



Energy Solutions Company
ESS Battery Division

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Company Websites

LG Chem Website : <http://www.lgchem.com>
LG Chem ESS Partner Portal : <http://www.lgesspartner.com>

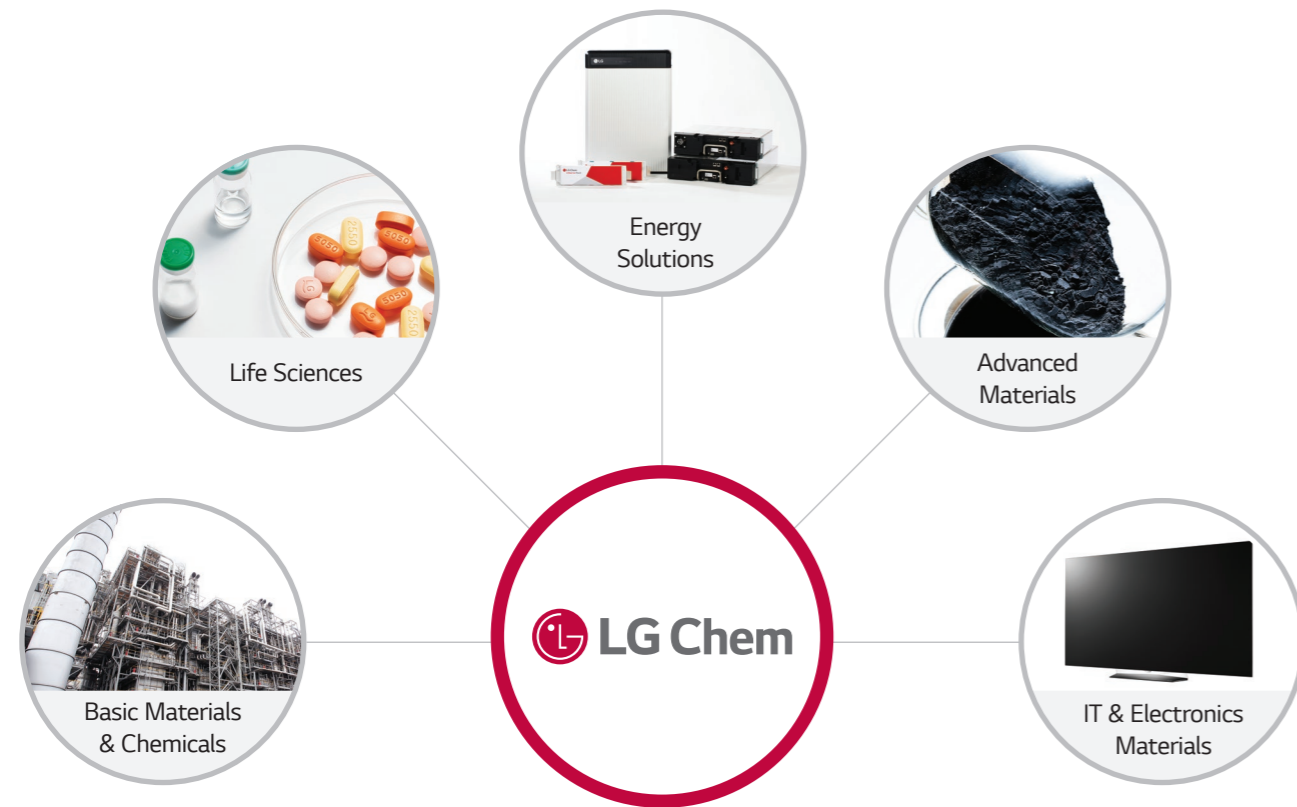


CHANGE YOUR ENERGY
CHARGE YOUR LIFE

ADVANCED BATTERIES
FOR ENERGY STORAGE

Introducing LG Chem

LG Chem at a Glance



Foundation	1947	Employees	33,694
Headquarters	Seoul, Korea	Sales Revenue	USD 25B (FY2018)

Energy Solutions

With 24 years of experience in successfully delivering products and solutions to customers in the global energy sector, LG Chem is recognized as the industry leader in Lithium-ion batteries.

