LG Energy Solution

LG ENERGY SOLUTION

CONTENTS

LG ENERGY SOLUTION

COMPANY PROFILE

LG Energy Solution

LG Group: Toward 100 Years of Business

Founded in 1947, the LG Group will celebrate its 75th anniversary in 2022, striving toward 100 years in business.

- Affiliated companies **60+**
- Overseas subsidiaries **270+**
- Employees **270K+**
  (Korea 14K/Overseas 132K)
- Sales **$150B**

as of Dec. 2022

Chemical

LG Chem
LG H&H
FarmHannong
...

Electronics

LG Electronics
LG Display
LG Innotek
...

Communication/ Service

LG U+
LG CNS
LG HelloVision
...

History of LG Group

1947	1958	1987	1995	1996	2003	2017	2021
Established Lucky Chemical Co., Ltd. (Today's LG Chem)	Established Goldstar (Today's LG Electronics)	Completed the construction of Lucky Goldstar Twin Tower	Changed Group CI from Lucky Goldstar →to LG	Established LG Telecom (Today's LG U+)	Launched LG Corporation, the holding company	70th anniversary of founding LG	Separated LX Group from LG Group






Next-Generation Growth Engine for LG Group

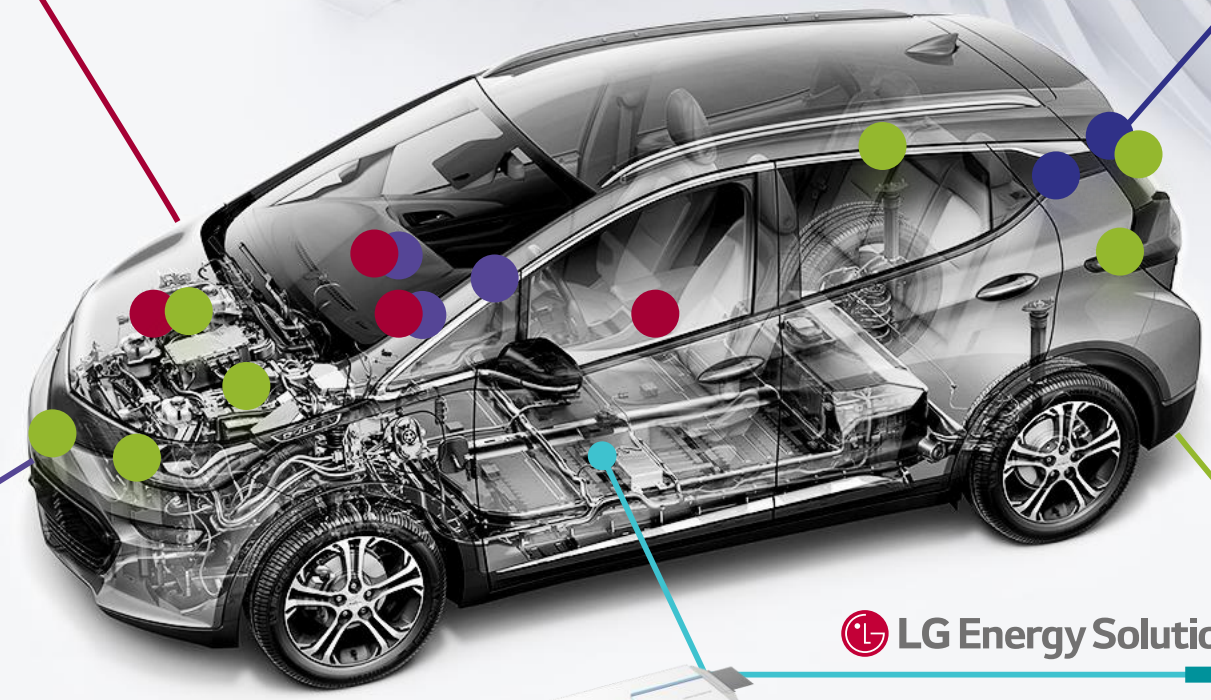
LG Group is nurturing the electronic devices and Automotive Electronics Business, focusing on the electric vehicle batteries, as a growth engine for the next generation.

