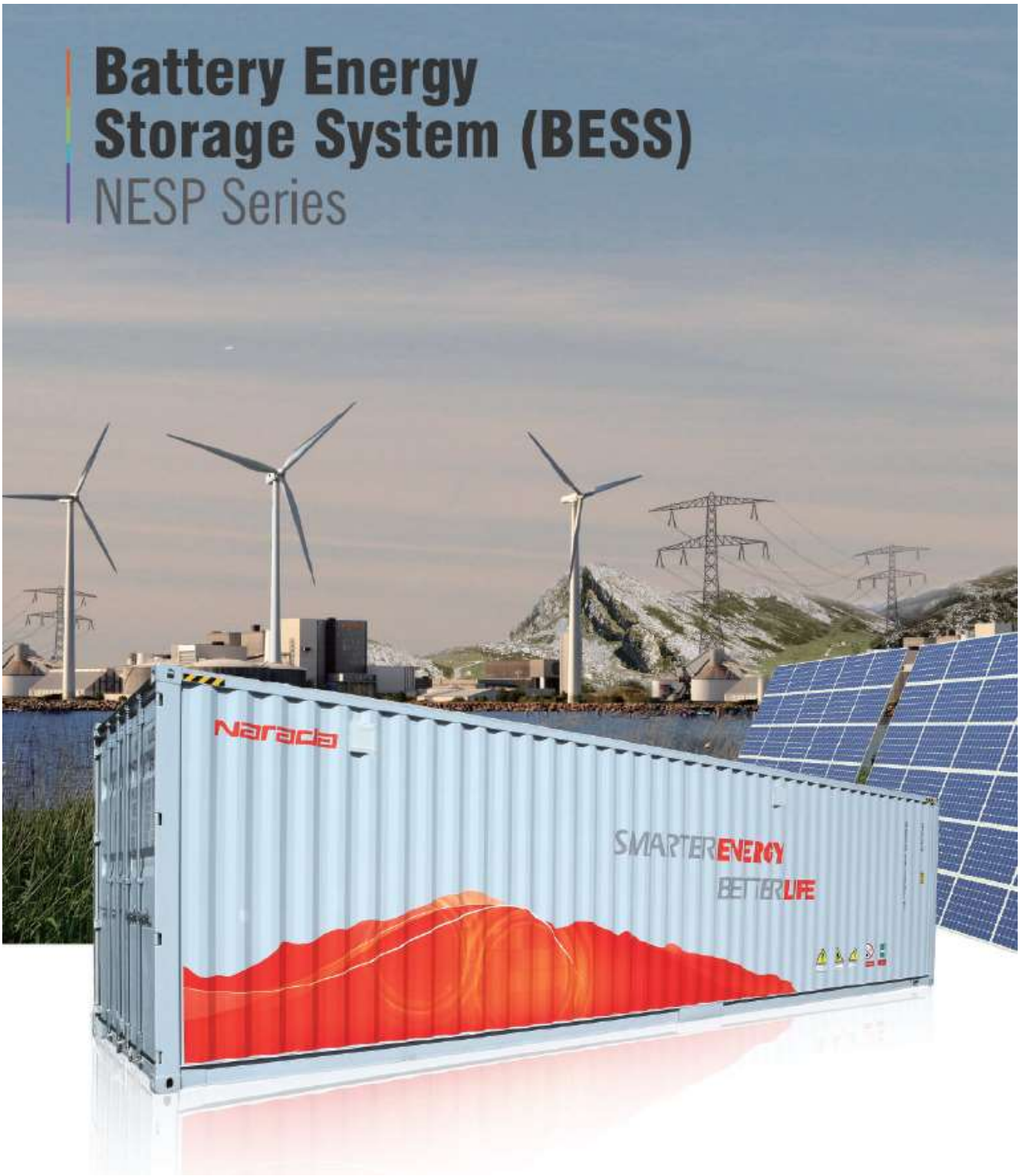
Narada®



NESP Series

LFP, Lithium Iron Phosphate Battery Solutions

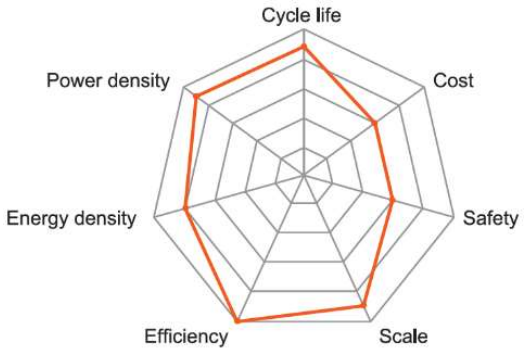
Cell Technology

| Lithium Iron Phosphate
Industry preferred LFP technology

| Stacking Plates
High power and thermal dissipation

| Prismatic Cell
Multi-layered protection at cell level

| Aluminum Case
Excellent thermal conductivity
Safe and efficient cooling



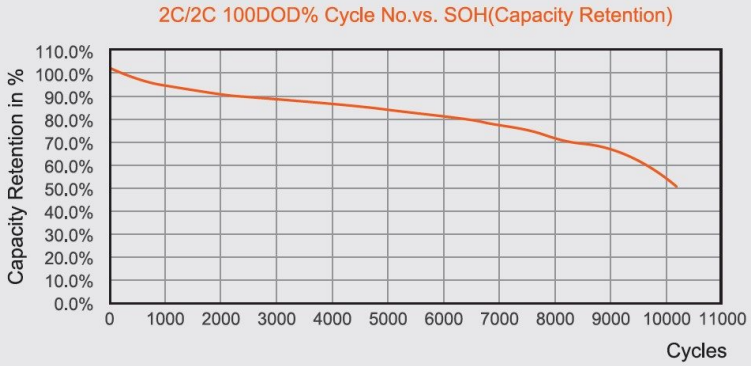
Sustainable Design

Continuously innovating to increase energy density while maintaining the same form factor and cell dimensions, thus facilitating future upgrades to higher capacity and energy density with no change to module and rack design.

Cell Model	FE80B	FE105A	FE125A	Unit
Weight	2.15	2.45	2.75	kg
Length		130		mm
Width		37		mm
Height		243		mm
Nominal Capacity	80	105	125	Ah
Nominal Voltage		3.2		V
Allowed C-Rate	2	2	2	C
Recommended C-Rate	2	1	0.5	C

Long Cycle Life and Multi-Industry Use

Extensive application and experience in Telecom, Energy Storage, Data Centers, Automotive.



Long Cycle life
2000 cycles @90%SOH
6000 cycles @80%SOH
10000 cycles @70%SOH

Wide application & experience
Telecom since 2010
BESS since 2011
Automotive since 2012

Features of Module & Rack Design

| Common Platform for Energy and Power Solutions

| 0.5C to 2.0C options available
- Frequency Regulation
- Peak Shaving
- Peak Shifting
- Curtailment/Demand Response
- Reserve Power

