LG CHEM SUSTAINABILITY REPORT

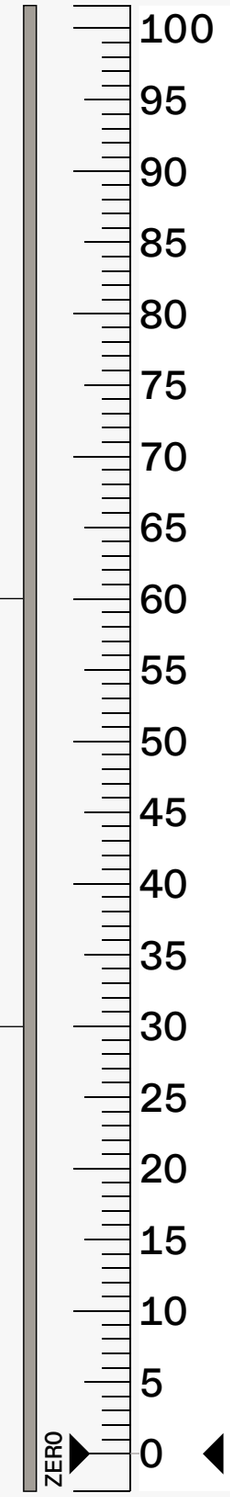
RE:ACT TO ZERO

BUSINESS AND STRATEGY

PROGRESS ON ESG

PERFORMANCE DATA

2023



LG CHEM SUSTAINABILITY REPORT 2023
RE:ACT TO ZERO

ABOUT THIS REPORT

LG Chem is publishing the 18th Sustainability Report in 2024 to communicate sustainability activities and performances transparently with various stakeholders. This report covers our sustainability strategy and major achievements in the areas of environmental, social, and governance, as well as our future plans. We will continue to communicate actively with stakeholders and become a top global science company, creating new values for customers.

Reporting scope
This report covers information and performance data collected from LG Chem's headquarters, sales offices, 31 domestic and global production sites, and R&D campuses, excluding data from LG Energy Solution and FarmHannong. Some financial information has been prepared in accordance with the consolidated financial statements of K-IFRS. Any statement with a different scope of reporting is explicitly noted.

Reporting period
This report presents data collected from January 1 to December 31, 2023, with some information up to June 2024 included in relevant sections. Performance data from the last three years, from 2021 to 2023, is presented to enhance the comparability of year-to-year trends.

Reporting cycle and reporting date
Annual, June 2024

Report assurance
LRQA was commissioned to provide independent assurance against LG Chem's data management procedure and the accuracy and reliability of ESG performance data, using ISAE 3000 and ISAE 3410.

For more information
LG Chem
LG Chem Sustainability Report

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BUSINESS AND STRATEGY

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CEO MESSAGE

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CEO MESSAGE

Dear Respected Stakeholders,
2023 was another year marked by a convergence of multiple crises, including record-breaking global temperatures, heightened geopolitical tensions, and persistent economic downturns. Global leaders have expressed grave concerns that these interconnected crises will pose significant and enduring obstacles to business growth. Amidst these uncertainties, LG Chem remains steadfast in our commitment to sustainability. We are committed to fostering a more open and innovative approach to sustainability management, believing sustainability is the only path forward for corporate survival and prosperity.

Hak Cheol Shin
CEO of LG Chem

LG Chem is driving change and innovation centered on portfolio transformation with the vision of "We connect science to life for a better future."

LG Chem has been focusing on a strategic portfolio transformation centered on three next growth engines: battery materials, sustainability, and biopharmaceuticals. As the first Korean chemical company to declare 2030 Carbon-neutral Growth and 2050 Net-Zero, we further strengthened our commitment by integrating sustainability into our core value through the ESG Committee under the Board of Directors. We prioritize carbon reduction initiatives based on feasibility and viability to make the optimal investment decisions to reduce direct emissions, avoid indirect emissions, and compensate for unavoidable carbon emissions. We have also introduced an Internal Carbon Pricing (ICP) system to create a framework for our portfolio to shift towards low-carbon businesses naturally. We have completed the Product Carbon Footprint (PCF) assessment for all domestic and overseas products. Furthermore, we are extending our management boundaries to corporate value chain (Scope 3) emissions.

LG Chem is pioneering new markets in the journey to low-carbon transition through active partnerships.

LG Chem formed a strategic partnership with ENI Group, Italy's largest state-owned energy company, in January 2024 to establish a joint venture plant for Hydro-treated Vegetable Oil (HVO) using waste cooking oil. We aim to secure next-generation bio feedstock and accelerate the transition to low-carbon materials through the internalization of HVO.
We also partnered with GS Caltex to develop 3-Hydroxypropionic Acid (3HP), a key raw material for eco-friendly materials such as biodegradable plastics. We plan to produce a prototype, which is anticipated to be the world's first case of commercialization of 3HP.
Furthermore, we are constructing a cathode plant in Tennessee with an annual production capacity of 60,000 tons, the largest of its kind in the United States. We plan to strengthen cooperation in the North American market by communicating with customers from the development stage of cathode materials. For our Life Sciences business, we are preparing to leap forward as a global pharmaceutical company, focusing on the clinical progress and license agreements of AVEO Pharmaceuticals, which we acquired last year.

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As a cross-sector key player, LG Chem will lead the market by providing innovative and differentiated customer values for the environment and society.

Addressing climate change demands a collaborative, systemic approach that transcends individual actions. It requires collective efforts from businesses, governments, consumers, and all stakeholders in the entire value chain. As a company with core competencies in carbon reduction technology such as catalytic and electrochemical conversion, we seek to create synergistic partnerships with industries that share our commitment to low-carbon solutions. At the same time, we are actively engaged with global leaders at the World Economic Forum to address supply chain and climate challenges. Moving forward, we will prioritize sustainability and competitiveness by adapting to market changes and contributing to global environmental solutions. Every step of our journey to becoming a sustainable science company has been made possible with the passion and dedication of our employees. We look forward to your continued interest and support for LG Chem.

COMPANY PROFILE

COMPANY OVERVIEW

We connect science to life for a better future.

LG Chem aims to connect science to life for a better future, integrating new insights with the wealth of knowledge, technologies, and solutions accumulated across Petrochemicals, Advanced Materials, and Life Sciences businesses. We aspire to become a top global science company leading the market by cultivating next-generation growth engines, including battery materials, sustainability, and biopharmaceuticals businesses.

❶ Means of renewable energy procurement include green pricing, renewable energy certificates (solar, wind), and self-generation (solar).
❷ Gimcheon, Cheongju (Separator), Guangzhou, Quzhou.
❸ Fatality Rate: Total number of fatality cases * 200,000 / total hours worked.
❹ Proportion of non-fixed term employees in Korea.
❺ Suppliers refer to domestic and overseas suppliers with records of annual purchase amounts of KRW 100 million or more, and 3 or more purchase orders.
❻ Customer Value Innovation Team has been conducting customer satisfaction surveys for customers across all business divisions since 2020.

General Information

Company name	LG Chem, Ltd.	**Headquarters**	128, Yeoui-daero, Yeongdeungpo-gu, Seoul 07336
Founded	January 1947	**Business overview**	Petrochemicals, Advanced Materials, Life Sciences
CEO	Hak Cheol Shin		
No. of employees	Korea 14,360 Overseas 4,890		

Financial Performance

(based on the consolidated financial statements as of December 31, 2023)

Revenue: KRW 55.2 trillion

Operating profit: KRW 2.5 trillion

2023 Sustainability Performance

Global Scope 1+2 emissions: 9,558,199 tCO_2e

Global renewable energy ❶ consumption: 878,569 MWh

Zero Waste to Landfill (ZWTL) ❷ certifications: 4 sites

Proportion of reused/recycled PC input: 2.5%

Employees and subcontractors fatality rate ❸: 0%

Female employees ❹: 16%

No. of suppliers ❺ that have finished ESG self-assessment: 1,000

Social contributions: KRW 16.884 billion

Customer satisfaction survey ❻ score: 84

KEY BUSINESS AREAS

Business Sustainability

Over the past few years, LG Chem has focused on expanding advanced materials and life sciences businesses after carefully analyzing market trends and future industry landscapes. This strategic shift has driven significant growth, resulting in a record-breaking revenue of KRW 55.2 trillion in 2023, which is a 7% increase from the previous year. In particular, the contribution of Advanced Materials, Life Sciences, LG Energy Solution, and FarmHannong to overall revenue surged from 28.6% in 2010 to 68.9% in 2023, highlighting the success of our diversified business model.

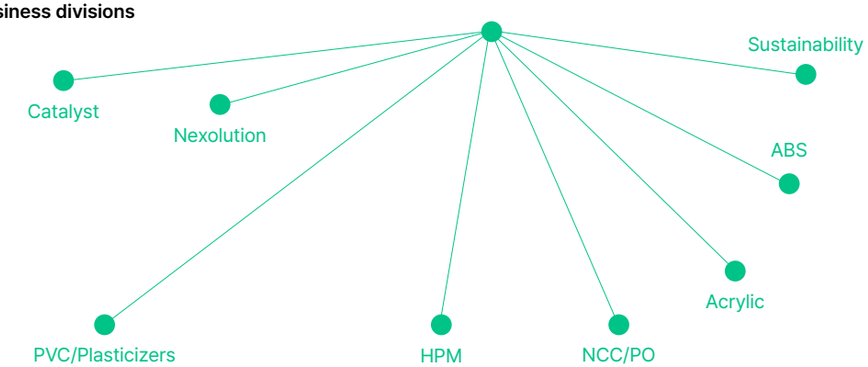
In July 2021, we announced plans to invest a total of KRW 10 trillion in ESG-focused businesses by 2025. Recognizing sustainability as a cornerstone of long-term business success, we have integrated sustainability into our strategic planning and investment decisions. In addition, leveraging the growth potential and alignment with our ESG goals, we identified battery materials, sustainability, and biopharmaceuticals as our next growth engines. Through investments until 2025, we aim to increase the revenue of our next growth engines to around KRW 40 trillion by 2030. By 2026, we will raise the revenue share to 40%, and by 2030, we will further increase it to 57%. We will strive to enhance our competitive advantage and drive sustainable growth through business strategies and investments centered on our next growth engines.

Petrochemicals

Petrochemicals businesses encompass the cracking of raw materials like naphtha into smaller molecules like ethylene, propylene, butadiene, and benzene, and the polymerization of these materials to produce a wide range of synthetic resins. Our primary products include polyethylene (PE), polyvinyl chloride (PVC), acrylonitrile butadiene styrene (ABS), super absorbent polymer (SAP), and synthetic rubber. We are also expanding our production and sales of sustainable materials, including post-consumer recycled (PCR) plastics and bio-based plastics like Bio-SAP, PO, PVC, and ABS, produced using bio-naphtha as a feedstock.

The petrochemical industry faces growing pressure to innovate as the global economy moves toward a more sustainable future. In response, we established the Sustainability and Nexolution Divisions within our Petrochemicals Company in 2023. These divisions focus on fostering eco-friendly and high-value-added businesses. We plan to seek innovative solutions that address environmental and social challenges and focus on eco-friendly materials to lead the sustainability business.

Business divisions



2023 Review	Market conditions deteriorated due to increased Northeast Asian supply and a weakening global economy.
	Profitability of major products declined due to difficulty in raising selling prices to offset rising production costs.
	High-value-added products like POE, CNT, and IPA maintained strong profitability.
Strategic Directions	Reinforce high-value product portfolio and diversify markets.
	Strengthen capabilities in sustainability areas like bioplastics, recycling, and carbon neutrality.
	Accelerate the transition to a low-carbon business model.

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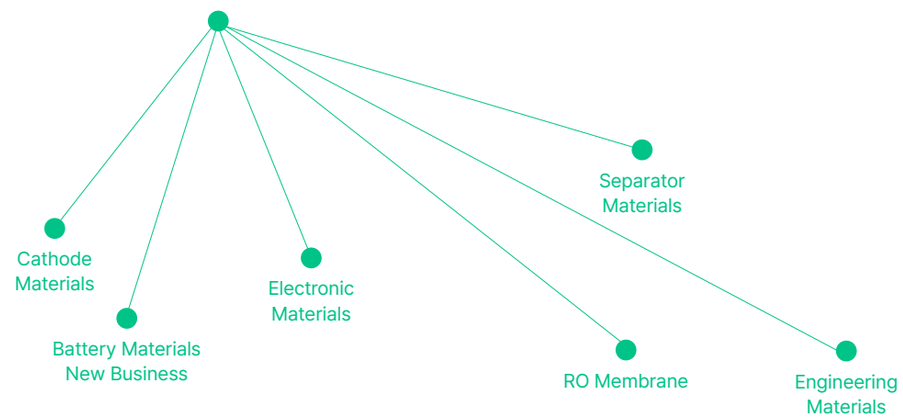
Advanced Materials

Advanced materials businesses focus on developing materials tailored to meet the changing needs of our customers. We are particularly attentive to the rapid technological advancements and industry trends in the information technology, consumer electronics, and automotive industries. In particular, there is a strong demand in the battery materials market due to the growth of electric vehicles, energy storage systems, and renewable energy infrastructures, along with sustainability-related regulations and circular economy initiatives. To position ourselves for this growth, we closely monitor industry trends like reducing cobalt dependence, battery recycling technology, and integrating AI. We plan to advance toward a future lifestyle with high-tech specialty materials and grow into the world's largest comprehensive battery materials company.

Business divisions

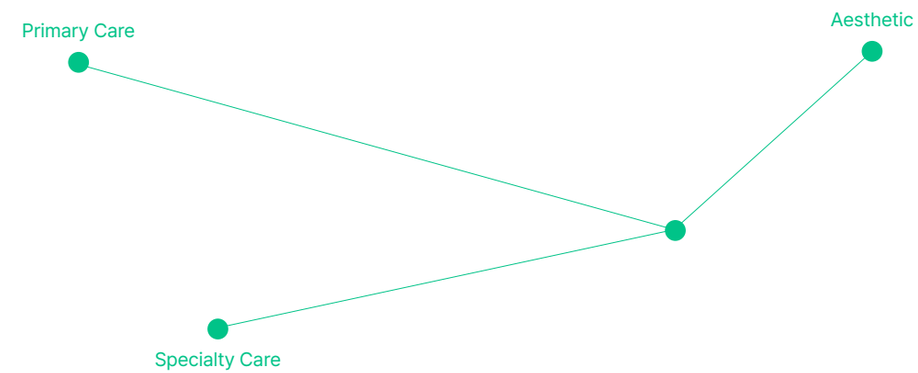


2023 Review	— Profitability declined due to metal price lags despite increased shipment.
	— Diversified customer base by securing supply contracts with new customers beyond LG Energy Solution.
	— Strengthened portfolio by rationalizing low-growth businesses.
Strategic Directions	— Establish a stable supply chain through investments in the battery material value chain.
	— Expand strategic customer partnerships and diversify customer base.
	— Increase sales and improve profitability of high-value-added products in engineering materials and electronic materials.

Life Sciences

The life sciences industry is witnessing businesses expanding their global footprint and portfolio through strategic partnerships such as mergers and acquisitions. Similarly, we are focusing on increasing our market presence and investment in research and development. We are manufacturing and marketing a diverse range of pharmaceuticals, including diabetes drug Zemiglo, human growth hormone Eutropin, arthritis injection Synovian, rheumatoid arthritis injection Eucept, the hyaluronic acid filler Yvoire, 5-in-1 vaccine Eupenta, and polio vaccine Eupolio. Furthermore, we are focusing on anticancer treatment, which holds immense promise due to unmet medical needs, and diabetes and metabolic treatment, where we have a long history of extensive research and development expertise. Through these efforts, we aim to become a global pharmaceutical leader by establishing category leadership through technological excellence.

Business divisions



2023 Review	— Achieved revenue exceeding KRW 1 trillion, including the revenue of AVEO Pharmaceuticals.
	— Maintained stable revenue through continued market leadership of major products such as Zemiglo, Eutropin, and Eucept.
	— Advanced global drug development pipeline, including gout treatment in Phase 3 clinical trials and rare obesity treatment in Phase 2 clinical trials.
Strategic Directions	— Expand anticancer drug pipeline and strengthen global business operations.
	— Enter the US anticancer market and build a strong market presence.
	— Increase R&D investment to drive future growth and gain a competitive advantage.

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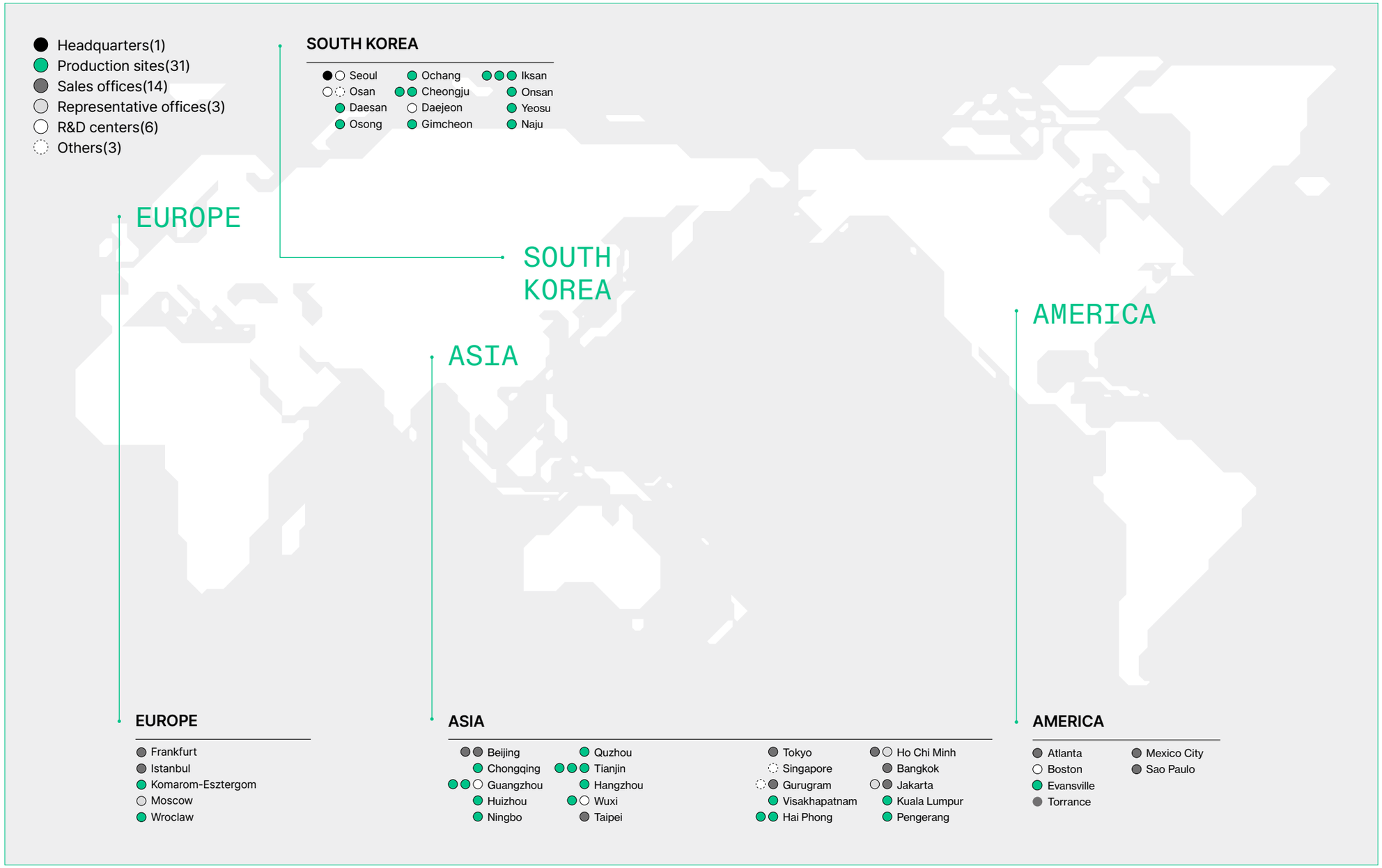
GLOBAL PRESENCE

LG Chem, which first entered the overseas markets by establishing the LA branch in 1972, has become a leading science company with a global business network comprised of 58 operations, including production sites, sales offices, and R&D centers across 43 regions worldwide. As of the end of June 2024, we employ 19,250 individuals globally, with 14,360 based in Korea and 4,890 across Asia, Europe, and the Americas.



OUR APPROACH TO ESG

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MEGATRENDS

Global megatrends and implications

LG Chem constantly analyzes the current industry landscape and the global megatrends shaping our future to better understand and take appropriate actions for change and adaptation. By comprehensively examining sustainability risks and opportunities across the entire value chain of the petrochemicals, advanced materials, and life sciences industries, we aim to build a better future by identifying various possibilities and potentials. Based on our vision of connecting science to life, LG Chem explored the big themes of environment and society to stay ahead of the curve and ensure a better future.

Environment

The natural ecosystem is currently facing multiple sustainability crises, including rising temperatures due to climate change, a significant decline in biodiversity, overexploitation of resources, and increased waste. Human activities that have surpassed the carrying capacity of ecosystems are placing pressure on both living and non-living organisms, leading to the destruction of habitats and posing a threat to ecosystems. Furthermore, as the number of climate-related disasters increases, the social costs to respond to and recover from damages are expected to rise. As a result, there is an urgent need for ecological reconstruction and a transition towards a society that promotes human well-being while also restoring nature.

Society

The world today is marked by increased interdependence due to globalization. Events like the coronavirus pandemic and geopolitical conflicts like the Russia-Ukraine war and the US-China trade war have highlighted this interconnectedness. However, as trust in the rules-based order and its supporting institutions diminishes, these international disputes are leading to increased deglobalization and trade protectionism. Consequently, the global economy is facing macroeconomic challenges, including unprecedented inflation, supply chain disruptions, declining global trade volumes, and reduced business investment. These factors, in turn, are fueling conflicts between countries and greater economic instability.

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Industry risks and opportunities

The uncertain global economic outlook, along with prolonged high interest rates, is putting increased financial and ESG management pressure on companies. Companies seeking to transition to a low-carbon management system depend more on borrowing for green investments, and capital expenditures (CAPEX) like large-scale facility investments, and experience reduced profitability due to high interest rates. Moreover, ongoing conflicts like the Russia-Ukraine war, are causing energy prices to rise and acting as a barrier to the renewable energy transition. The increase in energy prices is driving up the demand for relatively inexpensive traditional fossil fuels, while the transition to renewable energy is increasing the demand for transition minerals. As a result, the rising prices of traditional commodity resources are raising costs and causing cost pass-through across the entire spectrum of production, leading to greenflation.

External risk factors

Type	Risk factors
Geopolitical	Geopolitical tensions reshaping supply chains
Macroeconomic	Uncertain economic outlook and conflicting government policies
Sociopolitical	Increasing regulations and threats from the changing sociopolitical landscape
Interest rates	Continued high interest rate

Despite the risks surrounding the industry, the global commitment to address the climate crisis remains steadfast. Since the establishment of Nationally Determined Contributions (NDCs) set out in the Paris Agreement in 2015, the rising tide of global ESG regulation and the reorganization of industries and supply chains towards a low-carbon economy have become irresistible trends. In 2023, the 28th Conference of the Parties (COP28) to the United Nations Framework Convention on Climate Change (UNFCCC) led to the Global Stocktake (GST) under Article 14 of the Paris Agreement. The GST reaffirmed the mitigation pathway to achieve carbon neutrality in 2050 and confirmed that we need to reach peak emissions before 2025 and reduce emissions by 43% in 2030 and 60% in 2035, respectively, compared to 2019 emissions. An analysis of reductions to date shows that meeting the target of the Paris Agreement will be challenging, requiring countries to step up their efforts. Consequently, the final agreement calls for a transition of the energy system away from fossil fuels within a decade, a tripling of global renewable energy capacity by 2030, and an accelerated uptake of zero- and low-carbon technologies.

Policy efforts and related investments to achieve the 2050 Net-Zero goal are expanding globally. The global green economy has been growing since 2009, reaching an estimated total of USD 6.5 trillion as of the first half of 2023. Significant investments are expected to be made by 2050 to transition to Net-Zero as well. Meanwhile, major countries are increasing financial support to revitalize green industries. Legislative actions such as the EU Green Deal Industrial Plan and the US Inflation Reduction Act (IRA) indicate that the shift to a low-carbon economy is closely tied to securing national competitiveness.

Investors worldwide are increasingly focusing on sustainability. According to a survey conducted by a global consultancy between January and December 2023, 83% of investors surveyed said they incorporate sustainability information into their fundamental analysis, and 79% have a sustainability policy in place. Both of these figures reflect a 20% increase from five years ago. The top drivers for investors to incorporate sustainability factors into their ESG investment decisions are regulatory response (39%), followed by improved financial performance (37%), improved environmental and social performance, and stakeholder pressure (34%). We will continue to explore megatrends that shape the future and growth of society and seize new business opportunities and challenges.

STAKEHOLDER ENGAGEMENT

Stakeholder Communication

We engage with a variety of stakeholders and experts to gain a better understanding of sustainability issues. Our goal is to connect with relevant stakeholders throughout our entire value chain to fully understand their expectations and gain insights into the impacts of different sustainability topics.

We define our main stakeholder groups as customers, employees, shareholders and investors, suppliers, local communities, and the government. We listen to their needs and concerns through various communication channels and share their opinions with our management and the Board of Directors to better align our management activities with stakeholder feedback. We identify key areas for implementation and improvement and consistently monitor stakeholder feedback on these efforts. We aim to respond promptly to changes in the business environment and enhance sustainability performance to create differentiated value for our stakeholders.

Case study

Korea's first ESG open conference call

In December 2023, LG Chem's management organized Korea's first public conference call on ESG topics for shareholders and investors. The conference call covered LG Chem's latest ESG strategy, including corporate strategy and responsible investment from a sustainability perspective, and featured participation from executives such as the Chief Financial Officer (CFO) and Chief Safety & Environment Officer (CSEO). About 150 shareholders, investors, and corporate analysts attended the call, with half of them from overseas, indicating interest from both home and abroad.

The primary focus during the 40-minute conference call was LG Chem's climate action and carbon emission reduction plan, as well as the EH&S management plan for zero major accidents. LG Chem presented a detailed roadmap to reduce greenhouse gas emissions, aiming for Carbon-neutral Growth by 2030 and Net-Zero by 2050. LG Chem also shared the results of Project Magnolia launched in 2020, alongside updates on EH&S management capabilities and investments.

Stakeholder engagement process

❶ Identify stakeholders and create a communication plan
❷ Communicate with stakeholders and identify key stakeholder needs
❸ Establish short-, mid-, and long-term improvement plan
❹ Reflect on management activities and monitor implementation
❺ Improve sustainability performance and continue stakeholder communication

Key stakeholder interests

Stakeholder	Communication channels	Key interests
Customers	— Customer satisfaction surveys — Key Account Management activities — Voice of the Customer	— ESG information disclosure — GHG and energy targets and policies — Supply chain sustainability
Employees	— Labor-management council and employee roundtables — Employee satisfaction surveys — Grievance mechanism	— Training and development — Organizational culture and labor relations — Employment, benefits and welfare
Suppliers	— Integrated procurement portal — Supplier roundtables — National Commission for Corporate Partnership	— Fair trade culture — Funding and business support — Supplier ESG training
Local communities	— Community meetings and residents' committees — Local welfare organizations — Community outreach programs	— Community EH&S management — Local employment and economic development — Social partnership
Governments	— Policy roundtables — Industry associations — Local municipalities	— Compliance and fair trade — Indirect economic impacts — GHG, energy, and EH&S policies and regulations
Shareholders and investors	— Shareholder meeting and quarterly earnings calls — NDRs, conferences, and conference calls — Financial and ESG performance disclosures	— Economic performance — Board management and oversight — ESG information disclosure

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Partnerships and initiatives

In 2023, countries around the world, including the European Union, the United States, and China, continued to advance policies and regulations aimed at reducing carbon emissions. We are actively participating in global sustainability initiatives to address policy trends and contribute to shaping sustainability rules. We closely monitor regulatory trends related to carbon and recycling, actively participate in setting industry norms, and promote their widespread implementation. We believe that our efforts in establishing standards, developing solutions, and driving a collective agenda on sustainability topics play a crucial role in enhancing responsible business practices and creating a better world for future generations.

Moreover, through partnerships for resource recycling and waste reduction within our value chain, we are creating a closed-loop ecosystem aimed at minimizing environmental impact. We will continue to create new business opportunities to advance the sustainability of the plastics and battery industry ecosystems.

Global Membership

Sustainability recognitions

ESG and sustainability assessments provide valuable insights into stakeholder expectations. We actively identify assessment metrics of sustainability-related rating agencies such as MSCI, S&P DJSI, CDP, KCGS, and Sustainalytics to ensure that the topics most important to stakeholders are aligned and communicated with our business priorities.

External Recognition

MSCI	2023 MSCI Korea ESG Leaders Index
S&P Dow Jones Indices A Division of S&P Global	2023 S&P DJSI Asia-Pacific & Korea Index
CDP DISCLOSURE INSIGHT ACTION	2023 CDP Climate Change A-, Water Security A-
	2023 KCGS ESG Integrated Rating A (Environmental B+, Social A+, Governance A)
SUSTAINALYTICS	2023 Sustainalytics Medium Risk

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MATERIALITY ASSESSMENT

Materiality assessment overview

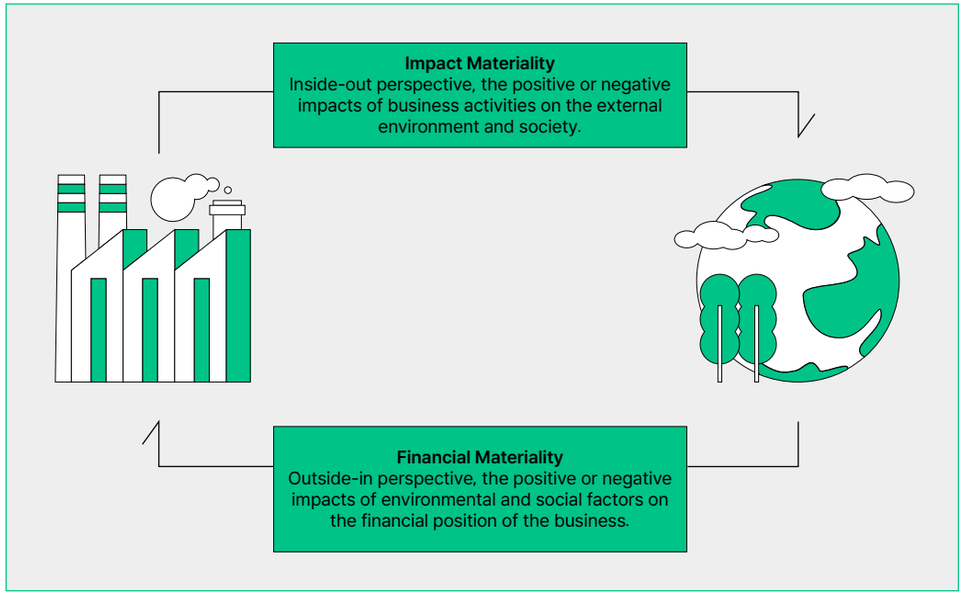
We established our sustainability vision and strategy based on nine focus areas in 2019 and set mid- to long-term goals for our top five sustainability priorities in 2020. In 2021, seeking to invigorate communications with stakeholders and enhance business competitiveness, we selected key indicators in the environmental, social, governance, and growth, based on the concept of stakeholder capitalism proposed by the World Economic Forum (WEF). In addition, we are continuously evaluating risks and opportunities, and conducting a comprehensive review of potential short-, mid- to long-term business impacts across the entire value chain of the petrochemicals, advanced materials, and life sciences industries to align with global megatrends and meet the evolving demands of stakeholders.

