

# LOTTE CHEMICAL

## SUSTAINABILITY REPORT 2021



Every Step for GREEN.



PEOPLE ORIENTED



FORWARD THINKING



LIFE ENRICHING




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### Interactive PDF


This report is published in Korean and English for communication with global stakeholders in the form of an interactive PDF.

### Navigator Button


 Cover page

 Contents

 Previous page

 Next page

 Print

 Homepage

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## TABLE OF CONTENTS



People Oriented



Forward Thinking



Life Enriching

### INTRODUCTION

- 2 Message from the CEO
- 4 LOTTE CHEMICAL at a glance
- 6 Global Network
- 7 Business Portfolio
- 9 Enhancing Brand Value
- 11 Our History
- 12 Our Sustainability Journey
- 13 LOTTE Chemical in Everyday Life

### SUSTAINABILITY OVERVIEW

- 17 Strategies for Sustainable Management
- 19 Stakeholder Engagement
- 20 Materiality Assessment
- 21 Management Approach
- 24 2021 ESG Highlights
- 26 UN SDGs

### SPECIAL FOCUS ON SUSTAINABILITY

- 30 Special Focus 1  
Roadmap to Carbon Neutrality
- 32 Special Focus 2  
New Growth Roadmap
- 34 Special Focus 3  
Resource Circulation
- 36 Special Focus 4  
Strengthening Safety Management

### ESG PERFORMANCE

#### Environmental

- 39 Strengthening Environmental Management
- 41 Climate Response
- 44 Minimizing of Environmental Impact

#### Social

##### Value Management

- 47 Securing New Growth Engines
- 50 Safety Management
- 53 Customer Value Creation
- 57 Pursuing Community Values

##### Human Resource Management

- 60 Human Rights and Diversity
- 62 Human Resource Development
- 64 Work-Life Balance

##### Mutual Growth Management

- 67 Mutual Growth with Business Partners
- 71 Sustainable Supply Chain

#### Governance

- 72 Governance Structure
- 74 Risk Management
- 76 Compliance
- 79 Ethical Management

### APPENDIX

- 82 Targets and Achievements
- 87 GHG Assurance
- 88 Third Party Assurance
- 90 LOTTE Chemical Declaration of Human Rights
- 91 GRI Content Index
- 94 TCFD, SASB Index
- 96 Main group membership status
- 96 About this Report

## Message from the CEO ———

“LOTTE Chemical creates a better world  
and sustainable future through chemistry.”





Dear Stakeholders,

I am Kim Gyo-hyun, CEO of LOTTE Chemical.

Last year was a year of continued internal and external instability from delayed economic recovery and increased external uncertainties due to the prolonged COVID-19. Despite these circumstances, LOTTE Chemical demonstrated a remarkable improvement in management performance in comparison to 2020 through stable plant operation, expansion of overseas production bases, and expansion of sales of high value-added products. In addition, we established an ESG Committee to integrate ESG perspectives at the company level. I would like to express my deep gratitude to all stakeholders who have shown interest in and support for LOTTE Chemical in these challenging times.

LOTTE Chemical set 2021 as the first year of Green Promise 2030 to expand eco-friendly businesses and achieve carbon neutrality. In 2022, we will develop sustainable business by systematically upgrading our strategic goals for ESG. In order to establish a foundation for sustainable management, we intend to pursue the following:

**First, we will set a new vision, and build a sustainable business foundation accordingly.**

Climate crisis has become the biggest risk companies face today and is rapidly changing the global demand trends. Thus, we are diversifying our portfolio to include hydrogen, batteries, and recycling businesses to keep up with the evolving business environment of the petrochemicals industry.

Furthermore, we are redefining our ESG strategic goals, such as achieving carbon neutrality by 2050 and applying for RE100 membership, to raise our corporate value.

**Second, we will enhance the competitiveness of our existing businesses.**

The foundation for future growth is built upon our existing businesses. Therefore, it is important to implement strategies that can enhance competitiveness and preserve the value of existing businesses.

In addition to the current LOTTE Chemical Indonesia New Ethylene (LINE) project, we are planning to maximize profitability through commercialization of the Heavy-feed Petrochemical Complex (HPC) project in 2022. By strengthening R&D of advanced materials, we will advance as a leading specialty materials company that provides customized products to customers.

**Third, we aim to become the safest companies in the world.**

Safety is our top priority, and we are revamping the safety standards at all domestic and overseas business sites to match the highest levels in the world. We have been advancing our efforts by setting an investment goal of more than KRW 500 billion for three years in the field of safety and the environment to become the safest companies. Furthermore, this year, we established and expanded the safety and environment division at each business site. By actively nurturing safety professionals, we take responsibility for raising the level of safety management, not only of our company but also of our subsidiaries and partners.

LOTTE Chemical will always listen to our stakeholders and strive to become a sustainable chemical company that contributes to society by practicing safe and environmental values. We greatly appreciate your kind interest and support for the new future of LOTTE Chemical.

May 2022

CEO Kim Gyo-hyun

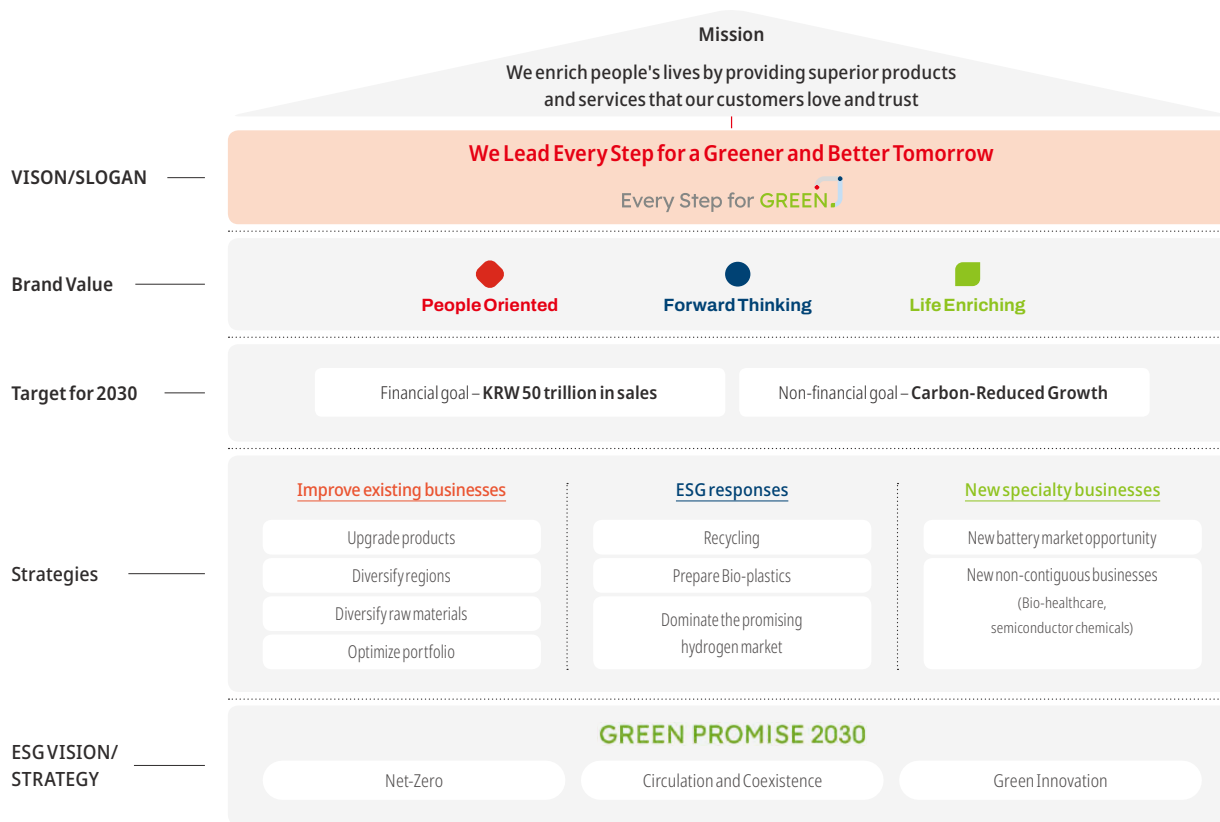


# LOTTE CHEMICAL at a Glance

## Company Profile

A company that creates a better world through chemistry

Since its founding in 1976, LOTTE Chemical has been leading the domestic chemical industry through stable business operation and efficient business portfolio construction. With the support and interest of stakeholders, LOTTE Chemical has established a new corporate vision and slogan, “Every Step for GREEN,” which conveys the company’s goal to achieve a prosperous and green world with leading technologies.