LG Electronics

- Telematics
- AVN*
- HVAC**
- EV motors

LG Chem

- Cathode, Separator, CNT



LG Display

- In-vehicle Display

LG Energy Solution

- EV Battery

LG Innotek

- EV components

LG Energy Solution's Unique Value

LG Energy Solution is building a unique corporate brand value,
a specialized company that provides a variety of energy solutions for a better world.

Business Areas

- Advanced Automotive
- Mobility & IT
- ESS

Manufacturing Facilities

- Korea
- USA
- Poland
- China
- Indonesia

- Established 2020.12
- Employees 34,177 (Domestic 10,442 / Overseas 23,735)
- CEO Kim, Dong-Myung
- Sales $19.8B

(as of 2022)

Korea's Battery History

Beginning in 1992, lithium-ion battery research ushered in the start of Korea's battery history.

1947 → **1992** → **1996** → **1999** → **2000** → **2004** → **2009** → **2012**

1947 LG Chem Founded
(start of LG Group)

1992 Began Lithium-Ion Battery Research

1996 Began Lithium-Ion Battery Development

1999 Mass-Produced Cylindrical Lithium-Ion Batteries

2000 Founded United States R&D Office

2004 Completed Construction of Nanjing Plant in China

2009 Supplied the World's First Mass-Produced EV Batteries
(GM Volt)

2012 Completed Construction of EV Battery Plant in the U.S.

Korea's Battery History

Beginning in 1992, lithium-ion battery research ushered in the start of Korea's battery history.