In 2023, we updated our materiality assessment framework to better understand the diverse and sometimes conflicting expectations of stakeholders and identify relevant topics for long-term business success. Throughout the year, we reviewed new topics and changes in their materiality. In addition, we are currently in the process of developing an internal methodology to analyze and assess the relevance of sustainability topics for different stakeholder groups.

Double materiality assessment process

We applied the concept of double materiality to determine topics for sustainability reporting and identify material topics that require focus in terms of sustainability management. In 2023, we developed a step-by-step process, scoring matrix, and prioritization model based on our interpretation of the GRI Reporting Process. We first assessed the impact materiality, based on an inside-out perspective, to evaluate the actual or potential positive or negative impacts on the environment and society along our value chain. During the process, we assessed the scale, scope, and likelihood of the occurrence of each impact. Then we assessed the financial materiality, from an outside-in perspective, to analyze the potential positive or negative financial impacts of sustainability-related risks to the business.

We are committed to quantification of impacts and refining our qualitative assessments. Given the complexity of assessing and quantifying sustainability-related impacts, risks, and opportunities, we prioritized refining our assessment methodology for impact materiality, and limited stakeholder groups to internal ESG experts in assessing sustainability-related impacts in 2023. Going forward, we plan to continue updating and refining our double materiality assessment methodology and process.



Materiality assessment process

❶ Compile a list of material topics
❷ Evaluate the actual and potential impacts of each topic
  1) Impact materiality
  2) Financial materiality
❸ Analyze materiality assessment results and identify key issues
❹ Integrate results into management and report progress

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Double materiality assessment results

We have undergone a thorough management review and identified the top ten material issues based on the assessment results of impact materiality and financial materiality for different stakeholder groups. The ten material issues are climate action, renewable energy transition, circular economy, environmental protection, supply chain management, employee and process safety, diversity, equity, and inclusion, human rights and labor, product stewardship, and business ethics. Our action plans and progress on these issues can be found in the following chapter, →PROGRESS ON ESG.

Impacts, risks, and opportunities across our value chain

We have identified various sustainability topics to gain a comprehensive view of our environmental, social, and economic impacts. These topics cover both positive and negative impacts that arise from our business activities throughout the value chain, as well as those that could affect our business performance. While not exhaustive, these topics address a wide range of material impacts that arise from the activities of a company that creates materials essential to our daily lives.

Assessing the value chain can enhance our understanding of the risks and dependencies associated with raw materials or workers in the value chain. As value chain assessments provide insights into the challenges our customers face and the solutions we can offer to address them, we use them to uncover new perspectives on business opportunities.

Material issues and value chain impacts

● High Impact ● Medium Impact ○ Low Impact

Top 10 material issues		Impact materiality				Financial materiality					Stakeholder impact					
#	Issue	Impact	Upstream	Own operations	Downstream	Impact	Revenue	Cost	Risk	Opportunity	Impact	Employees	Shareholders	Customers	Suppliers	Local communities
1	Climate action	Very high	●	●	●	Very high	●	●	●	●	Very high	●	●	●	●	●
2	Renewable energy transition	High	●	●	●	High	●	●	●	●	Very high	●	●	●	●	○
3	Circular economy	Very high	●	●	●	Very high	●	●	●	●	High	●	●	●	●	○
4	Environmental protection	High	●	●	●	Medium	○	●	●	○	High	○	●	●	○	●
5	Supply chain management	High	●	●	●	High	○	●	●	●	Medium	●	●	●	●	○
6	Employee and process safety	High	●	●	○	High	○	●	●	○	High	●	●	○	●	●
7	Diversity, equity, and inclusion	Medium	○	●	○	Medium	○	○	●	●	High	●	●	○	○	●
8	Human rights and labor	Medium	●	●	○	Medium	○	●	●	○	Medium	●	●	●	●	●
9	Product stewardship	High	○	●	●	Medium	○	●	●	○	High	●	●	●	○	○
10	Business ethics	Medium	●	●	○	Medium	○	●	●	○	High	●	●	●	●	○

CLIMATE CHANGE RISKS AND OPPORTUNITIES

Nearly a decade after the Paris Agreement, which agreed to limit the global average temperature rise to well below 1.5°C by 2100, the world in 2023 is experiencing unprecedented extreme temperatures, natural disasters, and the consequent loss of life and property. The Intergovernmental Panel on Climate Change (IPCC) projected in the Sixth Assessment Report (2023) that climate change-induced increases in extreme weather events and natural disasters will intensify and accelerate risks globally, including biodiversity loss, threats to food security, and damage to human health, with varying degrees of socio-economic impacts and costs depending on vulnerability.

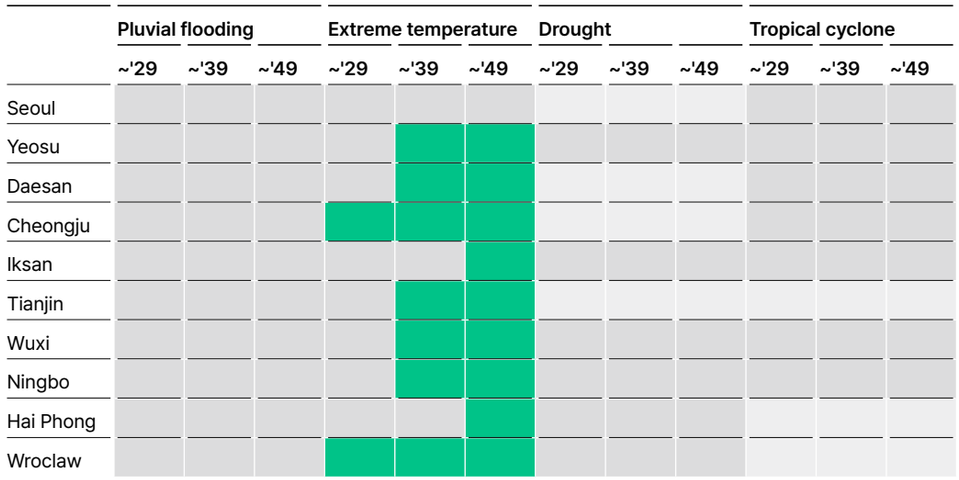
Carbon-intensive industries face not only physical risks, such as damage to physical assets, supply chain disruptions, and reduced worker productivity, but also transition risks, such as stricter carbon emission regulations, adoption of low-carbon technologies, and changing consumer perceptions as the world transitions to a low-carbon economy. We are committed to understanding and managing these climate change risks and opportunities throughout our value chain, encompassing everything from the production and sales at our own operations to new investments and mergers, as well as raw material sourcing, transportation, and the use and disposal of our products. To this end, we first identified major physical risk factors expected by 2050, focusing on our business sites in Asia and Europe, including Korea, as of 2023. We then explored transition risks and opportunities based on regional and sector-specific characteristics within the Petrochemicals, Advanced Materials, and Life Sciences businesses.

Physical risks

We have analyzed the potential impact of climate change on our assets in various locations under different climate scenarios. We calculated the modeled average annual loss (MAAL) of our asset value based on eight physical climate risk factors under two scenarios: SSP1-2.6 scenario, where global temperature increase is limited to 2°C by 2100 through socio-economic efforts to mitigate and adapt to climate change, and SSP5-8.5 scenario where temperature increase of about 5°C is projected by 2100 due to continued greenhouse gas emissions. We assessed the impact of different physical risks from the present to 2050 for the cities in our global network, including Seoul, where our headquarters and R&D campus are located, as well as Yeosu, Daesan, Cheongju, and Iksan in Korea, and Tianjin, Wuxi, and Ningbo in China, along with Hai Phong, Vietnam, and Wroclaw, Poland. We identified the risk factors that could have the greatest impact on response costs or revenue reduction. Our analysis showed that extreme temperature would result in an MAAL of 1% across all sites analyzed, except for Seoul. In addition, pluvial flooding, drought, and tropical cyclones would lead to recovery and repair costs, or impact facility breakdown at most sites, although the impact would vary by location. Based on physical risk factors identified through climate scenario analysis, we plan to enhance our response plan and establish adaptation measures.

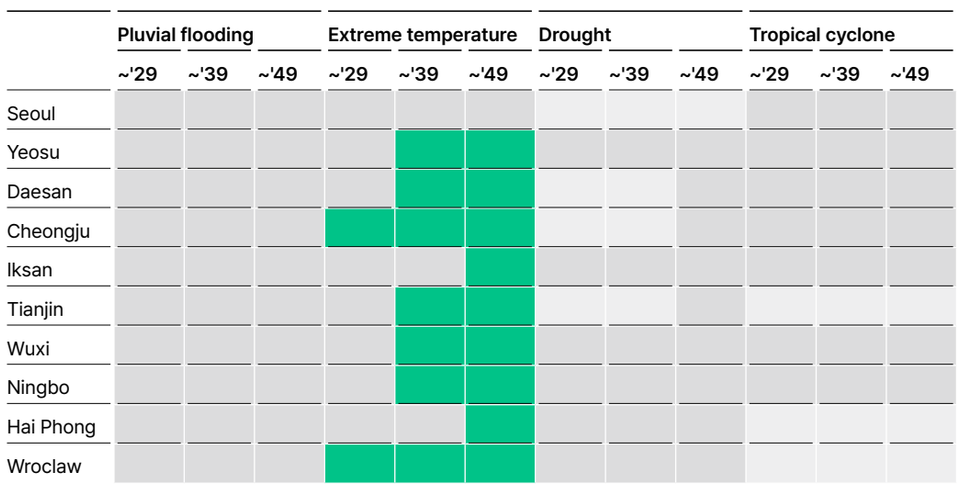
Modeled Average Annual Loss in asset value under SSP1-2.6

○ 0% ● Less than 1% ● More than 1%



Modeled Average Annual Loss in asset value under SSP5-8.5

○ 0% ● Less than 1% ● More than 1%



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Transition risks

As environmental regulations and climate change policies tighten globally, the business landscape is undergoing a significant shift. As we transition to a low-carbon business model, we anticipate an increase in operating costs due to factors like new investments and regulatory responses. As an energy-intensive company, we expect greenhouse gas emissions across our value chain will continue to rise if we maintain our current growth trajectory. To join efforts to respond to the global climate crisis and ensure long-term growth as a leading science company, we have set ambitious goals of Carbon-neutral Growth by 2030 and Net-Zero by 2050. To successfully navigate this transition to a low-carbon economy, we are conducting a comprehensive assessment of direct and indirect risks and opportunities.

Policy and legal

As a participant in the Korea Emissions Trading Scheme (K-ETS), we anticipated significant regulatory compliance costs as global greenhouse gas regulations continue to evolve. Therefore, we proactively established the 2050 Net-Zero goal and refined our reduction roadmap based on the analysis of the scale, affordability, and feasibility of different reduction measures. At the same time, we are actively encouraging activities and investments for carbon reduction. We introduced Internal Carbon Pricing (ICP) to shelve the regulatory costs of carbon emissions in mid- to long-term business planning and apply a carbon price above the current market price of emission credits when reviewing the economic feasibility of investments.

Technology

The facility that contributes the most to our value chain carbon emissions is the cracking furnace at the Naphtha Cracking Center (NCC). The furnace generates a significant amount of greenhouse gases by using fossil fuels to crack naphtha at high temperatures to produce petrochemical raw materials. In response, we are working on replacing fossil fuel-based naphtha with bio-based alternatives and developing technologies to convert cracking furnaces to electric furnaces. Furthermore, we are analyzing the emission characteristics of each step in the manufacturing process and introducing innovative measures to maximize direct reductions.

Market

Demand for eco-friendly products and supply chain decarbonization is surging among global companies. Failure to meet these demands could jeopardize corporate competitiveness and erode customer trust. We are proactively addressing this challenge by expanding carbon reduction efforts beyond our own manufacturing processes to encompass the entire value chain, from upstream suppliers to downstream customers. We achieved our goal of completing the life cycle assessment (LCA) for 100% of our products, by completing LCA for all domestically produced products by 2022 and all overseas-produced products by 2023. Furthermore, we are leading the way in developing eco-friendly products, pioneering the domestic market with our Bio-Circular Balanced (BCB) product line based on bio-naphtha, which is a combination of bio-based raw materials mixed with fossil raw materials, and obtaining ISCC Plus certification for 61 products, including super absorbent polymer (SAP) and acrylonitrile butadiene styrene (ABS).

Reputation

We recognize that climate change is not only an environmental concern but also a significant business risk that directly impacts corporate competitiveness. Global credit rating agencies now take into account ESG factors when determining corporate credit ratings. Customers also consider the management of upstream Scope 3 emissions, including the carbon footprint of raw materials for evaluating supply contracts. In response to these developments, we are continuously analyzing the financial impact of climate change on our business operations, expanding our eco-friendly product portfolio, and implementing our Net-Zero roadmap to strengthen competitiveness in raising capital.

Major physical and transition risks

	Type	Factors	Impacts and responses
Physical risks	Acute	Facility damage and production delay due to climate disaster events	Enhance climate scenario-based emergency response plan and management procedure
	Chronic	Reduced employee productivity due to rising average temperatures	Provide adequate rest periods and expand convenient facilities to promote employee safety and health
Transition risks	Policy and legal	Rising costs to respond to greenhouse gas regulations	Drive carbon reduction activities and investments through the introduction of an internal carbon pricing mechanism
	Technology	Increased investment in carbon reduction technologies	Increase direct reductions through innovative technologies and energy efficiency improvements
	Market	Increased demand for green products and credentials	Complete life cycle assessment on all products and obtain ISCC Plus certification for 61 products
	Reputation	Reduced ability to raise capital due to climate change inaction	Increase the ability to raise capital by expanding green product portfolio and executing Net-Zero roadmap

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SUSTAINABILITY GOVERNANCE

Board sustainability oversight

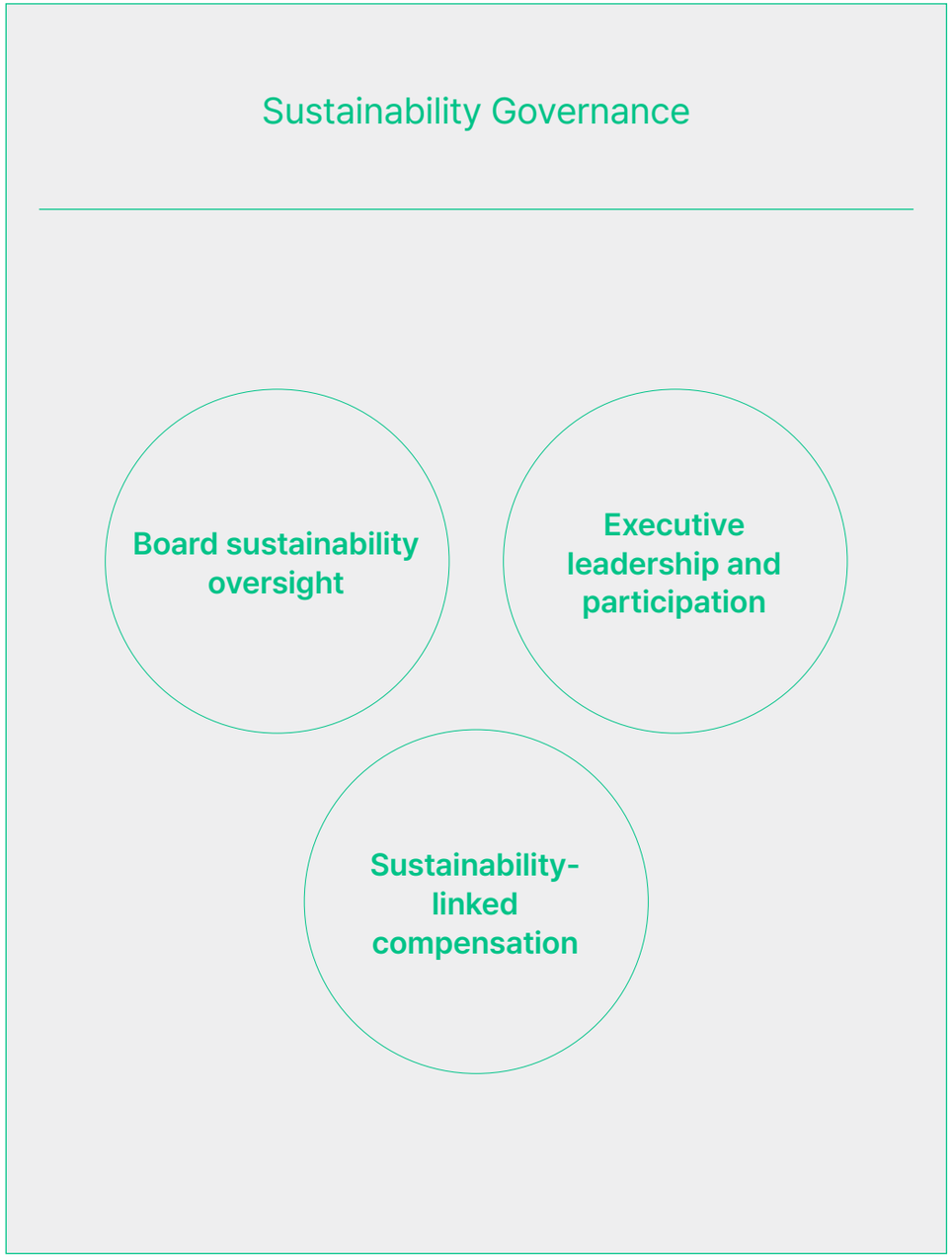
As the highest decision-making body, our Board of Directors is responsible for deliberating on important business matters and overseeing the execution of management's duties. The ESG Committee under the board evaluates key sustainability agendas and reviews organizational sustainability policies and strategies, including the Net-Zero target and roadmap. The board regularly receives reports on sustainability-related management agendas from the ESG Committee and monitors the progress of climate actions.

Executive leadership and participation

Our management actively integrates sustainability topics identified through materiality assessment into our annual planning and business processes. The Chief Sustainability Strategy Officer (CSSO) acts as a control tower for sustainability management, communicating with stakeholders and proposing actionable solutions. The Sustainability Strategy Team identifies and manages ESG improvement projects across departments and proposes key sustainability agendas for monthly executive meetings and bi-annual ESG Committee meetings. The Net-Zero Team, established in 2024, develops a comprehensive roadmap for Scope 1 and 2 emissions across our global operations to achieve Carbon-neutral growth by 2030 and Net-Zero by 2050, devises strategic plans for securing renewable energy sources and monitors progress on carbon reduction initiatives and renewable energy procurement.

Sustainability-linked compensation

To further promote sustainability leadership, we have linked ESG-related indicators to key management and performance indicators of our executives. We have also linked sustainability performance to management evaluation and compensation to incentivize the transition to a low-carbon economy and support the development of eco-friendly business opportunities. We are also working towards integrating ESG management throughout the company by setting sustainability performance targets for each business division and incorporating them into the key performance indicators of departments and individual employees.



SUSTAINABILITY STRATEGY

LG Chem's five sustainability priorities

To provide innovative and differentiated sustainable solutions for the environment and society, we selected five priority actions, including climate action, renewable energy transition, circular economy, environmental protection, and responsible supply chain.

Innovative and differentiated sustainable solutions for the environment and society

1 Climate action

- Commitment to 2030 Carbon-neutral Growth and 2050 Net-Zero
- Transition to low-carbon fuels and raw materials, developing CCU technology, and enhancing operational energy efficiency

2 Renewable energy transition

- Transition to 100% renewable energy for overseas facilities by 2030 and domestic facilities by 2050

3 Circular economy

- Research and development on mechanical and chemical recycling, and biodegradable plastics
- Expanding the recycling of waste plastics and waste batteries

4 Environmental protection

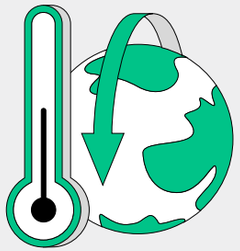
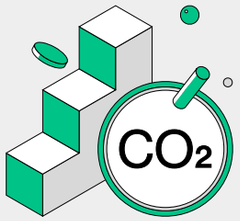
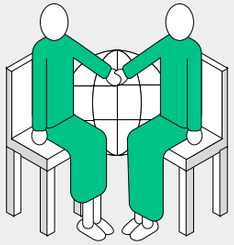
- Promoting Zero Waste to Landfill across operations

5 Responsible supply chain

- Risk assessments and on-site audits to improve supply chain sustainability
- Enhancing supply chain transparency and traceability

Toward 2050 Net-Zero

We anticipate our greenhouse gas emissions to rise in line with the growth of our businesses and the expansion of our production. As a global company that operates in the petrochemicals, advanced materials, and life sciences businesses, we have agonized over our survival and sustainable growth and have come to identify new business opportunities in the evolving market dynamics of sustainability and ESG. We are actively embracing the transformation from the perspective of our customers and the market, rather than remaining passive to new trends and order. In 2020, we made a preemptive move by announcing our sustainability strategy and declaring the 2050 Carbon-neutral Growth goal, making us the first in the Korean chemical industry to make such a commitment. Over the past two years, we have implemented various activities to reduce our carbon footprints at both internal and external levels, bringing us closer to our goals. During this process, we have also observed favorable changes in business circumstances that gave us confidence in our ability to accelerate our actions. To keep pace with sustainable growth as a top global science company, in 2022, we advanced our existing target of achieving Carbon-neutral Growth by 20 years and declared a new target of reaching 2050 Net-Zero. We are actively promoting the adoption of innovative processes, the use of eco-friendly materials and fuels, and the expansion of renewable energy use to achieve this new target. Furthermore, in addition to complying with regulations for Scope 1 and 2 emissions, we are setting up a management system for Scope 3 emissions, to enhance the competitiveness of our low-carbon products. Recognizing that achieving global carbon neutrality requires collective efforts greater than those of individual companies, we are expanding the sustainability ecosystem through collaborative initiatives with various partners.

Low-carbon transition	Product low-carbon competitiveness	Partnerships for Net-Zero
		
Innovative processes, low-carbon fuels and raw materials	Eco-friendly product portfolio	Global leadership for climate action
Renewable energy transition	Scope 3 management framework and supplier product carbon footprint measurement	Industry collaboration for breakthrough technology and circular economy
Carbon offset		

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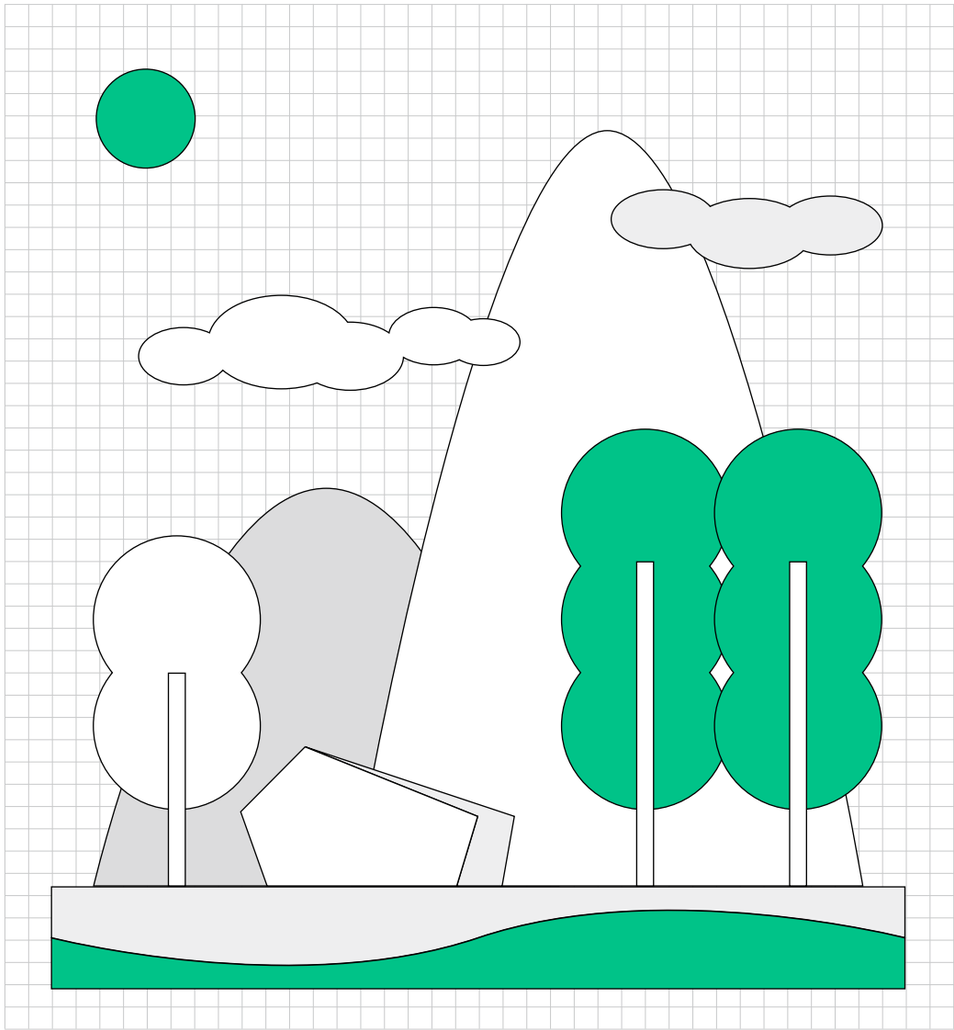
COMMITMENTS AND ACHIEVEMENTS

ENVIRONMENTAL



→Greenhouse gas reduction

Goals	Progress
— 2030 Carbon-neutral Growth, 2050 Net-Zero — 100% renewable energy transition for overseas sites by 2030, domestic sites by 2050	— Net-Zero focused decision-making governance — Largest renewable energy power purchase agreement in Korea (up to 615 GWh per year) — 13% renewable energy transition rate across global operations, with 100% renewable energy transition at 7 overseas operations

→Product carbon footprint management

Goals	Progress
— Complete Product Carbon Footprint assessment of 100% of products by 2023	— Completed the assessment of Product Carbon Footprint for 100% of products, establishing a baseline for reviewing and improving environmental impacts for all products — Participate in the Partnership for Carbon Transparency (PACT) hosted by the World Business Council for Sustainable Development (WBCSD) to develop the global standard methodology for calculating carbon footprint

→Transition to circular economy

Goals	Progress
— Enhance sustainable product and technology development — Expand circular economy network through collaboration	— Secured chemical recycling capacity with the construction of the first large-scale supercritical pyrolysis plant in Korea — The number of Post-Consumer Recycled products increased to 120 — Secured 25,000 tons of waste material feedstock through local partnerships and established a circular economy value chain for a chemical recycling facility

Environmental protection

Goals	Progress
— Promote Zero Waste to Landfill and protect local ecosystems	— →Obtained Zero Waste to Landfill certification at four sites — →Increased the seagrass habitat by 20,008m² and fixed 5.9 ton carbon by transplanting 50,000 seagrass

COMMITMENTS AND ACHIEVEMENTS

SOCIAL

→ Environment, health and safety

Goals	Progress
— Global top-tier safety excellence	— Zero cases of serious accidents — Average EH&S investment over KRW 200 billion over the past three years — Transformation of high-risk facilities to Digital Safe Factory

→ Supply chain sustainability

Goals	Progress
— Mutual growth with suppliers by taking a flexible approach towards risks and changes and establishing a sustainable supply chain	— 96% of suppliers signed a commitment to the revised Supplier Code of Conduct — Conducted on-site ESG audits and monitored progress on corrective actions for six high-risk suppliers — Provided KRW 206 billion win-win fund as financial support for supplier ESG management

→ Employees

Goals	Progress
— An inclusive organizational culture that respects and embraces diversity	— 5,500 employees participated in Career Week — 35 policy and process improvements based on the Voice of Employee — 3 sites conducted Human Rights Impact Assessment

→ Local communities

Goals	Progress
— Value creation for the society and local communities	— Provided ESG training to 40,000 youths in 505 schools and care facilities — Provided petrochemical industry training and mentoring programs to 335 high school students in Yeosu — Financial support for social enterprises addressing climate change and environmental issues, the total cumulative amount of support KRW 11.5 billion

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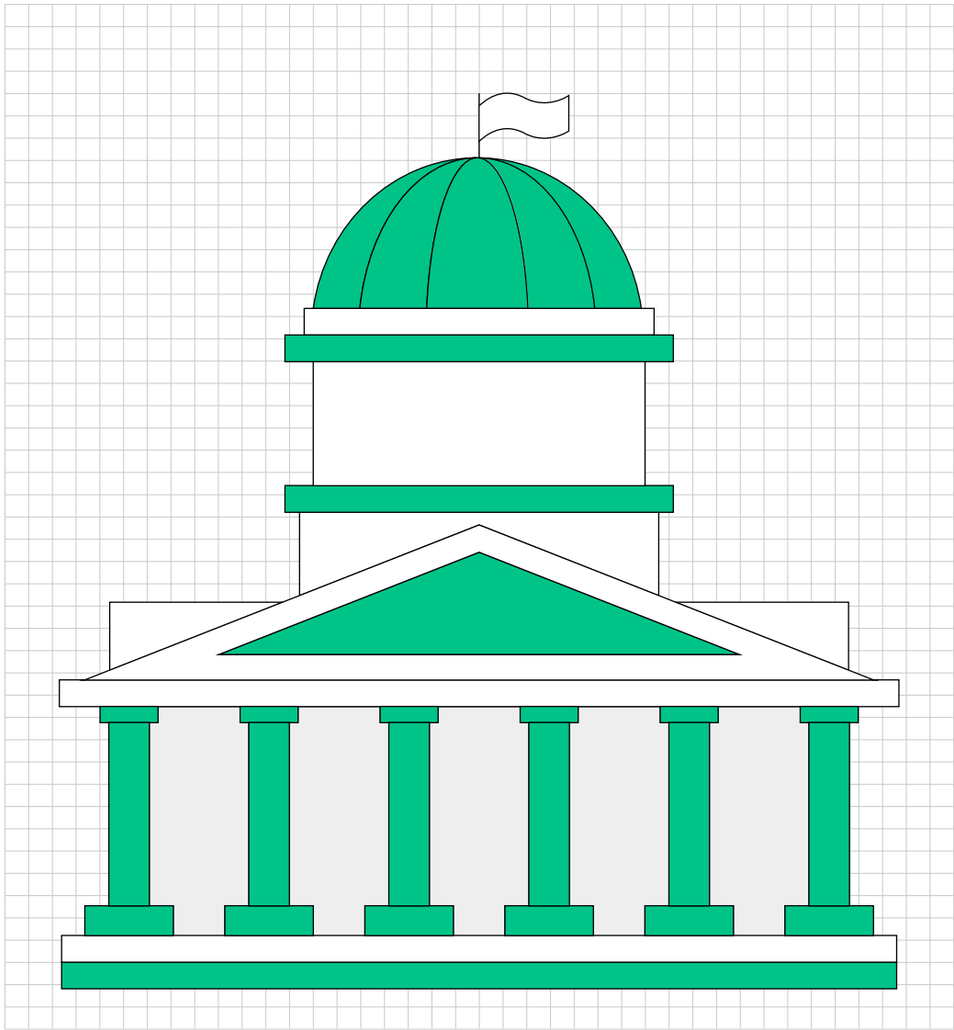
GOVERNANCE