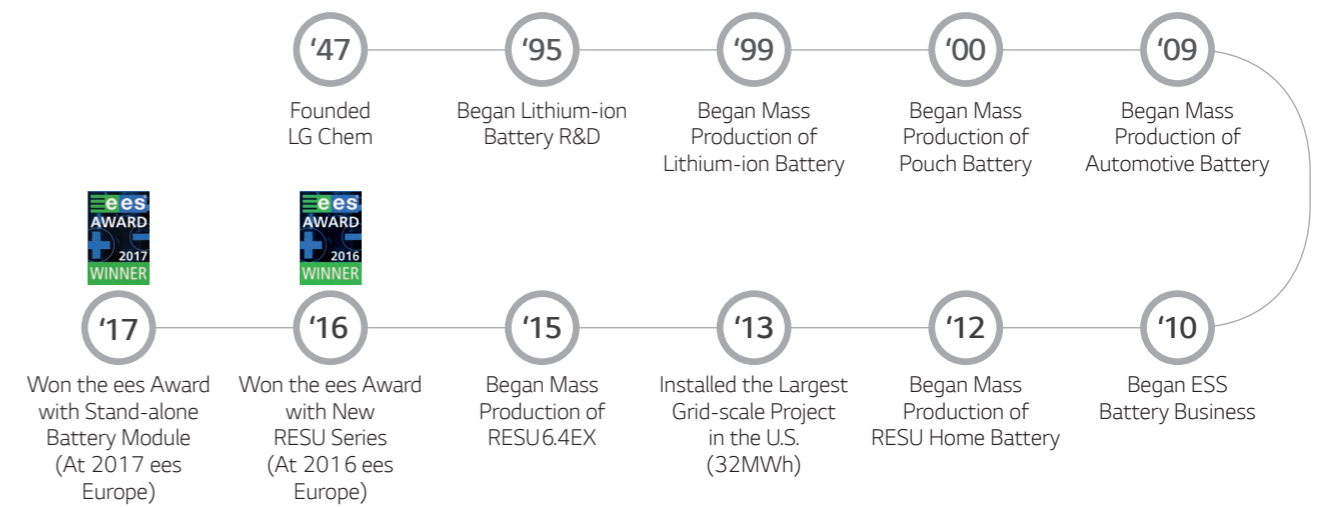


Global Operation of Energy Solutions

LG Chem is successfully implementing rapid go-to-market strategies across its wide range of global networks. By locating manufacturing plants in four strategic locations of Korea, China, the U.S., and Poland, LG Chem supplies batteries to meet the needs of local customers in the most efficient and timely manner.



Business History of Energy Solutions



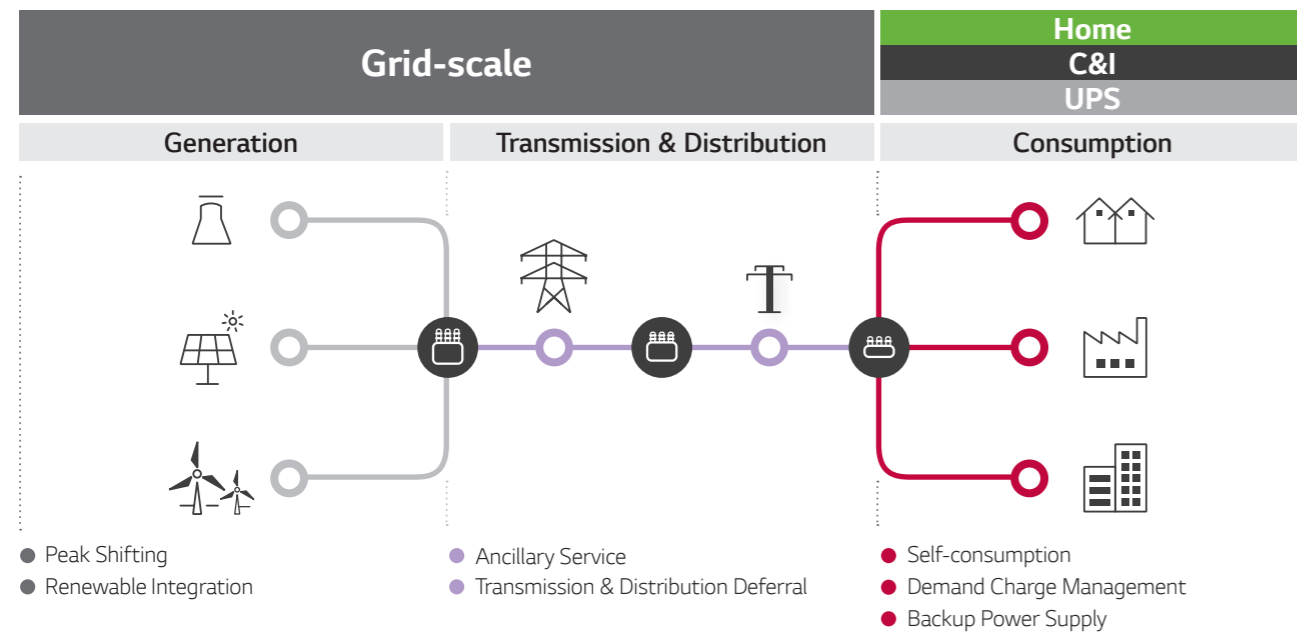
* The ees Award is one of the most prestigious awards presented annually at ees Europe, the largest exhibition for batteries and energy storage systems in Europe, with the purpose to pay tribute to pioneering products and solutions for energy storage system.

LG Chem ESS Solutions

Total Solutions for ESS (Energy Storage System)