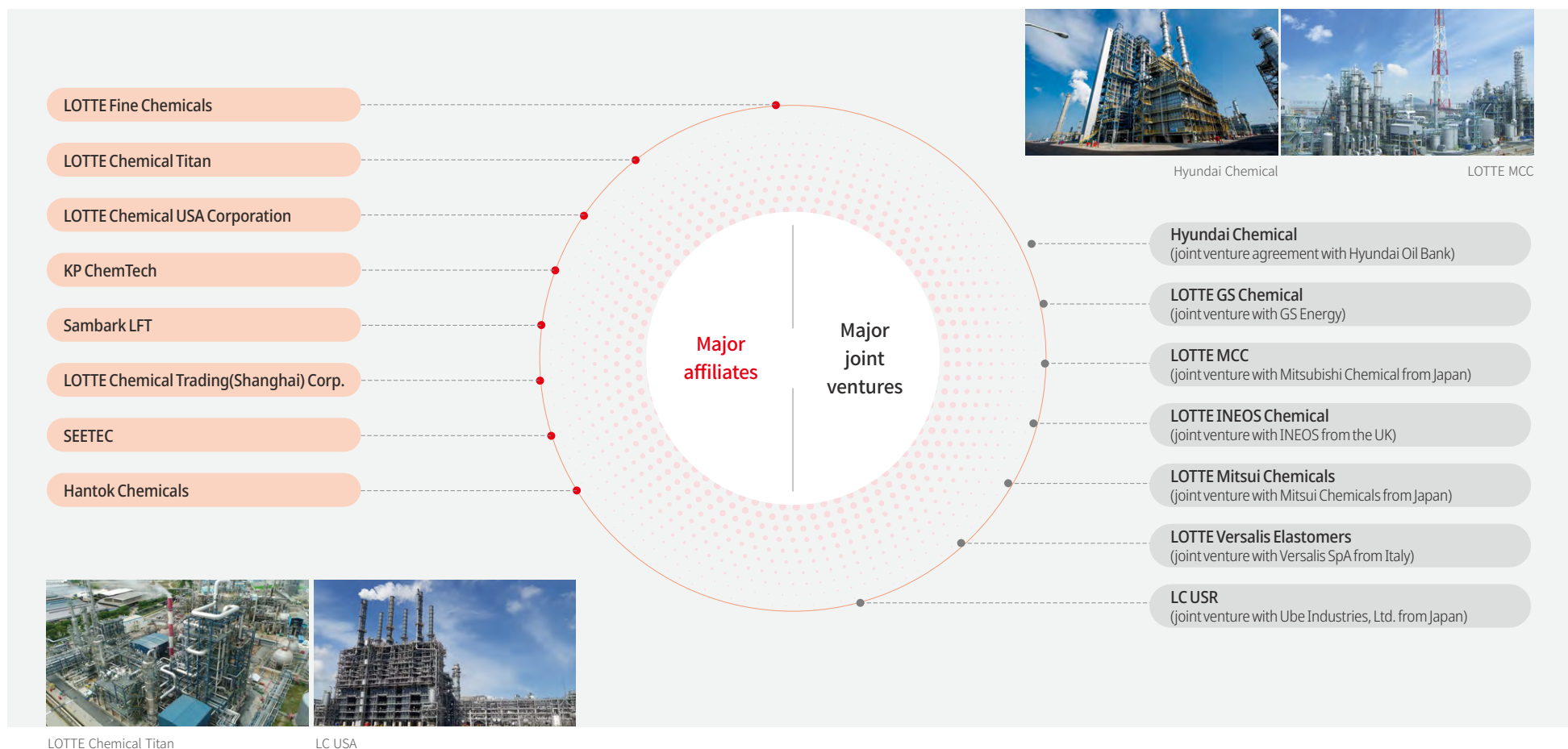
General		(As of Dec 31, 2021)
Date of Establishment	March 16, 1976	
CEO	Shin Dong-bin, Kim Gyo-hyun, Lee Young-joon, Hwang Jin-goo	
Headquarters	14-16F, LOTTE World Tower, 300 Olympic-ro, Songpa-gu, Seoul, Republic of Korea	
Number of Employees	4,644	
Subsidiaries	Domestic subsidiaries: Six / Foreign subsidiaries: 24	
Business areas	Basic chemicals, monomers, polymers, synthetic resin, construction materials	

Financial performance		(As of Dec 31, 2021)
Sales	KRW 18.1204 trillion	
Operating Income	KRW 1.5356 trillion	
Net Profit	KRW 1.4256 trillion	
Credit Rating (Corporate Bond)	AA+	

# LOTTE CHEMICAL at a Glance

## Major affiliates and joint ventures

LOTTE Chemical’s innovative technology and years of experience have propelled the expansion of its global network through M&As and joint ventures with overseas companies. We are striving to provide the best-quality products and services in high value-added businesses, such as engineering plastics and fine chemicals.



# Global Network

LOTTE Chemical has been responding to the changing times and customer demands by increasing production-efficiency at its business sites, strategically operating businesses, and signing global partnerships, which in turn increased the values of core businesses. LOTTE Chemical’s potential is proven through its operation of 26 production bases in 22 countries, and exportation to more than 120 countries.



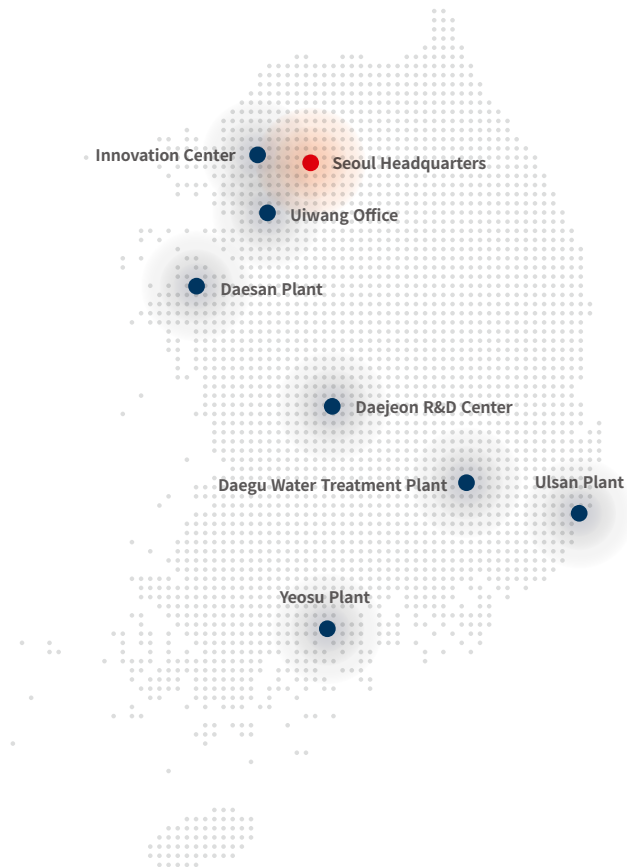
# Business Portfolio

## Business Sites in Korea

LOTTE Chemical has Korea's largest petrochemical complexes in Daejeon/Uiwang Research Center, Yeosu, Daesan, and Ulsan, along with its Seoul headquarters and Uiwang business site. We are committed to continuous growth and maximization of profits of our shareholders and stakeholders by expanding our production facilities and R&D infrastructure.



<p><b>Seoul Headquarters</b> 300 Olympic-ro, Songpa-gu, Seoul, Korea LOTTE World Tower</p>	<p><b>Innovation Center (Seoul Research Center)</b> 201 Magokjungang-ro, Gangseo-gu, Seoul, South Korea</p>	<p><b>Uiwang Office</b> 56 Gosan-ro, Uiwang-si, Gyeonggi-do, South Korea</p>	<p><b>Daesan Plant</b> 82 Dokgot 1-ro, Daesan-eup, Sosan, Chungcheongnam-do, South Korea</p> <p><b>Major Products</b> EL, LDPE, LLDPE, PP, EG, SM, BD, BTXM EVA</p>	<p><b>Daejeon R&amp;D Center</b> 115 Gajeongbuk-ro, Yuseong-gu, Daejeon, South Korea</p>
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<p><b>Ulsan Plant</b> 119 Sapyeong-ro, Nam-gu, Ulsan, South Korea</p> <p><b>Major Products</b> BZ, PX, OX, Me-X, PET, PIA</p>	<p><b>Daegu Water Treatment Plant</b> 35, Gukuksandan-daero 40-gil, Guji-myeon, Dalseong-gun, Daegu</p> <p><b>Major Products</b> Water treatment UF membrane</p>	<p><b>Yeosu Plant</b> <b>Basic Chemicals</b> 53, Yeosusandan 4-ro, Yeosu-si, Jeollanam-do</p> <p><b>Major Products</b> EL, HDPE, PP, PC, PET, EG, BD, BTX</p>	<p><b>Advanced Materials</b> 334-27, Yeosusandan-ro, Yeosu-si, Jeollanam-do</p> <p><b>Major Products</b> ABS, SAN, EPS, PC, engineered stone, artificial marble</p>
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# Business Portfolio

## Main Products

LOTTE Chemical specializes in providing chemical products and chemical material solution services. Our products range from daily necessities — such as synthetic resins, basic chemicals, monomers, and building and interior materials — to agricultural, industrial, medical, mobility, and advanced new materials.