| High LFP Energy Density
- Optimizes footprint and BOP costs

| Passive & Active Thermal Ventilation
- Designed in both module and rack

| Designed for containerized solutions

| High Lifetime Performance

BMS Functions

| Conditions Monitoring

| State of Charge, SOC

| State of Health, SOH

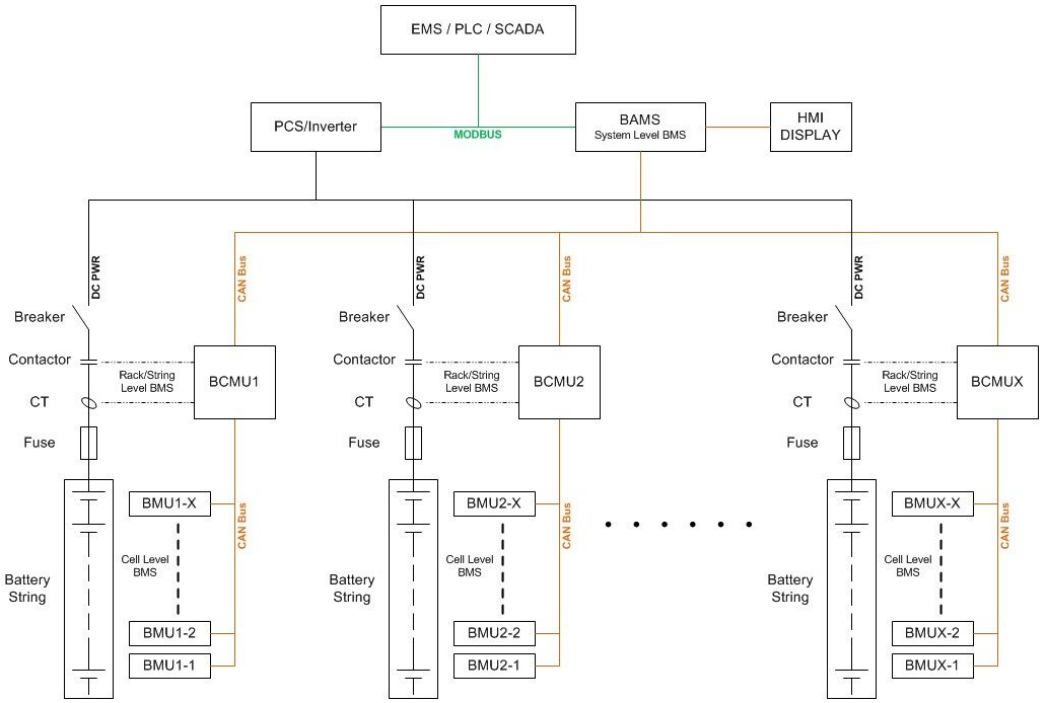
| Discharge Control

| Thermal Management

| Fault Alarms

| Balancing

| Protection

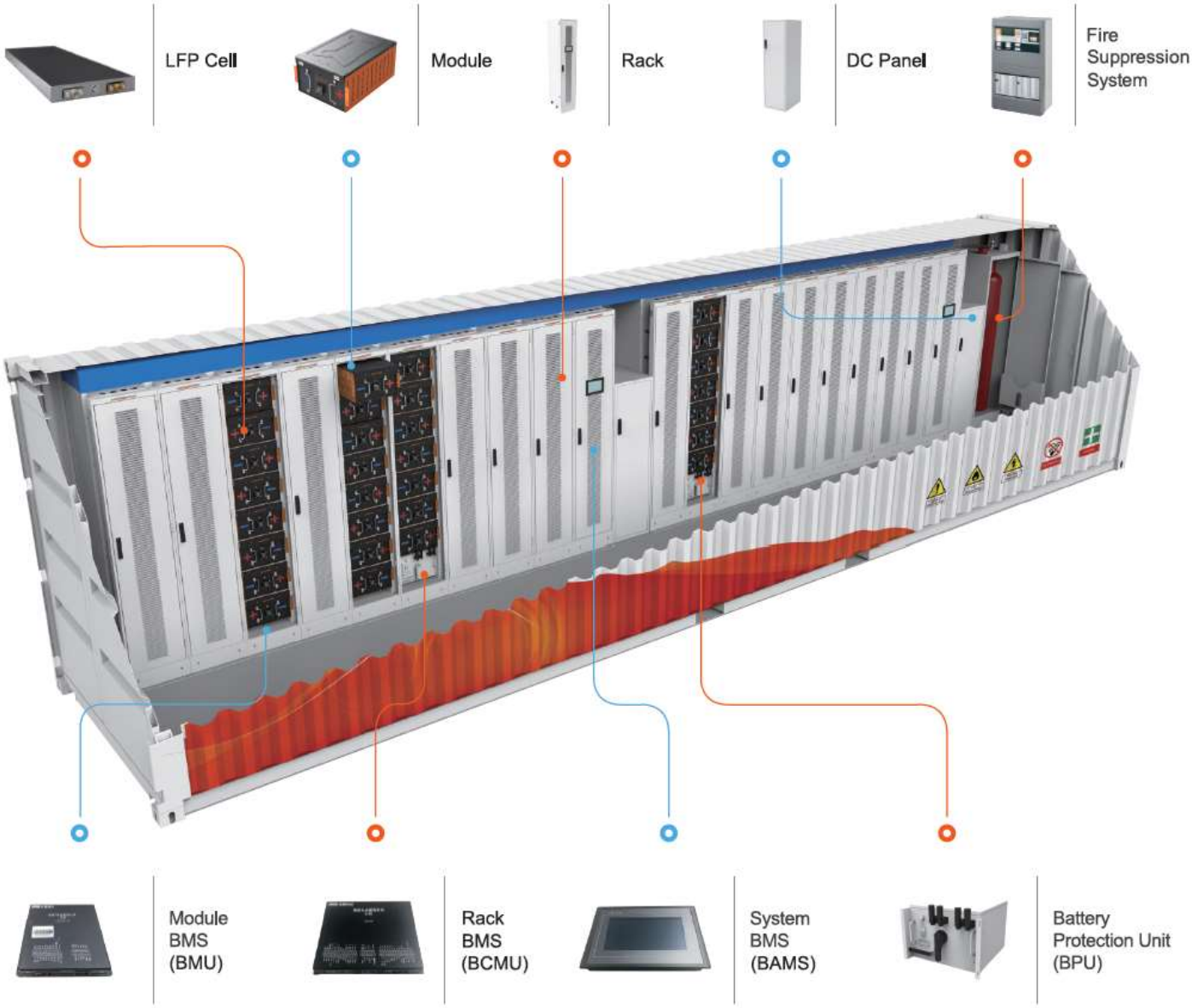


NESP Containerized Solution

| Cells
| BMS
| DC Panel

| Modules
| Battery Protection
| HVAC System

| Racks
| Container
| Fire Suppression



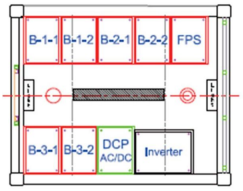
NESP Module & Rack Specification

ITEM		MODULE (32 Cells)	RACK TYPE 1 (11 Modules)	RACK TYPE 2 (13 Modules)	RACK TYPE 3 (15 Modules)
Type No.	2C	51.2NESP160	5128097	51280114	51280132
Capacity	Ah	172	172	172	172
Energy	kWh	8.8	97	114	132
Nominal Voltage	V	51.2	563.2	665.6	768.0
Minimum Voltage	V	44.8	492.8	582.4	672.0
Maximum Voltage	V	57.6	633.6	748.8	864.0
Dimensions W x D x H	mm	415x600x265	500*650*1800 (2 pcs)	500*650*2100 (2 pcs)	500*650*2400 (2 pcs)
Weight	kg	73.8	936.8	1084.4	1232

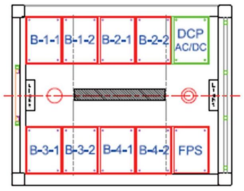
ITEM		MODULE (32 Cells)	RACK TYPE 1 (11 Modules)	RACK TYPE 2 (13 Modules)	RACK TYPE 3 (15 Modules)