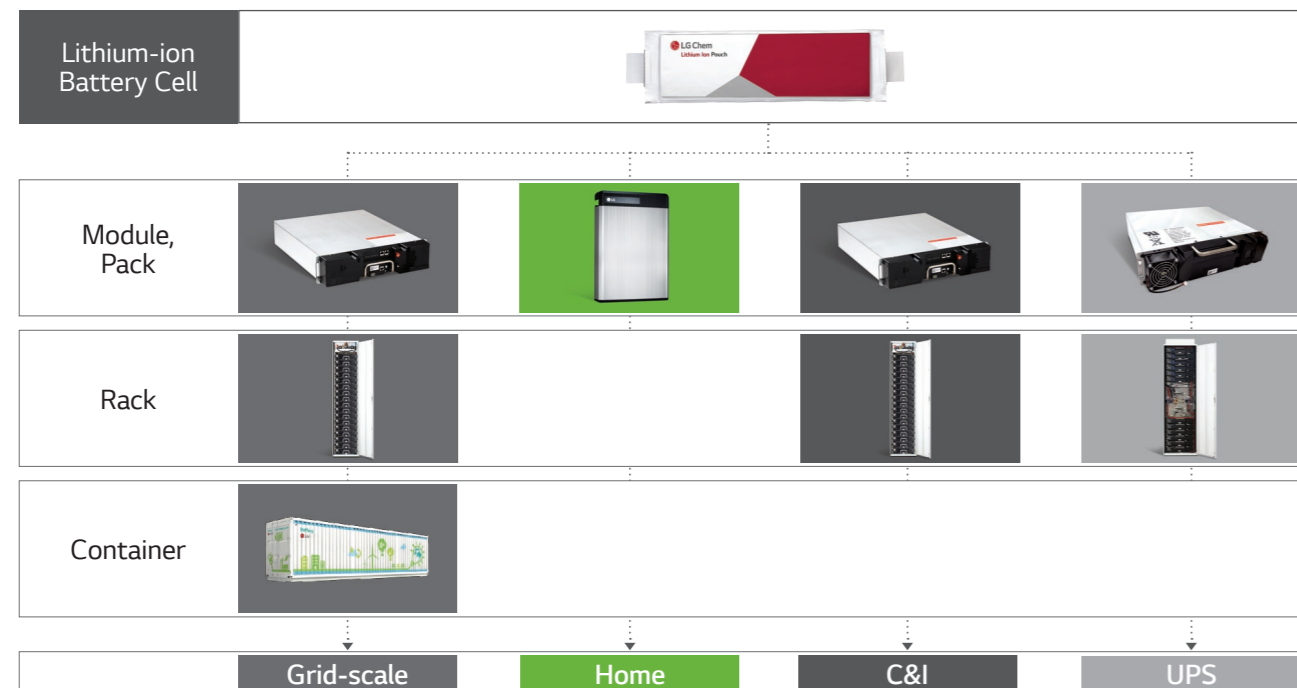
Applications of ESS

ESS (Energy Storage System) provides solutions for applications throughout power supply systems including Grid-scale, Home, C&I (Commercial and Industrial), and UPS (Uninterruptible Power Supply).



Product Portfolio

LG Chem offers a wide variety of products, such as Battery Module, Pack, Rack, and Container that allow our customers to source total battery solutions.

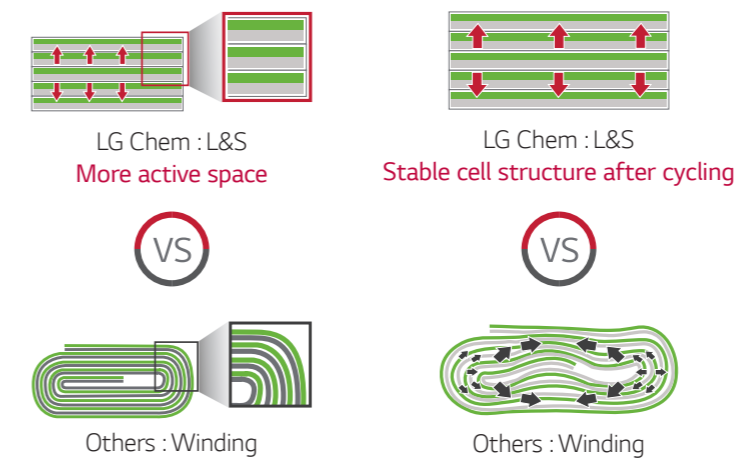


Key Strengths

Lithium-ion Battery Cell

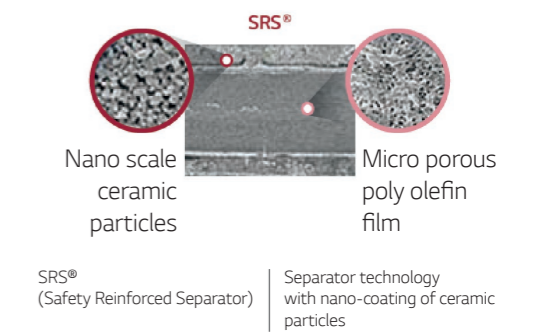
Compactness & Long Lifespan

LG Chem's L&S (Lamination & Stacking) process minimizes dead space, enables higher energy density, and enhances the sustainability of cell structures.



Safety

LG Chem's SRS® (Safety Reinforced Separator) increases the mechanical and thermal stability of battery cells.