→Board of Directors

Goals	Progress
— Transparent corporate governance and board-centric responsible management	— Four independent directors on the Board of Directors — Board gender diversity of 29% with two female independent directors — Independent directors with specialized expertise in chemicals, management, law, accounting, and taxation

→Compliance management

Goals	Progress
— Win stakeholder trust and achieve sustainable growth through advanced compliance practices	— Certified compliance management systems (ISO 37301) and anti-bribery management systems certifications (ISO 37001) — Integrated compliance IT system across global operations

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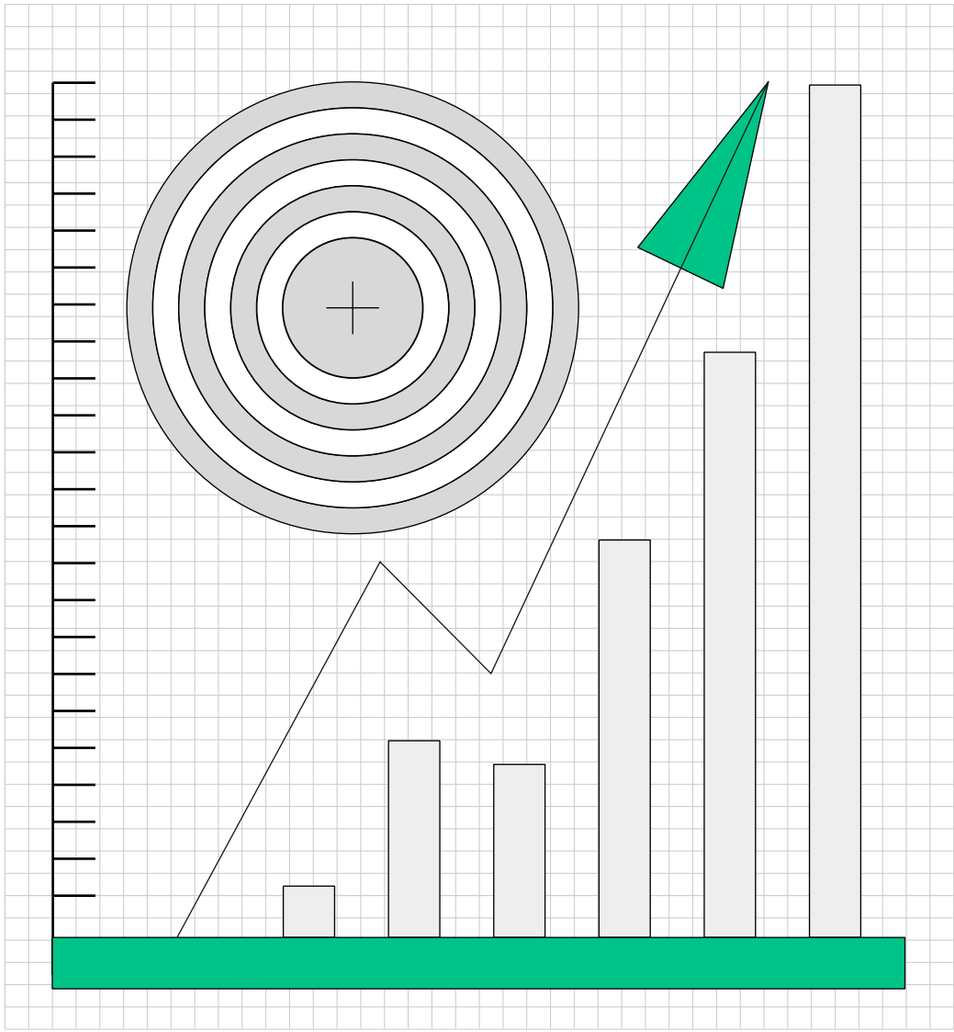
GROWTH



Sustainability

Progress

— Strategic partnership with ENI Group to establish a joint venture for HVO production
— Addition of product portfolio with new CO_2-based plastics and biodegradable materials
— Expansion of RO membrane business in Saudi Arabia, the world's largest market for seawater desalination

Battery materials

Progress

— Signed a 500,000 ton, KRW 24.75 trillion long-term cathode supply agreement with General Motors
— Signed a KRW 3 trillion cathode supply agreement with Toyota

Biopharmaceuticals

Progress

— Achieved revenue exceeding KRW 1 trillion, including the revenue of AVEO Pharmaceuticals
— Expanded sales of major products, including diabetes treatments, growth hormones, and kidney cancer therapies

PROGRESS ON ESG

ZERO

GOVERNANCE

Effective corporate governance acts as the cornerstone for developing and implementing a mid-to-long-term sustainability strategy. Globally, there is a growing call for enhanced corporate governance, emphasizing board expertise, diversity, and independence. Stakeholders also demand management transparency that promotes transparent decision-making and responsible business practices. Recognizing the critical role of governance in driving sustainability initiatives across the company, LG Chem is committed to establishing a board of directors with diverse backgrounds and specialized expertise. This approach ensures that stakeholder perspectives, including those of shareholders, are incorporated into our decision-making processes.

— RESPONSIBLE GOVERNANCE

— COMPLIANCE MANAGEMENT

— ETHICAL MANAGEMENT

RESPONSIBLE GOVERNANCE

Goals	Progress
Transparent corporate governance	Independent directors on the Board of Directors 4
Board-centric responsible management	Board gender diversity 29%
	Independent directors with specialized expertise Chemicals, Management, Law, Accounting, Taxation

COMPLIANCE MANAGEMENT

Goals	Progress
Advanced compliance practices	Compliance management systems and anti-bribery management systems certifications ISO 37301, ISO 37001
	Global Enterprise Risk Management Integrated compliance IT system

ETHICAL MANAGEMENT

Goals	Progress
Ethical organizational culture	Code of Ethics and Code of Conduct Internal audits on major business functions

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RESPONSIBLE GOVERNANCE

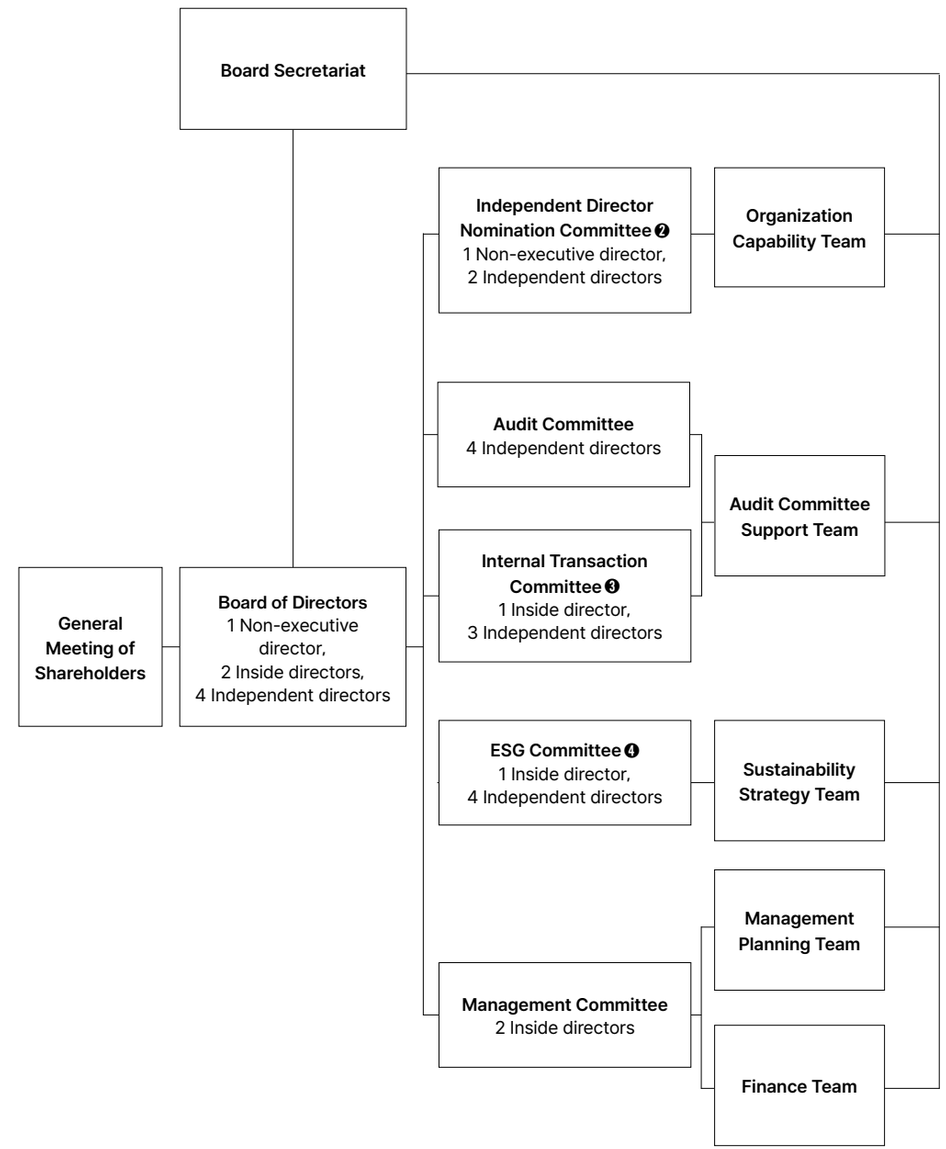
BOARD OF DIRECTORS

LG Chem establishes a transparent governance structure and strengthens the authority and role of the Board of Directors to promote sustainability and responsible business practices. The board assumes responsibility for managing and overseeing climate-related risks and opportunities and provides checks and balances through strict compliance. The board's activities and responsibilities encompass corporate policy and overall corporate performance.

We uphold the core values of expertise, independence, and transparency in board operations through specialized committees and rigorous director appointment processes. We disclose key governance documents on our website, including the Articles of Incorporation, Board Regulations, and Committee Regulations, to further ensure transparency. The composition and operation of the board and its committees strictly adhere to the principles and procedures outlined in these regulations.

Our Board of Directors comprises seven members: two inside directors, one non-executive director, and four independent directors. Under the board, we operate specialized committees: the Independent Director Nomination Committee, the Audit Committee, the Internal Transaction Committee, the ESG Committee, and the Management Committee.

Board of Directors ❶



❶ The Board of Directors, committees under the board, and supporting teams are listed as of June 30, 2024.
❷ The Independent Director Nomination Committee is a standing organization.
❸ The Internal Transaction Committee was established on July 1, 2021.
❹ The ESG Committee was established on April 28, 2021.

Composition of the Board of Directors

Board centered on independent directors

A majority of the board is composed of independent directors. Independent members of the board bring expertise and diverse perspectives to the board, enabling effective monitoring and oversight over the management. The Audit Committee, responsible for internal control related to business execution, is composed entirely of independent directors.

Board composition

As of June 30, 2024.

Type	Name	Gender (Age)	Position	Appointed date ❶	Expected expiry of term	Area of expertise	Career background
Non-executive director	Bong Seok Kwon	Male (60)	Independent Director Nomination Committee	March 23, 2022	Until the AGM in March 2025	Business administration in general	CEO, LG Electronics
CEO	Hak Cheol Shin	Male (66)	Board Chair, Management Committee Chair, ESG Committee	March 15, 2019	Until the AGM in March 2025	Business administration in general	Vice Chair and Executive Vice President, 3M
Inside director	Dong Seok Cha	Male (61)	Management Committee, Internal Transaction Committee	March 20, 2020	Until the AGM in March 2027	Business administration in general	CFO, Serveone
Independent director	WhaSun Jho	Female (58)	Audit Committee Chair, Internal Transaction Committee, Independent Director Nomination Committee, ESG Committee	March 23, 2022	Until the AGM in March 2025	Politics, economics, social sciences	Professor, Department of Political Science and International Studies, Yonsei University
Independent director	Hyunjoo Lee	Female (47)	Audit Committee, ESG Committee Chair	March 23, 2022	Until the AGM in March 2025	Chemistry	Professor, Department of Chemical and Biomolecular Engineering, KAIST
Independent director	Kyung-Hoon Chun	Male (51)	Audit Committee, Internal Transaction Committee Chair, Independent Director Nomination Committee, ESG Committee	March 28, 2023	Until the AGM in March 2026	Legal affairs	Professor, School of Law, Seoul National University
Independent director	Young-Han Lee ❷	Male (51)	Audit Committee, Independent Director Nomination Committee, ESG Committee	March 25, 2024	Until the AGM in March 2027	Accounting and taxation	Professor, Department of Science in Taxation, University of Seoul

❶ Initial appointment dates for reappointed directors.
❷ Young-Han Lee was newly appointed as an independent director at the Annual General Meeting of Shareholders on March 25, 2024.

Separation of the role of CEO and chairperson of the Board of Directors

The roles of CEO and chairperson of the Board of Directors at LG Chem were separated at the end of 2020; however, the roles are joint as of the current reporting date. LG Chem's Board of Directors is structured to promote effective and prudent decision-making. Notably, a majority of the board comprises independent directors, fostering an environment where the board operates independently from management and controlling shareholders.

Changes in board composition

	2023	2024
Appointments	Kyung-Hoon Chun	Young-Han Lee
Retirements	Dong-min Jung	Mun-su Kim

As of June 30, 2024.

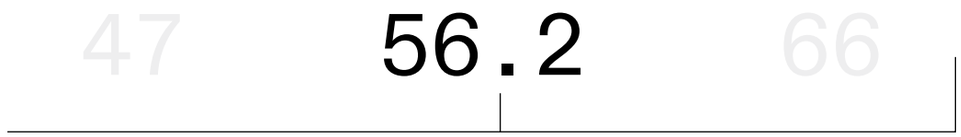
Board independence, diversity, and expertise

We elect and appoint board members in compliance with the Commercial Act and other relevant laws. Our board is composed of inside directors with expertise in business management and independent directors with specialized expertise in diverse fields like the chemical industry, business administration, finance, law, accounting, and taxation. The Independent Director Nomination Committee selects candidates with extensive experience and knowledge and appoints experts who can actively participate in board discussions on our agenda and effectively monitor management performance.

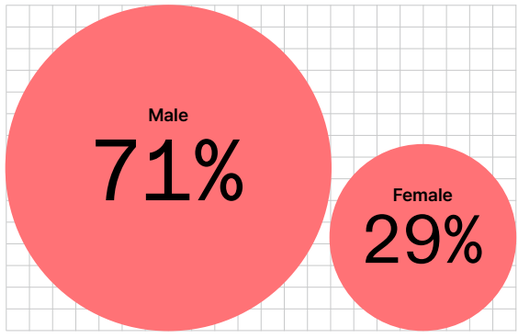
As of the end of 2023, four out of seven board members are independent directors, ensuring a solid majority. We maintain board independence through a rigorous screening process by the Independent Director Nomination Committee, with final approval at the shareholder's meeting. Additionally, we ensure board gender diversity with two female independent directors. These efforts to promote board diversity and expertise have resulted in a board composed of management professionals, industry and technical experts, finance and accounting specialists, and legal professionals whose insights and expertise contribute to our key business decisions.

Board diversity

Average age



Gender



Tenure

Board expertise

	Bong Seok Kwon	Hak Cheol Shin	Dong Seok Cha	WhaSun Jho	Hyunjoo Lee	Kyung-Hoon Chun	Young-Han Lee
Business management	O	O	O				
Law						O	
Accounting and taxation							O
Politics, economics, social sciences				O			
Chemistry					O		

Board expertise

Bong Seok Kwon served as the CEO of LG Electronics, following his positions as Head of Overseas Subsidiary, Head of Product Planning Group, Head of Business Unit, and Head of Business Division. As CEO of LG Electronics, he played a critical role in optimizing the business portfolio and improving the business structure of LG Electronics. His expertise is based on years of experience in the field of business management.

Hak Cheol Shin is an industry leader who has held various executive positions. He began his career at 3M Korea in 1984 and served as the Vice Chair at 3M headquarters in the United States until 2018. With his extensive experience and professional expertise, he is expected to play a pivotal role in LG Chem's strategic growth and development. He is an expert with exceptional insight into the company's emerging business domains, such as energy, water, and biotechnology.

Dong Seok Cha has been serving as the CFO of LG Chem, after holding the positions of CFO at Serveone in 2016 and CFO at S&I in 2018. With a profound understanding of LG Chem's business strategy and a wealth of experience in finance, he has made significant contributions to enhancing financial integrity and optimizing internal processes. As a seasoned professional, he plays a pivotal role in the company's strategic performance and risk management.

WhaSun Jho is a professor at Yonsei University's Department of Political Science and International Studies. Her research focuses on the political and societal changes driven by political-economic factors and technological development. She has a wealth of experience and expertise in science and technology policy and research on future governance.

Hyunjoo Lee is a professor in the Department of Chemical and Biomolecular Engineering at KAIST. She is a young scholar with a strong research and industry collaboration track record. Her expertise in petroleum chemical processes and sustainability business areas, as well as her extensive research in diverse fields such as biomass, carbon neutrality, and eco-friendly businesses, give her a deep understanding of LG Chem's business areas.

Kyung-Hoon Chun passed the 35th National Judicial Examination and completed the 26th class of the Judicial Research and Training Institute. He worked as an attorney at a law firm specializing in corporate governance, fair trade, and M&A for a decade before joining Seoul National University School of Law as a professor in 2010. In particular, he is a legal expert with a track record of active research and industry-academic collaborations. He has published over 50 research papers in corporate and securities law and received multiple scholarly awards for his work.

Young-Han Lee is an accounting and tax expert with experience in finance, accounting, and taxation. He worked as a Certified Public Accountant at an accounting firm and served as a member of the National Tax Review Committee of the Jungbu Regional Tax Office, a member of the Supervisory Committee under the Financial Services Commission, and a member of the KOSDAQ Market Committee of the Korea Exchange. He currently serves as a professor in the Department of Science and Taxation and Dean of the Graduate School of Science in Taxation at the University of Seoul.

As such, our board is comprised of directors with diverse backgrounds, knowledge, and expertise. To reinforce board-centric management practices, we run training programs for newly appointed directors on their roles and responsibilities as directors and the importance of board functions.

Interest between independent directors and LG Chem

To ensure a fair and transparent appointment process for independent directors, we conduct comprehensive evaluations of potential candidates. This involves interviews and reference checks conducted by relevant departments like legal affairs and human resources to assess qualifications and eligibility. Our assessments consider requirements from relevant laws like the Commercial Act and the Public Services Ethics Act, and we also evaluate candidates based on expertise, impartiality, ethical responsibility, and loyalty. All our independent directors meet the qualifications defined in these laws and our company regulations.

To prevent conflicts of interest, we conduct rigorous interviews and verification with independent directors during the appointment process and continuously check with current directors to identify any potential conflicts. As of the end of 2023, none of our independent directors have served for more than six years (or nine years, including affiliates). This commitment ensures the independence and integrity of our board and fosters a climate of accountability and transparency within the company.

Appointment of independent directors

1	**Resolution by Independent Director Nomination Committee** Vote on the nomination of independent directors Propose nomination to the Board of Directors
2	**Resolution by the Board of Directors** Approve nomination Propose nomination to the shareholder's meeting
3	**Resolution by the shareholders' meeting** Appoint independent directors

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Committees under the board

Board meetings and activities

The board convenes quarterly as a general rule, with pre-meetings and Q&A sessions held 1 to 7 days before each board meeting to address each agenda. Ad hoc meetings are conducted as needed when scheduling regular board meetings becomes difficult. In 2023, we held a total of 11 board meetings. As of June 30, 2024, we have held four meetings. During this period, the board discussed 67 agendas, of which 46 were approved and 21 were reported. The average attendance rate of directors was 98.8% in 2023 and was 96.4% in 2024 as of June 30, 2024.

Board meetings in 2023

	Meetings	Agendas
Board meetings	11	45 (30 approved, 15 reported)

Five committees under the board

We have five committees under the board, each with specific roles and functions. The Audit Committee oversees approval and reporting of compliance and internal control, the Internal Transaction Committee strengthens control over internal transactions to promote fair transactions and ensure transparency, and the ESG Committee focuses on promoting sustainable growth. The Management Committee is responsible for decision-making on urgent management issues, and the Independent Director Nomination Committee is responsible for the recommendation and screening of independent directors. Each committee operates under its own regulations, enhancing the independence, expertise, and efficiency of the board.

Roles of board committees

Audit Committee	Internal Transaction Committee	ESG Committee	Management Committee	Independent Director Nomination Committee
Oversees executive management, reviews the accuracy of financial statements, and ensures the independence of external audits.	Strengthens internal transaction controls to enhance transaction fairness and promote management transparency.	Reinforces environmental, social, and governance management to achieve long-term, sustainable growth.	Processes general management and financial affairs to enhance the efficiency of board operations.	Recommends and screens independent director candidates based on the guidelines of the Commercial Act and other relevant laws.

Committee meetings in 2023

Committee	Meetings	Agendas
Independent Director Nomination Committee	2	3 (2 approved, 1 reported)
Management Committee	2	5 (5 approved, 0 reported)
ESG Committee	2	3 (0 approved, 3 reported)
Internal Transaction Committee	3	12 (9 approved, 3 reported)
Audit Committee	6	20 (5 approved, 15 reported)

ESG Committee

We acknowledge that the perspectives of stakeholders go beyond mere economic value creation and encompass the pursuit of social value. In alignment with this recognition, we established the ESG Committee in April 2021 to internalize the concept of sustainability, which embraces both financial and non-financial values as a fundamental principle for growth. ESG committee does not represent a shared background or specific interests and adheres to the Diversity Principle. Over two-thirds of the committee members are independent directors, including two female independent directors.

To ensure sustainable business growth, the ESG Committee deliberates on key management agendas related to the environmental, social, and governance, including the Net-Zero roadmap, based on changes in the external business environment and the interests of key stakeholders. Recognizing the growing importance of compliance in corporate sustainability, we decided to strengthen the board's compliance review function. We reorganized the compliance management system to reflect board leadership and executive commitment. Hence, the ESG Committee has decided to deliberate on compliance issues at least twice a year, on a regular basis, and report significant findings to the board. We revised the ESG Committee Regulations in April 2023 to reflect these decisions and addressed the compliance-related agenda at the ESG Committee in November 2023.

Independent directors meeting attendance

Type	Name	Attendance Rate (%)			
		Average of Last 3 Years	Last 3 Years ❶		
			2023	2022	2021
Independent Director	Young-ho Ahn	100	N/A	N/A	100
Independent Director	Kook-heon Char	100	N/A	N/A	100
Independent Director	Dong-min Jung	100	N/A	100	100
Independent Director	Mun-su Kim	100	100	100	100
Independent Director	WhaSun Jho	100	100	100	N/A
Independent Director	Hyunjoo Lee	100	100	100	N/A
Independent Director	Kyung-Hoon Chun	100	100	N/A	N/A

❶ The ESG Committee was established on April 28, 2021, and is comprised of one inside director and four independent directors. As of June 30, 2024, the committee is composed of Hyunjoo Lee (Chair), WhaSun Jho, Kyung-Hoon Chun, Young-Han Lee, and Hak Cheol Shin.

Roles of board committees

No.	Meeting Date	Attendance/ Total	Agenda		Status
			Category	Content	
1H 2023	April 26, 2023	5/5	Reporting	**Reporting on the progress of ESG management** — Changes in the business environment and response strategies — Progress and plans on Scope 1 and 2 management — Progress and plans on Net-Zero Management System — Progress and plans on developing low-carbon supply chain	Reported
2H 2023	November 22, 2023	5/5	Reporting	**Reporting on supply chain ESG management** — Self-assessment on supplier management — Progress and plan on supplier ESG management	Reported
				Reporting on compliance risk management system — Management system for major risk types (corruption involving public officials, product defects, leakage of national core technology, sexual harassment, collusion, violation of Serious Accidents Punishment Act)	Reported
1H 2024	April 29, 2024	5/5	Reporting	**Reporting on plan for sustainability disclosures** — Sustainability disclosure requirements — Climate scenario analysis and reporting — 3-year preparation roadmap	Reported
				Reporting on compliance risk management system — Management system for major risk types (violation of environmental safety obligations, leakage of national core strategy, corruption involving public officials, product defects, violation of legal obligations related to subcontractors, collusion)	Reported

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Audit Committee

The Audit Committee consists of four or more directors, with more than two-thirds of the total members being independent directors, and at least one of the members is an accounting or finance expert as defined by relevant laws and regulations. The Audit Committee conducts internal audits on the accounting and major business operations of the company, evaluates the operation of the internal accounting management system, and checks the operation of the internal control mechanisms. In addition, the Audit Committee supervises the performance of duties by directors and executives to ensure rational management decisions. The Audit Committee has developed Audit Committee Regulations to maintain objectivity from the execution body, and the full text can be found on our website.

Internal risk management and control are mainly conducted at the Audit Committee Level to ensure objectivity and expertise. The Audit Committee plays a crucial role in ensuring the transparency and accountability of our financial reporting and business operations.

Key tasks of the Audit Committee

1	The Audit Committee actively participates in developing comprehensive internal audit plans, oversees their execution, and evaluates the outcomes of internal audits. On a quarterly basis, the Audit Committee reviews financial statements and external auditor's reports and provides feedback and recommendations to the executives.
2	The Audit Committee thoroughly monitors management activities by comprehensively evaluating the internal accounting management system and internal control mechanisms in accordance with the provisions of the Act on External Audit of Stock Companies and the Financial Investment Services and Capital Markets Act.
3	In the event of a significant non-financial incident that could potentially damage the company's reputation, the Audit Committee promptly convenes an ad hoc meeting to examine the detailed circumstances of the incident and develop strategies to minimize potential risks.

Evaluation and compensation for independent directors

We conduct a comprehensive evaluation of independent directors upon the completion of their term. The Board Secretariat and the Human Resources Department assess a wide range of factors, including attendance rate and engagement at board meetings, feedback on the board agenda, advisory role in critical management decisions, and contributions as Audit Committee Members to enhancing the internal control and oversight mechanisms, particularly about financial risks. The Independent Director Nomination Committee recommends candidates based on these evaluation results so that the board can make fair and informed reappointment decisions.

We maintain a policy of compensating independent directors at a level comparable to the industry average. While the evaluation results are taken into account as a reference for reappointment decisions, we do not apply any discriminatory measures based on them to ensure that independent directors can fulfill their duties without undue influence or pressure and maintain independence. Currently, we have yet to plan to implement a compensation system that directly links remuneration to evaluation outcomes.

MANAGEMENT

LG Chem's management is firmly committed to sustainability principles, actively integrating the impacts, risks, and opportunities derived from the materiality assessment into our annual business planning. Since 2021, we have been linking ESG-related indicators to the core management indicators and KPIs of executives, and we are integrating sustainability performance into the evaluation and compensation of executives to drive low-carbon transition and expand eco-friendly business opportunities. The Chief Sustainability Strategy Officer (CSSO) serves as the sustainability control tower, playing a pivotal role in accelerating sustainability efforts, fostering active communication with stakeholders, and developing actionable science-based solutions. Our leadership is committed to sharing sustainability vision with employees and promoting collaboration across the organization to achieve long-term sustainability goals.

We are committed to accelerating the transition to a low-carbon business model by implementing a comprehensive carbon management system. To this end, we have introduced an Internal Carbon Pricing (ICP) system to reflect carbon costs in business plans and actively incentivize carbon reduction activities. For investment evaluations, we factor in internal carbon prices based on the Emissions Trading Scheme (ETS) price forecasts to ensure that feasibility assessments account for the financial implications of carbon emissions. We proactively address potential challenges arising from strengthening global carbon regulations and the uncertainties surrounding the allocations of emission allowances under the Korea Emissions Trading Scheme (K-ETS). By incorporating these considerations into decision-making processes, we aim to mitigate mid- to long-term risks and strive to balance economic performance and social responsibility.

ESG-integrated management and organization

We recognize sustainability as a driver of business growth and a catalyst for accelerated performance. Pioneering ESG integration, we foster organic collaboration across departments, prioritizing the efficient execution of ESG initiatives to deliver measurable results. Central to this strategy is the Sustainability Department, a dedicated ESG organization under the Chief Sustainability Strategy Officer (CSSO). The Sustainability Strategy Team monitors ESG regulations and market trends, proactively identifying and managing ESG improvement projects across departments. The team reports the progress of these projects and proposes critical sustainability agendas for both monthly executive meetings and bi-annual ESG Committee meetings, ensuring sustainability is embedded into business strategy.

In 2024, we established the Net-Zero Team to accelerate the progress towards the goals of Carbon-neutral growth by 2030 and Net-Zero by 2050, alongside the transition to 100% renewable energy. The Net-Zero Team develops a comprehensive roadmap for Scope 1 and 2 emissions across our global operations, devises a strategic plan for securing renewable energy sources, and monitors progress on carbon reduction initiatives and renewable energy procurement. The team has introduced a Carbon Reduction Incentive Scheme to motivate and expedite carbon reduction projects. This scheme rewards the implementation of projects and the identification of new projects. The team continues to identify innovative ways to reduce emissions by continuously monitoring emerging trends in carbon reduction technologies and conducting in-depth analyses of manufacturing processes.

Sustainable corporate crisis management

In May 2021, we appointed a Chief Risk Officer (CRO) and established a company-wide crisis management organization to proactively analyze potential risks that could impact our operations and implement thorough risk management and response measures.

We are implementing a systematic risk management approach encompassing risk categorization and management, an efficient response system, and simulation training. Risks are categorized in advance, and preventive and management activities are carried out accordingly. In the event of a crisis, an efficient response system that includes rapid communication, reporting, and operation of the Emergency Response Committee is in place, and regular simulation training is conducted to verify the effectiveness of the crisis management system. To establish an integrated crisis management system, we developed the organizational Global Crisis Management Regulation, which clearly outlines the policies and principles, responsibilities and authorities, and crisis management processes. We also hold quarterly CRO-led Crisis Management Committee Meetings to strengthen leadership and communication. In addition to an effective risk identification and improvement system, which ensures consistency in crisis management activities across the organization, a comprehensive guidebook is prepared and is regularly updated to provide clear guidance on the crisis response system to minimize potential damage in the event of a crisis.

In the event of a crisis, swift and transparent communication ensures prompt determination of crisis level and decision on initial response measures. A crisis response system is activated based on the crisis level, and all incidents and accidents are investigated to identify the root cause and develop preventive measures. We oversee incidents and accidents related to environment and safety, quality, information security, supply chain management, procurement, logistics, etc., across global operations with an integrated IT system for crisis management, the Crisis Management Information System (CMIS). CMIS facilitates rapid communication and decision-making during incidents and accidents and enables effective management of event history and follow-up actions.

