



Global Battery leader

# LG Energy Solution

Changing Energy, Charging Life

1947

## LG Group

Subsidiaries **60+**

Overseas Offices **300+**

Number of Employees **250k+** (150k domestic/100k abroad)

Revenue **\$145B**

as of Dec 2020

1947

## LG Chem

Petrochemicals

Advanced Materials

Life Sciences

**Energy Solution**

# A Global Battery Company is Born

Spun-off from LG Chem's battery division in Dec 2020, unfolding the new era of a global battery frontier.

December 2020

## LG Energy Solution

Advanced Automotive Battery

Mobility & IT Battery

ESS Battery



# Creating LG Energy Solution's Unique Value

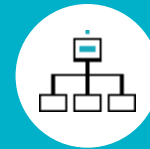
LG Energy Solution is building a unique corporate brand value, a specialized company that provides a variety of energy solutions for a better world.



Established  
**Dec 2020**



Employees  
**20,000+**



Business Areas  
**Advanced Automotive · Mobility & IT · ESS**



CEO  
**Jong Hyun Kim**



Revenue  
**\$10.5B** (as of 2020)



Manufacturing Facilities  
**Korea · USA · Poland · China**



LG Energy Solution pioneered South Korea's untapped battery industry, overcoming a series of concerns and difficulties with a daring spirit, and has recently laid the foundation for the profitable business model before anyone else in the field. Our journey is to become an enterprise: that provides value above expectations through the best technology and product quality, that *improves life for mankind innovatively and leads environment-friendly progress*; and that *grows with its constituents and instills pride*.

- CEO's Opening Speech -

1947

LG Chem Founded  
(start of LG Group)