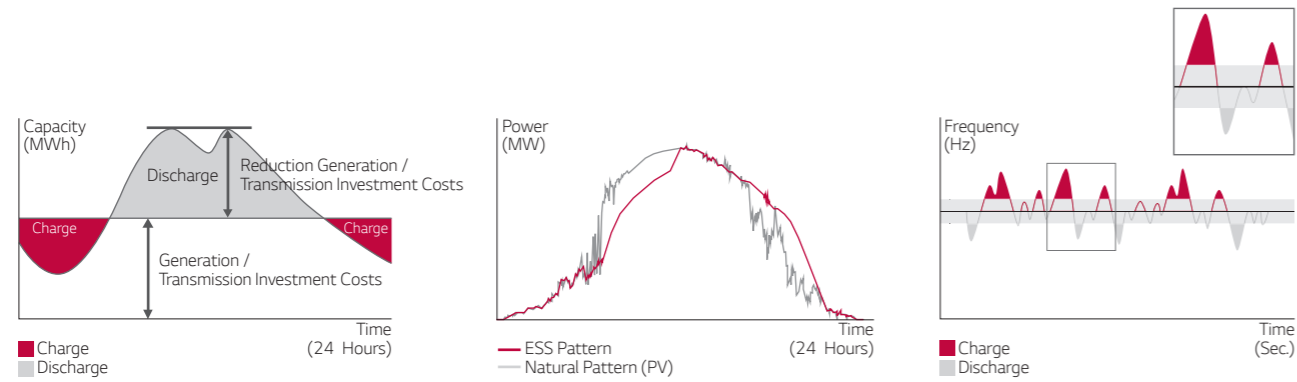
Unsurpassed Experience and Expertise

LG Chem is a reliable battery solution partner with extensive field experience and technical expertise.

<h3>Chemical Expertise</h3> <p>LG Chem features world class battery technology, made possible by 70 years of expertise in chemicals.</p>	<h3>Proven Technology</h3> <p>LG Chem is the global leading supplier of Lithium-ion batteries for electric vehicles.</p>	<h3>ESS Track Record</h3> <p>Since 2010, LG Chem has installed or been awarded ESS projects for a wide range of applications.</p>
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LG Chem ESS Solutions Grid-scale Battery

For stabilizing the grid, a grid-scale battery provides capabilities such as peak shifting, renewable integration, and frequency regulation. With our world-leading Lithium-ion battery technology, LG Chem offers advanced battery systems for grid-scale ESS applications.



Peak Shifting

- Charge during off-peak times
- Discharge during peak times

Renewable Integration


- Stabilize the intermittent renewable power by alternately charging and discharging

Frequency Regulation

- Charge when grid frequency increases
- Discharge when grid frequency decreases


Product Lineup

LG Chem offers two product lineups highly optimized for grid-scale customers' requirements.