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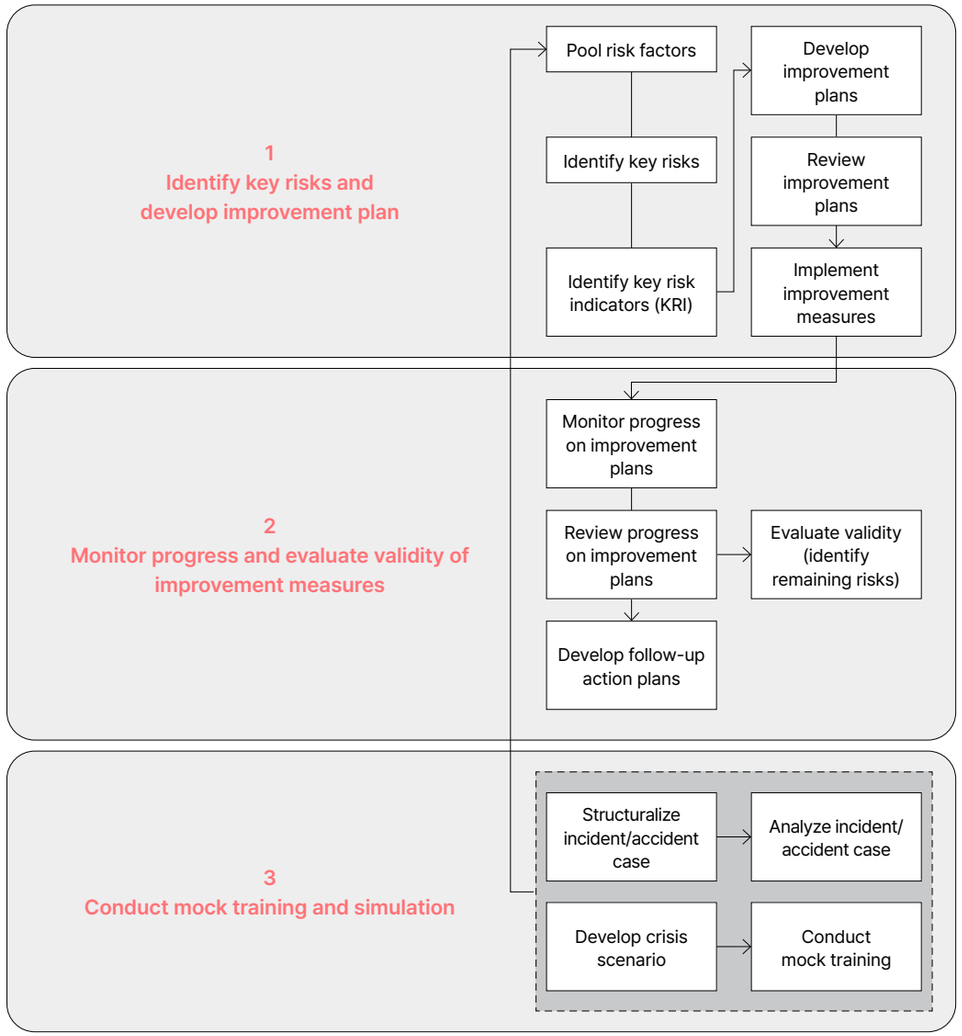
Crisis management process



COMPLIANCE MANAGEMENT

Compliance control and support

LG Chem has a robust compliance management framework in place to identify, assess, and prioritize compliance risks.

Compliance support system

We strive to fulfill corporate social responsibility and minimize business risks by operating a compliance control framework and embedding a compliance culture across the organization. The Compliance Officer oversees compliance control in accordance with the compliance control standards.

Compliance guidelines

We endeavor to establish effective organizational compliance monitoring and internal control systems. To this end, we developed compliance guidelines, the LG Chem Code of Conduct, to provide essential compliance principles for employees to strictly adhere to.

Compliance team

We designate the Compliance Team, directly under the Compliance Officer, as a dedicated team to support the independent, autonomous, and effective work of the Compliance Officer and operate the compliance control system. The Compliance Officer and Compliance Team work together to identify and assess compliance risks that may arise from business activities and employees' work processes. They effectively manage the compliance controls through periodic monitoring and reporting of risk management to the board from an independent position, as well as working on a series of compliance programs to improve identified risks.

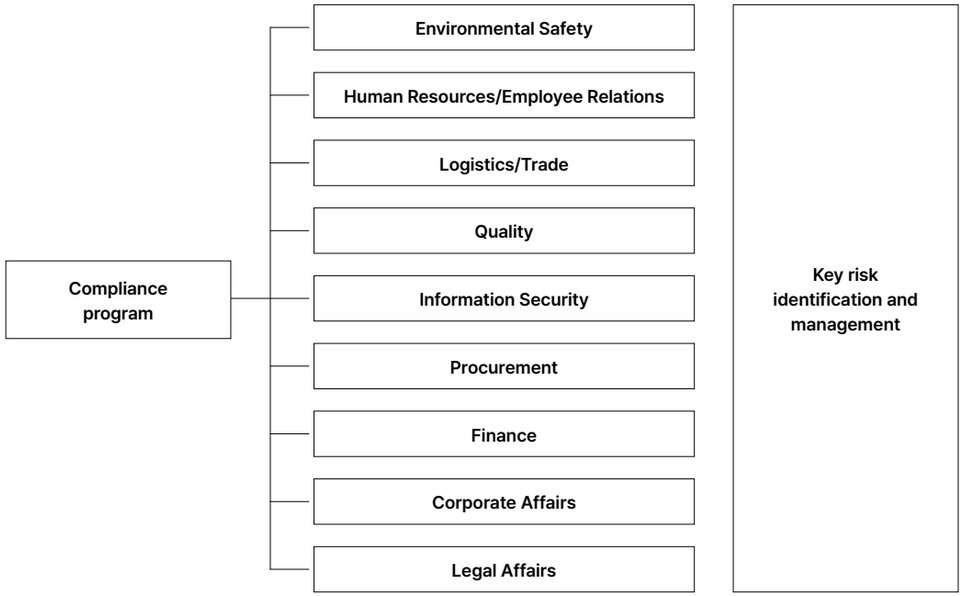
Key responsibilities
- Oversee compliance control standards.
- Implement compliance programs to prevent and improve compliance risks.
- Develop and implement compliance training programs.
- Monitoring, evaluation, and reporting of compliance activities to the board.

Compliance program

As global regulations become more diverse and sophisticated and the importance of ESG management increases, the need for prompt identification and management of compliance risks and regular monitoring of regulatory trends is highlighted.

Our Compliance Team has identified organizational compliance risks and selected 34 key risks. The team collaborates closely with functional departments dedicated to risk management, such as the Crisis Management Team. Since September 2022, we have established a compliance IT system to monitor compliance risks continuously and regularly. Specifically, our compliance program consists of three main areas: ❶ risk identification, ❷ risk assessment, and ❸ risk evaluation and management.

Roles of board committees



1 Risk identification

❶ Risk profiling: identify risks based on legal risks, global regulatory trends, contract reviews, and legal consultations relevant to our business areas.
❷ Key risk selection: select 34 key risks (fair trade, anti-corruption, business management, environmental safety, quality, information security, trade regulations, human resources and employee relations, accounting and taxation, intellectual property rights, etc.)
❸ Improvement review: review and assess the efficacy of management and control measures related to the selected key risks, develop improvement plans, and review progress on improvement measures.

2 Risk assessment

❶ Checklist assessment: conduct a simple question-and-answer survey on compliance awareness.
❷ Documentation assessment: review control measures of specific risk types by requesting questionnaires and supporting documentation from selected departments.
❸ Regular assessment: monitor control measures of key risks and quarterly update progress on key risk management.

3 Risk evaluation and management

❶ Evaluate the efficacy of key risk management measures and update improvement plans.
❷ Evaluate the efficacy of the organizational compliance control framework.
❸ Identify vulnerabilities through dashboards.
❹ Monitor and share key regulatory trends and global compliance issues.

Compliance IT system

We launched an integrated IT system for compliance management in line with our status as a Top Global Science Company. From May 2023, the system has been available to all overseas operations. The compliance IT system integrates the compliance framework into the Enterprise Risk Management (ERM) framework and lays a solid foundation for systematic compliance monitoring.

We plan to foster and embed a compliance culture throughout the organization and enhance employee engagement in compliance activities by introducing self-assessment rather than the traditional audit approaches centered on diagnosis and disciplinary actions.

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Compliance enhancement

We are committed to fostering trust and transparency with our stakeholders by enhancing compliance standards and oversight.

ISO 37301 and ISO 37001 certifications

In September 2023, we were certified with ISO 37301 (Compliance Management Systems) and ISO 37001 (Anti-bribery Management Systems) standards. The certifications reaffirm that our compliance and anti-corruption policies and risk management programs conform to global standards. We anticipate these certifications will contribute to enhancing stakeholder trust in compliance and ethical management.

Board compliance oversight

Globally, obligations for the boards' monitoring and oversight of compliance issues are emphasized to ensure an effective compliance control system. Recognizing the growing importance of compliance control, we decided to strengthen the board's compliance monitoring and review function. We have reorganized the compliance management system to reflect board leadership and executive commitment.

In April 2023, we revised the ESG Committee Regulations to include discussions on compliance issues and reviewed compliance-related agenda at the ESG Committee starting from November 2023. In April 2024, the ESG Committee reviewed the compliance risk management system and discussed critical issues with the board. For the meeting scheduled in the second half of 2024, the ESG Committee plans to review progress and plans on compliance management activities.

Corruption risk management

We maintain a zero-tolerance approach to corruption and bribery. To uphold principles of integrity and trust, we identified corruption risk as a key risk and assigned the Compliance Team to oversee and manage corruption risk as a pivotal compliance control activity. In strict adherence to both Korean and global laws and policies on anti-corruption, we implement the following corruption management actions.

❶ Develop policies (Global Anti-Corruption Policy), regulations (Prohibition and Prevention of Corruption Regulation), practice guidelines, and checklists (Guiding Principles for Fighting Corruption for Business Partners) for anti-corruption.
❷ Mandate all employees to make annual pledges on compliance with anti-corruption laws.
❸ Mandate all employees to complete training on anti-corruption.
❹ Conduct a survey on anti-corruption awareness of employees in Korea and monitor and review employee opinions for policy revision.
❺ Identify, evaluate, and prevent risk based on the anti-corruption management system established in 2021.
❻ Establish pre- and post-control procedures, including anti-corruption inspection IT system, to manage corruption risks within the organization and of business partners.
❼ Encourage business partners to manage corruption risks and provide Anti-Corruption Guidance for Business Partners, available in Korean, English, and Chinese, if necessary.

Compliance training

We are committed to raising awareness of compliance issues and providing guidance on responding to potential risks employees may encounter daily.

❶ LG Chem Code of Conduct
We developed the LG Chem Code of Conduct, a compliance guideline for the employees. To encourage employee participation in compliance management, the Compliance Team publishes a Compliance Letter covering various topics included in the compliance guidelines every month in Korean, English, and Chinese.

❷ Online compliance training
To cultivate compliance awareness among employees, we conduct online training twice a year (once in the first half and once in the second half) on major compliance issues such as fair trade, anti-corruption, trade regulations, supply chain management, environmental safety, and information security, for employees in Korea and overseas.

Tailored compliance training based on roles and responsibilities
- Employees in the purchasing department receive annual training on compliance regulations related to procurement contracts through the Purchase Academy.
- Expatriates representing LG Chem in global operations receive training on the significance of global compliance risk management and details of each risk factor before their dispatch.
- New hires receive training on understanding and preventing major compliance risks specific to their roles and responsibilities and respective business divisions.
- Leaders (team/department leader and above) receive focused training on understanding compliance governance and decision-making in conflict situations.

❸ Compliance guidelines
We issue topical compliance guidelines related to global regulatory trends and compliance management.

Compliance culture

We strive to embed compliance culture across the organization to minimize business risks and fulfill corporate social responsibility.

❶ Awareness survey on compliance and anti-corruption
We conducted an employee awareness survey on compliance and anti-corruption in March and September 2023, respectively, and reflected various opinions from employees on organizational culture, compliance, and anti-corruption on relevant internal policies.

❷ Employee performance evaluation from a sustainability perspective
We introduced Core Value Practice in employee performance evaluations starting in 2023. Core Value Practice accounts for 20% of the overall performance rating, and sustainability, which measures social and environmental responsibility, is one of the core value criteria.

❸ Organizational policy on compliance and anti-corruption
In July 2023, we developed and published LG Chem Global Compliance Policy and LG Chem Global Anti-Corruption Policy on our website and internal standards portal to show management's commitment to compliance and anti-corruption.

Furthermore, we are committed to fostering a compliance culture at the functional level through proactive identification and management of risks specific to roles and responsibilities and respective business units. Other initiatives to embed compliance culture include providing checklists and training materials that reflect global regulatory trends and operating a user-friendly Legal Portal that facilitates employees' alignment with compliance culture. The Compliance Officer and Compliance Team provide consultations on tasks closely related to potential compliance risks.

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ETHICAL MANAGEMENT

Ethics Office and Internal Audit Team

The Ethics Office and Internal Audit Team at LG Chem operate under the direct supervision of the CEO. The Ethics Office focuses on establishing organizational policies, systems, and norms on ethical management and also organizes ethics training for employees. The Internal Audit Team is responsible for conducting internal audits on a regular basis and investigating and handling cases of unethical conduct.

As a global company, we have ethics teams in overseas offices to promote ethical business practices throughout global operations. Ethics teams overseas establish policies, systems, and norms on ethical management in line with the regional characteristics and regulatory requirements and commit to embedding an ethical management culture in regional offices.

Ethical management activities

We implement the following measures to practice and promote systematic ethical management across the organization.

LG Code of Ethics and Ethics pledge

The LG Code of Ethics presents standards for moral conduct and value judgment and serves as our foundational pillar for Ethical Management. The code outlines the management principles and guides employees' roles and responsibilities.

LG Code of Ethics

❶ Responsibilities and obligations to customers (respect for customers, creating value, providing value)
❷ Fair competition (pursuit of free competition, compliance with laws and regulations)
❸ Fair transactions (equal opportunity, fair transaction procedures, support and aid for business partners)
❹ Basic ethics for employees (basic ethics, completion of duty, self-development, fairness in performance, avoidance of conflict with company interests)
❺ Corporate responsibilities to employees (respect for human dignity, fair treatment, promoting creativity)
❻ Responsibilities to society and the country (rational business development, protection of stakeholder interest, contribution to social development, environmental conservation)

Every year, our employees pledge to the Jeong-do Management Practice, which stipulates compliance with the LG Code of Ethics and adherence to ethical business practices. Our business partners also join the pledge and commit to transparency and ethical management.

Ethics IT system

We operate an integrated IT system for Ethical Management, the Jeong-do Management Portal, which provides comprehensive information on ethical management such as the LG Code of Ethics, LG Chem Code of Conduct, and Jeong-do Management Q&A. Jeong-Do Management Portal serves as a platform to resolve any uncertainties or questions related to Ethical Management, which can prevent potential violations that may arise from misunderstanding the LG Code of Ethics. The latest policies and news related to ethical management are updated, and information is provided in Korean, English, and Chinese.

Ethics training and awareness-raising

We conduct ethics training for all employees to prevent unethical business practices. Ethics training tailored for different job groups such as purchasing, sales, production, and R&D, as well as for different positions such as new hires, managers, and executives, is also available. Training is also extended to overseas employees and business partners, and online training is conducted at least once a year. In addition to training, we endeavor to raise awareness and establish a culture of Ethical Management through CEO Message on Ethical Management and the sharing of best and worst practices of Compliance Management and Ethical Management.

Ethics hotline and informant protection

To ensure transparency in fair business conduct, we operate an Ethics Hotline, which employees and external stakeholders can use to report business ethics violations. When a report is received, we investigate according to the documented report handling procedures to check for corruption, irregularities, and irrational policies and processes and take appropriate improvement measures. An informant protection policy is in place to prevent disadvantages to informants due to reporting. Once the investigation is complete, we examine whether any disadvantageous measures or punishments have been imposed on the informant.

Ethics Hotline

Address	LG Chem Ethics Office, 24th Floor, East Tower, LG Twin Towers, 128, Yeoui-daero, Yeongdeungpo-gu, Seoul 07336 Republic of Korea
Tel	1522-9947
Fax	02-3773-7099
Email	ethicsoffice@lgchem.com

ENVIRONMENT

CLIMATE ACTION

Climate change is one of the biggest challenges of our time that requires global action. Various stakeholders across industries actively engage in collaborative efforts for sustainable solutions. The Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report, approved in March 2023, emphasizes the imperative of rapid greenhouse gas reductions through energy and material transitions to prevent irreversible climate consequences. Committed to the 1.5°C goal of the Paris Agreement, LG Chem is proactively addressing climate-related risks while identifying opportunities for new business growth. We are enhancing our carbon reduction roadmap, refining internal carbon management, and aligning our business portfolio with sustainability objectives.

TRANSITION TO CIRCULAR ECONOMY

The circular economy is rapidly emerging as a major policy agenda alongside greenhouse gas reductions as part of global efforts to combat climate change. California and the European Union have mandated a 30% recycled content in plastic packaging by 2028 and 2030, respectively. South Korea has also set a goal to increase the use of recycled plastic materials to 30% by 2030. Driven by these regulations, the global plastic recycling market is projected to grow at an annual rate of over 7% from KRW 62 trillion in 2023 to reach KRW 600 trillion by 2050. As a leading science company committed to sustainability, LG Chem is actively promoting the transition from a linear economy to a circular economy to minimize resource consumption and waste disposal and maximize material circulation within the economic system.

CLIMATE ACTION

Goals	Progress
2030 Carbon-neutral Growth 2050 Net-Zero	Enhanced drive for carbon reduction activities Net-Zero focused decision-making
	Largest renewable energy PPA in Korea up to 615 GWh per year
100% renewable energy transition for overseas sites by 2030 for domestic sites by 2050	The assessment rate of Product Carbon Footprint 100%

TRANSITION TO CIRCULAR ECONOMY

Goals	Progress
Enhancing sustainable product and technology development	Number of Post-Consumer Recycled products 120 products
Expanding circular economy network through collaboration	First large-scale chemical recycling facility in Korea Supercritical pyrolysis plant
	Waste material feedstock secured through local partnerships 25,000 tons

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CLIMATE ACTION

GREENHOUSE GAS REDUCTION

Low-carbon business transition

At LG Chem, we are committed to tackling climate change by transitioning to a low-carbon business model. Driven by our February 2022 commitment to achieve Carbon-neutral Growth by 2030 and Net-Zero by 2050 for Scope 1 and 2 emissions, we are constantly refining our carbon reduction strategies. Recognizing the potential cost increases associated with carbon emissions regulations such as carbon credits and carbon border taxes, we have taken proactive measures to mitigate these risks. Since 2022, we have implemented an Internal Carbon Pricing (ICP) mechanism that incorporates the cost of carbon emissions into business planning and investment reviews, ensuring that carbon reduction considerations are built into decision-making processes from the outset. We further integrated carbon reduction into our strategic decision-making by developing the Net-Zero Portal. The platform is equipped with features to track progress against carbon reduction targets and simulate carbon emissions taking into consideration the changes in internal and external circumstances. Building upon these foundations, we are continuously strengthening the internal drivers for carbon reduction.

Internal Carbon Pricing

We implemented ICP to drive proactive carbon reduction and mitigate potential risks associated with future carbon regulations. We apply an internal price that exceeds the current market prices of carbon credits assuming tighter emissions regulations and integrate the regulatory cost of carbon emissions into mid- to long-term business planning and investment feasibility assessments. The ICP approach helps us navigate uncertainties surrounding the allocation of domestic emissions allowances and strengthening of global regulations and guides the transformation to a low-carbon business portfolio.

Net-Zero Portal ❶

In 2022, starting with the elaboration of our Business As Usual (BAU), we established the Net-Zero Portal, the first integrated carbon management system among Korean chemical companies to refine our reduction roadmap and examine how our reduction investments translate into changes in profits and losses. The Net-Zero Portal helps us gauge reliable BAU by linking basic data such as production volume and energy usage, as well as overall business plans such as mid- to long-term production plans and new investments. The platform also allows us to track progress against carbon reduction targets and simulate carbon emissions taking into consideration the changes in internal and external circumstances. The Net-Zero Portal serves as an important decision-making tool that supports our efforts to accelerate the transition to a low-carbon management system and secure a competitive edge in the emerging low-carbon economy.

Carbon reduction incentive scheme

To further internalize low-carbon management and strengthen the drive for effective implementation, we introduced the carbon reduction incentive scheme in 2024. We invite open proposals to identify carbon reduction projects with high feasibility and profitability and integrate the evaluation of each proposal into the performance evaluation of our business divisions to align them with rewards. We prioritize these projects into investment decisions to ensure that the proposals are successfully translated into investments and provide incentives based on actual emission reductions. Our carbon reduction incentive scheme encompasses the entire project lifecycle, from initial identification to implementation and ongoing monitoring.

We reinforced the execution and management responsibility of carbon reduction by refining our Net-Zero roadmap and establishing a Net-Zero focused decision-making framework. We empowered the business divisions, the main entities responsible for carbon reduction efforts, with the autonomy to lead and implement their respective reduction initiatives. We also introduced a Quarterly Project Review (QPR) mechanism to enhance management efficiency. The C-suites monitor progress and performance related to investments, address internal and external challenges, and make informed decisions on Net-Zero strategies.

Carbon reduction incentive scheme

Identify new reduction projects	**Open calls for new reduction projects**	Invite business units for proposals on carbon reduction projects
	Rewards for new reduction projects	Evaluate each project based on estimated reductions
Reinforce Net-Zero execution	**Quarterly Project Review**	Engage C-suites to monitor progress
	Rewards for emission reductions	Offer incentives for actual project reductions

❶ Renamed from the Net-Zero Management System.

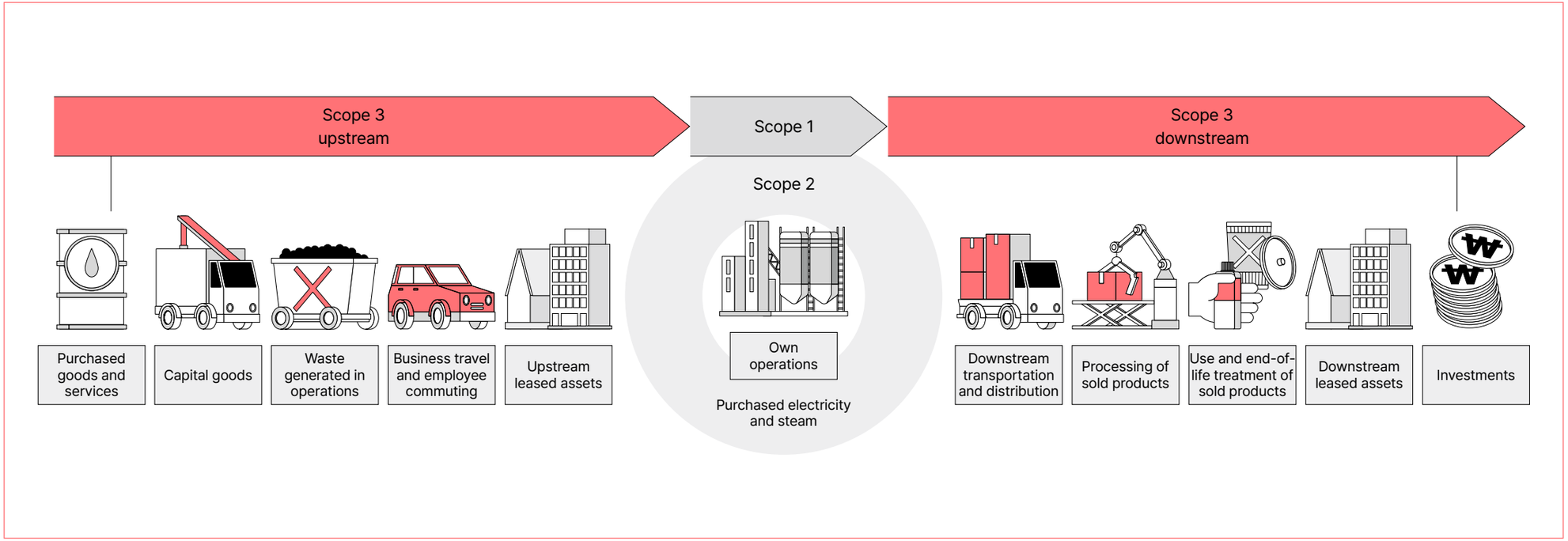
Scope 3 emissions reporting

Regulators and standard-setting bodies around the world are increasingly mandating climate disclosures, including Scope 3 reporting. In particular, the chemical industry is characterized by significant carbon emissions, not only from Scope 1 and 2 but also from Scope 3 due to the complex value chains❷.Therefore, there is a growing demand to account for Scope 3 emissions when establishing Net-Zero targets. We are examining our data collection and developing calculation methods for Scope 3 emissions to take a holistic approach towards greenhouse gas management from a value chain perspective. We plan to complete develop calculation methods for categories relevant to our value chain and complete the calculation of select categories by 2024, expand the scope of calculation to all categories relevant to emissions in domestic operations by 2025, and complete the calculation of emissions relevant to all our domestic and overseas operations by 2026.

❷ Upstream Scope 3 emissions from the chemical industry account for 61% of total emissions (World Economic Forum (2021), Net-Zero challenge: The supply chain opportunity)

Scope	Definition
Scope 1	Greenhouse gases emitted from sources directly owned or controlled by the organization.
Scope 2	Greenhouse gases emitted from the generation of energy, such as electricity and steam, purchased or acquired by the organization.
Scope 3	Greenhouse gases emitted across the value chain from sources that are outside of the organization's direct control, both upstream and downstream, including the production and transportation of raw materials, use and disposal of the product, etc.

Major emissions sources along the value chain

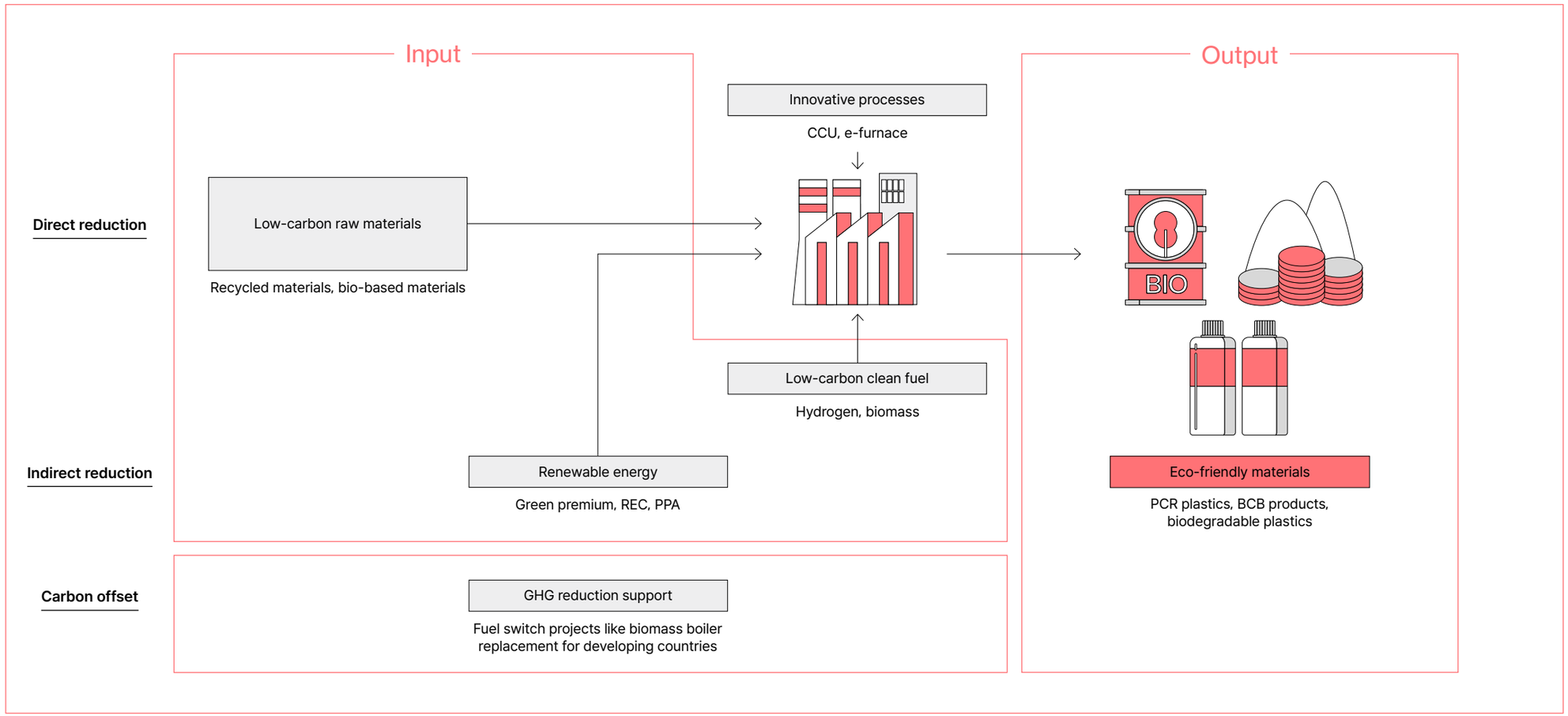


Greenhouse gas reduction roadmap

Through the Net-Zero Portal, we continuously monitor the real-time progress of our greenhouse reduction roadmap and investments and identify areas for improvement to formulate effective response strategies and accelerate the execution of our Net-Zero initiatives.

Direct reduction	Reduce scope 1 emissions through improved process efficiency and transition to low-carbon fuels.
Indirect reduction	Avoid scope 2 emissions by expanding the use of renewable energy.
Carbon offset	Compensate direct and indirect emissions by leveraging reduction credits pursued outside the organizational boundary.

Greenhouse gas reduction roadmap



Direct emission reduction

We promote direct reduction investments that consider the emission characteristics of each step in the manufacturing process. We will reduce upstream carbon emissions by introducing mid- to long-term innovative technologies such as carbon capture utilization (CCU) and electric furnaces at our Naphtha Cracking Center (NCC). We will reduce our downstream carbon emissions by overseeing energy demand, via switching to low-carbon fuel and high-efficiency equipment and recovering unused energy.

Low-carbon clean fuel

❶ Hydrogen

Hydrogen is gaining recognition as an effective low-carbon fuel for industries that are challenging to electrify. In 2023, as part of our transition to low-carbon fuels, we made an investment to reduce the use of fossil fuels in our NCC utilizing the by-product hydrogen generated at the Yeosu plant and reduced about 20,000.

In addition, we are building the industry's first hydrogen production plant to reduce carbon emissions from petrochemical processes. The hydrogen production plant, which is scheduled to be operational by 2025, will utilize by-product methane from the NCC process as raw material, and the hydrogen produced will undergo NCC pyrolysis to be used as fuel. We are expanding the proportion of clean fuels in the processes in our NCC, exploring the use of hydrogen in the production of bio-based raw materials, and building a circular value chain by utilizing carbon dioxide generated during the hydrogen production process as a resource.

❷ Biomass

In December 2022, we signed an agreement with GS EPS to establish a biomass power plant, TW Biomass Energy, to produce industrial steam and electricity from waste wood. Scheduled to be operation by the first half of 2027, we are making investments and securing raw materials for TW Biomass Energy which will be established at our Hwachi plant in Yeosu complex.