### Basic Materials Division



Basic chemicals, intermediate raw materials

Polymers

Monomers

### Advanced/New Materials Division



High-functional synthetic resin

Building and interior materials

Water-treatment products

Mobility materials

## Production-Capacity of Major Productions

(as of Dec. 2021)

### Basic chemicals

EL Ethylene <b>4,513</b> KTA	PL Propylene <b>1,697</b> KTA
SM Styrene Monomer <b>577</b> KTA	BD Butadiene <b>450</b> KTA
BZ Benzene <b>766</b> KTA	TL Toluene <b>339</b> KTA
MX Mixed Xylene <b>139</b> KTA	PX Para-Xylene <b>750</b> KTA
OX Ortho-Xylene <b>210</b> KTA (*No. 1 domestic production)	MeX Meta-Xylene <b>360</b> KTA (*No. 1 domestic production)

### Polymers

HDPE High-density Polyethylene <b>1,605</b> KTA (*No. 1 domestic production)	LDPE/EVA Low-density Polyethylene / Ethylene-Vinyl Acetate <b>360</b> KTA
LLDPE Linear Low-density Polyethylene <b>490</b> KTA	PP Polypropylene <b>1,820</b> KTA
PET Polyethylene Terephthalate <b>520</b> KTA	ABS Acrylonitrile-Butadiene-Styrene <b>670</b> KTA
PC Polycarbonate <b>460</b> KTA (*No. 1 domestic production)	S-SBR Solution Styrene Butadiene Rubber <b>100</b> KTA (**The production output of LOTTE Versalis Elastomers)
EPDM Ethylene Propylene Diene Monomer <b>96</b> KTA (*The production output of LOTTE Versalis Elastomers)	BR Polybutadiene Rubber <b>50</b> KTA (*LUSR production)

### Monomers

EG Ethylene Glycol <b>1,830</b> KTA (*No. 1 domestic production)	EOA Ethylene Oxide Adduct <b>330</b> KTA (*No. 1 domestic production)
PIA Purified Isophthalic Acid <b>520</b> KTA (*No. 1 international production)	PTA Purified Terephthalic Acid <b>500</b> KTA (*LC PL production)
MMA Methyl Methacrylate <b>260</b> KTA (*Including LOTTE MCC production (210,000 tons/year))	PMMA Poly Methyl Methacrylate <b>110</b> KTA (*LOTTE MCC production)
GE Glycol Ether <b>50</b> KTA	Artificial marble <b>970,000</b> sheets / year
Engineered stone <b>440,000</b> sheets / year	

\*Includes production from subsidiaries and overseas plants



## ENHANCING BRAND VALUE

### LOTTE Chemical Creates a Better Tomorrow

LOTTE Chemical conducts promotional activities and other external activities through various media and communication channels to enhance its brand value for current and future stakeholders.



#### TV Commercial

LOTTE Chemical utilizes TV commercials to build a positive corporate image among the public, and advertise its products and services. The corporate vision of “Contributing to the world for a better future” is conveyed in the campaign message of “Adding momentum to the world with chemistry” and the driving force of LOTTE Chemical through the striking image of a rocket launch. The commercial helped raise the public interest in C-rPET, CCU, hydrogen business and battery material business, which are major businesses and technologies of LOTTE Chemical.

\*LOTTE Chemical's PR videos can be viewed on YouTube, or via the LOTTE Chemical website.

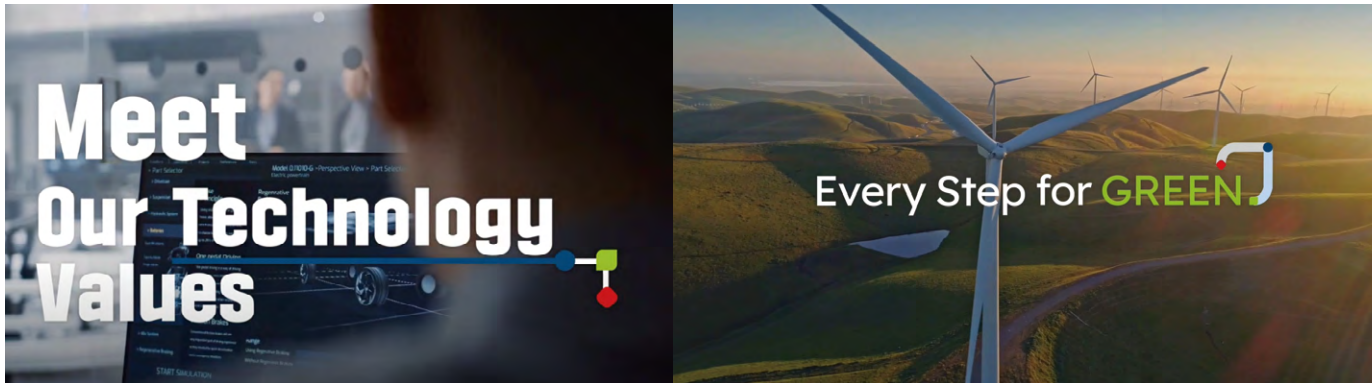
#### Digital Ads

To promote the benefits of LOTTE Chemical's products, a digital advertisement, “Fantastic Plastic,” was produced for six product categories: antibacterial materials, EPP buoys, artificial marble, Bio-PET, mobility materials, and recycled plastic materials. The advertisement successfully marketed major products and projects of LOTTE Chemical and created a popular brand image of a B2B chemical industry group.

#### Printed Ads

LOTTE Chemical promotes image advertisements in newspapers and magazines to enhance brand awareness. Since 2018, we have been using advertising slogans in promotions of our businesses and products. In 2021, we visualized the campaign message ‘propulsion’ and published the image in major daily newspapers and magazines, along with an eco-friendly slogan, as means of communicating our direction for sustainable management to customers and the public.

## ENHANCING BRAND VALUE



### Corporate Brand Film

LOTTE Chemical produced a corporate brand film on present and future values and visions. In the film, we portrayed the distinctiveness of our core businesses by highlighting our global network, customized materials, and R&D technologies. In addition, the film introduced the company's new growth engines for the future, such as materials for the resource circulation, hydrogen, and electric vehicle battery materials.

### Sports Marketing

LOTTE Chemical conducts marketing activities using the advertising platform of the LOTTE Group Sports Club. We foster and support sports through sponsorship advertisements for LOTTE Giants, the most popular sports club in Korea, and the LOTTE Golf Team with top female golfers. In addition, corporate advertisements at major LPGA and KLPGA tournaments, such as the LPGA LOTTE Championship in Hawaii, KLPGA LOTTE Open, and LOTTE Rent-a-Car Open, help raise brand awareness and customer values. We will continue to strive for effective marketing communications.



# Our History

LOTTE Chemical, a leading company in Korea, has taken steps together with economic growth and industrial development of Korea based on its experience of innovative challenges and success. Based on the corporate philosophy of “a world made better through chemistry” LOTTE Chemical is heading toward a brighter future to fulfill its social responsibilities and establish itself as a company that leads sustainable management in the chemical industry.