2013 → 2015 → 2017 → 2018 → 2020.12 → 2020.12 → 2021.4 → 2021.9 → 2022.3

2013 Developed the World's First Future Batteries (Stepped, Curved, Wire Battery)

2015 Began mass production of ESS battery cell

2017 Completed Construction of EV Battery Plant in Poland

2018 Developed the World's First Free-Form Battery

2020.12 LG Energy Solution Established

LG Energy Solution

2020.12 Established 'Ultium Cells' with GM

2021.4 Joined both RE100 and EV100 initiatives, as the first global battery manufacturer

RE100
EV100

2021.9 Signed MoU with Hyundai Motor Group and Indonesian Government to Establish EV Battery Cell Plant

LG Energy Solution + HYUNDAI MOTOR GROUP

2022.3 Established 'NextStar Energy' with Stellantis

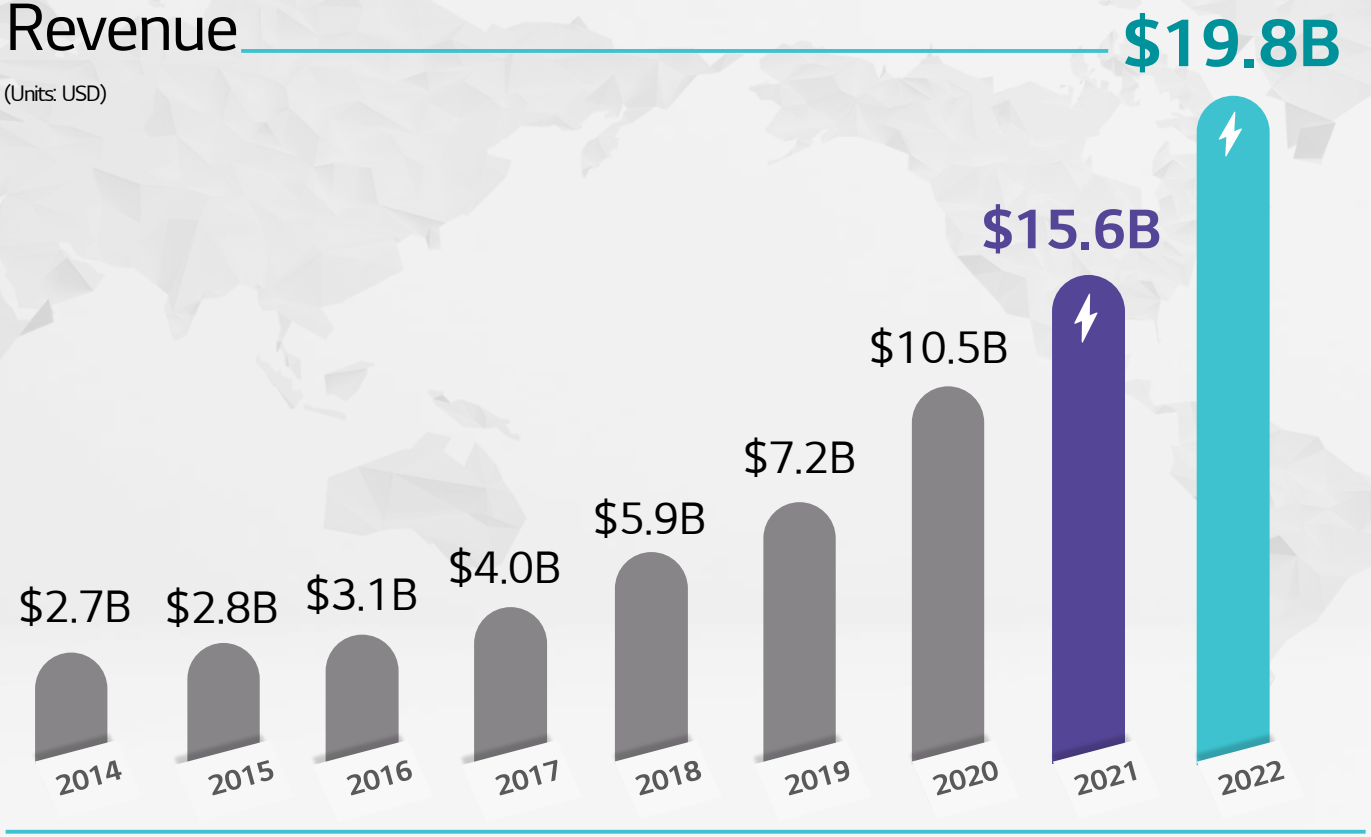
LG Energy Solution + STELLANTIS

Explosive Growth

By leading in the fast-growing green energy sector and global EV market, LG Energy Solution continues to see steady growth.

Revenue

(Units: USD)



Average Annual Growth

30%

Strong Business Portfolio

Leading the future energy industry by developing Advanced Automotive Battery, Mobility & IT Battery , and ESS Battery enterprises, which are key for the green energy transition.

1. Advanced Automotive Battery

Contributing to the popularization of electric vehicles with the world's best high-tech battery products

EV / PHEV / HEV / μ-HEV
Cell · Module · Pack · BMS

2. Mobility & IT Battery

Leading wireless innovation by actively targeting new markets, such as IT and LEV