1996

Began Lithium-Ion Battery  
Development



2000

Founded United States  
R&D Office



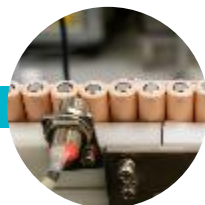
1992

Began Lithium-Ion  
Battery Research



1999

Mass-Produced Cylindrical  
Lithium-Ion Batteries



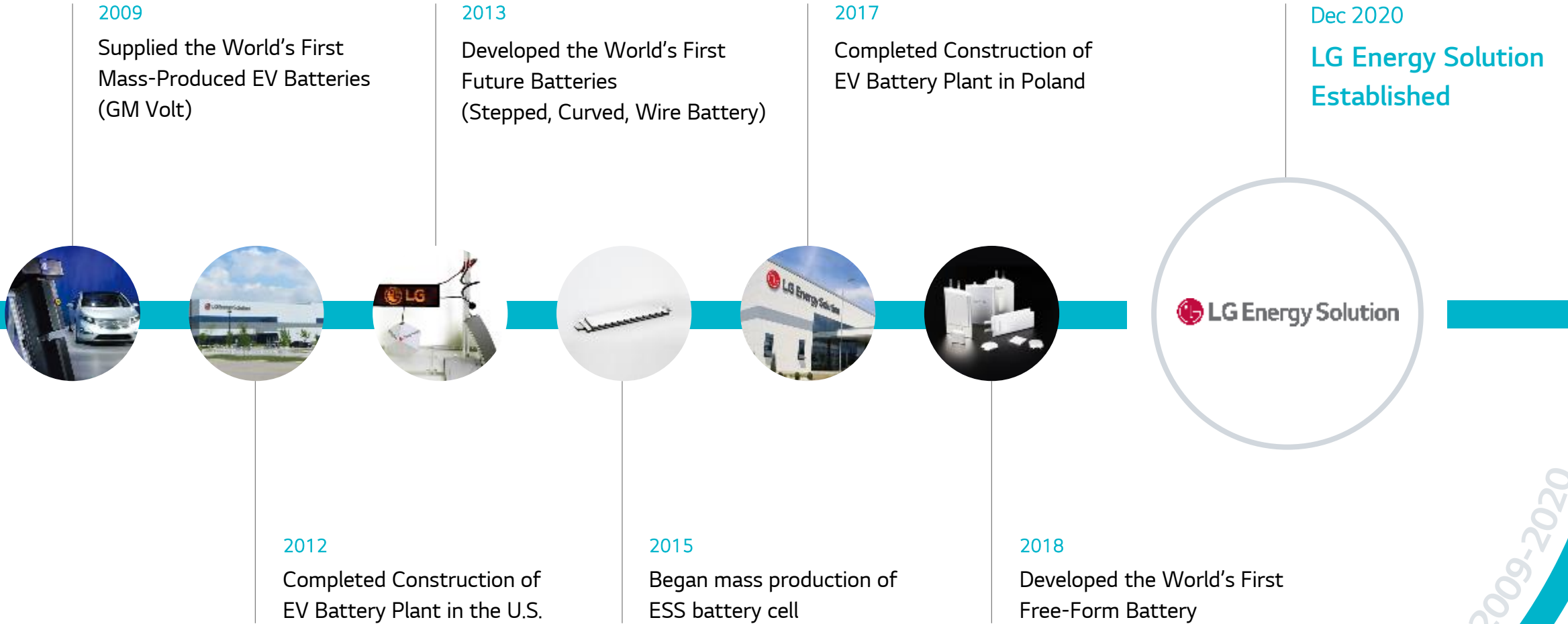
2004

Completed  
Construction of  
Nanjing Plant in  
China



# The Start of Korea's Battery History

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

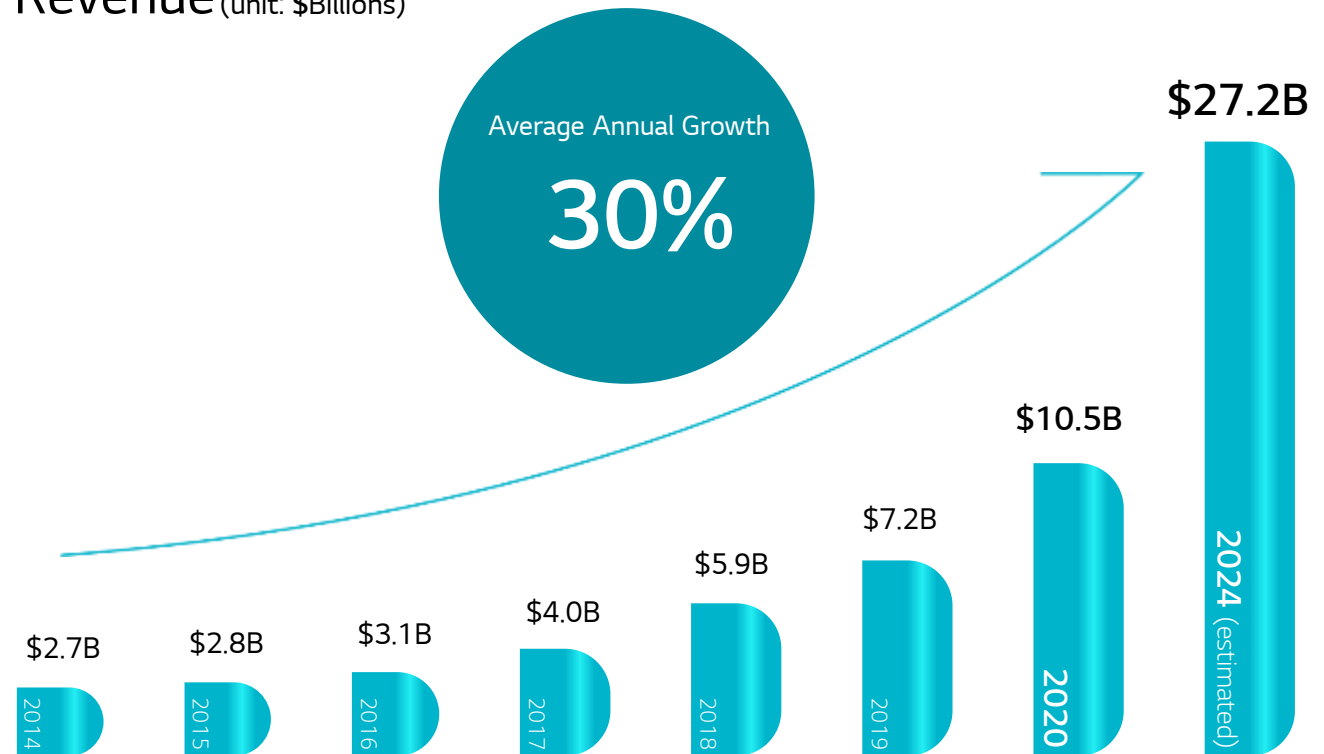


2009-2020

# Achieving Explosive Growth

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

Revenue (unit: \$Billions)