## 1976

## 2020 — 2022

### 1970s

- 1976. 3.**  
Inaugural meeting and company founding
- 1979. 6**  
Acquisition by LOTTE Group (privatization)
- 1979. 12.**  
Began commercial production
- 1982. 11.**  
Received 100 Mil USD Export Tower
- 1991. 5.**  
IPO and stock listing

### 1990s

- 1991. 6.**  
Construction of Daejeon R&D Center
- 1991. 12.**  
Construction of the NC Plant
- 1995. 8.**  
Obtained ISO 14001 certification (environmental management system)

### 2000s

- 2003. 06**  
Acquired Hyundai Petrochemical (current Daesan Plant)
- 2004. 7.**  
Acquired KP Chemical (current Ulsan Plant)
- 2006. 7.**  
Established LOTTE Chemical Trading (Shanghai) Corp.
- 2006. 8**  
Established a joint venture, LOTTE MCC

### 2010s

- 2010. 11.**  
Acquired Titan Chemical Corp. in Malaysia
- 2011. 11.**  
Established Honam Mitsui Chemical Corporation
- 2012. 12.**  
Merged with KP Chemical and changed corporate name to LOTTE Chemical (former name: Honam Petrochemical)

- 2014. 4.**  
Established Hyundai Chemical (joint venture with Hyundai Oil Bank)
- 2015. 10.**  
Completed construction of gas field chemical project in Uzbekistan (current Uz Kor Gas Chemical)
- 2016. 5.**  
Acquired Samsung Group chemical affiliates (Former LOTTE Advanced Materials, LOTTE Fine Chemicals)
- 2018. 5.**  
Signed MOU with Hyundai Oil Bank to jointly build new heavy feed petrochemical complex (HPC)
- 2019. 5**  
Completion of USA ethane cracker and ethylene glycol plant

### 2020s

- 2020. 1.**  
Merger with LOTTE Advanced Materials
- 2020. 2.**  
Established a joint venture, LOTTE-GS Chemical Co., Ltd.
- 2021. 1.**  
Announced Green Promise 2030, an eco-friendly initiative
- 2021. 4.**  
Ulsan Plant transitioned into a Green Factory
- 2021. 7.**  
Announced 2030 Hydrogen Growth Roadmap
- 2022. 1.**  
Invested in LINE project in Indonesia (US\$3.9 billion)



Inaugural meeting



NC Yeosu Plant



LOTTE Chemical merger and CI declaration ceremony



Promotion of ethane cracker joint project with the US











Merger with LOTTE Advanced Materials



LOTTE Chemical 2030 Vision & Growth Strategies

# OUR SUSTAINABILITY JOURNEY

<p><b>2007</b> →</p> <ul style="list-style-type: none"> <li>Established social contribution system</li> </ul>	<p><b>2008</b> →</p> <ul style="list-style-type: none"> <li>Introduced of matching grant</li> <li>Published of the first sustainability report</li> </ul> 	<p><b>2009</b> →</p> <ul style="list-style-type: none"> <li>Revised economic, safety, and health management policies</li> <li>Merged with LOTTE Daesan Petrochemical</li> <li>Entered DJSI KOREA for the first time</li> </ul> 	<p><b>2010</b> →</p> <ul style="list-style-type: none"> <li>Endorsed of the GEMS (green energy management system) as the first in the industry</li> <li>Incorporated into Social Responsibility Investment Index of Korea Exchange</li> <li>CDP KOREA 2010 Best Company in New Sector/Leader in Raw Materials Sector</li> <li>Awarded the best company in social contribution</li> </ul>	<p><b>2011</b> →</p> <ul style="list-style-type: none"> <li>Received the Korea SR Grand Prize</li> <li>Incorporated into DJSI Asia Pacific for the first time</li> </ul>	<p><b>2012</b> →</p> <ul style="list-style-type: none"> <li>Changed the company name to LOTTE Chemical</li> </ul>  <ul style="list-style-type: none"> <li>Merged with KP Chemical</li> <li>Received the Environment Minister Award at the Leading Resource Circulation Company Award</li> </ul>
<p><b>2018</b> ←</p> <ul style="list-style-type: none"> <li>1st place in LACP 100</li> </ul>	<p><b>2017</b> ←</p> <ul style="list-style-type: none"> <li>Awarded for excellent public announcement</li> <li>Renewed ISO 14001(2004-&gt;2015) certification</li> </ul> 	<p><b>2016</b> ←</p> <ul style="list-style-type: none"> <li>Declared of human rights contribution to the UN SDGs</li> <li>1st place in LACP 100</li> </ul> 	<p><b>2015</b> ←</p> <ul style="list-style-type: none"> <li>Established chemical management system (LCMS)</li> <li>Participated in the GHG emissions trading market</li> <li>Formed Charlotte Lotte Volunteer Group</li> </ul>	<p><b>2013~2014</b> ←</p> <ul style="list-style-type: none"> <li>Received the Excellent Corporate Governance Award by the Korea Corporate Governance Agency</li> <li>Participated in CDP</li> <li>Selected as an excellent company with the climate change competitiveness index</li> </ul>	<ul style="list-style-type: none"> <li>Selected as a “family-friendly company”</li> </ul> 
<p><b>2019</b> →</p> <ul style="list-style-type: none"> <li>Acquired ISO 37001 certification for anti-corruption management system</li> </ul> 	<p><b>2020</b> →</p> <ul style="list-style-type: none"> <li>Received Grade A in the ESG Evaluation by Korea Corporate Governance Service (2011~2018)</li> <li>Merged with LOTTE Advanced Materials</li> <li>Established Sustainability Management Guidelines for Suppliers</li> <li>Published Mutual Growth Report for the first time</li> </ul>	<p><b>2021</b></p> <ul style="list-style-type: none"> <li>Implemented Project LOOP, a resource circulation project</li> </ul> 	<p><b>2021</b></p> <ul style="list-style-type: none"> <li>Green Goals and ESG Business Strategies Declaration of Green Promise 2030</li> </ul>  <ul style="list-style-type: none"> <li>Announced 2030 New Growth Roadmap</li> </ul>	<ul style="list-style-type: none"> <li>Started Clean Hydrogen Project in Sarawak, Malaysia</li> <li>Entered Plastic Circular Economy Platform Agreement with Ulsan</li> <li>Issued ESG bonds and created dedicated funds</li> </ul>	



# LOTTE Chemical in Everyday Life

LOTTE Chemical provides chemical material products and specialized material solution services. Our products range from daily necessities such as basic chemicals, monomers, polymers, and building and interior materials to agricultural/ industrial/ medical/ automobile products, and advanced new materials.

## OFFICE



### 1 — PC (Ballpoint pens)

PC is a high-strength, heat- and shock-resistant plastic material. In addition, it is highly transparent and non-toxic, so it is widely used for electrical/mechanical parts, optical discs, and automobile headlamps.

### 2 — TPE (Wire and cable)

TPE has elasticity like rubber at room temperature and is deformable at high temperature. With low density, it reduces product weight. Researches are actively being conducted to use it in automobile parts; TPE is also widely used in wires and cables.

### 3 — PP (Reusable cup)

PP material is resistant to heat and shock, resistant to chemicals, and is transparent. PP is used as raw material for various products, including automotive materials, disposable syringes, transparent containers, and non-woven fabrics for hygiene.

### 4 — SM (Laptop)

SM uses benzene and ethylene as raw materials. It is used to make polystyrene (PS), which is widely used in toys and cushioning materials; ABS, which is widely used in automobile parts and electrical products; and paints.

### 5 — LDPE

#### (Disposable paper cups)

LDPE is easy to mold, flexible, resistant to moisture and water, and has excellent transparency. It is used in agriculture, packaging films, and various kinds of wraps. The coating film applied to paper cups to prevent them from getting wet is made of LDPE.

### 6 — PET

#### (Disposable lunch boxes)

It is commonly used in food and beverage containers for its non-toxic and transparent properties.

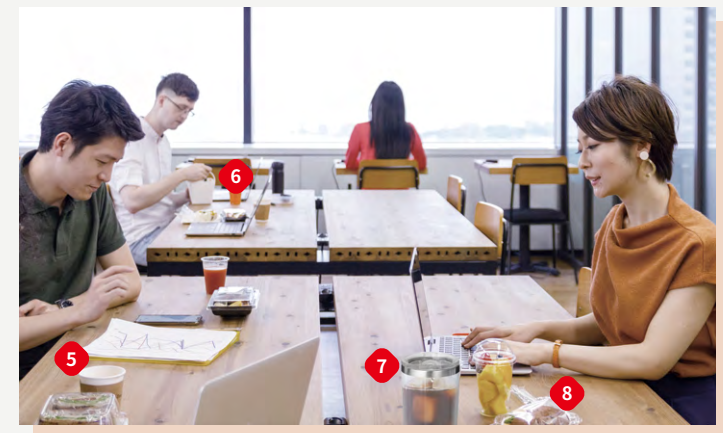
### 7 — HDPE (Water bottle)

As a type of PE, high-density polyethylene (HDPE) has excellent heat resistance, shock resistance, moldability, and cold resistance. It is used in kitchen containers, fishing nets, ropes, cable insulation, automobile fuel tanks, films, etc.