IT Equipment / Power Tools / LEV
Cylindrical · Pouch · Free-Form

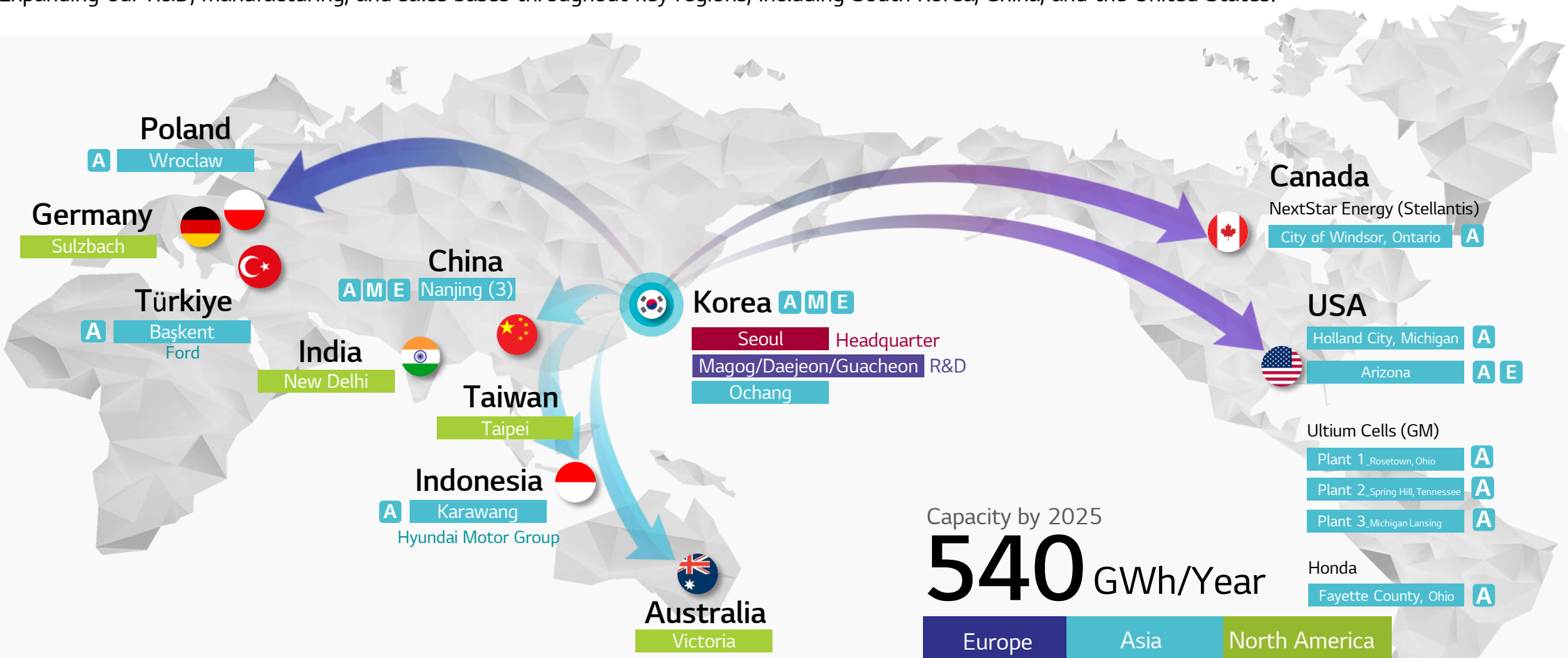
3. ESS Battery

Unlocking the smart grid era by providing various ESS battery products

Grids / Commercial / Residential
Cell · Pack · Rack

Global Network

Expanding our R&D, manufacturing, and sales bases throughout key regions, including South Korea, China, and the United States.



Headquarter | Manufacturing | R&D | Marketing

A Advanced Automotive M Mobility & IT E ESS

LG Energy Solution

Technological advancements

From raw material technology and manufacturing production technology to mass production systems, LG Energy Solution is at the forefront of technological advancements.

1. Material Technology

- Leader in high-capacity cathode material technology
- Owner of source proprietary technology for ceramic coating on separators
- (safety-reinforced separator)
- Stable supply of battery materials (in-house)

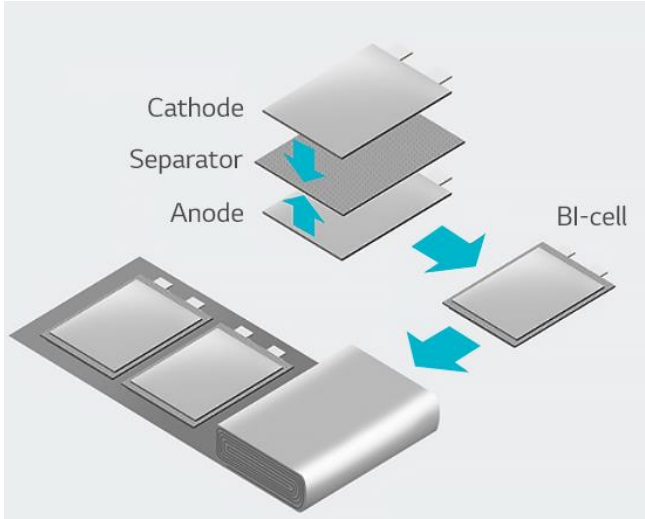
2. Global Production Capabilities

- Experienced in mass production
- Established a global production system (Korea/USA/Poland/China)
- Global R&D Network