# Building a 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.

## Advanced Automotive Battery

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

EV / PHEV / HEV /  $\mu$ -HEV

Cell · Module · Pack · BMS



## 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



## ESS Battery

Unlocking the smart grid era by providing various ESS battery products

Grids / Commercial / Residential

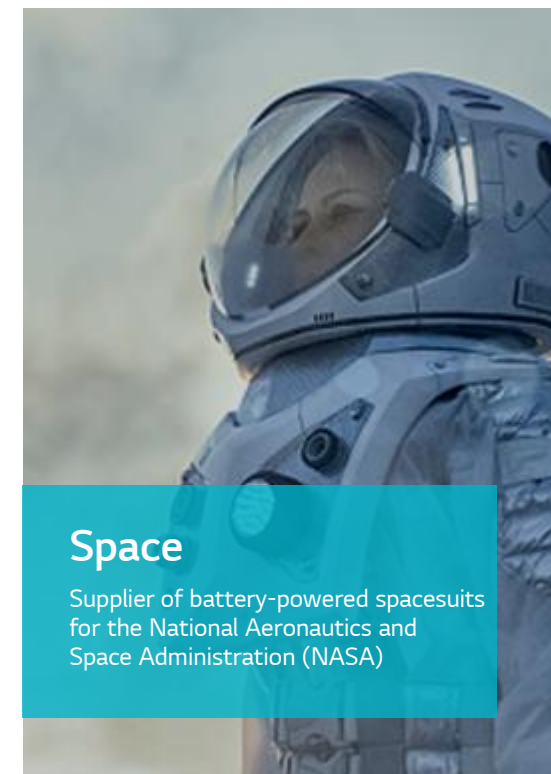
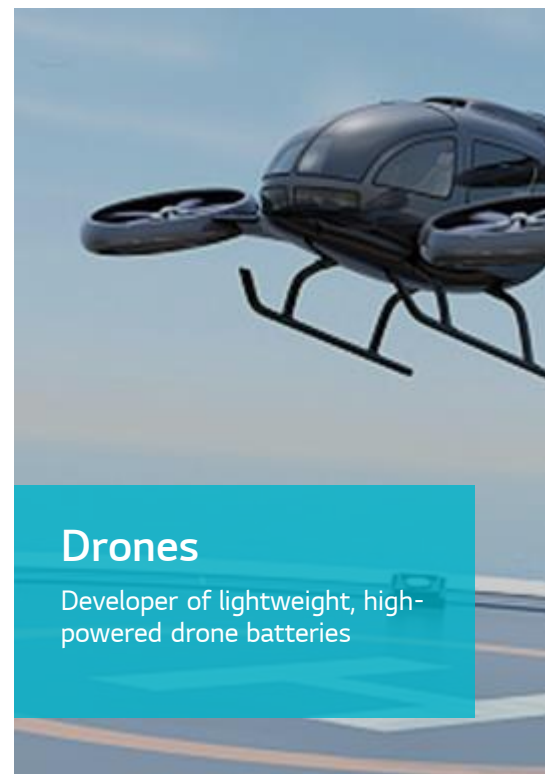
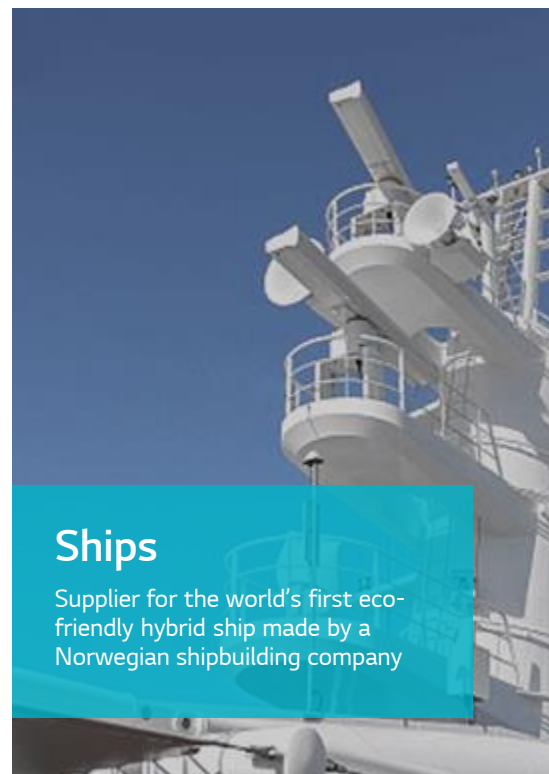
Cell · Pack · Rack



Business Area

## Land, Sea, Air & Beyond into Space

LG Energy Solution become the first supplier in the industry of electric vehicles, electric ships, drones, and battery-powered spacesuits.