The biomass power plant utilizes woodchips converted from waste wood that is normally incinerated and landfilled at households and industrial sites as raw materials to generate steam. Biomass is a popular renewable energy option as the only fuel that can produce thermal energy in large quantities, and reduce greenhouse gas emissions by about 99$ compared to coal. When the thermal energy and electricity produced by TW Biomass Energy is used to power our petrochemicals complex, we expect annual carbon emissions to decline by 400,000 tons.

Low-carbon raw material

❶ Recycled material

We are currently developing various plastic recycling technologies. We are producing Post-Consumer Recycled (PCR) plastics made from mechanical recycling of petrochemical products such as ABS, PC, PE, and PP. We are also developing chemical recycling technology, which breaks down the molecular structure of plastics and reclaims pure raw materials. We plan to actively market these technologies while also concentrating on securing a stable supply of recycled materials.

❷ Biomaterial

Biomaterial is effective in reducing carbon as it can replace the production of fossil fuel-based products and is recognized as a carbon-neutral raw material because it does not generate carbon during its lifecycle before it is converted into feedstock. In addition to expanding our portfolio of bio-based products derived from renewable raw materials, we are preparing to commercialize the raw materials by cooperating with raw materials companies to secure a stable supply of bio-based feedstock. We aim to lead the fast-growing bio-based plastics market through continuous efforts in product development and expansion of production capacity.

Innovative technology

We are developing promising technologies based on our leading research capabilities for mid- to long-term carbon reduction. These innovative technologies for carbon reduction can be categorized into the following three types.

1	Technology that converts generated carbon emissions.
2	Technology that stops carbon generation at the source.
3	Technology that utilizes low-carbon raw materials.

We are conducting feasibility studies on various carbon utilization technologies for carbon conversion, electrification technologies to replace energy sources in chemical plants from fossil fuels to eco-friendly electricity, and technologies to manufacture chemical materials using low-carbon fuel such as biomass energy.

Carbon conversion technologies include catalytic conversion, where we have accumulated research capabilities, electricity-based electrochemical conversion, and bioconversion technology utilizing biological methods such as fermentation. In the field of catalytic conversion, we developed our own technology for converting carbon into plastic materials through excellent catalysts that perform better than those of leading companies. We are also developing technology for converting carbon into sustainable aviation fuel (SAF).

In the field of electrochemical conversion, we have verified performance on par with leaders in the world's largest commercial-scale electrochemical conversion reactor cell and are preparing for pilot-scale demonstration. We are working on developing carbon-free electrification technology, which utilizes renewable energy, in the mid- to long-term, taking into account factors such as material control and electrical safety.

We aim to accelerate the technological differentiation of our core competencies, while actively cooperating with third parties and participating in national projects for competencies we do not yet possess. Through a joint research agreement with KIST, we have acquired two technologies related to electrochemical conversion and bioconversion, and are operating a joint research lab to cooperate on technological advancement. We are working with external research organizations to review the utilization of wood composites for biomass, and participating in mid- to long-term national projects for electrochemical and biological conversion, and electrification. We will continue to seek out innovative technologies and focus our development capabilities on carbon reduction.

Case Study

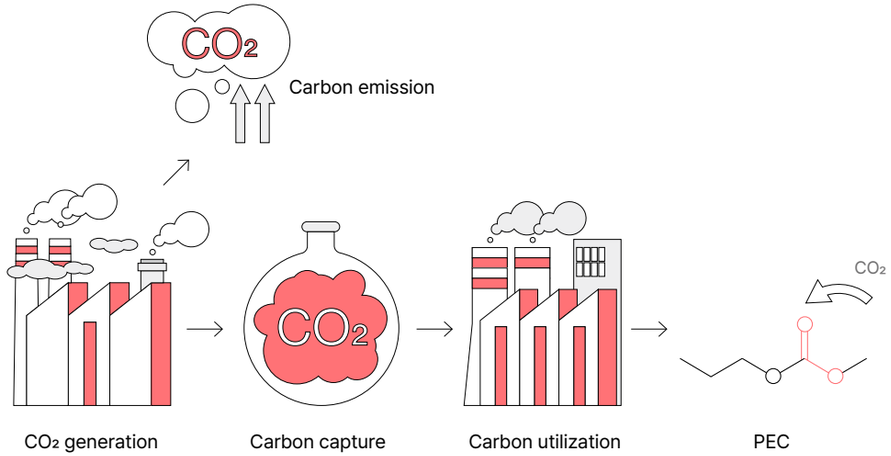
First proprietary technology-based dry reforming of methane (DRM) pilot plant in Korea

In 2023, LG Chem built a 1,000-ton DRM pilot plant at the Daesan complex in South Korea to verify the process technology and catalysts developed based on proprietary technology. DRM is a type of CCU technology that captures carbon dioxide and its by-product gas, methane, emitted at factories to produce petrochemical basic raw materials. Adopting DRM technology can reduce more than 50% of carbon emissions compared to conventional process technology for producing key petrochemical products. So far, commercialization of DRM has been a challenge due to the rapid degradation of catalyst performance during operation. However, LG Chem has developed a proprietary technology that overcomes this issue, dramatically enhancing the durability of the catalyst and enabling pilot evaluations, opening the door to commercialization. To expedite progress towards achieving the 2050 Net-Zero goal, LG Chem plans to expand the scale of the DRM facility from 2026 onwards.

Case Study

CO_2-based PolyEthylene Carbonate (PEC)

In February 2024, LG Chem unveiled PEC, a plastic manufactured by a catalytic conversion of CO_2 captured from industrial facilities and ethylene oxide. The process of converting captured CO_2 into monomers, the raw materials for plastic production, typically requires multiple steps. However, LG Chem's proprietary technology has enabled the direct conversion of CO_2 into plastics using a highly efficient catalyst. This breakthrough not only saves energy but also achieves the highest productivity among existing CO_2-based plastics. With over 45% of its total weight being composed of CO_2, 0.45 kilograms of carbon dioxide is utilized for every kilogram of PEC used. Furthermore, during disposal, PEC can be cleanly burned without producing soot, contributing to the reduction of air pollutants. This makes PEC an environmentally friendly product throughout its entire life cycle.



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Indirect emission reduction

We have analyzed various measures to reduce carbon emissions in business operations around the world, and have concluded that replacing fossil fuel-based electricity with renewable energy is the most effective solution. Therefore, in July 2020, we became the first company in the Korean chemical industry to declare a goal of achieving 100% renewable energy for overseas operations by 2030 and for global operations by 2050. As of 2023, the share of renewable energy in total electricity consumption was 13%, up from 11% in 2022.

While securing renewable energy is challenging due to unfavorable policy conditions in Korea, we are making efforts to procure renewable energy through long-term contracts that are stable and economically feasible. In 2023, we signed three long-term supply contracts with solar power plants. In May 2024, we signed a long-term renewable energy contract and secured up to 615 GWh of onshore wind power per year, which can be used by 146,000 households for a year. It is the largest amount of wind power renewable energy ever purchased by a private company in Korea, and this will accelerate the transition to renewable energy at our domestic business sites from 2026. We are prioritizing the transition to renewable energy at our overseas business sites first, as renewable energy supplies are more abundant overseas than in Korea. Additionally, we are continuously monitoring policy and market conditions to promptly respond to changes in renewable energy policies.

We are prioritizing the transition at our sites where renewable energy use and carbon emission reduction directly impact the competitiveness of our products, in response to customer demand and regulatory requirements. To this end, we have implemented a quick decision-making system that includes a renewable energy procurement roadmap, quality management standards, and contract and management processes. We have also connected with the Net-Zero Portal to monitor the progress of renewable energy conversion at our global plants. In the future, we will further upgrade our internal renewable energy procurement system and increase the proportion of renewable energy sourced directly from producers, such as through direct PPAs.

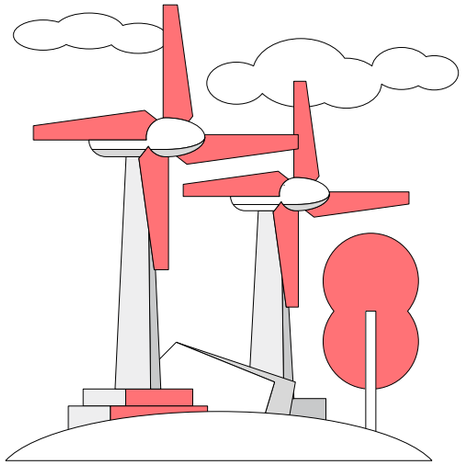
Carbon offset

We are actively working to reduce emissions both within and beyond our business boundaries. Alongside our internal efforts, we are investing in carbon offset projects that provide technical support for greenhouse gas reductions in developing countries. In 2023, we formed a consortium with Korea South-East Power (KOEN), KPOWER ENERGY, and Daehan E&C. As a consortium, we signed an agreement with the Korea Environment Corporation to support the International Greenhouse Gas Reduction Project. Part of this agreement involves a fuel conversion project in Vietnam, aiming to replace industrial steam boilers using fossil fuels with boilers using biomass solid fuels. Our next step is to conduct a preliminary feasibility study to explore opportunities for more carbon offset projects.

Renewable energy consumption

Unit : MWh

	2021	2022	2023
Total	306,316	741,480	878,569



615 GWh
Largest purchase by a private company in Korea

146,000
households can use for a year

Message

Kyungmoo Lee (Research Fellow, Carbon Neutralization Research Task Force Team)

Achievements of carbon neutrality research

We uncovered new profitable opportunities beyond social responsibility by approaching carbon neutrality research from a mid- to long-term perspective.

The Carbon Neutrality Research TFT was established to provide technical support for LG Chem's goal of achieving Carbon-neutral Growth by 2050 in January 2021. The team is responsible for identifying potential research and development projects from various candidate technologies, considering their effectiveness in reducing carbon emissions and economic feasibility, and assigning them to formal projects through feasibility assessments. Despite the challenges associated with carbon reduction technologies like CCU, the team is committed to continuing mid- to long-term R&D efforts as part of LG Chem's sustainability.

In early 2023, the European Union approved legislation mandating the use of Sustainable Aviation Fuel (SAF), which can be produced through technologies such as CCU. This has created an environment in which the lack of economic viability of carbon utilization technologies is being offset by regulations and subsidies. As market demand becomes more visible, the development of competitive carbon reduction technologies is accelerating, and the impact is expected to extend to marine fuels in the near future. Our team is adjusting research directions to keep pace with these changes in the external environment.

By concentrating research on strategic items that can quickly enter the market and generate profits, we have made significant advancements in carbon reduction technologies, such as those related to SAF, within a short period of time. This success is a result of our continuous exploration of various carbon reduction methods over the past three years. Furthermore, we have gained confidence and momentum that carbon reduction technologies can contribute not only to fulfilling corporate social responsibility but also to creating new business opportunities, securing both the growth and sustainability of the business.

Major projects in carbon neutrality research

We will leverage our expertise to commercialize carbon reduction technologies and contribute to achieving Net-Zero by 2050.

Carbon reduction technologies in the chemical industry can be broadly categorized into three types. The first type is CCU technology which captures and utilizes CO_2, the second type replaces fossil fuels with eco-friendly energy sources to stop CO_2 generation, and the third type substitutes fossil-based raw materials with low-carbon alternatives. The team focuses on CCU and low-carbon technologies. Leveraging our expertise in catalysts, we primarily focus on the catalytic conversion of CO_2, with the aforementioned SAF being a key initiative of this effort. We are also conducting research on CO production using electrochemical conversion and alcohol production through biological conversion. In addition, we aim to commercialize CCU technology by 2030.

In regards to eco-friendly energy substitution, we are participating as the lead organization in a national project to develop electric pyrolysis furnace technology that will replace fossil fuels with renewable energy, specifically electricity, in NCC starting in 2023. Although the technology presents technical challenges in terms of durability, stability, and control, we are aiming for commercialization by the mid-2030s through collaboration between industry, academia, and the government.

In addition to developing carbon reduction technologies, the TFT is expanding the application of analysis results of product carbon footprint (PCF), which identifies the total carbon emissions from raw materials to final products, to research projects. We are also incorporating carbon reduction as an important criterion for prioritizing research and development projects.

Future directions for carbon neutrality research

At the center of the value chain, we will lead cross-industry collaboration for the practical and efficient utilization of carbon reduction technologies.

We believe that it is time for companies to move past making declarations and to actively engage in practical and efficient collaboration between industries for sustainable growth. Many industries are developing technologies aimed at sustainability, each with its own unique strengths. For instance, the steel and cement industries excel in economically securing CO_2 for the commercialization of CCU technologies, while we have expertise in catalyst technology, which is key to utilizing captured CO_2. Refineries have strengths in quality control and sales of e-fuel, including SAF, produced through CCU technology. In the future, cooperation and synergy between industries will be crucial for commercializing these technologies.

With our expertise in carbon conversion technology, we expect to play a pivotal role in the carbon reduction value chain. Simultaneously, it is essential to engage in discussions about relevant policies and regulations to facilitate cross-industry cooperation. As a Global Science Company, we remain committed to enhancing our business competitiveness through research and development in carbon reduction technologies. We will also take the lead in collaborating with industries to improve policies and contribute to addressing climate change concerns.

LIFE CYCLE ASSESSMENT

As regulations on the carbon emissions of products become more visible, the calculation and verification of the calculation and verification of Product Carbon Footprint (PCF) has become a mandatory requirement for market entry. The EU Battery Regulation mandates the calculation of carbon footprint, the display of carbon footprint performance ratings, and carbon footprint tolerance standards to minimize environmental impact throughout the battery life cycle, and the regulatory requirements are gradually becoming more stringent. In addition, customers are no longer only interested in life cycle assessment results but also seeking process-specific and raw material-specific environmental impact data, to manage and achieve their own decarbonization goals.

We analyze the environmental impact of each of our products through Life Cycle Assessment (LCA) and strive to secure sustainable advantages. LCA is a methodology to quantify the potential environmental impacts of a product or a system throughout its entire life cycle, from raw material extraction to final disposal.

To establish our methodology for conducting LCA and calculating PCF, we comprehensively analyzed and reviewed the international standards for LCA (ISO 14040, 14044, 14067), guidelines published by institutions and initiatives in the chemical industry, and case studies of industry peers. In addition, we obtained a third-party certification from TÜV Rheinland which ensures the reliability of our Product Carbon Footprint (PCF) methodology based on the standard ISO 14067: 2018. Since 2023, we have been participating in the Partnership for Carbon Transparency (PACT), an initiative under the WBCSD to enhance transparency in the exchange of carbon-related information among companies. We actively seek speak-up positions on global guidelines and are participating in global rule-setting to ensure that our voice is represented in PCF regulations. Moreover, we share data with partners and customers from various industries participating in PACT to continuously enhance our methodology.

In addition, to internalize LCA throughout the company and secure the reliability of the results, we have established a collaborative system for LCA and PCF management. LCA experts under the CSSO and process experts under the Chief Technical Officer (CTO), as well as experts in related fields such as manufacturing, operations, purchasing, EH&S, and business innovation teams, all collaborate to conduct LCA. This helps employees understand the environmental impacts of the entire process while improving the quality of LCA, including precision, completeness, and consistency. Based on these efforts, we have completed LCAs for all products produced domestically by 2022 and for all products produced overseas by 2023 and thus completed LCAs for 100% of our products. By actively responding to requests for disclosure of environmental information on all our products, we help reduce the environmental impacts of our customers' products. Moreover, we use the assessment results to compare the effects of various activities aimed at reducing PCF and to prevent greenwashing issues.

Carbon footprint Analysis and Management Platform

The quality of LCA results depends on the quality of the collected data. The increasing use of PCF data for decision-making, like sustainable purchasing and low-carbon strategies, has raised the bar for data quality requirements, including carbon reduction contributions and scenario analysis. Consequently, ensuring the reliability of the underlying LCA data has become crucial. This process requires iterative review and refinement, and the speed at which this is done directly impacts the competitiveness of the LCA.

To maintain the competitive advantage of our low-carbon products and meet growing customer demands, we developed the Carbon footprint Analysis and Management Platform (CAMP). CAMP integrates various data management systems used for product LCA, drawing on our extensive experience in conducting company-wide LCA. This has helped us overcome major challenges with manual LCA, such as reducing the time needed for data collection, analysis, and review, and improving data utilization and monitoring, giving us a competitive edge in terms of data accuracy and insights. In 2024, we plan to further develop CAMP for products manufactured at all our domestic and international operations, prioritizing product groups subject to battery-related regulations.

Competitive advantage of CAMP

- Increased data accuracy and reliability
- Reduced workload
- Reduced turnaround time

Accelerating supply chain decarbonization

As a manufacturer of diverse intermediate products, the environmental impacts of our products are directly related to the environmental impacts of our customer's products. With this responsibility, we aim to create a decarbonized supply chain, from suppliers to customers, by promoting upstream carbon reduction. We aim to improve the accuracy and completeness of LCA results by reflecting the primary data of major raw materials in calculating our PCF. Furthermore, we plan to utilize LCA results for developing supply chain decarbonization strategies.

To speed up this process, we have developed LCA guidelines for our suppliers to assist them in developing the capacity to manage PCF and conduct their own LCA. Furthermore, we are offering direct support to small and medium-sized suppliers to help reduce carbon emissions through the Win-Win Fund, and by connecting them with government-supported projects.

In March 2024, we signed a memorandum of understanding (MOU) on Mutual Cooperation for ESG Management with the Ministry of Environment and the Korea Environmental Industry & Technology Institute. We are participating in a project to support LCA, carbon management, and carbon reduction for suppliers of recycled plastic materials. Through this, we are leading the plastics circular economy and promoting the discovery and spread of our supply chain carbon reduction model.

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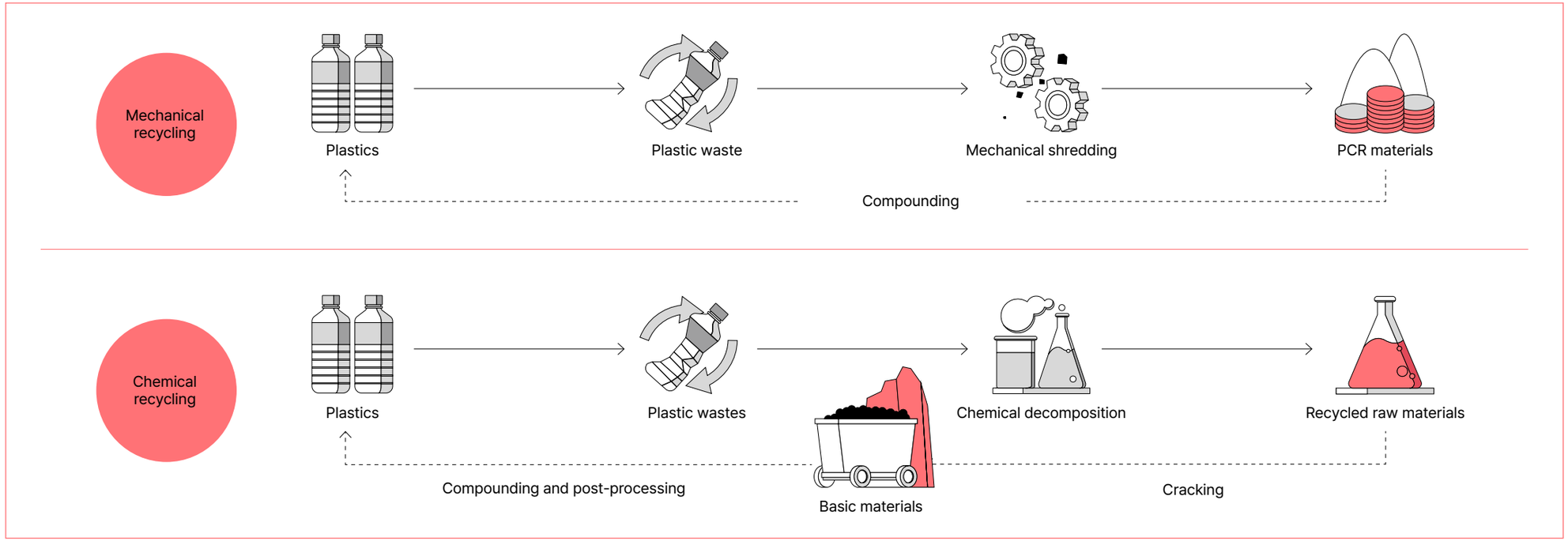
TRANSITION TO CIRCULAR ECONOMY

PLASTIC RECYCLING

According to the OECD, global plastic waste generation is expected to triple by 2060 compared to 2019. Global exports of plastics reached a record high of USD 1.2 trillion in 2021. Greenhouse gas emissions related to plastics, such as production and conversion from fossil fuels, totaled 1.8 gigatons in 2019, making up 3.4% of global emissions in that year. However, 71% of global plastic waste is either mismanaged or ends up in landfills, with only 9% being recycled. To tackle these issues, there is a growing global movement to reduce plastic use and address environmental issues associated with plastics. Regulatory measures are being strengthened to require the use of recycled plastics in a wider range of products, from packaging to automobiles. Customers are also demanding a greater variety of materials and products made with recycled plastics. As we aim for a circular economy to solve environmental challenges, securing a stable supply chain of recycled plastic materials and innovating in recycling technologies has become increasingly important.

LG Chem is committed to providing differentiated value to customers by producing high-quality recycled plastics using different raw materials and recycling methods. Plastic recycling methods include mechanical recycling and chemical recycling. Mechanical recycling begins with removing impurities from waste plastics, followed by mechanically shredding them, and then compounding the ground pellets to produce recycled products. Chemical recycling involves the chemical decomposition of polymers in waste plastics to monomers to produce recycled plastics. Alongside the widely commercialized mechanical recycling, we aim to take the lead in the development and production utilizing chemical recycling technology.

Plastic recycling



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Mechanical recycling

Mechanical recycling, which involves cleaning and crushing used and discarded plastics to turn them back into raw materials, is the most conventional and common method used to recycle plastics.

We have commercialized Post-Consumer Recycled (PCR) products of polycarbonate (PC), an engineering plastic, since 2009. Our current product line includes PCR-PC products with up to 90% recycled PC, as well as PCR-PC/ABS compound products containing up to 75% recycled PC. In 2020, we launched the world's first commercial white-colored PCR-ABS, overcoming the technical limitations of mechanical recycling that made reproducing bright colors difficult due to using multicolored raw materials. We have expanded our PCR product range to include materials beyond PC and ABS, which are the most commonly used. We also utilize PVC, a challenging material to recycle, and ocean-bound PA, which accounts for 80% of marine waste.

We classify recycled raw materials according to strict quality standards. High-grade materials can be used to produce products in any color and with properties similar to those made from fossil fuels. As a result, even though the market for recycled plastics is still developing, the number of our major PCR products has increased from around 40 in 2021 to over 120 in 2023, marking a growth of over 60%. We have also seen a steady increase in our sales. We provide PCR products to customers such as global automotive OEMs, home appliance manufacturers, IT companies, and toy companies, helping them achieve their goals of resource circulation.

Chemical recycling

Chemical recycling is the process of chemically breaking down composite plastic materials, such as plastic bags, into monomers. This process is capable of being repeated multiple times without degrading the quality of the plastics, which allows for more efficient recycling of waste plastics.

We are currently investing in the construction of Korea's first pyrolysis plant in Dangjin, which is expected to start operations by November 2024. The plant will have an annual production capacity of 20,000 tons and will use chemical recycling technology to decompose mixed plastic wastes using supercritical water vapor at high temperatures and pressures. During pyrolysis the formation of black carbon, soot, is minimized, allowing for continuous operation without the need for frequent maintenance. The plant is expected to have the highest productivity in the industry, capable of producing more than 8 tons of pyrolysis oil from every 10 tons of waste plastics. About 2 tons of by-product gas will be reused for plant operations, including the production of supercritical water vapor.

In January 2023, we signed a memorandum of understanding (MOU) with NETSPA, a leading company in resource circulation. We established a system for recycling marine wastes and secured a stable supply of raw materials for our pyrolysis plant. Together, we will reduce marine waste and utilize it as raw materials for recycled plastics, thereby reducing carbon emissions by three times compared to virgin products made from fossil fuels. Furthermore, we have also signed MOUs with local governments such as Siheung City in 2022, Seoul City in 2023, and Ansan City in 2024, to ensure a stable supply of raw materials and contribute to reducing local waste, promoting sustainable circulation of plastic resources.

Open innovation

We are working to expand the range of products that can be made from waste plastics. Our efforts include not only reproducing waste plastics into plastic products but also developing waste plastics into various products such as plasticizers and paints.

In January 2024, we developed an eco-friendly plasticizer from waste PET bottles and initiated pilot production. The plasticizer is an additive that improves the flexibility and elasticity of PVC and is mainly used to make flooring and automobile seats. This eco-plasticizer is anticipated to reduce carbon emissions by 30% compared to conventional plasticizers. To lead the eco-friendly flooring market in the United States, we obtained the Global Recycled Standard (GRS) certification for our eco-friendly plasticizer in October 2023.

Starting in 2022, we have been enhancing open innovation by organizing a Global Innovation Challenge for startups and research groups in the field of sustainable materials, including recycling, eco-plastics, carbon transition, and biomaterials. In addition, we run sustainable partnership programs that are always open to new ideas for sustainable materials innovation.

RENEWABLE RAW MATERIALS

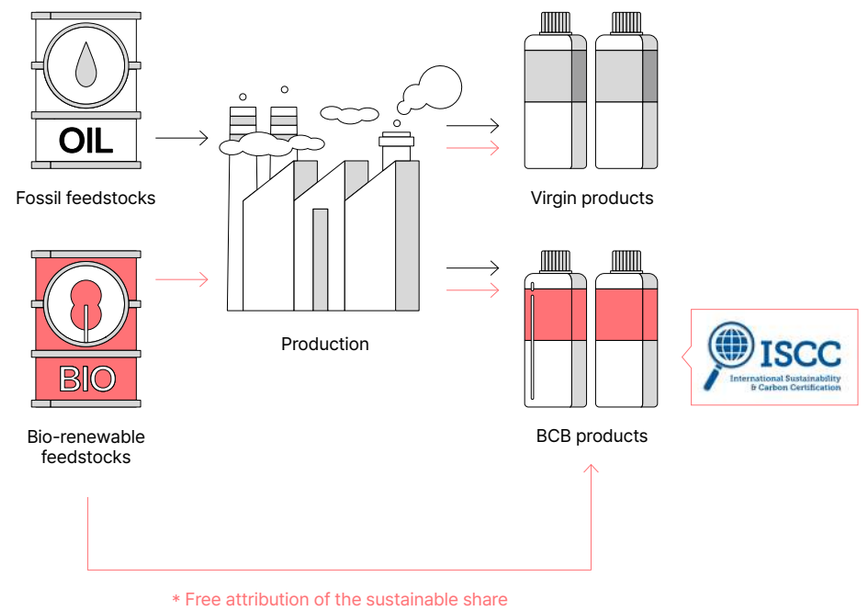
Making plastics using renewable biomaterials is promoted in parallel with plastic recycling strategies of the EU and South Korea in their circular economy policies, as it can replace fossil-based virgin plastic materials and reduce the use of fossil fuels. Potential biomaterials include waste cooking oil and vegetable by-products.

We developed Korea's first Bio-Circular Balanced (BCB)❶product line based on bio-naphtha. We established a supply system for bio-based raw materials needed for the production of eco-friendly synthetic resins, by signing an MOU with Neste, the world's largest bio-based materials company, and establishing a joint venture with ENI Group for a Hydro-treated Vegetable Oil (HVO)❷plant using waste cooking oil. Through the partnership, we aim to secure a stable supply of eco-friendly raw materials and continue to expand BCB products that contribute to reducing carbon emissions. To date, we have obtained ISCC Plus❸certification for 61 products, including Super Absorbent Polymer (SAP) and Acrylonitrile Butadiene Styrene (ABS).

Case Study

Korea's first Hydro-treated Vegetable Oil factory

In January 2024, LG Chem signed an agreement with ENI, Italy's largest state-owned energy company, to establish a joint venture for next-generation bio-oil. By 2026, LG Chem will complete an HVO plant with an annual production capacity of 300,000 tons, the largest in Korea, at its Daesan plant. HVO is a next-generation bio-oil produced by adding hydrogen to plant-based raw materials such as waste cooking oil without the use of fossil-based fuels and can be utilized as a raw material for eco-friendly plastic products such as super absorbent resins, like SAP, high value-added synthetic resins, like ABS, and polyvinyl chloride (PVC). By establishing the first HVO plant in Korea that can integrate production from raw materials to final products, LG Chem plans to secure a stable supply of raw materials for eco-friendly products and enhance profitability.



❶ Eco-friendly bioproducts made from a blend of fossil-based oils and bio-renewable feedstock derived from renewable vegetable oils.
❷ A next-generation bio-oil produced by adding hydrogen to vegetable raw materials such as waste cooking oil. Reduces 92% of carbon compared to conventional fossil fuels and can be used as a raw material for automotive diesel, aviation fuel, and marine fuel.
❸ International Sustainability & Carbon Certification: International certification that verifies sustainability across the entire lifecycle, from raw material sourcing to production and distribution.

Message

Min-jong Lee (Head of Department, Circular Business Development Department)

Achievements in circular business

We lead the development of the plastic recycling business through business agreements and joint ventures with raw material companies and technology companies.

The Circular Business Development under the Sustainability Division is responsible for consistently identifying and commercializing new businesses in line with the established management strategy. Companies typically take a three-pronged approach to business development: in-house development (make), acquisition (buy), and partnership (collaborate). As research centers focus primarily on in-house development, the Circular Business Development department focuses on pursuing business through mergers and acquisitions (M&A), joint ventures (JV), equity investment, and joint research and development.

In line with this direction, our biggest achievement in chemical recycling is the continuous pyrolysis plant in Dangjin, scheduled for completion in November 2024. The 20,000-ton plant will be built through technology licensing from US-based KBR, based on the technology of Mura Technology from the United Kingdom. The new plant is preferred for its high safety, high yield, and eco-friendliness compared to the conventional batch-type factories. However, since there is no precedent for the type of chemical recycling process, it took about six months of consultation with various government ministries in Korea to break ground. Once operational, half of the pyrolysis oil recycled from waste plastics will be directly utilized as input to our NCC as raw materials, bringing us one step closer to a circular economy.

Mechanical recycling, which is being carried out by relevant business divisions, is already achieving steady sales growth after commercialization. In 2020, we developed the world's first white-colored PCR ABS, surpassing the technical limits of color expression of recycled plastics and expanding the application to be used for not only the interior but also the exterior of products.

New business developments

We laid the foundation for stable production and portfolio expansion of Bio-Circular Balanced (BCB) materials.

Along with our plastic recycling strategy, we are also promoting measures to reduce the use of fossil fuels by utilizing renewable biomaterials in plastic production. The BCB business, which produces petrochemical products through bio-naphtha manufactured using waste cooking oil, is at the center of this. By signing an MOU with Neste, the world's largest bio-based materials company, we have been able to secure a stable supply of imported bio-naphtha as raw material to produce BCB products and significantly drive up sales. Furthermore, we established a joint venture with ENI Group, Italy's largest state-owned energy company, to directly produce and ensure a stable supply of bio-naphtha. The plant will be able to produce about 300,000 tons of HVO per year, a portion of which will be used by ourselves.