Korea	China	Poland	USA
Location: Ochang	Location: Nanjing (3)	Location: Wroclaw	Location: Holland
Completed: 2011	Completed: 2015/2019	Completed: 2018	Completed: 2018
Market: global	Market: Asia	Market: Europe	Market: USA

3. Process Technology

- Lamination & Stacking
- CNT Pre-Dispersion
- Pre-lithiation

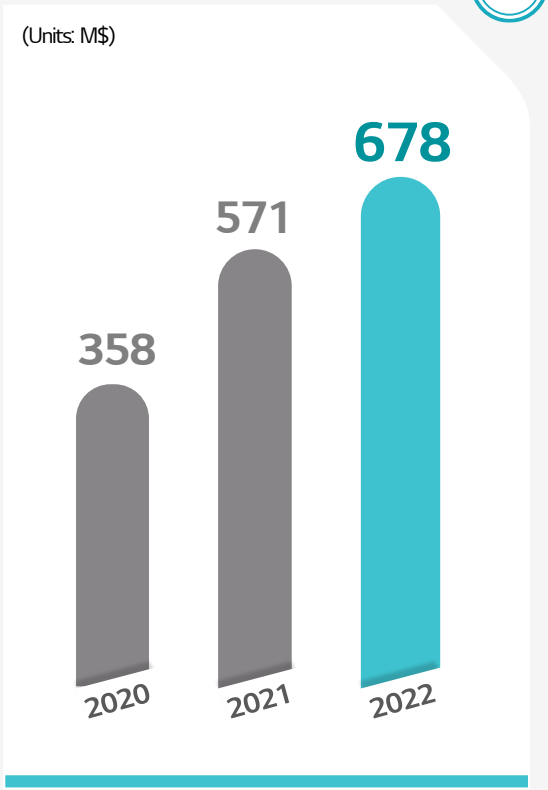


Securing Skills & Technology

Established substantial intellectual property rights, a key source of competitiveness, through active R&D investments and talent acquisitions

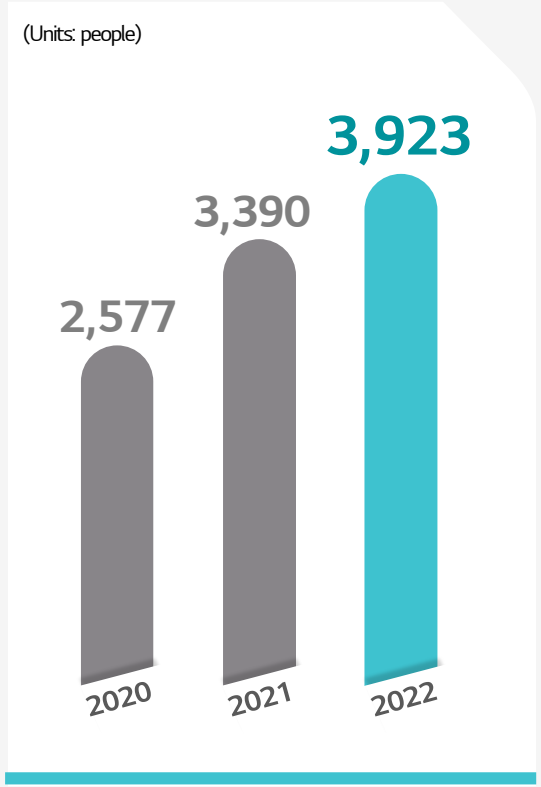
Investment

(Units: M$)



Human Resources

(Units: people)



Intellectual Property Rights

Overseas 18,067 + Domestic 8,574

Total Patents

26,641

(as of Dec 2022)

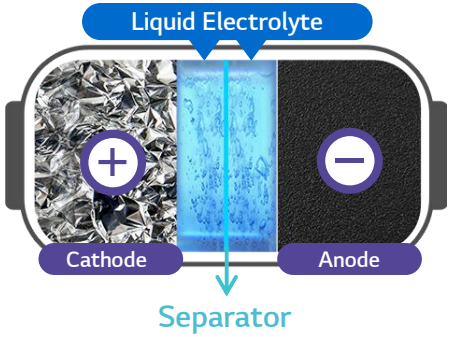
The Next-Generation Batteries

Leading the way in battery innovation with research on next-generation batteries based on new materials technology that satisfies high safety and capacity standards