## Equipped with a Global Network

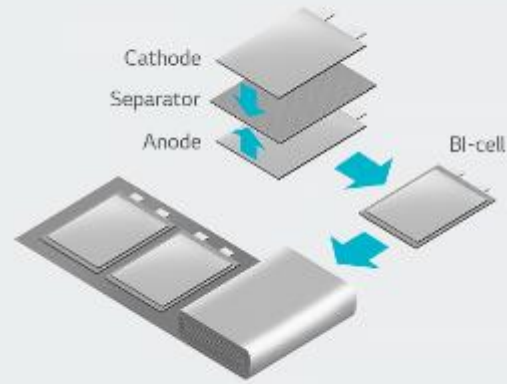
Expanding our R&D, manufacturing, and sales bases throughout key regions, including South Korea, China, and the United States.



01

## Global Production Capabilities

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



03

Competitiveness

## Ready to Compete in the Global Market

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

## 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)

02



### Production Facilities

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

## Process Technology

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

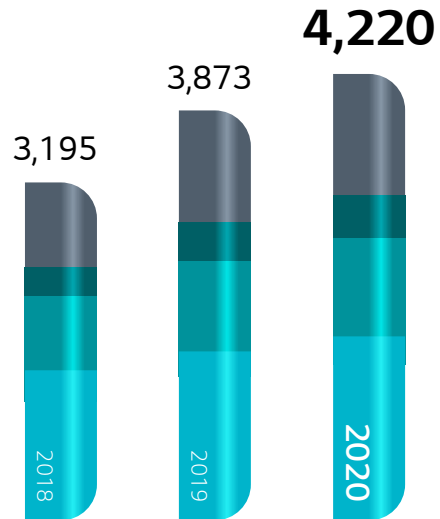
# Securing Skills & Technology that Stand Out

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

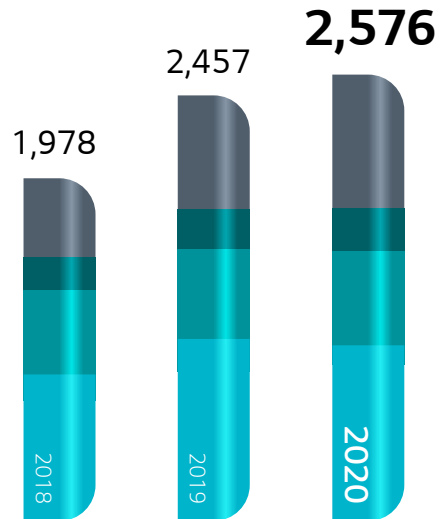
## R&D



**Investment** (Units: KRW 100 mil)



**Human Resources** (Units: people)



- General
- ESS
- Mobility & IT
- Advanced Automotive



# A True Leader in Open Innovation

LG Energy Solution partners with universities, startups, and researchers to promote technological innovation for the global battery industry.



## Battery Innovation Contest (BIC)

### University/Research Lab Financial Support Program

Ensure research autonomy for universities and research labs to conduct challenging research and match dedicated research teams from LG Energy Solution with institutes to jointly advance technological development in order to ensure the commercialization of research results.



## The Battery Challenge

### Battery Industry Startup Competition Program

A biennial event, hosted by LG Energy Solution and run by American startup accelerator New Energy Nexus, where selected startups cooperate to conduct joint R&D and venture projects, resulting in win-win growth.



## Innovation Forum

### International Battery Experts' Open Forum

Experts from around the world discuss the latest research trends in the battery industry and analyze the possibilities and direction of future development of battery technology.