Market-leading business developments

We stay ahead in terms of customer demand and supply chain management with an advanced business development strategy.

We are one step ahead of our competitors in circular businesses, including plastic recycling and BCB product development. This advantage is valuable in satisfying customers and managing the supply chain effectively.

Our partnerships with leading technology and raw material companies help us mitigate market volatility and allow us to provide a stable supply for our customers. This allows us to meet the increasing sustainability demands of our customers and deliver differentiated value at the right time. For instance, global consumer goods companies are increasingly focusing on managing their Scope 3 carbon emissions and adopting eco-friendly materials, making our BCB products increasingly popular. We plan to further enhance our competitiveness with a market preemption strategy that is likely to create a strong lock-in effect on our customers.

We have also witnessed the strengths of market-leading business development in terms of supply chain management. For example, it is crucial to secure a steady supply of waste plastics as raw materials to operate a pyrolysis plant. Our swift entry into the market enabled us to secure reliable waste treatment companies and sign supply contracts quickly. Additionally, our early entry into the BCB business allowed us to secure a supply of waste cooking oil.

Future directions of our circular business

We will strive to achieve multilayered sustainability and strengthen customer communications.

Collaboration with research and development is crucial for ensuring that new businesses established through JV and M&A possess distinct sustainability advantages. We will continue to foster open communication and mutual support with R&D, as they explore various innovative technologies for carbon reduction. Furthermore, we aim to enhance communication with our customers through promotional activities to raise awareness about our sustainability initiatives and products, ultimately securing competitiveness for a win-win future.

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LITHIUM-ION BATTERY RECYCLING

With the rapid growth of the electric vehicles market, the disposal of waste batteries at the end of their life cycle has become a critical issue in terms of resource circulation. At the same time, regulations regarding battery reuse and recycling are tightening. As concerns around resource depletion and environmental impacts in mineral extraction processes intensify, the EU Battery Regulation mandates that batteries contain recycled materials.

There are two main ways to recycle waste batteries: reusing them as batteries in an energy storage system (ESS) if they still have life left, or separating them at the end of their life to extract key raw materials such as cobalt, nickel, manganese, and lithium, which are then reprocessed into cathode materials. As a global battery materials company, we are actively promoting projects to recycle waste battery materials. Through partnerships with refineries and smelters that can separate and extract core materials from waste batteries, we are reducing the use of resources by increasing circularity and creating a battery recycling value chain, from the production of battery materials to the recycling stage to meet the needs of our customers.

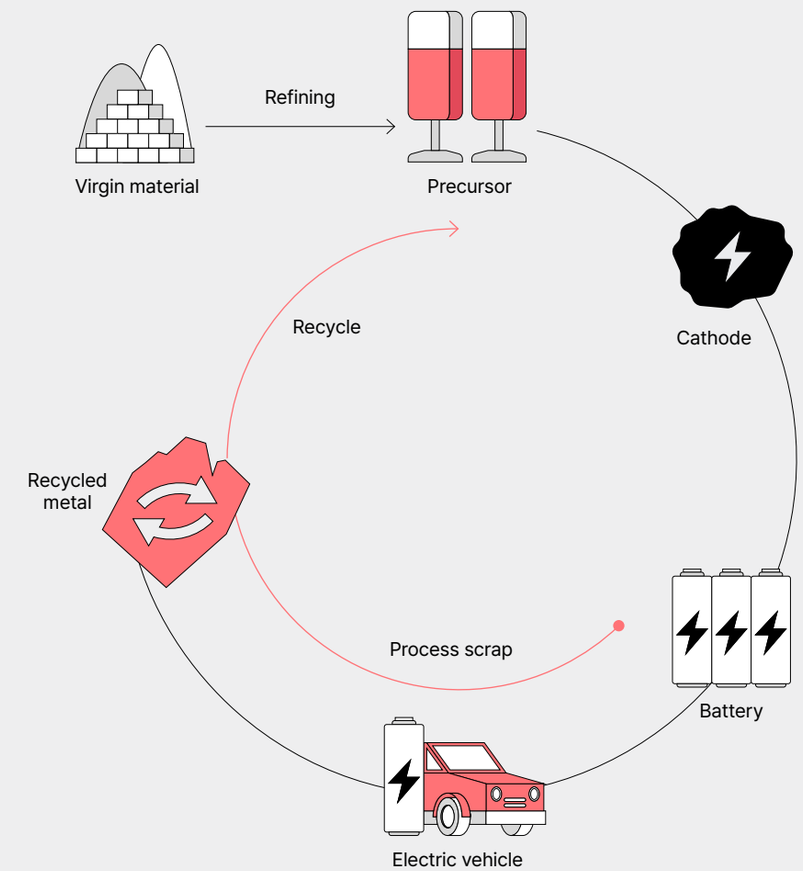
Case Study

Battery precursor joint venture with KEMCO

In June 2022, LG Chem established a recycling and precursor joint venture with KEMCO, an affiliate of Korea Zinc with world-class metal refining technology, to strengthen the battery materials value chain. The joint venture will have an annual capacity of 20,000 tons, and produce precursors with recycled metals, which will be used in the production of LG Chem's cathode materials after prototype production in the second quarter of 2024. Precursors are a key material for cathode production and account for 40% of the cost of secondary battery production.

The recycling process of the joint venture will be characterized by high production efficiency using the world's largest capacity reactor. The process combines dry and wet processes to maximize metal recovery rates compared to conventional processes, and adopts eco-friendly procedures such as recycling wastewater during extraction to minimize harmful emissions, to proactively respond to global environmental regulations. The joint venture will provide LG Chem with recycling capabilities and a stable supply of high-quality nickel sulfate.

Battery Recycling Process



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ZERO WASTE TO LANDFILL

We were the first Korean chemical company to obtain the Zero Waste to Landfill (ZWTL) certification. This certification recognizes companies that divert wastes from landfills and recycle them into resources. In 2023, three of our global factories, including two factories in Gimcheon and Cheongju in Korea and the plant in Guangzhou, China, received the certification. The plant in Quzhou, China, maintained the certification. The newly certified Cheongju separator and Gimcheon plants received a Gold rating for achieving a recycling rate of over 97%, and the Guangzhou plant received a Platinum rating for recycling 100% of their waste. We improved the recycling rate at our Cheongju separator plant by establishing a waste inventory and recycling cardboard paper rolls that were previously discarded during the manufacturing process. At our Gimcheon plant, we introduced a system to sort, store, and recover defective SAP products in the middle of the manufacturing process so they can be reused.

In line with our zero-landfill strategy, we will continue to reduce waste generation and transition from landfill and incineration to recycling. As part of this effort, we plan to expand ZWTL certification in 2024.

SOCIAL

ENVIRONMENT, HEALTH AND SAFETY

Environment, health and safety should be a top priority for organizations to ensure the well-being and safety of employees, environmental protection, and sustainable business growth. As environmental safety and occupational health regulations become increasingly stringent worldwide, a systematic approach to meeting legal requirements is also necessary. As a global manufacturer and supplier of materials and goods essential to modern industry development and everyday convenience, LG Chem is deeply committed to the environment, health and safety. We strictly comply with regulations such as pollution prevention at workplaces and strengthen the management of hazardous substances in our products. In addition, we have invested over KRW 800 billion over the past three years to establish robust preventive measures and operational processes and strengthen safety awareness and emergency preparedness.

SUPPLY CHAIN SUSTAINABILITY

Supply chain management in the modern days goes beyond secure sourcing of raw materials. Global companies with a diverse supplier network face growing obligation under supply chain due diligence laws, which mandate human rights and environmental assessments to identify and mitigate risks proactively. Operating across 43 locations worldwide, LG Chem prioritizes compliance with the regulations throughout the global supply chain network. In 2023, we strengthened our commitment by revising our Supplier Code of Conduct and the Responsible Sourcing Policy. These initiatives serve as the foundation for sustainable supply chain management, enabling us to collaborate with suppliers in addressing human rights concerns and environmental risks.

OUR EMPLOYEES

Talent attraction and development are among the most important tasks an organization must accomplish to survive and grow. Organizations that recognize their people as intangible assets can foster engagement and collaboration that uncover innovative ideas and products and better business decisions, which lead to an overall improvement in business performance. With the growing importance of diversity, equity, and inclusion, along with talent recruitment and development, LG Chem has redefined the concept of The Better Company in terms of Growth, Work, Recognition, and Care. We are committed to creating a workplace that ensures labor rights, nurtures talents, enhances employee engagement, and promotes diversity.

LOCAL COMMUNITIES

Transnational organizations must carefully consider not only their global impact but also the impact of their activities on the local communities where they operate. In addition to minimizing environmental impact, businesses should strive to make positive contributions to the local economy and culture. At LG Chem, we are committed to fulfilling our corporate responsibilities by establishing open communication channels with local communities and addressing their environmental and social concerns. We also strategically align our social contribution projects with our business goals, social needs, and the UN Sustainable Development Goals and take a collaborative approach through solid partnerships with NGOs.

ENVIRONMENT, HEALTH AND SAFETY

Goals	Progress
Global top-tier safety excellence	Case of serious accident 0 case
	Average EH&S investment over the past three years over KRW 200 billion
	Digital transformation of high-risk facilities Digital Safe Factory

SUPPLY CHAIN SUSTAINABILITY

Goals	Progress
Flexible approach to risks and changes	Percentage of suppliers committed to the revised Supplier Code of Conduct 96 %
Sustainable supply chain for mutual growth	High-risk suppliers that have completed ESG on-site audit 6 companies
	Number of people that received ESG training at 162 suppliers 234 trainees
	Amount of win-win fund to support suppliers KRW 206 billion

OUR EMPLOYEES

Goals	Progress
Embracing diversity through employee engagement	Employees who participated in Career Week 5,500 employees
Fostering inclusive workplace culture	Policy and process improvements based on the Voice of Employee 35 items
	Business sites that have conducted Human Rights Impact Assessment 3 sites

LOCAL COMMUNITIES

Goals	Progress
Delivering values for society and local communities	Impact of 50,000 seagrasses transplanted for the preservation of marine ecosystems 5.9 tons of carbon fixed
	Schools and care facilities that received ESG training materials 505 institutions
	High school students in Yeosu who benefited from petrochemical industry training and mentorship programs 335 students

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ENVIRONMENT, HEALTH AND SAFETY

EH&S POLICY AND ORGANIZATION

LG Chem established an organized environment, health and safety (EH&S) management system based on ISO 14001 and ISO 45001 standards of the International Organization for Standardization (ISO). ISO 14001 is an international standard for environmental management systems, and ISO 45001 is an international standard that specifies requirements for occupational health and safety management systems, providing a framework for organizations to manage risks and improve health and safety performance.

We prioritize EH&S as a top management objective and core mission and integrate EH&S best practices into our operations by establishing and ensuring compliance with organizational EH&S policies, regulations, and guidelines. Beyond these established frameworks, we actively engage leaders in on-site EH&S management, and each of our operations has dedicated EH&S teams to prevent incidents. To further strengthen safety awareness and behavior, we assess the severity of safety incidents and implement programs to prevent recurrence. We have revised our EH&S policies and regulations in line with the enactment of the Serious Accidents Punishment Act in 2021, and we oversee the EH&S management status of each site using an integrated EH&S IT system. Through this comprehensive approach, we are constantly strengthening our efforts to create a safe and healthy work environment.

EH&S Policy

- We will comply with all applicable EH&S legal requirements and establish leading corporate EH&S rules and best practices.
- We will improve our EH&S level continuously by establishing the safety and health system that identifies and improves the potential risks in advance.
- We will drive continuous innovation throughout the entire life cycle of operation to supply environmentally-friendly products and services.
- We will provide a safe and healthy work environment and ensure the principle-adhering corporate culture.
- We will support business partners and local communities to improve their EH&S practices as our social responsibility.
- We will communicate our EH&S policies and programs with stakeholders.

EH&S IT system

We built an integrated EH&S IT system based on our global standard work processes. EH&S IT system integrates LG Chem Standard (LGC Standard) work processes of daily tasks such as safety work permit management, worker status monitoring, fire equipment management, risk assessment, emergency preparedness, and response to ensure compliance with LGC standards and to allow real-time monitoring of the status of each operation. The system is in place for operations at all Korean sites and overseas operations in China, the United States, Poland, Vietnam, and Malaysia, raising the standards of EH&S management at each site. We are steadily upgrading the IT system to enhance response to compliance risks arising from new and revised laws and regulations and strengthen the execution capabilities of our EH&S work processes.

EH&S organization

In January 2022, we established the role of Chief Safety & Environment Officer (CSEO), the top executive in charge of organizational EH&S management. Given the autonomy and responsibility, the CSEO leads strategic planning, investment, budget, human resources, and evaluation related to EH&S. The CSEO organization functions as a control tower overseeing the planning, management, and diagnosis of EH&S activities across the company. Planning and management functions encompass establishing organizational EH&S policies, complying with laws and regulations, evaluating performance, and operating the EH&S IT system. Diagnostic functions include providing technical support and reviewing progress on implementation of EH&S projects. To ensure consistent policy application and bolster local response capabilities, we have appointed EH&S managers at each of our operations. Furthermore, the CSEO organization conducts meetings with attendees at various levels to monitor policy implementation at operational units, discuss improvement measures, and facilitate efficient decision-making processes related to organizational EH&S initiatives.

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CSEO meetings in 2023

Meeting	Agenda	Frequency
Environment & Safety Committee	— CSEO, EH&S department leaders, factory EH&S leaders as attendees — Decision-making on company-wide EH&S issues — Review the status of prevention and management of serious accidents	Bi-annual
Health & Safety executive meeting	— CSEO, EH&S department leaders, factory EH&S leaders as attendees — Review and discussion of major EH&S issues	Quarterly
EH&S department meeting	— Discussion of major EH&S policies and issues	Monthly
EH&S leader's workshop	— Review performance of key EH&S management indicators	Annual
Business division EH&S meeting	— Review of each business division's EH&S activity	Monthly
EH&S digital council	— Review of EH&S digitalization projects — Development and implementation of new digitalization projects	Bi-annual
EH&S day	— Dialogue with EH&S practitioners on day-to-day challenges and potential improvement measures	Bi-annual

EH&S academy

Starting in 2022, we launched an EH&S academy in addition to the mandatory and statutory training to allow EH&S personnel to grow into EH&S experts. The 2023 EH&S academy offered training courses on empowering employees and cultivating an EH&S-first mindset. EH&S academy provides a variety of courses tailored for different job functions and competency levels of individual employees. The Safety Leadership Course focused on instilling an EH&S mindset among new executives, department leaders, and team leaders. The Process Safety Course offers targeted training for EH&S engineers and on-site safety engineers. The course is divided into three modules: advanced process safety management (PSM), piping and instrumentation diagram (P&ID), and risk assessment leadership. Engineers can tailor their professional development by focusing on the most relevant and practical knowledge and skills for their roles. As a result, the number of training courses for engineers has more than doubled from 8 courses in 2022 to 18 courses in 2023. We are further strengthening our organizational EH&S practices by extending these training programs to engineers in our overseas operations.

EH&S academy in 2023

Korea

Participant	No. of participants	Total training hours
EH&S leader	123	1,200
EH&S engineer	349	5,312
On-site safety engineer	73	1,168

Major overseas sites

Region	No. of participants	Total training hours
China	62	878
excl. China	25	50

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EH&S EXECUTION AND PERFORMANCE MANAGEMENT

Standing behind our conviction that "there is no future if we fail to fix EH&S permanently and irreversibly," we ran Project Magnolia from June 2020 to 2021 and established an accident prevention system. Starting from 2022, we are continuing efforts to elevate our EH&S management system to meet global standards. In 2023, we further solidified our EH&S management system by elaborating and accelerating the implementation of the LGC Standards. We continued EH&S investments and conducted profit and loss (P&L) analysis for EH&S management. In line with our business expansion, we are actively implementing the LGC Standard accident prevention system across our overseas operations to ensure our EH&S excellence extends to all our operations.

As a result, we achieved zero serious accident in 2023, with no cases of serious incidents or safety events. While the total number of incidents remained comparable to 2022, the severity of these occurrences demonstrably decreased. We remain dedicated to safeguarding the safety and health of our employees and creating a safe and healthy work environment.

The LGC Standards and accident prevention

LGC Standards in 2023

To proactively address high-risk factors and prevent accidents, we have incorporated the five key tasks of the LGC Standards into our EH&S management system. We are committed to EH&S excellence by improving our emergency response systems and internalizing accident prevention systems through initiatives such as pre-operational safety checks and safe work permit cross-checks.

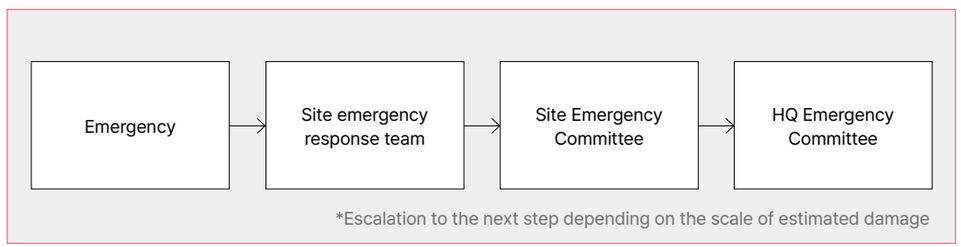
Key task	Achievements	Progress and actions
❶ Technical guidelines	Developed and revised technical guidelines.	We have implemented comprehensive LGC Technical Guidelines across all our operations to drive organizational EH&S excellence. Built on international standards, legal requirements, and operational expertise, the LGC Technical Guidelines have accumulated to a total of 104 as of 2023.
❷ Mother Factory initiative	Continued the Mother Factory initiative.	We reinforced the operations of the Mother Factory initiative, which transfers the knowledge and best practices of the most technologically advanced factory in terms of manufacturing processes and products to peer factories. The Mother Factory not only provides simple guidelines but also conducts reviews and approvals on changes in the management of peer factories at all times.
❸ Accident prevention system	Introduced automation of high-risk tasks.	We introduced cleaning robots for chemical reactors, inspection drones for confined spaces and high altitudes, auto-cleaning devices for heat exchangers, and automation systems for unmanned raw material warehouses.
❹ Emergency response system	Organized proactive management and training for hazardous work areas and high-risk work processes.	We introduced quadrupedal robots, intelligent CCTVs, digital twin virtual driving, VR experience training, and other technologies in hazardous work areas and high-risk processes.
❺ Digital transformation (DX)	Digitized the EH&S management system	We validated and implemented core digital technologies to prevent safety incidents and critical accidents.

Organizational EH&S risk management

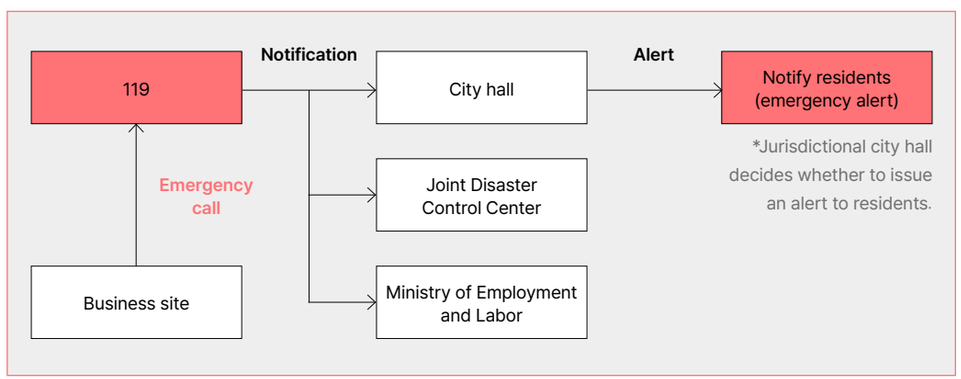
Through diagnosis of the crisis response system, we analyze the risk preparedness of each business operation and conduct root cause analysis to promote company-wide corrective actions. We regularly monitor the enactment and revision of EH&S-related laws and regulations, megatrends, and relevant social issues and review their impact on our business to identify potential risks proactively. Every year, we conduct voluntary inspections to ensure compliance with EH&S laws and regulations across global operations and improve our organizational EH&S compliance. To establish LGC standards and instill an EH&S mindset, the EH&S department conducts regular assessments across all locations to eliminate potential EH&S risks. Progress on improvement measures identified in this process is monitored and managed through the global EH&S integrated IT system and reflected in investment plans when necessary.

We have also upgraded our emergency preparedness system by unifying organizational emergency response guidelines based on analyzing emergency cases at operations. We also strengthen our response capabilities by systematizing emergency drills and communication. In case of an emergency, we respond quickly by sending individual tasks via Alert Talk. To minimize damage in the local community, we establish cooperation plans with government offices and neighboring factories and evacuation plans for residents.

Emergency response system



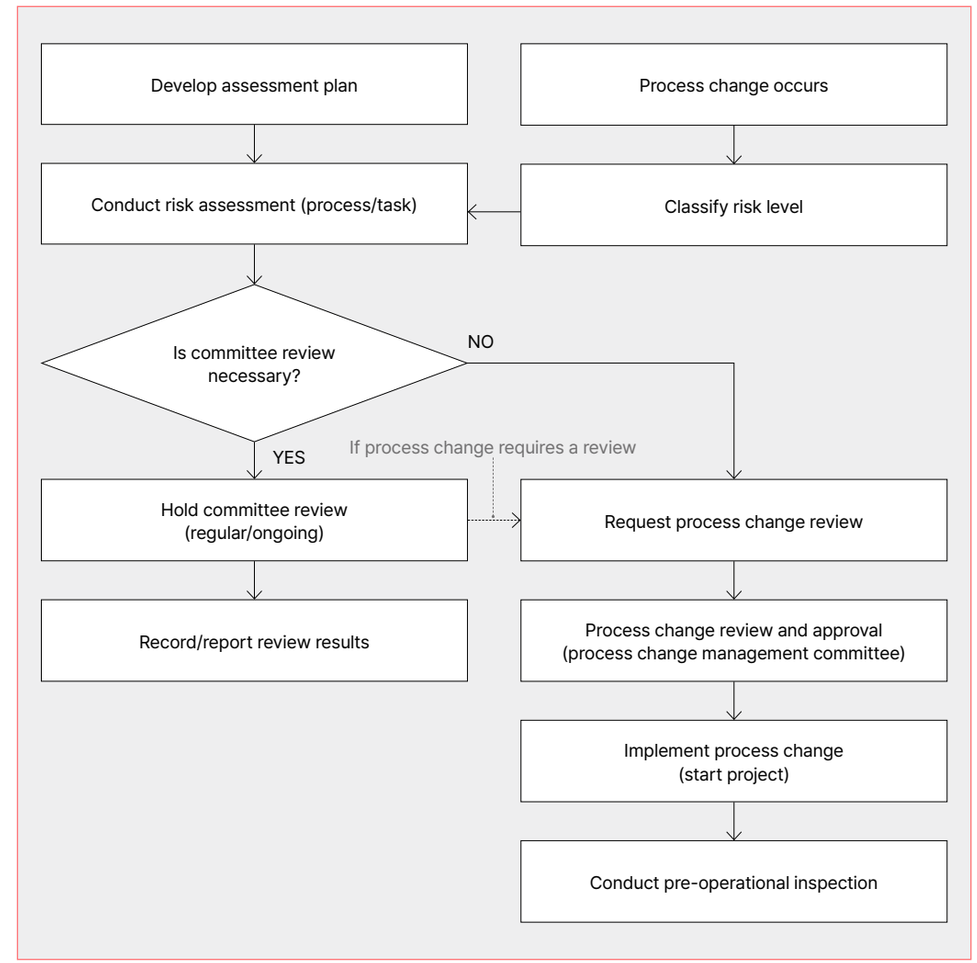
Coordination with local governments



Risk assessment and corrective action

All our global sites operate risk assessment committees led by plant managers to periodically review the validity of risk assessments and reassess potential risk factors to prevent major accidents. In addition, to ensure double and triple safety measures, plant managers conduct pre-inspections of risks according to specialized protocols before approving high-risk tasks. We analyze the causes and consequences of major incident cases to develop corrective action plans to prevent recurrence, continuously monitor the progress of improvement measures, and disseminate them to our global operations.

Risk assessment and remediation process



EH&S Investment

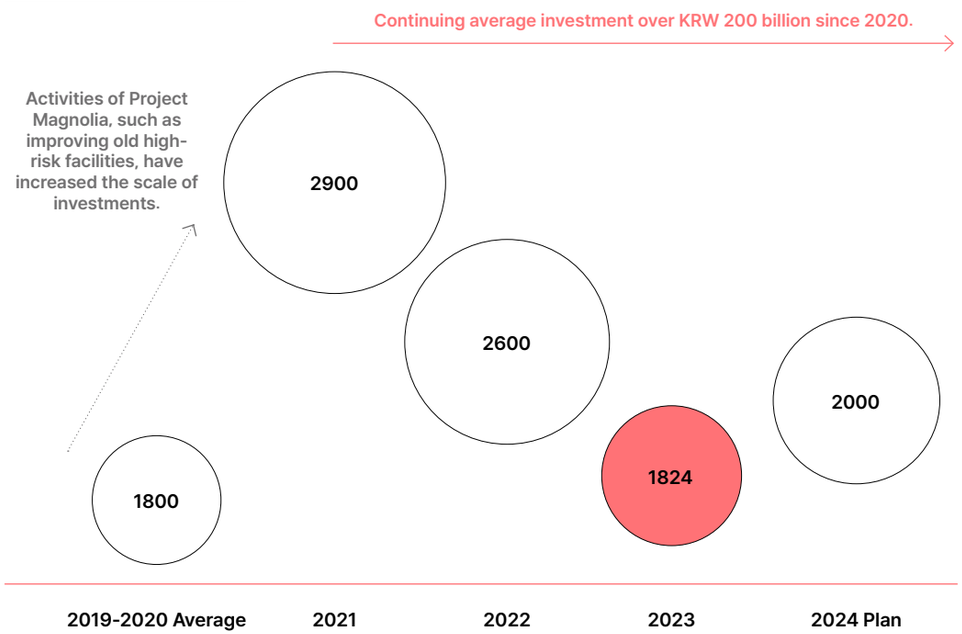
As part of Project Magnolia, we have focused on risk mitigation by investing in and improving high-risk processes and facilities. We have set up four focus areas for EH&S digitalization and introduced technologies to establish a digital-based Safe Factory. We have expanded EH&S investment compared to the past and will continue our investment for organizational EH&S excellence based on the safety-first culture.

Focus areas for EH&S digitalization

❶ Automation of high-risk work processes
❷ Proactive risk management
❸ Direct control of hazardous work processes
❹ Rapid detection and response to incidents

EH&S investment summary

Unit: KRW 100 million



Major EH&S investments

2021	2022	2023	2024
Improved urgent and detailed safety diagnostics for high-risk processes and facilities.	Improved ESG risks, including proactive detection of risks and reduction of pollutant emissions.	Invested in digitalization and automation facilities to prevent human error.	Improved and reinforced fire protection equipment, high-risk processes and equipment, offsite piping, and pipe racks.
	Reinforced response to regulatory requirements, such as the Act on the Integrated Control of Pollutant-Discharging Facilities and Serious Accidents Punishment Act.	Invested in improvements to prevent accidents in older equipment.	Digitalized EH&S processes.
			Improved and enhanced work environment.

Case Study

Investment in digital-based Safe Factory

LG Chem is investing in the digital transformation of factories to proactively identify abnormalities in high-risk facilities such as waste gas incinerators. As a result, in January 2023, we established a process abnormality detection system in the flare stack at our Yeosu and improved work efficiency. The system analyzes the flame and soot in real-time and adjusts the oxygen input upon detecting an abnormality to ensure the complete combustion of residual components. The process, previously handled manually by plant operators, has been replaced with artificial intelligence, increasing production efficiency and safety and removing compliance risks related to air pollution caused by soot. In addition, we reduced steam consumption by 34% and saved more than KRW 1.1 billion compared to the previous year through process optimization. We continue to invest in establishing a digitally enabled Safe Factory model and plan to introduce Safe Factories in six Korean factories by 2024.

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SAFETY CULTURE AND PRODUCT STEWARDSHIP

We established an EH&S Policy to raise leaders' consciousness on the importance of EH&S and actively promote activities to equip employees and suppliers with a mindset that prioritizes EH&S.

We run EH&S mindset training courses for employees and suppliers twice a year, conduct surveys to check the level of EH&S awareness, and prepare policies and improvement measures based on the Voice of Employees. We have been implementing the Seven Safety Commandments since 2022 to ensure a foundation of compliance culture among all employees. In 2023, we strengthened EH&S awareness among employees by reinforcing penalty standards. We also operate motivational programs such as the Zero Accident Incentive, EH&S Hero, and EH&S slogan contests to encourage the voluntary participation of employees in building an EH&S-first culture. Through activities prioritizing EH&S, we create an organizational culture where safety comes first in everything we do.

Seven Safety Commandments

- Wear personal protective equipment as prescribed for working conditions.
- Measure flammable gas concentration and place a fire extinguisher at the workspace when working with open flames.
- Measure hazardous gas and oxygen concentrations when working in confined spaces.
- Take fall protection measures and wear double safety harnesses when working at heights.
- Obtain a work permit before commencing work.
- Do not release interlocks at one's discretion.
- Follow Lock Out Tag Out (LOTO) procedures in case of equipment shutdowns.

Supplier EH&S management

We run a safety observer program where specialized personnel monitors supplier's safety management. We also operate the Safety Bid Evaluation (SBE) system, which first evaluates basic safety management capabilities and then checks specific accident prevention systems when selecting suppliers for construction projects. In addition, we provide a library of task-specific risk assessment best practices to help suppliers effectively identify and improve the risks of the work they perform in our operations, promoting the upward leveling of safety excellence. Furthermore, we hold an annual EH&S performance review meeting to nominate and reward outstanding suppliers in terms of EH&S.

Hazardous substances management

Identification of control substances

We conduct thorough inspections of the substances used in our products from the raw material stage according to the internal Regulation on Product Stewardship Management. We categorize hazardous substances into three groups depending on the risk levels. We have also set up procedures to require all material purchases to be pre-approved based on the inspection standards.

Response to environmental regulations and product-specific requests

We have an electronic approval system for chemical management, through which we receive, review, research, and respond to customer requests for various environmental regulations. We have established a product chemical inventory and a global chemical regulations database to enable instant and online compliance checks and the issuance of warranty documents. For example, as regulators are contemplating restrictions on per- and polyfluoroalkyl substances (PFAS), we have included PFAS in our internal list of hazardous substances, conducted a full investigation of materials and products containing PFAS, and reviewed whether other substances could substitute these.

Bill of Substance management

We integrated information about the composition of our products into the Bill of Substance (BOS) management system, which allows us to monitor the presence and the amounts of hazardous substances in the products we sell and provide aggregated information to customers upon request.