Energy
JH3, JH4

- Duration for ≥ 1 hour
- Continuous power supply



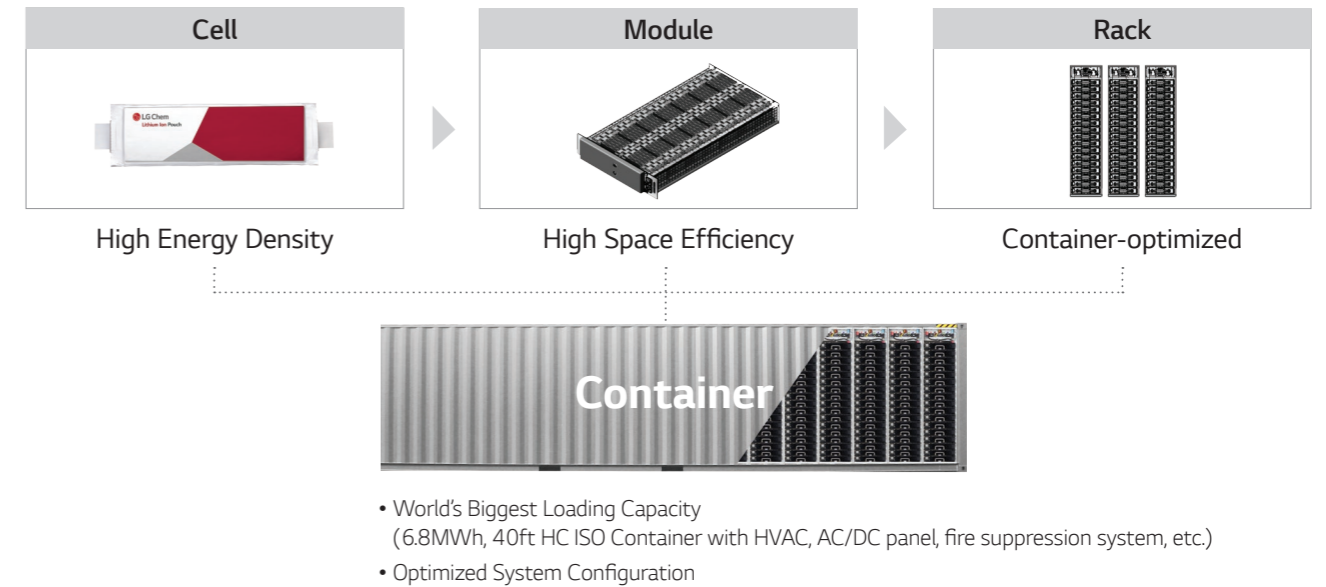
Power
JP3

- Duration for < 1 hour
- High power supply

Key Features

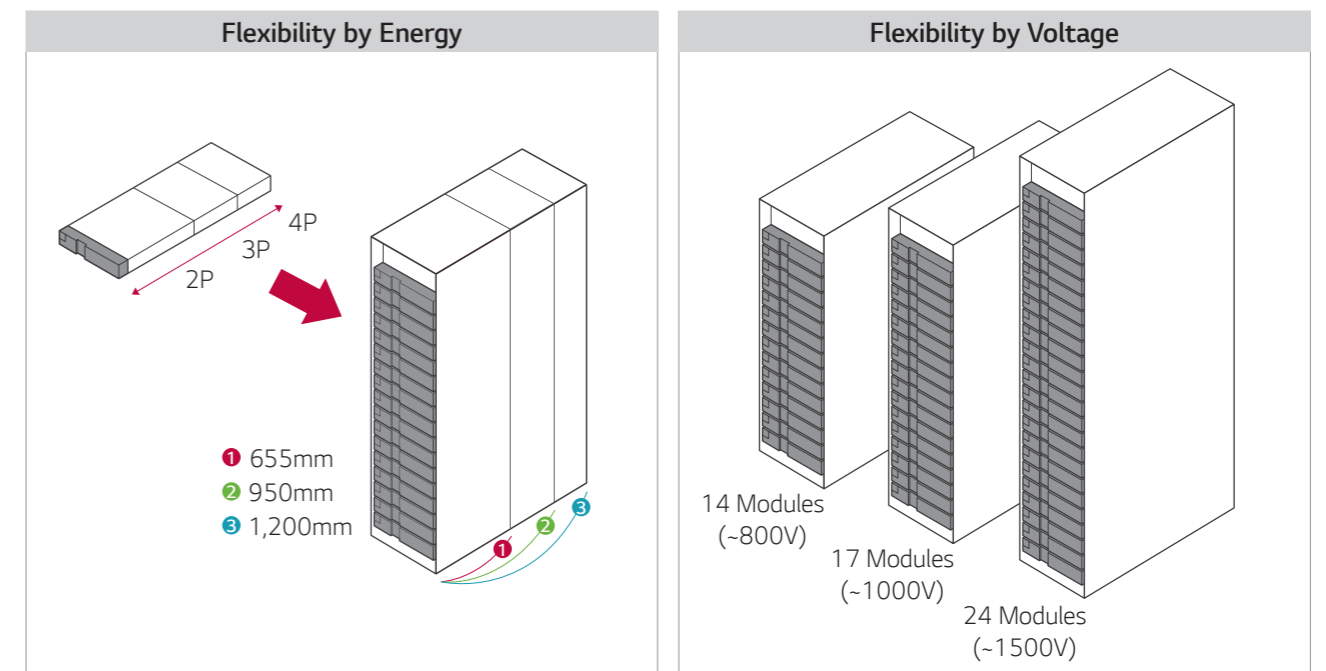
System Optimization

LG Chem features a highly optimized battery system design which enables high energy density.



Diverse Product Options

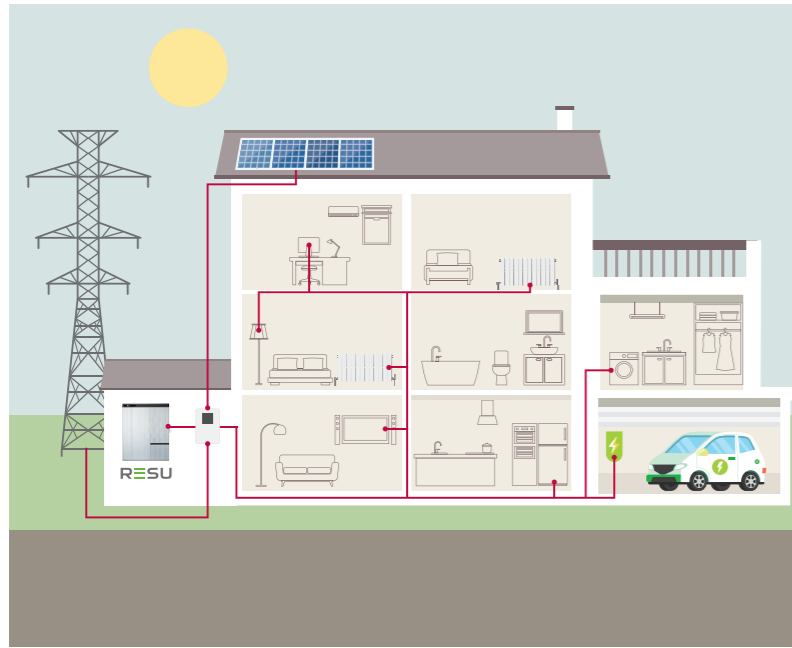
LG Chem offers a range of product options to optimally meet our customers' needs for energy, footprint and voltage.



LG Chem ESS Solutions

Home Battery

A home battery can store surplus energy generated from rooftop photovoltaic panels for use when needed. When the sun has set, energy demand is high, or there is a black-out, you can use the energy stored in your home battery to meet your energy needs at no extra cost. In addition, a home battery helps you pursue the goal of energy self-consumption and ultimately energy-independence.



Electricity Bill Saving

- Charge during off-peak times
- Discharge during peak times

Self-consumption

- Store solar energy generated from photovoltaic panels for the future use

Emergency Power Backup

- Discharge during a black-out, functioning as backup power

Key Features



Compact Size & Space Saving

The compact and sleek design of the RESU allows you to place it anywhere you want, both indoors and outdoors.



Reliable Performance

The RESU provides reliability for your home with its industry leading longevity.



Proven Safety

The safety of LG Chem's lithium-ion battery is proven in the automotive and ESS markets.