# The Next-Generation Batteries

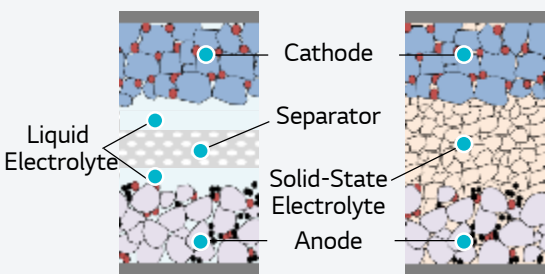
Leading the way in battery innovation with research on next-generation batteries based on new materials technology that satisfies high safety and capacity standards

## 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

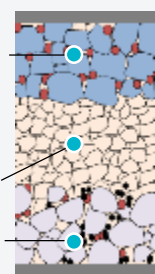
### Lithium-Ion Battery

(liquid electrolyte)



### Solid-State Battery

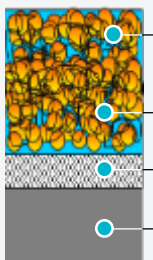
(solid-state electrolyte)




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.



- Cathode (Sulfur-Carbon)
- Liquid Electrolyte
- Separator
- Anode (Lithium-Metal)



UAM, Drones

# Focusing on Renewable Energy to Take the 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.



RE100: 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



# We are committed to fulfilling 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.

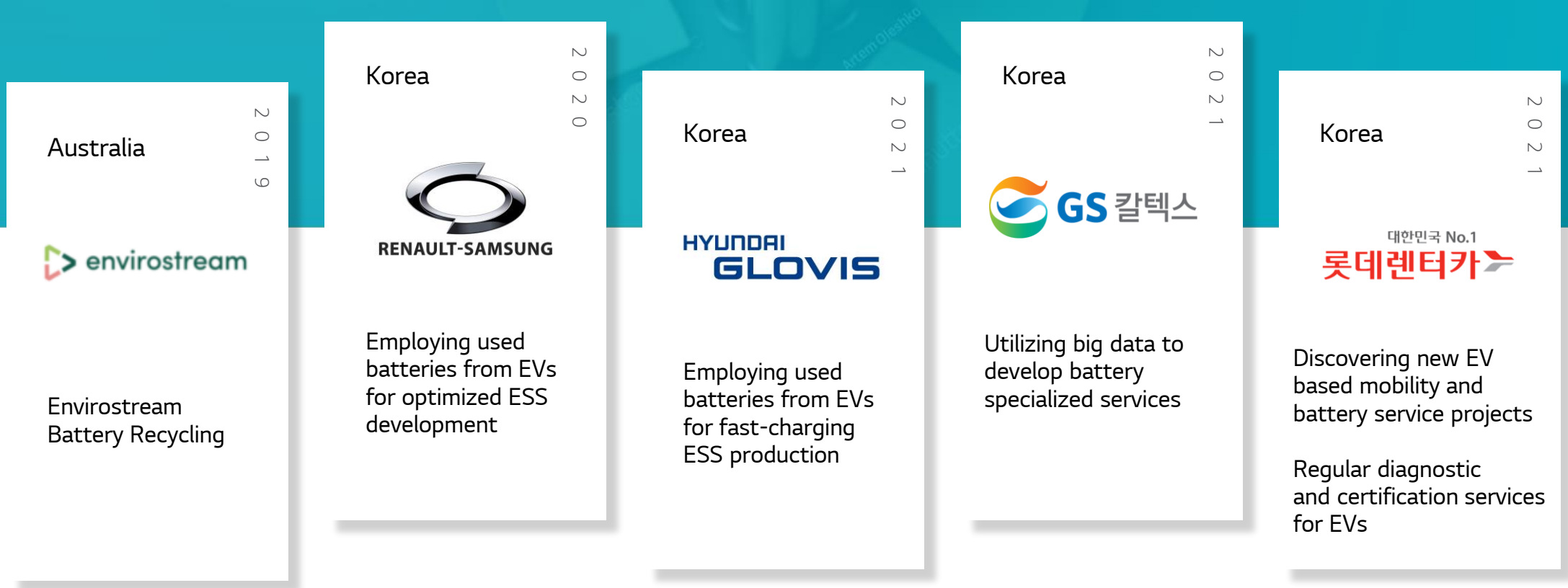
## ESG VISION

We **CHARGE** toward a better future



# Increasing 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



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





## Transparent Supply Chain Management for a Sustainable Future

LG Energy Solution strives for transparent and responsible mineral procurement by building a system that continuously monitors the ingredient information of the supplied materials from the purchase stage of minerals to the production of the final product.

**THANK YOU**

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