### 8 — LDPE

#### (Food packaging film)

LLDPE has excellent mechanical strength and transparency; it is used in industrial films, containers, storage tanks, toys, etc. for its high thermal stability, machinability, mechanical properties and fluidity.



## LOTTE Chemical in Everyday Life

### 9 — ASA (Window frame)

ASA is a material with excellent chemical resistance, gloss, and injection properties. Due to its superior weather resistance, it shows little change in appearance even when exposed to the external environment for a long time. Hence, it is widely used for outdoor applications such as window frames and building cladding.

### 10 — PC (TV housing, Mobile phones)

PC is a high-strength, heat- and shock-resistant plastic material. In addition, it is highly transparent and non-toxic, so it is widely used for electrical/mechanical parts, optical discs, and automobile headlamps.

### 11 — ABS (Inner case of refrigerator)

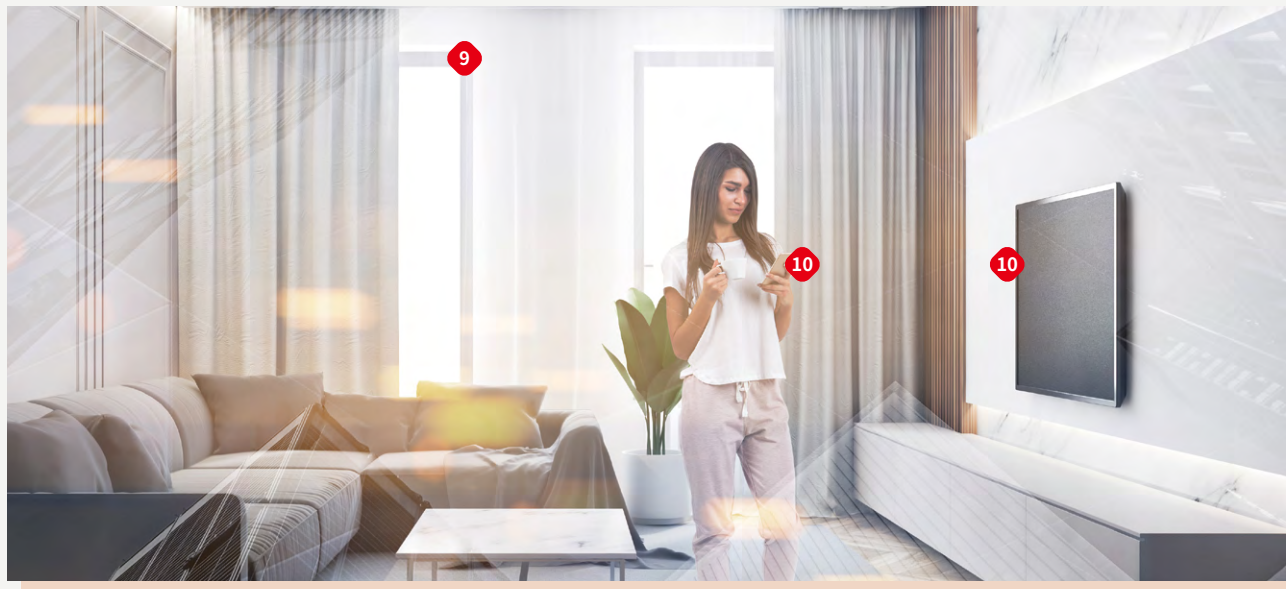
ABS is a practical material used in various home appliances such as refrigerators, washing machines, clothing management machines, and vacuum cleaners due to its excellent impact resistance, formability and colorability.

### 12 — PMMA (Artificial Marble Walls)

Staron is a high-quality artificial marble brand that embodies the textures and colors of nature. An interior material that comes in a variety of colors and patterns, it can be seamlessly sculpted, enabling easy-to-maintain creative designs.

### 13 — HDPE (Cutting boards)

As a type of PE, high-density polyethylene (HDPE) has excellent heat resistance, shock resistance, moldability, and cold resistance. It is used in kitchen containers, fishing nets, ropes, cable insulation, automobile fuel tanks, films, etc.



# HOME



# LOTTE Chemical in Everyday Life

## LEISURE



### 14 — EPP (Helmets)

EPP is a PP composite resin with improved functions of polypropylene (PP) and is a representative petrochemical product. Increasing number of industries use EPP for it is non-toxic, sturdy, and has excellent insulation.

### 15 — PC (Sports goggles)

PC is a high-strength, heat- and shock-resistant plastic material. In addition, it is highly transparent and non-toxic, so it is widely used for electrical/mechanical parts, DVDs, and acoustic barriers.

### 16 — BD (Tires)

BD is a major raw material for synthetic rubber that replaces natural rubber. It is colorless gas with a unique odor at room temperature; it is used mainly as a raw material for tire, rubber hose, etc.

### 17 — EVA (Shoes)

EVA has characteristics like rubber and plastic; it is soft, absorbs shock, and retains heat well and is used to make shoe soles.

### 18 — TPO (Rear bumpers)

It has improved properties and functionalities compared to ordinary plastics by adding a material that adds functionality to PP or PE, which is a synthetic resin. It is used for parts that require excellent stability and to make products lighter.

### 19 — TPV (Wipers)

It is a TPE material that applies dynamic crosslinking technology. It has the elasticity of rubber and has excellent machinability. It also has excellent elasticity recovery, weather resistance, chemical resistance and ozone resistance, thus can be substituted for PVC and synthetic rubber.

### 20 — EO/EG (Automobile antifreeze)

It is manufactured through the oxidation reaction of ethylene and oxygen, which are the main products of LOTTE Chemical. It is widely used as a synthetic raw material or for sterilization and disinfection.



# SUSTAINABILITY OVERVIEW

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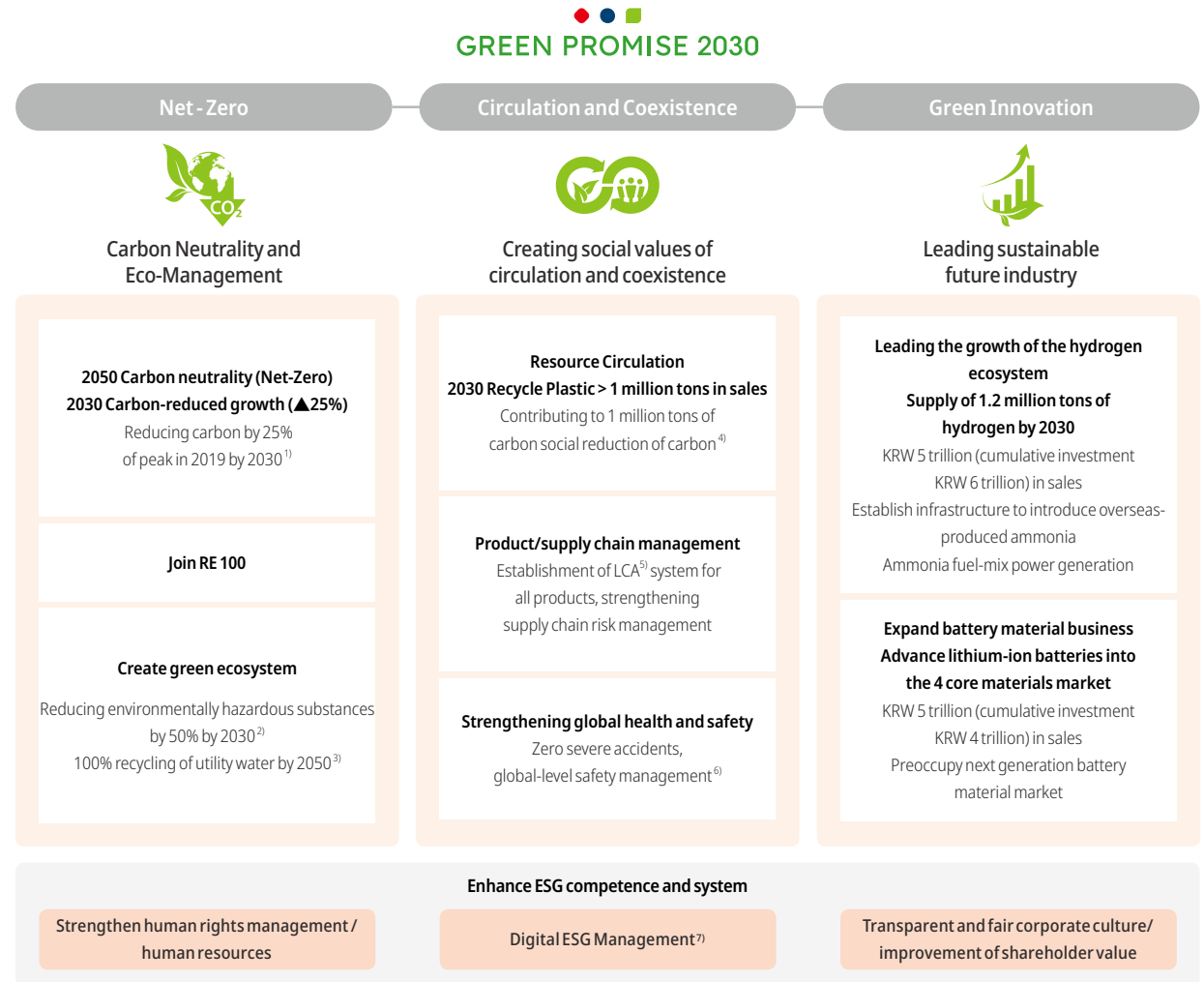
# Strategies for Sustainable Management