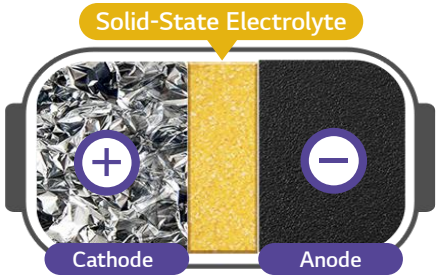
Solid-State Battery

Solid-state batteries are rechargeable batteries with
a solid-state electrolyte between a cathode and an anode,
enabling high energy density and high capacity with a low risk of combustion

▶ Lithium-Ion Battery



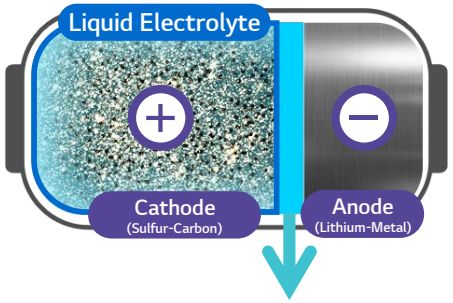
▶ Solid-State Battery



E-mobility, Wearable Devices, Ships/Aircraft, Robots

Lithium-Sulfur Battery

Lithium-sulfur batteries are made from lightweight materials,
such as sulfur-carbon composite in the cathode and lithium-metal in the anode,
giving them an energy density 1.5 times higher than conventional lithium-ion batteries.



UAM, Drones

Social responsibility for a better future

'Selecting and promoting 8 critical areas related to the environment, human rights, safety, and society, as well as four key areas including climate action, closed-loop, human capital, and responsible supply chain management.

We CHARGE Toward a Better future

C	H	A	R	G	E
Climate Action & Circular Economy	**H**uman Value Management	**A**dvanced EH&S	**R**esponsible & Impactful Business	**G**ood Governance	**E**SG Disclosure & Communication
Climate Action Achieving carbon neutrality by 2050	**Human Rights Management** Creating risk-free business sites for human rights	**Product stewardship** 100% green products by 2023	**Responsible Supply Chain Management** Securing over 90% of ESG low-risk group by 2030	**Compliance**	**Communication**
Circular Economy Establishing a closed loop by 2025	**Human Capital Management** Fostering diverse talent	**EH&S** Zero EH&S accidents	**Shared Growth and Greater Impact on Local Communities** Reinforcing brand image for mutual growth and cooperation	**Governance**	**ESG initiative**

8 Critical Areas

4 Key Enablers

Global ESG Initiatives

LG Energy Solution is reinforcing ESG management by joining global initiatives and creating value for a sustainable future.

Responsible Business Alliance

Formerly the Electronic Industry Citizenship Coalition

Advancing Sustainability Globally

RBA (Responsible Business Alliance)

RMI
Responsible Minerals Initiative,

- Response to human rights and environmental issues in the mineral procurement process

RLI
Responsible Labor Initiative

- Response to forced labor, child labor, and working conditions issues

RE 100

Renewable Electricity 100%

A global campaign that aims to cover 100% of the electricity used by companies with renewable energy such as wind and solar power by 2050

EV100

Electric Vehicle 100%

A global campaign with the goal of converting company-owned and operated vehicles to 100% electric vehicles by 2030 to reduce CO2 in the transport sector

Lead in Climate Change Response

As the first South Korean battery manufacturer to join RE100, LG Energy Solution is protecting the environment by advancing the goal of transitioning all businesses to 100% renewable energy 20 years ahead of the suggested schedule.

RE 100

A global initiative with the goal of producing 100% of the electricity used by businesses from renewable energy sources, such as wind and solar, by 2050

by 2050 → 2030 20years Early

CHANGEOVER PERFORMANCE

2020 ···· 33%

↓

2021 ···· 44%

↓

2022 ···· 60%

Among the domestic affiliated companies Best Performance

2019

Poland

LGESWA

2020

U.S.