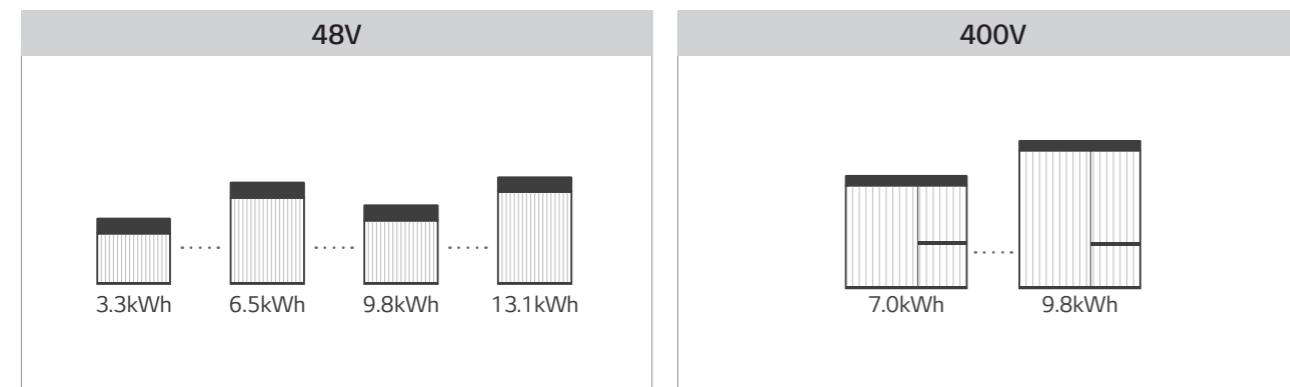
Expandable at Need

The RESU models can be combined up to 2 units to increase energy capacity.

Product Lineup

LG Chem offers six home battery models in two product lineups to fulfill diverse capacity and voltage needs of homeowners.

RESU



RESU Plus is an expansion kit specially designed for 48V models of the RESU series. With RESU Plus, RESU3.3/6.5/10 are cross-connected with each other, and RESU13 is connected with the same model. (Number of expandable battery units : Up to 2EA)

Customer Testimonials



Remarkable Self-sufficiency

"The remarkable result one year after completion and move-in : up to 90 percent self-sufficiency"
- Jörg Erstling, Germany



Simple Installation & Sleek Design

"The LG Chem RESU10H was easy to install and looks good. It's not overly intrusive, and it is a real conversation starter"
- Stephen Young, Australia

Specifications

Grid-scale Battery



Energy

Long-duration application
with continuous power supply (≥ 1 hour)

Energy Module



Models	M48145P5B (2P)	M48218P5B (3P)	M48290P5B (4P)
Energy [kWh]	7.4	11.2	14.9
Capacity [Ah]	145	218	290
Nominal Voltage [V]	51.4		
Voltage Range [V]	42.0-58.8		
Dimension [W x H x D, mm]	445 x 110 x 620	445 x 110 x 915	445 x 110 x 1,162
Weight [kg]	46	68	89

Energy Rack



Models	R800 (14 Modules)		
	M48145P5B	M48218P5B	M48290P5B
Energy [kWh]	104.3	156.4	208.5
Capacity [Ah]	145	218	290
Nominal Voltage [V]	719		
Voltage Range [V]	588-823		
Dimension [W x H x D, mm]	520 x 1,880 x 655	520 x 1,880 x 950	520 x 1,880 x 1,200
Weight [kg]	760	1,097	1,396



Models	R1000 (17 Modules)			R1500 (24 Modules)
	M48145P5B	M48218P5B	M48290P5B	M48290P5B
Energy [kWh]	126.6	189.9	253.2	357.5
Capacity [Ah]	145	218	290	290
Nominal Voltage [V]	873			1,233
Voltage Range [V]	714-1,000			1,008-1,411
Dimension [W x H x D, mm]	520 x 2,200 x 655	520 x 2,200 x 950	520 x 2,200 x 1,200	520 x 3,150 x 1,200
Weight [kg]	905	1,305	1,680	2,407

Energy Container



Models	40ft HC ISO Container	
	M48145P5B	M48218P5B
	Manned	Unmanned
Energy [MWh]	5.4	6.8
System Voltage [V dc]	714-1,000	
Dimension [W x H x D, m]	12.2 x 2.9 x 2.5	
Weight [ton] (incl. battery)	50	60
Ambient Temperature [°C]	-20-50	
Communication	CAN2.0B, Modbus TCP/IP	

(Container system design can be changed according to customer requirements)

Energy Module



Models	M48126P3B(2P)	M48189P3B(3P)	M48252P3B(4P)
Energy [kWh]	6.5	9.8	13
Capacity [Ah]	126	189	252
Nominal Voltage [V]	51.8		
Voltage Range [V]	42.0-58.8		
Dimension [W x H x D, mm]	445 x 110 x 620	445 x 110 x 915	445 x 110 x 1,162
Weight [kg]	46	68	89

Energy Rack



Models	R800 (14 Modules)		
	M48126P3B	M48189P3B	M48252P3B
Energy [kWh]	91.3	137.0	182.7
Capacity [Ah]	126	189	252
Nominal Voltage [V]	725		
Voltage Range [V]	588-823		
Dimension [W x H x D, mm]	520 x 1,880 x 655	520 x 1,880 x 950	520 x 1,880 x 1,200
Weight [kg]	766	1,104	1,402