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High-risk chemicals accident prevention

We designated 50 high-risk substances for special management, including those with high toxicity and physical hazards or with a history of chemical-related fatalities internationally. We revised the guidelines and conducted periodic inspections of the 50 high-risk substances, which include benzene, styrene, hydrochloric acid, and sulfuric acid. We also standardized the emergency response procedures and trained 100% of all relevant personnel handling these substances at Korean production sites. In particular, we have strengthened the following accident prevention activities for facilities that store these 50 high-risk substances beyond legal and regulatory requirements.

Accident prevention activities

❶ Spill and leakage monitoring and alarm system: installation of additional intelligent CCTVs and gas detectors.
❷ Tank lorry unloading operations: interlocking of pump shutdown and warning alarm with the storage equipment's level gauge or piping pressure gauge.
❸ Damage control in emergencies: construction and operation of emergency water collection and storage tanks and establishment of exhaust and ventilation systems.
❹ Material Safety Data Sheet (MSDS): MSDS should be collected for all chemical purchases; any exceptions should be clearly documented through the electronic approval process.

We aim to prevent accidents and minimize damage through special management of high-risk chemical substances. Since 2022, we have been strengthening facility management at our Korean sites. In 2024, we plan to extend these reinforced control standards and facility measures to overseas sites handling high-risk substances.

Toxicity Management System

From 2021 to 2023, we improved our toxicity management system to prevent toxicity issues at the source. We focused on improving the existing process, which centered on the legal registration of chemicals required for mass production, to ensure product safety in advance and strengthen toxicity management.

Since June 2023, we have been conducting preliminary toxicity assessments of products and materials at the final stage before decision-making on beginning mass production. The preliminary toxicity assessment is undertaken in-house, including toxicity prediction through quantitative structure-activity relationship (QSAR) modeling and in-vitro testing. In addition, we have established a database of toxicity data from legally registered chemical substances and plan to use the database to develop our own toxicity modeling program and fill in toxicity information on MSDS. We are also standardizing the roles and responsibilities and the management procedures to strengthen the internalization and efficiency of the toxicity management system.

Safety culture and safe workplace

We are engaged in various activities to protect the health of our employees and create a comfortable working environment. To reduce hazardous factors in the workplace, we organize third party assessments in the first and second half of each year to identify and measure hazardous factors in the work environment. We also manage the work environment by setting stronger internal standards than legal standards. We conduct musculoskeletal disorder prevention activities and on-site exhaust to ensure all employees work comfortably. We provide customized medical services and various wellness promotion programs through our in-house clinics and healthcare centers to support employees' health management.

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SUPPLY CHAIN SUSTAINABILITY

SUPPLY CHAIN MANAGEMENT

Supplier Code of Conduct

LG Chem is committed to empowering suppliers to adhere to stringent sustainability standards that align with global and local regulations. Accordingly, we established a comprehensive Supplier Code of Conduct in 2016, aligned with leading international standards and initiatives by the International Labor Organization (ILO), the OECD Guidelines for Multinational Enterprises, and the Responsible Business Alliance (RBA). In March 2023, we revised the Supplier Conduct to reflect updates in these reference documents. The Supplier Code of Conduct outlines standards for our suppliers to comply with regarding human rights and labor, health and safety, environment, responsible sourcing of minerals, ethics, and management systems.

Every year, we ask our suppliers to sign the Supplier Code of Conduct to validate their commitment. Following the revision, 96% of our 1,900 suppliers with a purchase history of more than KRW 100 million and at least three purchase orders in the last three years signed the revised code.

Responsible Sourcing Policy

We aim to build a responsible and transparent supply chain to contribute to creating sustainable future values. To prevent human rights violations, environmental degradation, safety accidents, unethical behavior, and illegal acts in mineral mining, we established the Responsible Sourcing Policy in 2020 based on the OECD Due Diligence Guidelines. We updated the policy in June 2023 to demonstrate our commitment to establishing a risk management system for our supply chain. The policy addresses human rights and labor issues in the upstream supply chain, such as mining facilities, and provides suppliers with a policy direction for environmental sustainability. In addition, we expanded the scope of the policy, which was previously limited to responsible minerals sourcing, to the entire supply chain to reflect our commitment to comprehensive supply chain management.

Supply chain management organization

We established the Sourcing Sustainability Initiative Team, dedicated to supplier ESG management, to fulfill our responsibility of developing a sustainable supply chain. The team identifies suppliers' potential environmental, human rights, and governance risks and improves supplier ESG capabilities through supply chain ESG assessment and due diligence processes. Based on the results of assessments and audits, the team supports training and capacity-building programs for suppliers' ESG management.

The Sourcing Sustainability Initiative Team cooperates with various functional teams, including Procurement, Sustainability Strategy, Energy/Climate Change, Cathode Materials Sustainability Strategy, and Compliance, on ESG assessments and on-site audits, responsible sourcing, product carbon footprint, ESG-related procurement guidelines, and stakeholder engagement.

Supplier evaluation and ESG assessment

Supplier regular evaluation
Every year, we conduct comprehensive evaluations of our suppliers, encompassing a wide range of criteria, including quality, EH&S, financial structure, cost, etc., to assess the overall risks and opportunities surrounding our supply chain. In 2023, we selected 1,523 suppliers from a total of 2,161 with a purchase history of more than KRW 100 million and at least three purchase orders in the previous years to conduct the regular evaluation. We reward outstanding suppliers with a score of 90 or higher with incentives such as cash payment and priority consideration for volume allocation. In 2023, we provided incentives to 51 outstanding suppliers, which amount to KRW 50 billion, to improve their payment terms from notes to cash.

Supplier ESG assessment
In 2023, we revised our supplier ESG self-assessment to 118 questionnaires across ESG categories, encompassing environmental management, energy use, carbon emissions, water resources, waste management, human rights, health and safety, labor, responsible minerals, and ethical management. 1,000 suppliers representing 87% of our total purchase amount conducted the supplier ESG self-assessment. We categorize assessment results into three risk tiers – low, medium, and high – and identify high-risk suppliers. We categorized suppliers as high-risk if they received a score of 1 or lower in the environment and governance category, a score of 3 or lower in the social category, and significant non-compliance in two questionnaires in the social category related to minimum wage and foreign worker insurance.

Supplier on-site audit
Based on the results of the ESG self-assessment, we identify high-risk suppliers and conduct on-site audits with third party organizations to identify non-conformities and establish corrective action plans. In 2023, we identified 16 high-risk suppliers and conducted on-site audits for six of them, identifying improvement areas for different ESG topics. In 2024, we plan to continue monitoring the progress of our suppliers based on the corrective action plans they established.

Major findings from ESG on-site audits

Labor	Health and safety	Environment	Ethics
— Inadequate organizational policies and regulations on human rights. — Lack of anonymous reporting hotline for human rights and labor issues.	— Lack of policies on personal protective equipment. — Insufficient fire protection equipment. — Lack of emergency escape routes.	— Inadequate environmental policy and management objectives.	— Lack of organizational policy on code of ethics.

Supplier training and grievance mechanism

ESG training for suppliers and procurement practitioners
In 2023, we conducted ESG training focusing on an introduction to sustainability management and ESG self-assessment guidelines for our suppliers and procurement practitioners across our business departments. 234 trainees from 162 suppliers participated in the online training organized for suppliers. 50 managers from the procurement department attended online and offline in-house training programs covering ESG trends, analysis of supplier ESG self-assessment results, supply chain decarbonization, and supplier due diligence.

Supplier hotline and grievance mechanism
Since October 2023, we have been operating a hotline for suppliers to report any difficulties or suggestions for improving their working conditions and business relationships with us. This channel allows stakeholders to report or suggest any case along the supply chain and guarantees the anonymity of the reporters to prevent any disadvantages or retaliation. Out of 15 cases received, we implemented corrective actions for four requests regarding suggestions on the suppliers' internal management processes and suppliers' business relationship with us.

Supplier hotline and feedback
Response rate: 100%
Improvement rate: 100%
Average response time: 0.75 days for first feedback, 5.75 days for second feedback (upon receipt of the report)

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RESPONSIBLE MINERALS MANAGEMENT

Minerals like nickel, cobalt, and lithium, critical raw materials for cathode production, are highly linked to environmental and social concerns during mining and processing. Regulations such as the EU Battery Regulation and the US Uyghur Forced Labor Prevention Act (UFLPA), among others, emphasize the need for responsible minerals supply chain management. The Cathode Materials Sustainability Strategy Team establishes and implements strategies to identify and mitigate environmental and social risks in the responsible mineral supply chain and continues efforts to operate a transparent mineral supply chain.

Responsible minerals management goals

Short-term	Strengthen cathode supplier management by sharing supplier policies and regular management exchanges with suppliers.
Mid-term	Expand mineral supply chain due diligence for proactive risk identification and increased transparency.
Long-term	Establish a risk-free mineral supply chain.

Responsible minerals management process

Following the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas (CAHRA), we are building a step-by-step procedure for managing the mineral supply chain. Of the five steps, we have completed step 1, establishing internal systems and policies, and step 2, identifying and assessing risks. In 2024, we plan to proceed with step 3, establishing risk response strategies, and step 4, third party accompanied due diligence.

Step 1	Step 2	Step 3	Step 4	Step 5
Establish strong company management systems.	Identify and assess risks in the supply chain.	Design and implement a strategy to respond to identified risks.	Carry out independent third party audit of supply chain due diligence.	Report annually on supply chain due diligence.

To identify potential risks in our mineral supply chain, we created our own CAHRA identification tool based on the guidance of the Responsible Mineral Initiative (RMI)❶, of which we have been a member since 2019, and identified regions with high-risk potential. For supply chains located in CAHRA regions, we require ongoing management and oversight of risk factors.

❶ Responsible Mineral Initiative (RMI): An industry initiative to support responsible sourcing of minerals.

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EXECUTIVE COMMITTEE FOR CORPORATE PARTNERSHIP

To establish a culture of mutual growth with our suppliers, we have established the Executive Committee for Corporate Partnership, chaired by the CFO, as the highest decision-making body for win-win partnerships. The committee discusses significant issues and directly inspects partnership activities, focusing on five areas that foster sustainable supplier partnerships.

Fair trade culture
We adopt a standard subcontractor agreement recommended by the Korea Fair Trade Commission. We introduced delivery-payment terms to share the burden of price spikes and prevent unfair treatment of suppliers to promote mutual growth.

Supplier financial support
We established a win-win fund totaling KRW 206 billion to provide operational and facility financing for our suppliers to strengthen their ESG management. In addition, we support our tier 2 and 3 suppliers in easing payment terms through the win-win payment system, which allows tier 2 and 3 suppliers to cash out payment bonds issued by large companies at banks at the commission rate of large companies.

Sustainability outreach activities
We organize specialized ESG training and consulting programs to help suppliers improve their ESG management capabilities. We support suppliers with energy-saving and health and safety equipment to help them practice sustainability in their daily operations.

Supplier empowerment and investment
We contribute to improving the quality of our suppliers' products by providing or replacing aging analytical equipment and laboratory facilities. We also run programs to support the localization and adaptation of Korean suppliers entering new markets with us. We provide online training programs to enhance the skills and knowledge of our suppliers' employees and offer recruitment incentives to help suppliers overcome labor cost burdens and potential hiring difficulties.

Open communication and information sharing
We actively engage with our suppliers through various communication channels. We organize technical seminars and share regulatory trends to help them respond quickly to changing market conditions.

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OUR EMPLOYEES

The Better Company

In 2020, LG Chem announced a new vision, "We connect science to life for a better future." We established five core values to support this vision and launched initiatives to strengthen our Employee Value Proposition (EVP), establishing our own EVP as The Better Company. Since 2022, we have been working on refining the definition of The Better Company, and in 2023, we further strengthened each element of The Better Company through open communication with our employees. To create a positive and empowering work environment, we run various programs to safeguard labor rights, promote talent attraction and development, enhance employee engagement, and foster diversity.

The Better Company

2020	**Announcement of LG Chem 2020 Vision** "We connect science to life for a better future." **Five core values** ❶ Customer focus: we are customer-oriented in all aspects of our business and present life-changing inspirations beyond fulfilling their needs. ❷ Agility: we stay updated with an open mind and respond flexibly and quickly to change. ❸ Collaboration: we create synergy by encouraging respectful collaborations. ❹ Passion: we grow together by taking on stiff challenges with passion. ❺ Sustainability: we provide innovative and sustainable solutions for the environment and society. **The Better Company** We established an EVP to attract, develop, and motivate outstanding talents and contribute to achieving the company vision. ❶ Competitive compensation ❷ Growth with the company ❸ Dynamic organizational culture
2023	**The Better Company redefined** ❶ Growth: where employees develop their own careers through meaningful work. ❷ Work: where employees make meaningful changes in an efficient and focused environment. ❸ Recognition: where employees can be recognized and rewarded for their contributions. ❹ Care: where employees and their families' health and work-life balance are supported.

Global Human Rights & Labor Policy

We commit to fulfilling our primary responsibilities to respect human dignity and uphold the right to freedom and happiness under the principle of People-oriented Management. We endorse internationally recognized human rights set out in the United Nations Universal Declaration of Human Rights, the UN Guiding Principles on Business and Human Rights (UNGP), the ILO Declaration on Fundamental Principles and Rights at Work, and the OECD Guidelines for Multinational Enterprises on Responsible Business Conduct and comply with national and local laws in all global operations. Since 2016, we have been applying the Global Human Rights & Labor Policy throughout our global operations. We are sharing the policy with all stakeholders affected by business activities, such as customers, business partners, and local communities, to raise and improve human rights and labor awareness.

In 2023, we conducted Human Rights Impact Assessments on three business sites, two in Korea and one overseas. We developed a self-assessment checklist in line with the LG Chem Global Human Rights & Labor Policy to evaluate risks and conduct diagnosis on various aspects of human rights, including diversity, talent development, employee engagement, and labor rights. We identify areas for improvement through self-assessments, continuous revision of human rights policies, improvement of business processes, and provision of relevant training. We plan to expand the number of business sites and collaborate with external organizations to strengthen our efforts in mitigating potential and actual human rights impacts.

Talent attraction and development

We are a global company dedicated to building a diverse workforce and inclusive work environment. We strive to attract diverse talents regardless of gender, age, nationality, race, or religion. We recruit global talents through business and campus tours (BC Tour) and Global Internship programs. We invite diverse talents through recruitment activities like the Target Lab Tour, Tech conference, local talent recruiting, and internships. We introduced AI interviews to enhance a fair and transparent recruitment process and select candidates that best match our core values. We also conduct regular interviewer training and organize pre-interview meetings for interviewers to convene before the interview to discuss candidate profiles and evaluation criteria. At overseas sites, we recruit talents through recruitment activities tailored to local characteristics and circumstances. As a result of these strategies, we hired 1,025 new employees globally.

We are committed to fostering the continuous growth and development of our employees. We offer a range of programs and resources, such as mentoring programs and career development information sessions, to encourage employees to take a proactive approach to their professional growth and shape their careers with us.

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Career development plan
We encourage employees to participate in an annual career development interview with their leader during their mid-year performance review to help them explore their own career development needs and for leaders to support them. In 2023, 53% of office workers who completed self-assessments on their job competencies participated in career development planning. We distributed a career development interview guideline to leaders to help them engage in conversations with employees about career development.

Career Week
The 1st Career Week, held in 2023, was organized to allow employees to design their career paths through mentoring sessions with experts in various job functions such as sales, production, marketing, DX, and R&D. In addition to special lectures by internal and external experts who shared their insights, the program also offered group mentoring sessions where employees met with internal experts in the same job function to help them plan their career paths and seek growth opportunities. The first Career Week was held over four days, with eight special lectures and 45 group mentoring sessions, and was voluntarily attended by around 5,500 employees. We plan to organize Career Week every year to reflect the needs and interests of our employees and help them discover various growth opportunities.

In addition, we offer a comprehensive suite of programs to cultivate the full potential of our workforce. Our career advisor program provides employees personalized career guidance through one-on-one coaching and mentoring from experts and leaders at any time. We foster future leaders through training programs like LG&I (executive candidate training) and leadership training programs. We also foster global talents through overseas training programs, Global MBA, and foreign language programs. Through these diverse development opportunities, we aim to shape a future where the company and employees can grow together.

Employee engagement and motivation

We listen to the voices of our employees to create an efficient and focused work environment where employees can make meaningful changes.

Connect HR platform
We recognize the significance of the employees' voice in the operations and development of an organization. We reflect the ideas and voices of employees in improving organizational HR policies and processes. We launched the Connect HR platform, where employees can post questions and suggestions anytime. All questions are answered within five business days, while suggestions undergo a thorough review process and are answered on a monthly basis. By March 2024, we received a total of 417 suggestions. After a comprehensive review of the feasibility, we implemented improvement measures for 35 suggestions, one of which is the expansion of fertility treatment support.

Fertility treatment support
— Extra paid leave of absence (before: one day of paid leave of absence and two days of unpaid leave of absence → after: three days of paid leave of absence).
— Increased medical expense support
(testing fees, fertility treatment with our treatment products).

Internal job posting
Removed the limit on the number of applications per year.

Overseas R&D degree programs
Introduced living assistance and expanded the amount of tuition assistance.

Flexible working hours and work-life balance
We implemented a self-service platform that allows employees to efficiently manage their work schedules, vacations, overtime, and other attendance records. The system is web- and mobile-based, enabling employees to manage their working hours according to their work type, apply for leave and overtime, and review their attendance status at any time. By encouraging employees to take proactive control of their work and vacation schedules, we hope to help employees achieve a healthy work-life balance and create a virtuous cycle where well-rested employees come back more engaged and satisfied.

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Workplace diversity and inclusion

We run various training and mentoring programs designed to embrace and enhance diversity in all forms, including gender, cultural, generational, and cognitive diversity. Through these programs, we aim to foster a collective mindset that values diversity and inclusion and grow into a sustainable organization prioritizing mutual respect and cooperation.

Gender diversity	Cultural diversity	Generational diversity	Cognitive diversity
— Female talent development program	— Global mobility — Inclusive leadership — Global teaming	— Co-mentoring	— Discussion table — Dialogue with LG Chem — Working together

Initiatives for gender diversity

We take a serious approach to promoting gender diversity. We have set internal goals to increase the number of female new hires and female managers, and we have female talent development programs that focus on developing female leaders. As a result, female new hires in Korea increased by 9.9%, and female managers in Korea increased by 1.1% in 2023 compared to 2021.

Prevention of workplace harassment and discrimination

To create an organizational culture free of harassment and discrimination, we deliver anti-harassment messages through various communication channels. We adhere to a strict zero-tolerance policy, emphasizing reporting confidentiality and caution with secondary victimization. We operate a harassment reporting center to prevent workplace harassment and discrimination. Upon receipt of a report, we conduct a prompt and thorough investigation of each case and take appropriate measures.

❶ Prevention and sensing
To protect employees from harassment and discrimination, we provide all employees with mandatory training on harassment and sexual harassment, conduct surveys, and communicate through various channels, such as HR interviews and employee councils.

❷ Reporting
The harassment reporting center is open 24 hours a day and provides a reporting window for employees to file a report at any time. Employees can make a report via email, phone, or online form.

❸ Investigation
All personal information and the contents of each report are handled with strict confidentiality. During the investigation, the victim is protected through measures such as separation from the accused, and all participants in the investigation are required to sign confidentiality agreements.

❹ Corrective measures
If misconduct is confirmed through investigation, the responsible employee will face appropriate disciplinary action. We implement a one-year monitoring procedure after each report is filed to safeguard the potential for further harm to those involved in investigations.

❺ Reporting and improvement
To secure a safe and inclusive work environment, the harassment reporting center strives to strengthen the prevention and response mechanism by analyzing and identifying areas of improvement in the reporting system.

Message

Hyejin Kwon (Vice President, Human Resources Department)

Key goals of the Human Resources department

We promote human resources activities closely linked to LG Chem's vision, five core values, and three next growth engines.

The role of human resources at LG Chem is to attract, develop, and motivate the best talent to achieve the company's vision. All human resources activities reflect the vision "We connect science to life for a better future," business strategies encompassing the five core values and three next growth engines, and the sustainability management system embedded in them. Therefore, the human resources department's strategic goals and missions are aligned with the organizational goals and directions.

For example, in our talent attraction strategy, we analyze the essential competencies that need to be strengthened to accelerate our next growth engines to secure the right talent. In the recruitment process, we identify talents that best match our five core values through AI interviews. The introduction of AI interviews also reinforces a fair and transparent hiring process. We believe that the best performance is achieved when employees understand the organizational direction and believe in achieving organizational goals. Furthermore, we want to create meaningful values for employees' lives and careers, just as we strive for corporate sustainability.

Highlights of the Human Resources department in 2023

We redefined The Better Company to connect employee experiences to performance and encouraged employee participation in achieving LG Chem's vision.

We further refined our Employee Value Proposition (EVP), The Better Company. Established in 2020, The Better Company ensures that the positive value that employees experience within the organization translates into individual and organizational performance. In 2023, we carefully reviewed the values employees experience within the organization based on a thorough analysis of data collected from employee surveys, workshops, and key human resources indicators. The four refined values of The Better Company are Growth, Work, Recognition, and Care (GWRC).

The redefinition of The Better Company contributed to fostering a culture in which employees actively participate in achieving organizational value. Communication through new channels, such as Connect HR and Career Week, is facilitated in a much more constructive manner than before. Employees now propose requests or suggestions in terms of GWRC, and we carefully review their alignment with the values of The Better Company.

Efforts for diversity, equity and inclusion

We will drive excellence in organizational diversity, equity and inclusion through active participation and support of the leadership.

Diversity, equity, and inclusion (DE&I) are becoming increasingly important as we expand operations overseas and increase global sales. As a global company, we strive to align our initiatives and values to global DE&I standards. We closely monitor indicators such as the proportion of local hires and female hires. We are also focusing on increasing the proportion of female leaders, which we identify as a major area for improvement.

The proportion of female hires in Korean operations saw a significant rise from 19.6% in 2021 to 29.5% in 2023. This progress is the result of our ongoing efforts, including monitoring DE&I indicators through CEO-led quarterly talent forums and aligning executive KPIs with internal DE&I targets. We have also emphasized the role of leadership in driving and implementing DE&I initiatives. As a result, the proportion of female managers in Korean operations also increased by 1.1% in 2023 compared to 2021. Our ultimate goal is to achieve DE&I excellence to a point where we no longer need to monitor these indicators. We strongly believe these changes will give us a competitive advantage in the long run.

LOCAL COMMUNITIES

Green Connector

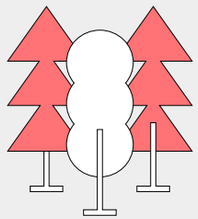
LG Chem connects social partnerships with green values to build a more sustainable future for all. Under the vision of Green Connector, we strive to fulfill our social responsibilities by meeting the interests of our stakeholders, especially the communities close to our business sites. We pay close attention to the community's expectations and concerns surrounding environmental and social issues so that we can grow together with the community.

As a Green Connector, we plan to maximize social and environmental value by concentrating on four focus areas: education, ecology, economy, and energy. We engage with the community in each area based on short-, mid-, and long-term goals.

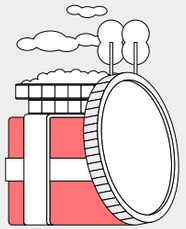
Short-term	Enhance social contribution programs and expand employee engagement.
Mid-term	Expand social contribution platforms and embed a culture of social contribution.
Long-term	Establish a social contribution brand identity.

Green Education	Green Ecology	Green Economy	Green Energy
We foster next-generation ESG talent by supporting science and environmental education programs for youth.	We respond to global environmental crises through biodiversity conservation projects.	We take the lead in creating social value by supporting eco-friendly economic activities.	We contribute to carbon neutrality by expanding renewable energy use and improving energy efficiency.

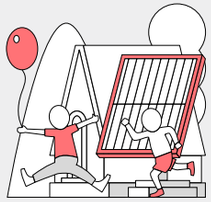
Like Green



Blue Forest



LG Social Campus
ESG donation app RZ



Seoul Hope
Green Power Plant

Social contribution projects

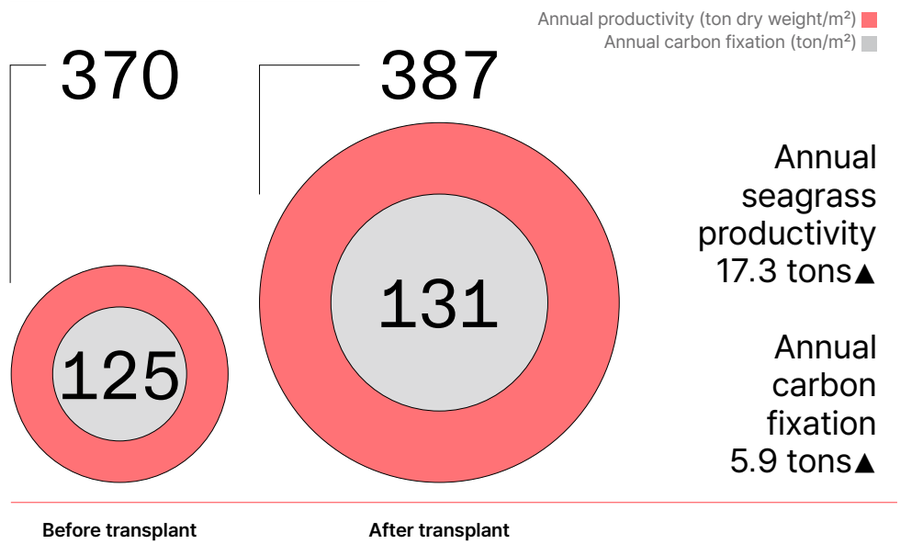
We actively pursue various social contribution projects aligned with our four key focus areas. To track our progress and project effectiveness, we measure and analyze the social impact of each project based on a comprehensive impact assessment by an independent third party every year.

Focus area	Project	Project summary	Progress and plan
Green Education	Like Green	Environmental education, which focuses on eco-friendly practices in daily life and creating a sustainable planet, includes programs like the Green Class and Green Festival.	Over the past three years, Green Class has provided ESG education to 140,000 young people at 1,829 organizations, including schools and care facilities. Green Festival videos, which feature ESG experts, have attracted around 300,000 viewers.
Green Ecology	Blue Forest	A marine ecosystem conservation project to restore seagrass habitat, the project engages the participation of global citizens via metaverse.	In November 2023, we transplanted 50,000 seagrasses in the coastal area of Yeosu, and we expect the colony to expand to 10 hectares by 2026. In June 2023, we opened the metaverse world map Blue Forest and welcomed 3.7 million visitors.
Green Economy	LG Social Campus	A joint project of LG Chem and LG Electronics since 2011 to support social enterprises addressing climate change and environmental issues.	We provided KRW 11.5 billion in financial support to 278 social enterprises, and the participating social enterprises witnessed a 21% increase in employment and a 55% growth in revenues.
Green Energy	Seoul Hope Green Power Plant	An eco-friendly energy welfare program that installs solar power plants in public areas owned by local governments and uses the proceeds to support youth and energy-poor households.	Over the past six years, we have provided 162 youths with scholarships of KRW 1 million each and 4,281 energy-poor households with heating supplies and support for heating bills. As of December 2023, the amount of solar power generated was approximately 4.51 million kWh, which has the effect of reducing 2,101 tons of carbon.

Seagrass habitat restoration project

To preserve the marine ecosystem and reduce carbon, we are restoring and expanding seagrass habitats in the coastal area of Yeosu, which is close to the Yeosu plant. Through the transplantation of seagrass, which is a powerful carbon sink, we aim to revitalize marine biodiversity, improve water quality, reduce carbon, and foster collaboration with local fishing communities. In November 2023, we transplanted 50,000 seagrasses, and we expect the colony to expand to 10 hectares, the size of 14 soccer fields. An independent third party commissioned to assess the impact of the project has found that the seagrass habitat increased by 20,008m² after transplantation, increasing the annual productivity of the seagrass colony by around 17.3 tons and the amount of carbon fixed by the seagrass by around 5.9 tons.

Seagrass productivity and carbon fixation



We are the Green Heroes

The We are the Green Heroes project empowers 50 children and teenagers to become passionate youth activists for biodiversity conservation. The Green Heroes receive in-depth training on biodiversity, explore ecological conservation areas, and participate in planning the Bamseom festival, through which they understand and spread the value of biodiversity conservation. We measure and analyze the social impact through surveys and interviews with participating children, their parents, and biodiversity experts. Using these results, we continue to refine the Green Ecology programs.

Community partnerships at Yeosu

The Yeosu plant aims to coexist with the local community as a corporate-citizen partner. Yeosu plant strives to achieve a strong partnership through the following three strategies.

❶ Business-aligned social contribution programs

Nurturing dreams, Hope Green Box	Since 2017, the Green Box program has provided 500 underprivileged teenage girls with essential hygiene products made with our Bio-SAP each year.
Coffee Cycle	The Coffee Cycle program invites senior citizens to upcycle coffee grounds from our factories into products like pencils and flowerpots and donate them to the community. By doing so, we contribute to a circular economy and create employment opportunities for seniors.

❷ Social contribution funds for the local community

The Twin Angel Fund is an employee-driven social contribution fund. At the Yeosu plant, more than 70% of employees have joined the Twin Angel Fund to support the underprivileged in the local community. The Yeosu plant also contributes as much as the Twin Angel Fund raised by employees, and together, we donate to various organizations such as senior welfare facilities, local children's centers, and living facilities for people with disabilities or provide essential help to the local community. In addition, we hold monthly birthday parties for children in priority care at local children's centers, sponsor children's orchestra activities in villages near our plants underserved by cultural welfare, and create flower gardens at representative historical sites in Yeosu.

❸ Fostering local talents and community development

The Yeosu plant has been conducting the Regional Science Talent Development Program since 2023 for high school students in the region to foster excellent local talent. The Regional Science Talent Development Program aims to establish a virtuous cycle in which the public, private, and industrial sectors interconnect to produce excellent talents and contribute to continuous regional development. The Yeosu Plant helps students gain exposure to the petrochemical industry, a major economic driver in the region and organizes alumni career mentoring sessions to provide career guidance and help students navigate future career aspirations. Last year, 335 students in science and chemistry clubs across 12 high schools participated in the program. In 2024, we plan to invite 400 students from 12 high schools for a two-month program commencing in May.