## Sustainability management system

In recognition of the importance of ESG management in the business environment, LOTTE Chemical declared 2021 as the first year of ESG management. To grow as a sustainable company, we believe that value-creation in social and environmental fields is as important as value-creation in the financial field, and hence we have established core ESG strategies and goals. We will continue to listen to stakeholders' opinions and respond strategically to changes in social trends to build a more systematic and sustainable management system.

## ESG Vision and Strategies

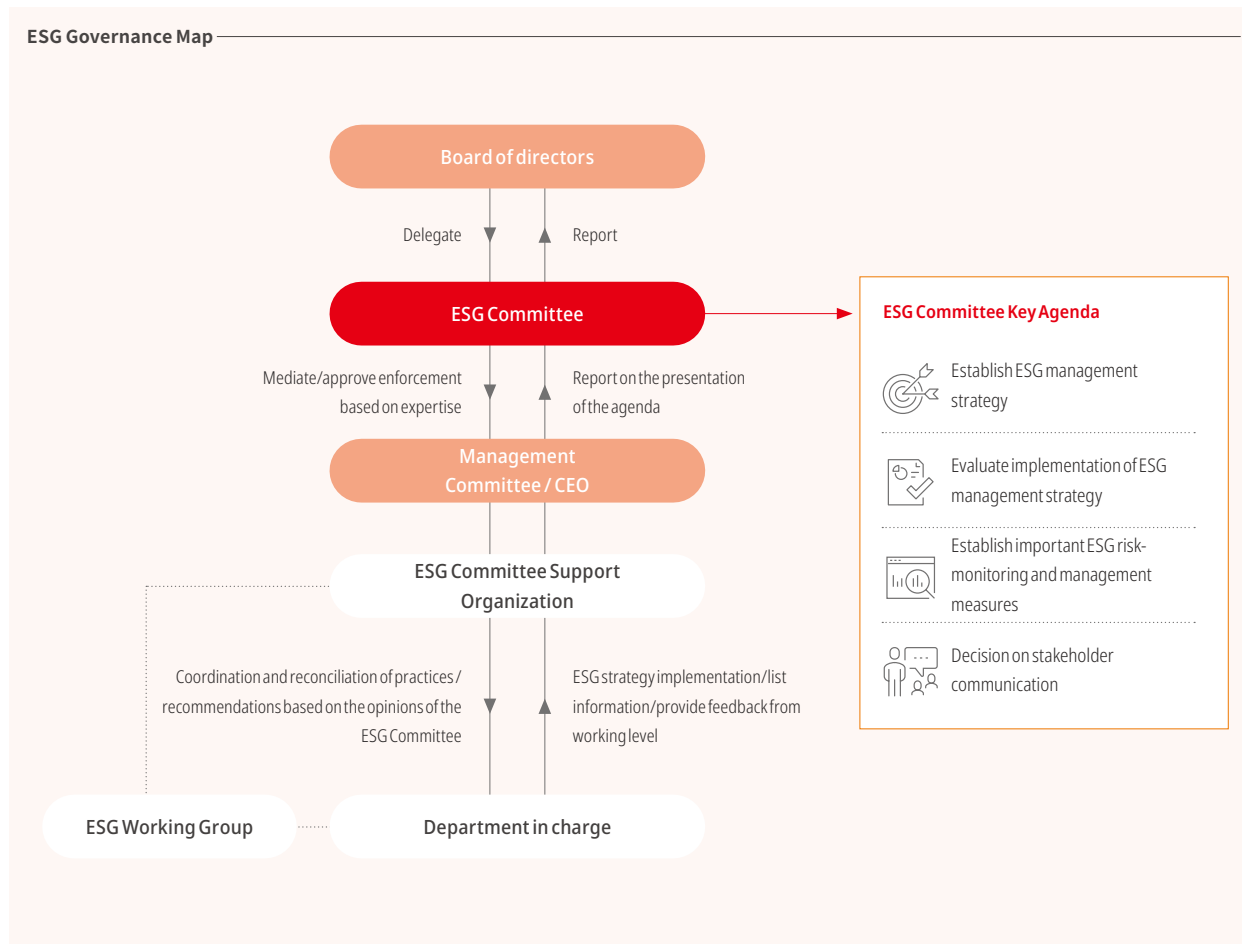
To contribute to the environment and society, LOTTE Chemical has re-established the ESG vision as "GREEN PROMISE 2030," based on the corporate slogan of "Every Step for GREEN." Through our ESG vision, we plan to promote carbon neutrality and eco-management, create social values of circulation and coexistence, and lead sustainable future industry. For carbon neutrality and environmental management, we will reduce carbon emissions by 25% of 2019 emissions (peak) by 2030 and achieve carbon neutrality (Net-Zero) by 2050, and promote RE100 membership. To create social value of circulation and coexistence, we plan to increase sales of recycled plastic products to more than 1 million tons by 2030, and promote product/supply chain management and global safety and health reinforcement. Furthermore, to lead the sustainable future industry, we plan to build the hydrogen ecosystem preemptively and at the same time advance into the battery material business to reinforce high value-added future businesses.



1) Domestic, based on Scope 1&2 2) Air, water quality, waste 3) 100% recycling of wastewater discharge (including purchase of recycled water) by 2050 4) Expected social carbon reduction effect when 1 million tons of recycled plastic is sold 5) Life Cycle Assessment (across all process) 6) Introduction of global safety management indicators → LTR (Lost Time Injured Rate, number of casualties per 100 people per year) 0.065 ↓ or less 7) Advancement of internal management systems such as carbon and energy management and safety management / integrated ESG information management and disclosure system / application of new IT technologies for process innovation (AI)

### Establishment and operation of sustainable management governance

LOTTE Chemical manages risks beyond the operational and financial risks, which are normally present in corporate activities. Under the strengthened ESG management, the company manages non-financial risks related to the environment, safety, information security, ethics and compliance in a comprehensive and systematic manner. In September 2021, we established the ESG Committee through a resolution of the Board of Directors to further the sustainable governance system. The ESG Management Headquarters has formed a working group, under which organizations are working together to achieve the sustainability management vision and tasks.



#### Stakeholder Interview

#### “LOTTE Chemical promotes sustainable management by building a proper ESG management structure”

LOTTE Chemical has launched an ESG management system prioritizing transparent governance. Accordingly, an ESG Committee (Board) was established with expertise in each field and diversity as main considerations. A key task for this year is the establishment of a risk-management system, which is most important in the chemical industry. It requires all departments and teams to work together organically to respond to a variety of risks present in industrial safety, finance, and human rights. LOTTE Chemical has established a stable and horizontal organizational culture but needs to improve on organizational vitality and creativity. In an active organization, there is a high level of employee engagement (loyalty), and all employees actively participate in realizing the corporate vision to attain sustainable management. As LOTTE Chemical makes progress in implementing the ESG governance structure and system, I look forward to seeing the company's contributions to society through sustainable management.