Models	R1000(17 Modules)		
	M48126P3B	M48189P3B	M48252P3B
Energy [kWh]	110.9	166.4	221.8
Capacity [Ah]	126	189	252
Nominal Voltage [V]	881		
Voltage Range [V]	714-1,000		
Dimension [W x H x D, mm]	520 x 2,200 x 655	520 x 2,200 x 950	520 x 2,200 x 1,200
Weight [kg]	912	1,314	1,687

Energy Container



Models	40ft HC ISO Container	
	M48126P3B	M48189P3B
	Manned	Unmanned
Energy [MWh]	4.8	6.0
System Voltage [V dc]	714-1,000	
Dimension [W x H x D, m]	12.2 x 2.9 x 2.5	
Weight [ton] (incl. battery)	50	60
Ambient Temperature [°C]	-20-50	
Communication	CAN2.0B, Modbus TCP/IP	

(Container system design can be changed according to customer requirements)

Grid-scale Battery



Power

Short-duration applications with fast response, high power supply (< 1 hour)

Power Module



Models	M4864P6B (1P)	M48128P6B (2P)
Energy [kWh]	3.3	6.6
Capacity [Ah]	64	128
Nominal Voltage [V]	51.5	
Voltage Range [V]	42.0-58.8	
Dimension [W x H x D, mm]	445 x 110 x 344	445 x 110 x 620
Weight [kg]	28	47

Power Rack



Models	R800 (14 Modules)	
	M4864P6B	M48128P6B
Energy [kWh]	46.2	92.3
Capacity [Ah]	64	128
Nominal Voltage [V]	721	
Voltage Range [V]	588-823	
Dimension [W x H x D, mm]	520 x 1,880 x 425	520 x 1,880 x 655
Weight [kg]	491	775

Models	R1000 (17 Modules)	
	M4864P6B	M48128P6B
Energy [kWh]	56.0	112.1
Capacity [Ah]	64	128
Nominal Voltage [V]	876	
Voltage Range [V]	714-1,000	
Dimension [W x H x D, mm]	520 x 2,200 x 425	520 x 2,200 x 655
Weight [kg]	584	924

Power Container



Models	40ft HC ISO Container	
	M48128P6B	
Energy [MWh]	4.0	
System Voltage [V dc]	714-1,000	
Dimension [W x H x D, m]	12.2 x 2.9 x 2.5	
Weight [ton] (incl. battery)	50	
Ambient Temperature [°C]	-20-50	
Communication	CAN2.0B, Modbus TCP/IP	

(Container system design can be changed according to customer requirements)

Home Battery



Models	48V			
	RESU3.3	RESU6.5	RESU10	RESU13
Total Energy [kWh] ¹⁾	3.3	6.5	9.8	13.1
Usable Energy [kWh] ²⁾	2.9	5.9	8.8	12.4
Capacity [Ah]	63	126	189	252
Nominal Voltage [V]	51.8			
Voltage Range [V]	42.0-58.8			
Dimension [W x H x D, mm]	452 x 403 x 120	452 x 656 x 120	452 x 484 x 227	452 x 626 x 227
Weight [kg]	31	52	75	99
Enclosure Protection Rating	IP55			
Communication	CAN2.0B			
Certificates	Cell	UL1642		
	Product	UL1973 / TUV (IEC 62619) / CE / FCC / RCM		TUV(IEC 62619)/CE/FCC/RCM

1) Total Energy is measured at the initial stage of battery life under the condition as follows : Temperature 25°C

2) Usable Energy is based on battery cell only

Compatible Inverter Brands : SMA, Ingeteam, GoodWe, Sungrow, Victron Energy, Selectronic - More brands to be added



Models	400V			
	RESU7H		RESU10H	
	Type-R	Type-C	Type-R	Type-C
Total Energy [kWh] ¹⁾	7.0		9.8	
Usable Energy [kWh] ²⁾	6.6		9.3	
Capacity [Ah]	63		63	
Voltage Range [V]	350-450	430-550	350-450	430-550
Dimension [W x H x D, mm]	744 x 692 x 206	744 x 907 x 206	744 x 907 x 206	744 x 907 x 206
Weight [kg]	75	87	97	99.8
Enclosure Protection Rating	IP55			
Communication	RS485	CAN2.0B	RS485	CAN2.0B
Certificates	Cell	UL1642		
	Product	TUV (IEC 62619) / CE / FCC / RCM	TUV (IEC 62619) / CE / RCM	UL1973 / TUV (IEC 62619) / CE / FCC / RCM

1) Total Energy is measured at the initial stage of battery life under the condition as follows : Temperature 25°C

2) Usable Energy is based on battery cell only

• Noise Level : < 40dBA

Compatible Inverter Brands : SMA, SolarEdge, Fronius, Huawei - More brands to be added

C&I Battery



Models	R800		R1000	
	M48126P3B	M48189P3B	M48126P3B	M48189P3B
Energy [kWh]	91.3	137.0	110.9	166.4
Capacity [Ah]	126	189	126	189
Nominal Voltage [V]	725		881	
Voltage Range [V]	588-823		714-1,000	
Dimension [W x H x D, mm]	520 x 1,880 x 655	520 x 1,880 x 950	520 x 2,200 x 655	520 x 2,200 x 950
Weight [kg]	766	1,104	912	1,314
Certificates	UL 1973 (Listed), IEC 61000-6-2 / 61000-6-3, FCC Part15 Class A			