Type No.	1C	51.2NESP200	512100118	512100140	512100161
Capacity	Ah	210	210	210	210
Energy	kWh	10.8	118	140	161
Nominal Voltage	V	51.2	563.2	665.6	768.0
Minimum Voltage	V	44.8	492.8	582.4	672.0
Maximum Voltage	V	57.6	633.6	748.8	864.0
Dimensions W x D x H	mm	415x600x265	500*650*1800 (2 pcs)	500*650*2100 (2 pcs)	500*650*2400 (2 pcs)
Weight	kg	83.4	1042.4	1209.2	1376

ITEM		MODULE (32 Cells)	RACK TYPE 1 (11 Modules)	RACK TYPE 2 (13 Modules)	RACK TYPE 3 (15 Modules)
Type No.	0.5C	51.2NESP250	512125141	512125166	512125192
Capacity	Ah	250	250	250	250
Energy	kWh	12.8	141	166	192
Nominal Voltage	V	51.2	563.2	665.6	768.0
Minimum Voltage	V	44.8	492.8	582.4	672.0
Maximum Voltage	V	57.6	633.6	748.8	864.0
Dimensions W x D x H	mm	415x600x265	500*650*1800 (2 pcs)	500*650*2100 (2 pcs)	500*650*2400 (2 pcs)
Weight	kg	93	1148	1334	1520

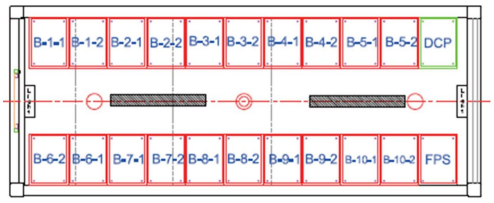
General Layout of Containerized Solutions



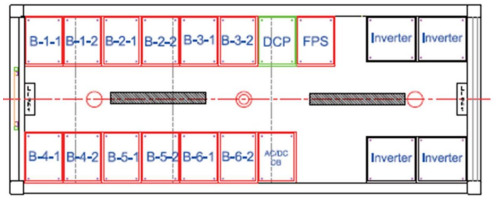
10 ft ISO HC Container
External Mounted HVAC
Max Rack Energy 192kWh
Max Container Energy 0.576MWh
Max Container Power 0.25MW



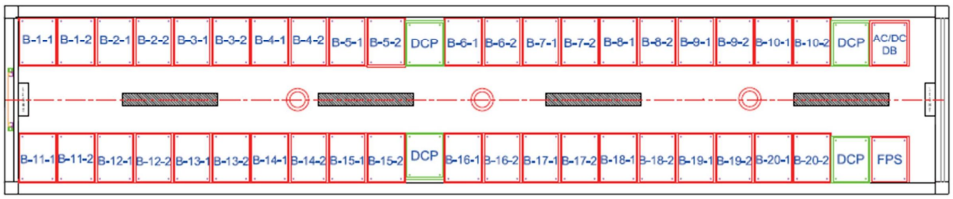
10 ft ISO HC Container
External Mounted HVAC
Max Rack Energy 192kWh
Max Container Energy 0.768MWh