ESG Committee  
Chair Jeon Woon-bae









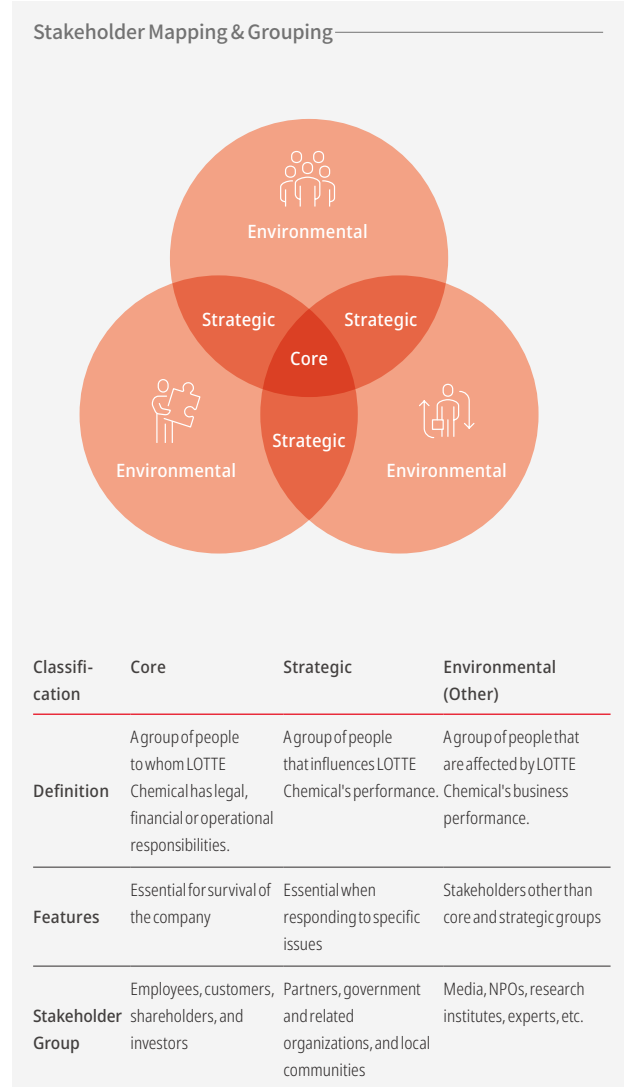
# Stakeholder Engagement

## Classification of stakeholders

LOTTE Chemical has identified key stakeholders as executives and employees, customers, shareholders and investors, business partners, government and related organizations, and local communities that have an impact on overall management and social responsibility. According to the legal, financial, and operational responsibilities and impact, which are the standards for stakeholder classification defined by ISO 26000, LOTTE Chemical has classified stakeholders into three groups: core stakeholders, strategic stakeholders, and other stakeholders. LOTTE Chemical reflects the needs of stakeholders in establishing business strategies and making corporate decisions and operates various communication channels according to the interests of each group. Through active communication with stakeholders, we will endeavor to provide information on fair management activities and transparent information disclosure.

### Engagement Channels & Status by Stakeholder Group

Classification	Stakeholders	Issues of interest	Communication channel	Details of activities
Internal	<b>Employees</b> 	<ul style="list-style-type: none"> <li>Enhance safety and health of employees</li> <li>Promote work-family balance</li> </ul>	<ul style="list-style-type: none"> <li>Employee council (quarterly)</li> <li>Labor-management council (quarterly)</li> <li>Grievance committee (at all times)</li> <li>Chemi-talk (quarterly)</li> <li>Organizational Culture TF (at all times)</li> <li>Company magazine (monthly)</li> <li>HR Presentation (at all times)</li> </ul>	<ul style="list-style-type: none"> <li>Promote work-life balance</li> <li>Competency enhancement program</li> <li>Employee welfare and benefit program</li> <li>Working environment improvement activities</li> </ul>
	<b>Customers</b> 	<ul style="list-style-type: none"> <li>Product quality</li> <li>Product reliability</li> <li>R&amp;D</li> </ul>	<ul style="list-style-type: none"> <li>Customer satisfaction surveys (annual)</li> <li>In-person visit (as needed)</li> <li>Customer invitation programs (Once a year or more)</li> <li>Voice of customer processing procedure (at all times)</li> </ul>	<ul style="list-style-type: none"> <li>Continued operation of customer service digital platform (MaaS)</li> <li>Promptly respond to claims related to product quality and logistics/ transportation</li> <li>Conduct customer satisfaction survey</li> <li>Develop new products</li> </ul>
	<b>Government and related organizations</b> 	<ul style="list-style-type: none"> <li>Compliance with environmental and safety laws</li> </ul>	<ul style="list-style-type: none"> <li>National Assembly Debate (at all times)</li> <li>Government hearings (at all times)</li> <li>Other meetings (at all times)</li> </ul>	<ul style="list-style-type: none"> <li>Report on major issues in the industry</li> <li>Development of public-private cooperation project</li> <li>Review participation in national projects</li> </ul>
External	<b>Shareholders and investors</b> 	<ul style="list-style-type: none"> <li>Economic Performance</li> <li>Stability in governance</li> </ul>	<ul style="list-style-type: none"> <li>Regular shareholders' meeting (once a year or more)</li> <li>Corporate briefing (once a year or more)</li> <li>Performance announcement (quarterly)</li> <li>Disclosure (at all times)</li> <li>IR Meetings (at all times)</li> <li>Investment information website (at all times)</li> </ul>	<ul style="list-style-type: none"> <li>Introduction of electronic voting at the general shareholders' meeting</li> <li>Operation of subcommittees within the board of directors</li> <li>Disclosure of mid-term shareholder return policy</li> <li>CEO IR Day</li> <li>Conference, NDR</li> <li>Disclosure in Korean and English</li> </ul>
	<b>Partner companies</b> 	<ul style="list-style-type: none"> <li>Communication with Partners</li> <li>Mutual Growth</li> </ul>	<ul style="list-style-type: none"> <li>Meetings with partner companies (once a year or more)</li> <li>In-person visits to partner companies (at all times)</li> <li>Operation of complaint-handling hotline channel (at all times)</li> </ul>	<ul style="list-style-type: none"> <li>Providing ESG support to partner companies</li> <li>Financial support</li> <li>Hiring support</li> <li>Welfare and benefits support</li> <li>Technical support and protection</li> <li>Productivity improvement support</li> </ul>
	<b>Local communities</b> 	<ul style="list-style-type: none"> <li>CSR Activities</li> </ul>	<ul style="list-style-type: none"> <li>Sisterhood ties (at all times)</li> <li>Meetings with local residents (at all times)</li> <li>Environmental clean-up (at all times)</li> <li>Charlotte Volunteer Group (at all times)</li> </ul>	<ul style="list-style-type: none"> <li>Communication with local communities</li> <li>CSR Activities</li> </ul>



# Materiality Assessment

## Materiality Assessment Summary and Process

LOTTE Chemical has identified issues that stakeholders consider important and conducted a materiality assessment for systematic selection and management of sustainability-related topics. The assessment consisted of the analysis of international standards, stakeholder survey, media research, benchmarking of advanced companies, and domestic and foreign industry analysis, as recommended by the ISO 26000. Through this assessment, we derived an issue pool that reflects changing industry trends and values of sustainability management that we should prioritize.

### Materiality Assessment Process

<p><b>Step 1</b> <b>Identification</b> Analysis of internal and external environments to derive a pool of sustainability management issues</p>	<ul style="list-style-type: none"> <li>International standards and evaluation criteria for analysis: Global standard evaluation items related to sustainable management, such as GRI Standards, ISO 26000, UNSDGs, SASB, MSCI, and KCGS</li> <li>Media analysis: LOTTE Chemical on economic/social/environmental articles in the past three years (2019, 2020, 2021)</li> <li>Benchmarking analysis: Activities and composition of sustainability reports of advanced companies in the same industry at home and abroad</li> </ul>
<p><b>Step 2</b> <b>Prioritization</b> Prioritization of issues through materiality assessment</p>	<ul style="list-style-type: none"> <li>Evaluation of relevance: Select 16 material topics by evaluating the relevance to sustainability issues identified through analysis of internal and external environments.</li> <li>Evaluation of significance: Prioritize relevant topics from online stakeholder survey conducted on international and domestic stakeholders from Jan 19 ~ Feb 16, 2022. Determine 12 materials topics</li> </ul>
<p><b>Step 3</b> <b>Validation</b> Verification of Validity</p>	<ul style="list-style-type: none"> <li>The management (ESG Committee) and TF team review the importance of the selected 12 material topics to LOTTE Chemical's sustainability management.</li> <li>Determine the level of reporting on material topics, such as scope and period, and establish a plan</li> </ul>

## Materiality Assessment Results

Based on the derived issue pool, both “stakeholder interest” and “business impact” were quantitatively measured, and 12 material topics were finally identified. Environmental topics such as climate response, health and safety at workplace, and sustainable resource circulation were identified as key topics with high priority. Other social topics, such as human rights management and talent acquisition & training were classified as important issues. The contents of LOTTE Chemical's sustainability report were determined based on material topics selected through materiality assessment.