Telecom Backup Solution / Residential Module



Models	M4863P3S	M48126P3S
	Energy [kWh]	3.3
Capacity [Ah]	63	126
Nominal Voltage [V]	51.8	51.8
Voltage Range [V]	42.0-58.8	42.0-58.8
Dimension [W x H x D, mm]	445 x 110 x 339	445 x 110 x 587
Weight [kg]	24	44

UPS Backup Solution



Models	UPS Rack		
	12 Modules (6S2P)	10 Modules	10 Modules
	M7830P7B	M4864P6B	M48128P6B
Energy [kWh]	28.0	33.0	65.9
Continuous Power [kW]	250	115	132
Nominal Voltage [V]	466	515	515
Voltage Range [V]	397-523	420-588	420-588
Dimension [W x H x D, mm]	520 x 2,292 x 500	600 x 2,000 x 650	600 x 2,000 x 800
Weight [kg]	480	390	625

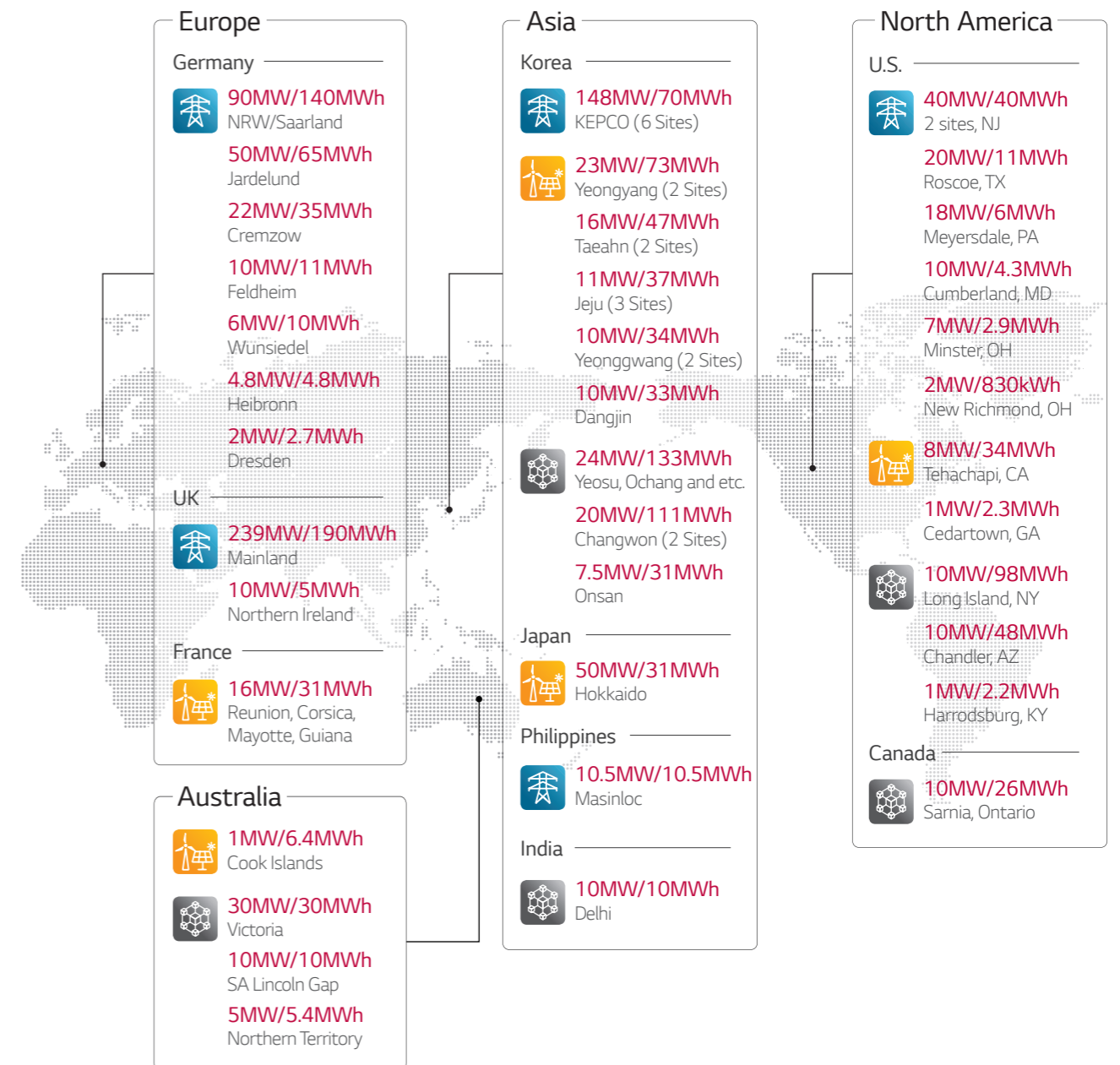
Global Reference (Grid-scale)

LG Chem has installed or been awarded over 7.5GWh of grid-scale projects since the launch of our ESS business.

> 7.5GWh
(As of July 2019)

World-leading Grid-scale battery supplier with extensive experience and proven reference projects

* Cumulative amount of installed/awarded projects



Frequency Regulation



Renewable Integration



Peak Shifting & Multi Purpose