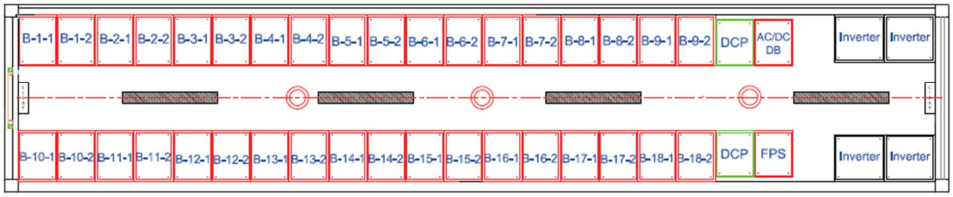
20 ft ISO HC Container
External Mounted HVAC
Max Rack Energy 192kWh
Max Container Energy 1.92MWh



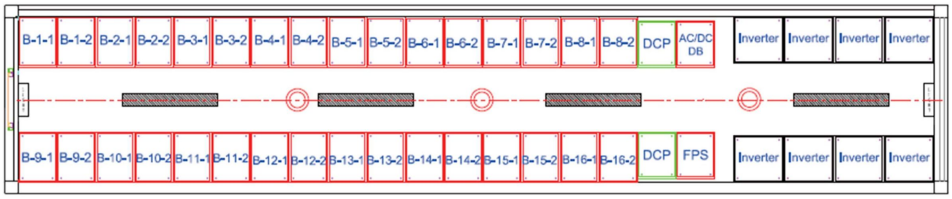
20 ft ISO HC Container
External Mounted HVAC
Max Rack Energy 192kWh
Max Container Energy 1.15MWh
Max Container Power 1.0MW



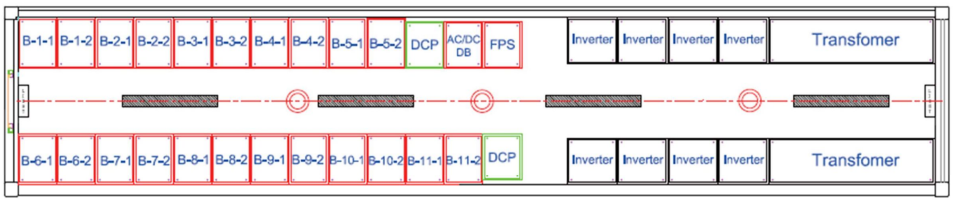
40 ft ISO HC Container
External Mounted HVAC
Max Rack Energy 192kWh
Max Container Energy 3.84MWh



40 ft ISO HC Container
External Mounted HVAC
Max Rack Energy 192kWh
Max Container Energy 3.45MWh
Max Container Power 1.0MW



40 ft ISO HC Container
External Mounted HVAC
Max Rack Energy 192kWh
Max Container Energy 3.07MWh
Max Container Power 2.0MW



40 ft ISO HC Container
External Mounted HVAC
Max Rack Energy 192kWh
Max Container Energy 2.11MWh
Max Container Power 2.0MW
Max Transformer 2.0MVA

Codes and Standards

Fully compliant with U.S. market codes and standards.

SAFETY	
UL9540	Safety for Energy Storage Systems and Equipment
UL9540A	Test Methods for Evaluating Thermal Runaway Fire Propagation - BESS
UL1973	Batteries for Use in Stationary Applications
UL1642	Standards for Lithium Batteries
IEC62619	Safety for Secondary Lithium Cells and Batteries
IEC61508, UL991, UL1998, UL60730-1	Functional Safety for Electrical Systems
NFPA 70E	Standard for Electrical Safety in the Workplace
NFPA 70	NEC, National Electrical Code
ANSI/IEEE C-2	National Electric Safety Code
UL60950	Electrical Insulation
NFPA 551 / NFPA 550	Fire Detection and Suppression
IEC 60812	Safety Analysis and Control System (FMEA, FTA)
IEC 61025	
MIL-STD-1629A	
UL1778	UPS for Ancillary
UL1598 UL8750	Luminaires
UL1012	Rectifier for DC power supply
UL1995	Air Conditioner for Cooling
UN 38.3 / IEC 62281	Transportation Safety of Lithium metal and Lithium ion batteries