PERFORMANCE DATA

ZERO

ESG PERFORMANCE DATA

ESG PERFORMANCE DATA

Greenhouse gas emissions		Unit	2021	2022❶	2023❷
Scope 1+2 emissions	Global	tCO_2e	10,335,203	10,035,577	9,558,199
	Korea	tCO_2e	8,839,571	8,616,934	8,129,037
	excl. Korea	tCO_2e	1,495,632	1,418,643	1,429,162
	Emission intensity❸	tCO_2e / KRW 1M	0.4444	0.4090	0.4600
Scope 1 emissions	Global	tCO_2e	5,439,321	5,628,898	5,176,673
	Korea	tCO_2e	5,290,343	5,489,586	5,032,008
	excl. Korea	tCO_2e	148,978	139,312	144,665
	Emission intensity	tCO_2e / KRW 1M	0.2339	0.2294	0.2491
Scope 2 emissions	Global	tCO_2e	4,895,882	4,406,678	4,381,526
	Korea	tCO_2e	3,549,228	3,127,348	3,097,029
	excl. Korea	tCO_2e	1,346,654	1,279,330	1,284,497
	Emission intensity	tCO_2e / KRW 1M	0.2105	0.1796	0.2109
Scope 3❹ emissions	Korea	tCO_2e	1,339,125	1,217,390	11,471,953
Category	1. Purchased goods and services	tCO_2e	571,164	425,556	10,215,107
	2. Capital goods	tCO_2e	56	83	245,912
	3. Fuel and energy-related activities (not included in Scope 1 or 2)	tCO_2e	175,732	193,940	399,605
	4. Upstream transportation and distribution	tCO_2e	197,919	124,744	611,329
	5. Waste generated in operations	tCO_2e	63,358	61,972	Developing calculation methods
	6. Business travel	tCO_2e	970	621	
	7. Employee commuting	tCO_2e	7,488	10,474	
	15. Investments	tCO_2e	322,438	400,000	

❶ Figures for Scope 1 and Scope 2 emissions in Korea in 2022 have been partially revised based on the verification results of the Ministry of Environment.
❷ Figures for Scope 1 and Scope 2 emissions in Korea in 2023 are based on values reported to the Ministry of Environment, and the above figures are subject to revision depending on the verification results.
❸ Emission Intensity = Global GHG emissions / Revenues excluding LG Energy Solution, and Common and others. Figures for emission intensity in 2021 and 2022 have been partially revised due to the restatements reflecting discontinued operations.
❹ Calculation of Scope 3 emissions has been limited to select categories of the Greenhouse Gas (GHG) Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard (2011).

LG Chem's Scope 3 Emissions Reporting

- With the introduction of sustainability reporting and climate disclosure rules and the growing importance of Scope 3 management, we are reexamining our data collection and calculation methods for Scope 3 emissions.
- The calculation is based on the GHG Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard (2011). In 2023, we expanded the scope of activity data collection and calculated Category 1 to 4 emissions using the emission factors for each activity (Figures for Scope 3 emissions in 2021 and 2022 remain unchanged from last year's report and were not recalculated using the 2023 calculation criteria).
- Category 1: Calculated emissions based on the purchase statements (more than 95% of the relevant purchase amount) of key material inputs (raw materials, intermediary goods, goods) of Petrochemicals and Advanced Materials businesses.
- Category 2: Calculated emissions based on asset statements of acquired, acquired/replaced tangible goods (buildings, facilities, machinery, vehicles, equipment, etc.).
- Category 3: Calculated emissions based on external fuel and energy purchases on the Statement of Greenhouse Gas Emissions.
- Category 4: Calculated transport-related emissions based on goods calculated in Category 1.
- We plan to continue reviewing and developing calculation methods for other categories relevant to our value chain.

Energy consumption		Unit	2021	2022❶	2023❷
Total energy consumption	Global	TJ	147,322	151,401	133,424
	Korea	TJ	138,022	142,386	124,335
	excl. Korea	TJ	9,300	9,015	9,089
	Energy intensity❸	TJ / KRW 1M	0.0063	0.0062	0.0064
Direct energy Consumption (fuel)	Global	TJ	109,043	107,352	96,272
	Korea	TJ	106,349	104,876	93,692
	excl. Korea	TJ	2,694	2,476	2,580
	Energy intensity	TJ / KRW 1M	0.0047	0.0044	0.0046
Indirect energy consumption (steam, electricity)	Global	TJ	38,279	44,049	37,152
	Korea	TJ	31,673	37,510	30,643
	excl. Korea	TJ	6,606	6,539	6,509
	Energy intensity	TJ / KRW 1M	0.0016	0.0018	0.0018
Renewable energy consumption❹	Global	MWh	306,316	741,480	878,569

❶ Figures for energy consumption in Korea in 2022 have been revised based on the verification results of the Ministry of Environment.
❷ Figures for energy consumption in Korea in 2023 may be revised in the future based on the verification results of the Ministry of Environment.
❸ Energy Intensity = Global energy consumption / Revenues excluding LG Energy Solution, and Common and others. Figures for energy intensity in 2021 and 2022 have been partially revised due to the restatements reflecting discontinued operations.
❹ Means of renewable energy procurement include green pricing, renewable energy certificates (solar, wind), and self-generation (solar).

Water resources management		Unit	2021	2022	2023
Water withdrawal	Total	m^3	78,063,643	74,781,261	73,423,047
	Surface water	m^3	-	-	-
	Groundwater	m^3	444,068	440,512	464,569
	Seawater	m^3	-	-	-
	Municipal water	m^3	77,597,935	74,326,951	72,813,032
	Others❶	m^3	21,640	13,798	145,446
	Water withdrawal intensity	m^3 / KRW 1M	3.2434	2.9400	3.5336
	in regions with water stress	m^3	4,521,147	4,457,410	4,405,035
Wastewater discharge	Total	m^3	21,449,266	21,190,129	22,543,478
	Water discharge intensity	m^3 / KRW 1M	0.8912	0.8831	1.0849
	in regions with water stress	m^3	1,656,575	1,765,931	1,625,892
Water consumption	Total	m^3	56,614,377	53,591,133	50,879,569
	Water consumption intensity	m^3 / KRW 1M	2.3522	2.1069	2.4486
	in regions with water stress	m^3	2,864,572	2,691,479	2,779,143
Water reuse rate❷		%	2.30	2.57	2.65

❶ Other water sources include rainwater, etc.
❷ Calculation of water reuse rate includes the amount of recycled water within the operation and purchased reclaimed wastewater.

Water resources management (Yeosu, Daesan)		Unit	2021	2022	2023
Yeosu	Water withdrawal	m^3	50,420,936	48,143,272	43,611,260
	Municipal water❶	m^3	50,420,936	48,143,272	43,611,260
	Water consumption	m^3	40,209,460	38,272,526	32,254,609
Daesan	Water withdrawal	m^3	14,130,202	13,096,040	17,462,242
	Municipal water❶	m^3	14,130,202	13,096,040	17,462,242
	Water consumption	m^3	8,611,123	7,967,640	12,039,271

❶ Yeosu and Daesan plants source 100% of water from municipal water.

Water pollution management		Unit	2021	2022	2023
Water pollutant discharge	COD❶	Metric tons	589	472	244
	Discharge intensity	kg / KRW 1M	0.0245	0.0186	0.0117
	TOC❶	Metric tons	318	457	381
	Discharge intensity	kg / KRW 1M	0.0132	0.0179	0.0183
	SS	Metric tons	255	240	228
	Discharge intensity	kg / KRW 1M	0.0106	0.0094	0.0110
	T-N	Metric tons	273	211	211
	Discharge intensity	kg / KRW 1M	0.0113	0.0083	0.0102
	T-P	Metric tons	25	34	41
	Discharge intensity	kg / KRW 1M	0.0010	0.0013	0.0020

❶ Reflects the gradual transition of reporting metrics from COD to TOC under the Korean Water Environment Conservation Act.

Air pollution management		Unit	2021	2022	2023
Air pollutant emissions	Dust	Metric tons	167	183	176
	Emission intensity	kg / KRW 1M	0.0069	0.0072	0.0085
	NOx	Metric tons	4,134	3,823	3,150
	Emission intensity	kg / KRW 1M	0.1718	0.1503	0.1516
	SOx	Metric tons	184	240	119
	Emission intensity	kg / KRW 1M	0.0076	0.0094	0.0057
	VOCs	Metric tons	956	1,206	151
	Emission intensity	kg / KRW 1M	0.0397	0.0474	0.0073
	HAPs	Metric tons	273	298	105
	Emission intensity	kg / KRW 1M	0.0113	0.0117	0.0051

Waste management		Unit	2021	2022	2023
Waste generated	Total	Metric tons	278,345	279,585	248,036
	Waste intensity	kg / KRW 1M	0.0120	0.0114	0.0119
Nonhazardous waste	Total	Metric tons	153,981	150,922	125,043
	Recycling	Metric tons	108,145	111,612	97,692
	Incineration (w/ heat recovery)	Metric tons	22,682	23,149	13,779
	Incineration	Metric tons	12,359	6,177	4,433
	Landfill	Metric tons	10,795	9,984	9,138
	Other	Metric tons	-	-	-
Hazardous waste	Total	Metric tons	124,364	128,663	122,994
	Recycling	Metric tons	53,961	60,374	57,458
	Incineration (w/ heat recovery)	Metric tons	53,407	54,361	52,210
	Incineration	Metric tons	15,501	12,862	11,930
	Landfill	Metric tons	1,495	1,066	1,395
	Other	Metric tons	-	-	-
Waste recycling rate	incl. Incineration (w/ heat recovery)	%	86	89	89
	excl. Incineration (w/ heat recovery)	%	58	62	63
Zero Waste to Landfill (ZWTL) certifications ❶		Site	-	3	4

❶ Gimcheon, Cheongju (Separator), Guangzhou, Quzhou.

Hazardous substances management ❶	Unit	2021	2022	2023 ❷
Proportion of sold products containing REACH ❸ Annex 17 substances	%	16.10	9.69	20.46
Proportion of sold products containing REACH SVHCs ❹ substances	%	1.57	2.47	4.85
Proportion of sold products containing CMR ❺ substances	%	2.71	4.65	7.07
Hazardous chemicals risk assessment ❻	%	25.09	26.33	26.64

❶ Calculated the proportion of products containing each substance relative to the number of products sold per year.
❷ Proportion of products containing hazardous substances has increased with the addition of Annex 17, SVHCs, and CMR substances compared to 2022.
❸ REACH: Registration, Evaluation, Authorization and Restriction of Chemicals.
❹ SVHC: Substances of Very High Concern.
❺ CMR: Carcinogenic, Mutagenic and Reprotoxic chemicals.
❻ Proportion of substances that have completed or are exempt from substance registration among the constituent substances of the sold product.

Reused/recycled materials		Unit	2021	2022	2023
Proportion of reused/recycled materials ❶ Input	PC	%	1.44	1.68	2.50
	ABS ❷	%	0.02	0.12	0.19
	PO ❷	%	-	0.05	0.18
	PVC ❷	%	-	-	0.0010
	Plasticizers ❷	%	-	-	0.0019

❶ Reused/recycled Materials refer to Post-Consumer Recycled (PCR) or Post-Industrial Recycled(PIR) products. The proportion of reused/recycled input is the amount of PCR or PIR material input relative to the total material input.
❷ Following the expansion of the recycled plastics business, the proportion of reused/recycled materials for ABS, PO, PVC, and Plasticizers products have been calculated in addition to PC products.

Employee and process EH&S		Unit	2021	2022 ❶	2023
Employees	Fatality Rate ❷	Rate	0.0056	-	-
	TRIR ❸	Rate	0.7642	0.6079	0.8344
	LTIR ❹	Rate	0.2454	0.0968	0.1597
Subcontractors	Fatality Rate	Rate	-	0.0104	-
	TRIR	Rate	0.5078	1.1025	0.7816
	LTIR	Rate	0.2132	0.3640	0.1804
Process safety ❺	PSE ❻	Event	-	1	-
	PSER ❼	Rate	-	0.0035	-
Transport incidents	Road	Event	1	1	-
	Rail	Event	-	-	-
	Ship	Event	-	-	-

❶ From 2022 onward, the accident rate is calculated by applying actual hours worked.
❷ Fatality rate: Total number of fatality cases * 200,000 / total hours worked.
❸ TRIR(Total Recordable Incident Rate): Total number of recordable incidents * 200,000 / total hours worked.
❹ LTIR(Lost Time Incident Rate): Total number of lost time incidents * 200,000 / total hours worked.
❺ Calculations for process safety events are based on the internal accident index standard which includes injuries, fires, leakages, amount of loss, etc.
❻ PSE(Process Safety Events).
❼ PSER(Process Safety Event Rate): Number of process safety events * 200,000 / total hours worked.

Diversity, Equity, and Inclusion (DE&I) ❶		Unit	2021	2022	2023
No. of employees ❷ by region	Total	Person	18,792	19,627	19,218
	Korea	Person	13,906	14,572	14,360
	China	Person	3,564	3,705	3,488
	Asia-Pacific (excl. China)	Person	627	578	513
	Europe	Person	419	471	479
	Americas	Person	276	301	378
No. of executives ❸	Total	Person	108	113	113
	Male	Person	100	103	105
	Female	Person	8	10	8
No. of employees by employment contract (Korea)	Non-fixed term	Person	13,652	14,249	14,029
	Fixed-term	Person	254	323	331
No. of employees by gender (Korea)	Male	Person	11,946	12,356	12,088
	Female	Person	1,960	2,216	2,272
	Ratio of female employees (non-fixed term)	%	14	15	16
	Ratio of female employees (incl. fixed term)	%	14	15	16
No. of employees by age (Korea, non-fixed term employees)	Under 30	Person	2,441	2,508	2,187
	30 to 49	Person	8,655	9,110	9,275
	50 or above	Person	2,556	2,631	2,567
No. of leaders in revenue-related ❹ departments (Korea)	Male leaders ❺	Person	427	486	506
	Female leaders	Person	21	23	28
	Ratio of female leaders	%	5	5	5
No. of employees in R&D ❻ departments (Korea, non-fixed term)	Male	Person	1,821	2,004	2,030
	Female	Person	855	962	1,020
	Ratio of female employees	%	32	32	33
Social minorities (Korea)	Persons with disabilities	Person	252	250	251
	National Veterans	Person	270	286	290
Gender pay gap ❼	Non-management level (base salary)	%	77	80	84
	Management ❽ level (base salary)	%	94	94	95
	Management level (base salary + cash incentives)	%	94	94	95
	Executive level (base salary)	%	93	86	91
Parental leave (Korea)	Total number of employees due to return to work after taking parental leave	Person	129	157	90
	Male	Person	46	60	41
	Female	Person	83	97	49
	Total number of employees that did return to work after taking parental leave	Person	129	157	84
	Male	Person	46	60	39
	Female	Person	83	97	45

Employee hires		Unit	2021	2022	2023
New employee hires	Total	Person	3,140	2,651	1,025
	Korea	Person	1,560	1,431	662
	excl. Korea	Person	1,580	1,220	363
by employment contract (Korea)	Non-fixed	Person	1,330	1,261	922
	Fixed-term	Person	230	170	103
by Gender (Korea)	Male	Person	1,255	1,070	466
	Female	Person	305	361	196
by Age (Korea)	Under 30	Person	759	849	409
	30 to 49	Person	635	469	201
	50 or above	Person	166	113	52

Employee turnover		Unit	2021	2022	2023
No. of voluntary turnover (Korea)	Total	Person	306	344	303
by Gender (Korea)	Male	Person	245	257	225
	Female	Person	61	87	78
by Age (Korea)	Under 30	Person	133	161	100
	30 to 49	Person	158	173	182
	50 or above	Person	15	10	21

❶ Figures for 2021 and 2022 have been partially revised due to changes in the organizational boundaries and internal classification criteria.
❷ Calculated based on the number of employees at the end of the fourth quarter of each year.
❸ Executives refer to executive officers and registered directors at the Vice President level and above. Figures for 2021 and 2022 have been revised to reflect the criteria in the Business Report.
❹ Revenue-related refers to departments directly related to goods and services, such as production, sales, etc.
❺ Leaders refer to employees at the positions of team leader and above, excluding executives.
❻ R&D refers to departments related to research & development, technology, etc.
❼ Gender pay gap is calculated by dividing the average remuneration of all women in a position by the average compensation of all men in the same position. There are no distinctions based on gender, while factors such as years of service contribute to the pay gap.
❽ Management refers to employees at the level of professionals/senior managers and above, excluding executives.

Training and Development		Unit	2021	2022	2023
Training hours (Korea, non-fixed term)	Total	Hour	567,604	506,803	373,011
	Male	Hour	449,714	412,266	300,215
	Female	Hour	117,890	94,537	72,796
	Average training hours per employee	Hour / Person	41.6	35.6	19.7
Mandatory training hours (Korea)	Total	Hour	69,170	95,990	62,048
	Male	Hour	57,675	86,004	56,723
	Female	Hour	11,496	9,986	5,325
Training cost (Korea)	Total	KRW 10K	1,564,100	2,139,966	2,219,761
	Average training cost per employee	KRW 10K / Person	115	150	118

Labor and human rights		Unit	2021	2022	2023
Labor union (Korea)	No. of employees eligible to join	Person	7,337	7,447	6,799
	No. of employees participating	Person	5,436	5,410	5,279
	Percentage of employees participating	%	74	73	78
Percentage of employees covered by collective agreements (Korea)		%	100	100	100

Supply chain management		Unit	2021	2022	2023
ESG self-assessment	Total number of suppliers ❶	Company	1,262	1,433	1,168
	Number of suppliers that have finished ESG self-assessment	Company	232	762	1,000
	Total number of core suppliers ❷	Company	240	178	118
	Number of core suppliers that have finished ESG self-assessment	Company	53	77	97
ESG on-site audit	Total number of high-risk suppliers ❸	Company	42	169	13
	Number of high-risk suppliers that have finished ESG on-site audit	Company	-	17	6
	Total number of high-risk core suppliers	Company	-	1	-
	Number of high-risk core suppliers that have finished ESG on-site audit	Company	-	-	-
ESG on-site audit findings and improvements	Number of findings ❹	Case	-	-	142
	Number of improvements	Case	-	-	-

❶ Suppliers refer to domestic and overseas suppliers with records of annual purchase amounts of KRW 100M or more, and three or more purchase orders.
❷ Core suppliers refer to suppliers in the top 90% of purchase amounts and include companies of all sizes.
❸ High-risk suppliers refer to suppliers who fall under a high-risk rating as a result of self-assessment or fall into the high-risk group due to findings of critical non-conformance items, etc.
❹ The increase in the number of findings is attributed to on-site audits focused on ESG risk monitoring and inspection after the supplier training and support period until 2022.

Social contributions and community engagement		Unit	2021	2022	2023
Social contributions	Total	KRW 1M	16,194	21,725	16,884
	Charitable donations	KRW 1M	9,641	17,760	13,101
	Community investments	KRW 1M	6,071	3,852	3,730
	Commercial initiatives	KRW 1M	482	113	53
Employee volunteer hours		Hour	4,965	3,371	2,993

Ethics, anti-corruption, and fair trade		Unit	2021	2022	2023
Corruption and bribery	No. of investigated cases	Case	7	14	13
	No. of handled cases	Case	3	4	3
Unfair trade practices	No. of legal investigations	Case	-	-	-
	No. of legal actions	Case	-	-	-
Ethics training	No. of employees participating in ethics training ❶	Person	13,431	15,159	15,068
	No. of employees participating in fair trade training2) ❷	Person	14,413	15,191	15,298

❶ Includes contents on Jeong-Do management and the Code of Ethics.
❷ Includes contents related to subcontractors and compliance.

Information security and cybersecurity		Unit	2021	2022	2023
ISO 27001	Certified business sites	Site	4	16	16
Information security training	Awareness raising activities	Campaign	12	12	12
	Average training hour per employee	Minute / Person	30	30	10

Public policy and regulation	Unit	2021	2022	2023
Contributions to trade associations ❶	KRW 1M	2,223	2,497	3,076
Contributions to political campaigns ❷	KRW 1M	-	-	-

❶ In 2023, contributions have been made to the following top 5 organizations:
— World Economic Forum (WEF): 437,400 (KRW 1K)
— Korea Enterprises Federation (KEF): 331,082 (KRW 1K)
— Korea Vinyl Environmental Council (KOVEC): 293,000 (KRW 1K)
— Korea PC/BPA Council (KPBC): 291,471 (KRW 1K)
— Korea Petrochemical Industry Association (KPIA): 236,761 (KRW 1K)
❷ The Political Funds Act prohibits companies from sponsoring political organizations.

Tax reporting		Unit	2021	2022	2023
Reported taxes ❶	Total	KRW 1M	1,235,790	641,482	432,501
	Korea	KRW 1M	672,683	747,539	5,387
	Asia (excl. Korea)	KRW 1M	565,833	389,245	424,168
	Europe	KRW 1M	-61,505	186,016	66,978
	Americas	KRW 1M	2,421	4,141	20,589
	Others	KRW 1M	39	247	642
	Consolidated adjustments	KRW 1M	56,319	-685,706	-85,264
Cash payment of corporate tax		KRW 1M	1,281,796	1,707,449	1,348,461

❶ Based on the consolidated financial statements of FY 2023.

Customer satisfaction		Unit	2021	2022	2023
Customer satisfaction survey	Scope ❶	%	100	100	100
	Score	Score	79	84	84

❶ Refers to the percentage of business divisions that have conducted customer satisfaction surveys. Since 2020, the Customer Value Innovation Team conducts customer satisfaction surveys across all business divisions.

Economic performances		Unit	2021	2022	2023
Revenues ❶	Total	KRW 1M	41,786,572	50,983,251	55,249,785
	Petrochemicals	KRW 1M	20,175,492	21,151,355	17,208,803
	Advanced Materials ❷	KRW 1M	2,390,269	2,538,394	2,441,790
	Life Sciences	KRW 1M	690,346	849,289	1,128,075
	LG Energy Solution	KRW 1M	17,803,863	25,586,365	33,667,228
	Common and others	KRW 1M	726,602	857,848	803,889
Revenue excluding LG Energy Solution, and Common and others ❸		KRW 1M	23,256,107	24,539,038	20,778,668
R&D expenses	Total	KRW 1M	710,071	869,634	1,007,779
	Sustainable technology and product ❹	KRW 1M	90,250	143,604	178,401

❶ Based on the consolidated financial statements of FY 2023.
❷ Revenues for 2021 and 2022 have been restated, reflecting discontinued operations.
❸ Represents simple deductions of revenues of LG Energy Solution and Common and others from the total; Common and others include revenues of FarmHannong. This figure has been used to calculate the intensity of environmental performance data. For details, please refer to the notes to the consolidated financial statements.
❹ Includes expenses for projects in the areas of bio materials, recycling, and carbon neutrality.

GRI INDEX

GRI INDEX

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GRI 417	417-3	Incidents of non-compliance concerning marketing communications	-	Business Report-XI-3.

SASB INDEX

SASB INDEX

Topic	Code	Accounting metric	Disclosures
Greenhouse Gas Emissions	RT-CH-110a.1	Gross global Scope 1 emissions, percentage covered under emissions-limiting regulations	5,176,673 tCO_2e, 97% (emissions in Korea subject to K-ETS relative to global Scope 1 emissions)
	RT-CH-110a.2	Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets	p. 22, 47
Air Quality	RT-CH-120a.1	Air emissions of the following pollutants: (1) NOx (excluding N_2O), (2) SOx, (3) volatile organic compounds (VOCs), and (4) hazardous air pollutants (HAPs)	(1) 3,150 tons (2) 119 tons (3) 151 tons (4) 105 tons
Energy Management	RT-CH-130a.1	(1) Total energy consumed, (2) percentage grid electricity, (3) percentage renewable, (4) total self-generated energy ❶	(1) 133,424 TJ (2) Korea 32%, overseas 52% (3) Korea 3%, overseas 45% (4) 377 MWh
Water Management	RT-CH-140a.1	(1) Total water withdrawn, (2) total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress	(1) 73,423,047m^3, 5.9% (Percentage of water withdrawn from regions with water stress) (2) 50,879,570m^3, 5.5% (Percentage of water consumption from regions with water stress)
	RT-CH-140a.2	Number of incidents of non-compliance associated with water quality permits, standards, and regulations	0
	RT-CH-140a.3	Description of water management risks and discussion of strategies and practices to mitigate those risks	p. 19
Hazardous Waste Management	RT-CH-150a.1	Amount of hazardous waste generated, percentage recycled	(1) 122,994 tons (2) 89% (incl. incineration w/ heat recovery), 47% (excl. incineration w/ heat recovery)
Community Relations	RT-CH-210a.1	Discussion of engagement processes to manage risks and opportunities associated with community interests	p. 78
Workforce Health & Safety	RT-CH-320a.1	(1) Total recordable incident rate (TRIR) and (2) fatality rate for (a) direct employees and (b) contract employees	(1) (a) 0.8344 (b) 0.7816 (2) (a) 0 (b) 0
	RT-CH-320a.2	Description of efforts to assess, monitor, and reduce exposure of employees and contract workers to long-term (chronic) health risks	p. 63

Topic	Code	Accounting metric	Disclosures
Product Design for Use-phase Efficiency	RT-CH-410a.1	Revenue from products designed for use-phase resource efficiency	25% (Excluding revenues from LG Energ Solution, and Common and others)
Safety & Environmental Stewardship of Chemicals	RT-CH-410b.1	(1) Percentage of products that contain Globally Harmonized System of Classification and Labeling of Chemicals (GHS) Category 1 and 2 Health and Environmental Hazardous Substances, (2) percentage of such products that have undergone a hazard assessment	(1) 37.10% (2) 84.97%
	RT-CH-410b.2	Discussion of strategy to (1) manage chemicals of concern and (2) develop alternatives with reduced human and/or environmental impact	(1) p. 68-69 (2) p. 68-69, We identify product toxicity as one of the Sustainable Value criteria used to determine the sustainability contribution of products and technologies, and we are introducing a process to consider toxicity from the product design stage.
Genetically Modified Organisms	RT-CH-410c.1	Percentage of products by revenue that contain genetically modified organisms (GMOs)	N/A
Management of the Legal & Regulatory Environment	RT-CH-530a.1	Discussion of corporate positions related to government regulations and/or policy proposals that address environmental and social factors affecting the industry	We participate in policy proposals through our local public affairs networks at home and overseas and continuously monitor new legislation and regulations that may affect our global business. We also participate in the activities of industry associations that represent our business areas and collaborate with various stakeholders by engaging in professional networking activities like external seminars, forums, and conferences. We secure incentives related to major investments and conduct policy support activities.
Operational Safety, Emergency Preparedness & Response	RT-CH-540a.1	Process Safety Incidents Count (PSIC), Process Safety Total Incident Rate (PSTIR), and Process Safety Incident Severity Rate (PSISR)	Number of Process Safety Events (PSE): 0 Process Safety Event Rate (PSER): 0
	RT-CH-540a.2	Number of transport incidents	0

❶ LG Chem was the first Korean chemicals company to declare 2030 Carbon-neutral Growth and 2050 Net-Zero goal, and aims to maintain greenhouse gas emissions in 2030 in line with 2019 emissions. Accordingly, the total amount of self-generated energy was calculated including only the energy generated by facilities installed in or after 2020. Based on this new calculation method, the total amount of self-generated energy in 2022 (in last year's report) is revised to 377 MWh, the same as in 2023.

TCFD INDEX

TCFD INDEX

Recommendations		Location
Governance	a) Describe the board's oversight of climate-related risks and opportunities.	p. 21, 35
	b) Describe management's role in assessing and managing climate-related risks and opportunities.	p. 37
Strategy	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	p. 19
	b) Describe the impact of climaterelated risks and opportunities on the organization's businesses, strategy, and financial planning.	p. 19-20, 47
	c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	p. 19, 47
Risk Management	a) Describe the organization's processes for identifying and assessing climate-related risks.	p. 37-38, 47
	b) Describe the organization's processes for managing climate-related risks.	p. 47-49, 54
	c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	p. 37-38
Metrics and Targets	a) Disclose the metrics used by the organization to assess climaterelated risks and opportunities in line with its strategy and risk management process.	p. 18
	b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	p. 82
	c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	p. 22

ASSURANCE STATEMENT

LRQA INDEPENDENT ASSURANCE STATEMENT

Relating to LG Chem, Ltd.'s Sustainability Report for the calendar year 2023
This Assurance Statement has been prepared for LG Chem, Ltd. in accordance with our contract but is intended for the readers of this Report.

Terms of engagement

LRQA was commissioned by LG Chem, Ltd. (LG Chem) to provide independent assurance on its 'LG Chem Sustainability Report 2023' ("the report") against LG Chem's data management procedure to a limited level of assurance and materiality of professional judgement using ISAE 3000 and ISAE 3410.

Our assurance engagement covered evaluating the accuracy and reliability of ESG performance data and information on CHAPTER 3 PERFORMANCE DATA of the report relating to LG Chem's operations and activities at domestic and overseas sites from 1 January 2023 to 31 December 2023.

Our assurance engagement excluded the data and information of LG Chem's suppliers, contractors and any third parties mentioned in the report.

LRQA's responsibility is only to LG Chem. LRQA disclaims any liability or responsibility to others as explained in the end footnote. LG Chem's responsibility is for collecting, aggregating, analysing and presenting all the data and information within the report and for maintaining effective internal controls over the systems from which the report is derived. Ultimately, the report has been approved by, and remains the responsibility of LG Chem.

LRQA's Opinion

Based on LRQA's approach nothing has come to our attention that would cause us to believe that LG Chem has not, in all material respects, disclosed accurate and reliable performance data and information as all errors identified during the assurance engagement were corrected.

The opinion expressed is formed on the basis of a limited level of assurance and at the materiality of the professional judgement of the verifier.

Note: The extent of evidence-gathering for a limited assurance engagement is less than for a reasonable assurance engagement. Limited assurance engagements focus on aggregated data rather than physically checking source data at sites. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed.

LRQA's apprvoach

LRQA's assurance engagements are carried out in accordance with our verification procedure. The following tasks though were undertaken as part of the evidence gathering process for this assurance engagement:

- Auditing LG Chem's data management systems to confirm that there were no significant errors, omissions or mis-statements in the report. We did this by reviewing the effectiveness of data handling procedures, instructions and systems, including those for internal verification. We also spoke with those key people responsible for compiling the data and drafting the report.
- Checking whether direct (Scope 1) and indirect (Scope 2) greenhouse gas (GHG) emissions, and energy consumptions in domestic sites were transposed correctly from the GHG inventory which was verified by the third-party assurance provider.
- Verifying other indirect GHG emissions (Scope 3) using GHG Protocol - Corporate Value Chain (Scope 3) Accounting and Reporting Standard.
- Checking whether financial data were transposed correctly from the financial statements.
- Reviewing additional evidence made available by LG Chem at its head office in Seoul.

LRQA's standards, competence and independence

LRQA implements and maintains a comprehensive management system that meets accreditation requirements for ISO 14065 Greenhouse gases – Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition and ISO/IEC 17021 Conformity assessment – Requirements for bodies providing audit and certification of management systems that are at least as demanding as the requirements of the International Standard on Quality Control 1 and comply with the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants.

LRQA ensures the selection of appropriately qualified individuals based on their qualifications, training and experience. The outcome of all verification and certification assessments is then internally reviewed by senior management to ensure that the approach applied is rigorous and transparent.

LRQA is LG Chem's certification body for ISO 9001, ISO 14001, ISO 37001 and ISO 37301. We also provide LG Chem with a range of training services related to management systems. The verification and certification assessments, together with the training, are the only work undertaken by LRQA for LG Chem and as such does not compromise our independence or impartiality.

Dated: 16 June 2024

Tae-Kyoung Kim
LRQA Lead Verifier
On behalf of LRQA
2nd Floor, T Tower, 30, Sowol-ro 2-gil, Jung-gu, Seoul, Republic of Korea
LRQA reference: SEO00000269

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We value your feedback.
We welcome any questions, comments, or suggestions you may have regarding this report and our sustainability performance.

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Related information
Business Report
Corporate Governance Report
LG Code of Ethics
LG Chem Code of Conduct
Responsible Sourcing Policy
Supplier Code of Conduct
Global Human Rights and Labor Policy
Social Partnerships Report
LETZero Product Book