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.

### History of LG Group

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1947</td>
<td>Established Lucky Chemical Co., Ltd. (Today’s LG Chem)</td>
</tr>
<tr>
<td>1958</td>
<td>Established Goldstar (Today’s LG Electronics)</td>
</tr>
<tr>
<td>1987</td>
<td>Completed the construction of Lucky Goldstar Twin Tower</td>
</tr>
<tr>
<td>1995</td>
<td>Changed Group CI from Lucky Goldstar to LG</td>
</tr>
<tr>
<td>1996</td>
<td>Established LG Telecom (Today’s LG U+)</td>
</tr>
<tr>
<td>2003</td>
<td>Launched LG Corporation, the holding company</td>
</tr>
<tr>
<td>2017</td>
<td>70th anniversary of founding LG</td>
</tr>
<tr>
<td>2021</td>
<td>Separated LX Group from LG Group</td>
</tr>
</tbody>
</table>

### Affiliated companies
60+

### Overseas subsidiaries
270+

### Employees
270K+ (Korea 14K/Overseas 132K)

### Sales
$150B as of Dec. 2022

<table>
<thead>
<tr>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>LG Chem</td>
</tr>
<tr>
<td>LG H&amp;H</td>
</tr>
<tr>
<td>FarmHannong</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electronics</th>
</tr>
</thead>
<tbody>
<tr>
<td>LG Electronics</td>
</tr>
<tr>
<td>LG Display</td>
</tr>
<tr>
<td>LG Innotek</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication/Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>LG U+</td>
</tr>
<tr>
<td>LG CNS</td>
</tr>
<tr>
<td>LG HelloVision</td>
</tr>
</tbody>
</table>
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 Innotek
- EV components

LG Energy Solution
- EV Battery
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 (as of 2022, Domestic 10,442, Overseas 23,735)
- CEO: Kwon, Young Soo
- Sales: $19.8B (as of 2022)
Beginning in 1992, lithium-ion battery research ushered in the start of Korea’s battery history.
**Korea’s Battery History**

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

- **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
- **2020.12**: Established ‘Ultium Cells’ with GM
- **2021.4**: Joined both RE100 and EV100 initiatives, as the first global battery manufacturer
- **2021.9**: Signed MoU with Hyundai Motor Group and Indonesian Government to Establish EV Battery Cell Plant
- **2022.3**: Established ‘NextStar Energy’ with 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%

$2.7B  $2.8B  $3.1B  $4.0B  $5.9B  $7.2B  $10.5B  $15.6B  $19.8B

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

3. Process Technology
- Lamination & Stacking
- CNT Pre-Dispersion
- Pre-lithiation

Korea: Location: Ochang, Completed: 2011, Market: global
Poland: Location: Wroclaw, Completed: 2018, Market: Europe
USA: Location: Holland, Completed: 2018, Market: USA
Securing Skills & Technology

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

**Investment**

<table>
<thead>
<tr>
<th>Year</th>
<th>Investment (M$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>358</td>
</tr>
<tr>
<td>2021</td>
<td>571</td>
</tr>
<tr>
<td>2022</td>
<td>678</td>
</tr>
</tbody>
</table>

**Human Resources**

<table>
<thead>
<tr>
<th>Year</th>
<th>Human Resources (people)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>2,577</td>
</tr>
<tr>
<td>2021</td>
<td>3,390</td>
</tr>
<tr>
<td>2022</td>
<td>3,923</td>
</tr>
</tbody>
</table>

**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-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.
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

8 Critical Areas

- Climate Action
  - Achieving carbon neutrality by 2050
- Circular Economy
  - Establishing a closed loop by 2025
- Human Rights Management
  - Creating risk-free business sites for human rights
- Human Capital Management
  - Fostering diverse talent
- Product stewardship
  - 100% green products by 2023
- EH&S
  - Zero EH&S accidents
- Responsible Supply Chain Management
  - Securing over 90% of ESG low-risk group by 2030
- Shared Growth and Greater Impact on Local Communities
  - Reinforcing brand image for mutual growth and cooperation

4 Key Enablers

- Compliance
- Governance
- ESG initiative
- Communication
Global ESG Initiatives

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

- **RBA (Responsible Business Alliance)**
  - Formerly the Electronic Industry Citizenship Coalition
  - Advancing Sustainability Globally

- **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%

- **EV100**
  - Electric Vehicle 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.

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.

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.

Changeover Performance

- 2020: 33%
- 2021: 44%
- 2022: 60%

Among the domestic affiliated companies Best Performance

- Poland: LGESWA
- U.S.: LGESMI
- China: LGESNJ, LGESNA, LGESNB
- 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.

<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>Australia</td>
<td>Envirostream Battery Recycling</td>
</tr>
<tr>
<td>2020</td>
<td>Korea</td>
<td>Employing used batteries from EVs for optimized ESS development</td>
</tr>
<tr>
<td>2021</td>
<td>Korea</td>
<td>Employing used batteries from EVs for fast-charging ESS production</td>
</tr>
<tr>
<td>2021</td>
<td>Korea</td>
<td>Utilizing big data to develop battery specialized services</td>
</tr>
<tr>
<td>2021</td>
<td>Korea</td>
<td>Discovering new EV based mobility and battery service projects</td>
</tr>
<tr>
<td>2021</td>
<td>Korea</td>
<td>Regular diagnostic and certification services for EVs</td>
</tr>
</tbody>
</table>

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.