LGESMI

2025

China

LGESNJ, LGESNA, LGESNB

2025

South Korea

Ochang

The Value of Batteries with the BaaS Business Model

To expand the EV market and increase the value of batteries to society, LG Energy Solution creates services to cover the entire battery life cycle

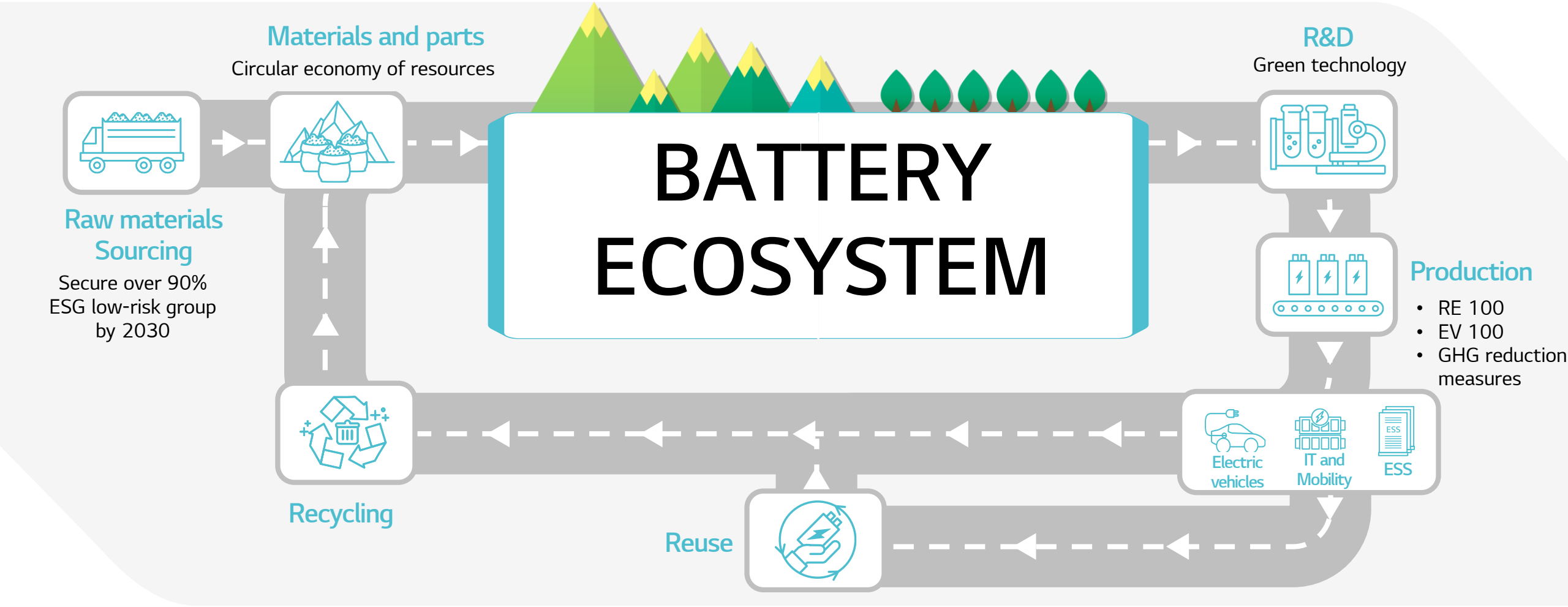
2019 Australia	2020 Korea	2021 Korea	2021 Korea	2021 Korea
envirostream	RENAULT-SAMSUNG	HYUNDAI GLOVIS	GS 칼텍스	대한민국 No.1 롯데렌터카
Envirostream Battery Recycling	Employing used batteries from EVs for optimized ESS development	Employing used batteries from EVs for fast-charging ESS production	Utilizing big data to develop battery specialized services	Discovering new EV based mobility and battery service projects Regular diagnostic and certification services for EVs

Used Battery: a battery that can be reused for other purposes, such as ESS, after being used in an EV

BaaS : Battery as a Service

Building a Circular Economy for Battery

From procurement of raw materials to reuse and recycle, we are establishing a circular ecosystem of batteries.



THANK YOU

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