Performance Standards & Grid Interconnect	
IEC61427-2 2015	Secondary cells and batteries for renewable energy storage – General requirements and methods of test – Part 2: On-grid applications
IEC 62620	Secondary Lithium Cells and Batteries for Industrial Applications
PNNL-22010	Protocol for Measuring Performance of Energy Storage System
UL 1741 (SA)	Standards for Inverters, Converters, Controllers and Interconnection System Equipment
IEEE1547	Standard for Interconnecting DR with EP
ANSI/IEC 60529	Degrees of Protection Provided by Enclosures
NEMA 250	Enclosures for Electrical Equipment
NEMA 250 / UL50E	Environmental Considerations for Electrical Equipment Enclosures
IEEE 693-2005	Recommended Practice for Seismic Design of Electrical Equipment

Global Track Record

Since 2011, Narada's BESS products have been successfully operating in over 14 countries.

SINCE 2011 | TOTAL 190MW/1.1GWh | COUNTRIES 14

Europe

Germany
Mockrehna 30MW / 50MWh

UK
36 kW / 33 kWh
Spain
0.25 MW / 0.4 MWh

Asia pacific

India
1.4 MW / 1.4 MWh

Australia
60 kW / 262 kWh
Pakistan
150 kW / 150 kWh
Philippines
200 kW / 200 kWh
Thailand
0.55 MW / 0.62 MWh
Singapore
0.15 MW / 1.250 MWh
Saudi Arabia
9 kW / 21.6 kWh

Nigeria
6 kW / 13 kWh
Saudi Arabia
9 kW / 21.6 kWh
UAE
1MW / 8.9MWh (multiple sites)

China

Jiangsu (35 Sites)
104 MW / 812 MWh

Qinghai (3 Sites)
15.5 MW / 122 MWh
Guangdong (7 Sites)
6.2 MW / 26 MWh
Zhejiang
6.3 MW / 25 MWh
Beijing (7 Sites)
1.5 MW / 18.3 MWh
Henan
9.6 MW / 9.6 MWh

Hebei (3 Sites)
2.1 MW / 12.5 MWh
Hubei
1.5 MW / 9 MWh
Xinjiang (3 Sites)
2.1 MW / 5 MWh
Inner Mongolia (2 Sites)
1.1 MW / 2.6 MWh

Milestones

Narada has been offering Energy Storage solutions for over 10 years.

2010
First Island Project
Zhejiang , China
200kW/560KWh
Lead Carbon

2011
First BESS jointly with Solar in China
Narada First BESS Trial Project in 2011
Narada factory
500kW/2MWh
Lead Carbon & Lithium Battery

2013
First Ramping Rate Control Project with Wind
Jiangsu, China
2.5MW/1.87MWh
Lead Carbon

2014
First Oversea Project
HDB,Singapore
30kW/250kWh
Lead Carbon
India First Frequency Regulation Project
India
1MW/1MWh
Lead Carbon & Lithium Battery
Largest Project for Distribution Upgrade Deferral & Voltage Support
Jiangsu, China
20MW/160MWh
Lead Carbon
Largest Solar BESS project for Telecom Operator
Abu Dhabi, UAE
1MW/8.86MWh
Lead Carbon

2016
Largest Energy Quality, Demanding Response & Arbitrage Solution
Jiangsu, China
12.5MW/100MWh
Lead Carbon
First Containerized Lithium Solution for Solar Out of China
Chiengmai, Thailand
500kW/500kWh
Lithium Battery
First Energy Shifting & Arbitrage Project
Zhejiang, China
1.5MW/12MWh
Lead Carbon

2017
First Large BESS Project in Africa
Nigeria & Tanzanian
3MW/14MWh
Lead Carbon

2018
First Lithium Project for Distribution Upgrade Deferral
Henan China
9.6MW/9.6MWh
Lithium Battery
First & Largest Frequency Regulation Project
Germany
30MW/50MW
Lead Carbon

Zhejiang Narada Power Source Co., Ltd. Was established in 1994 and has been publicly listed on the Shenzhen Stock Exchange since 2010. Narada specializes in providing energy system integration products, solutions, and operation services to Information and Communication Technology (ICT), Renewable Energy Storage, Electric Vehicles (EV), and other energy saving applications. With decades of development, Narada has become the leader in global industrial batteries. The “Narada” brand is well known worldwide.