### Materiality Assessment Results Matrix












### Material Topics in 2021





Area	Topics	GRI Topic	Reporting Boundary	Page number
Environmental	Climate Response	GRI 305: Emissions	Inside	41-42
Economic	Developing New Growth Engines	-	Inside	47-49
Social	Management of health and safety at workplace	GRI 403: Occupational Health and Safety	Inside/ Outside	50-52
Environmental	Sustainable Resource Circulation	GRI 303: Water and Effluents, GRI 306: Waste	Inside	45-46
Social	Ethical management, compliance and Fair Trade	GRI 206: Anti-competitive behavior	Inside	76-80
Environmental	Reduction of Environmental Pollution	GRI 305: Emissions	Inside	39-40, 46
Social	Opportunity and Risk Management	-	Inside	74-75
Social	Human Rights Management	GRI 412: Human Rights Assessment	Inside/ Outside	60
Social	Talent Acquisition & Training	GRI 401: Employment, GRI 404: Training and Education	Inside	62-63
Social	Establishment of Sound Governance	-	Inside	72-73
Environmental	Hazardous Chemicals Management	-	Inside	54-55
Social	Stakeholder Communication	-	Inside	19



# Management Approach Core Topics

Topics	Context	Our Approach	Key Performance	Next Plan
<b>Climate Response</b>  	Climate change is the most commonly recognized global issue that needs to be solved. Reducing greenhouse gas emissions at the corporate level has now become an essential business area. We must recognize the impact of climate crisis on the social and economic areas and prepare for sustainability beyond environmental preservation.	LOTTE Chemical's Green Promise 2030 initiative displays LOTTE Chemical's commitment to overcome climate crisis and reduce carbon emissions. By establishing a GHG reduction plan for 2030 and 2050, we are striving for absolute reduction of GHG emissions. Various reduction measures are being carried out to minimize the impact on climate change. Through research and development of new GHG reduction technologies, application and improvement of energy-saving facilities in business sites, and efficient operation, we aim to reduce energy consumption and GHG emission.	<ul style="list-style-type: none"> <li>Establish goals for 2030 Carbon Reduction Growth, 2050 Net-Zero</li> <li>Complete demo operation of carbon dioxide capture facility</li> <li>Organize climate-change response governance structure (ESG Committee)</li> <li>Expand air tele-monitoring system (TMS)</li> <li>Declare support for TCFD</li> </ul>	<ul style="list-style-type: none"> <li>Promote tasks to achieve carbon reduction targets for 2030 and 2050</li> <li>Develop plans to meet RE100 (Renewable Energy 100)</li> <li>Expand use of renewable energy</li> <li>Commercialize carbon capture/ use</li> </ul>
<b>Developing New Growth Engines</b>  	LOTTE Chemical is recognized as a technologically advanced company in the petrochemical industry. Through consistent development of innovative materials and technologies, we are maintaining a competitive advantage in our main business areas of basic materials and advanced materials. In the future business area, we are endeavoring to preoccupy the market and technology in promising fields by launching the hydrogen energy and battery material business group.	Various efforts to achieve the vision 2030 are being carried out in LOTTE Chemical's research centers. Furthermore, we are analyzing patents and proactively responding to risks to formulate a patent strategy for R&D collaboration. Based on new business proposals and DT (Digital Transformation), we are developing new growth engines that will enhance economic values.	<ul style="list-style-type: none"> <li>World top-class products: HDPE for CPE, PP for medical use, PP for lamination</li> <li>New technology certification: PO-based shrink label</li> <li>Environmental Label Certification: Bio-PET</li> <li>Operate R&amp;D project organization for basic materials</li> <li>Effective research execution process</li> </ul>	<ul style="list-style-type: none"> <li>Diversify portfolio in the fields of new materials and innovative materials (hydrogen, battery, carbon-neutral, and bio)</li> <li>Research and develop new megatrends</li> <li>Strengthen internal and external open innovation channels</li> </ul>
<b>Workplace Health and Safety Management</b>  	With the recent enactment of the Serious Accidents Punishment Act of Korea, health and safety regulations at workplaces are becoming stricter in accordance with changes in the government's safety-related policies. Companies must comply with government regulations and prevent workplace safety accidents for employees. A safety and health system must be established preemptively, even if it requires further manpower and cost. A company must carry out systematic management and supervision, and strengthen the prevention system.	LOTTE Chemical is working to ensure the industrial safety of its employees and related parties and to strengthen the safety and health management system. Under the goal of Zero Serious Accidents, Zero Process Problems, and Zero Human Errors, we are striving to create a safer workplace culture. We are strengthening the ability to respond to safety and environmental risks by improving safety work management systems, facility maintenance systems, and DT (Digital Transformation)-based processes. Furthermore, we are implementing a variety of support systems to ensure the rights to safety and health of employees of partner companies.	<ul style="list-style-type: none"> <li>Promote safety innovation tasks</li> <li>Response to the Serious Accidents Act/ Occupational Safety and Health Act</li> <li>Response to the Act on Punishment of Serious Accidents (appoint manager and establish organization in charge)</li> <li>Business site audit (LSHEA) hosted by headquarters: 1st cycle completed for all business sites (26 teams / 25 divisions)</li> <li>ISO Management System Certification: Maintain international standard certification and expand the scope of application</li> </ul>	<ul style="list-style-type: none"> <li>Business site audit (LSHEA) hosted by headquarters: 2nd cycle completed for all business sites</li> <li>Implement three-year key measures for safety innovation</li> <li>Advanced risk management</li> </ul>
<b>Sustainable resource circulation</b>  	Agenda for the resource circulation are being discussed by global initiatives and in particular, the 2020 European Green Deal announced related action plans. Sustainable resource circulation has become an important global issue. As a petrochemical company, we have to take responsibility and prepare ourselves for the tightened environmental regulations, as well as increasing global demands. We need to utilize our capabilities in resource circulation to create values.	Through Green Promise 2030, we are implementing procurement of green raw materials (green product category, eco-friendliness evaluation guidelines, green procurement). We have secured an important position in the market and created economic value by developing renewable energy for the materials division and recycling the by-products. We will continue to expand investment in resource circulation technologies to fulfill our social and environmental responsibilities, as well as new values to be created in the future.	<ul style="list-style-type: none"> <li>Set circulation target for 2030 (sales of one million tons of recycled products)</li> <li>Develop and apply PCR-PE (post-consumer recycled polyethylene) packaging bags</li> <li>Launch the first Project LOOP social venture for resource circulation</li> </ul>	<ul style="list-style-type: none"> <li>Introduce recycling technology and expand sales of recycled products</li> <li>Expand operation of Project LOOP</li> </ul>

Topics	Context	Our Approach	Key Performance	Next Plan
<p>Ethical Management</p> 	<p>Ethical management plays a vital role in gaining stakeholder support, because customers' perception of an ethical company is directly related to their consumption patterns. In other words, the practice of ethical management is the foundation of a company's sustainable management.</p>	<p>Under the direct supervision of the CEO, the Compliance Management Team has been operating systems required to expand ethics/compliance management culture. We also offer online and offline training for employees to instill a culture of ethical management and compliance management.</p>	<ul style="list-style-type: none"> <li>Establish and continue improving work process to be more transparent and efficient</li> <li>Continue providing ethical management training</li> <li>Completed processing of two unethical management cases</li> <li>Online and offline ethical management training</li> </ul>	<ul style="list-style-type: none"> <li>Continuously monitor ethical management (regular/constant)</li> <li>Support implementation of ethical management of partner companies</li> <li>Internalize ethical management culture within the company</li> </ul>
<p>Compliance and Fair Trade</p> 	<p>We are making ethical/compliance management a part of our culture to be able to lead the market in lawful, fair ways, share success, and play an active role in resolving social problems. We operate a global level of compliance management throughout our business areas and strive to spread the culture of compliance management to domestic and overseas affiliates and stakeholders. Moreover, recognizing that compliance management is an essential aspect in business operation, we evaluate compliance management indicators as common KPIs.</p>	<p>Under direct supervision of the CEO, the Compliance Management Team has been endeavoring to establish systems required to realize and expand the compliance management culture, and reporting the status to the top management and board of directors. The Compliance Management Team evaluates risks for the entire company, preemptively reviews areas with high risks, and conducts internal control activities on a regular basis. In order to instill a culture of ethics/compliance management, we also conduct online and offline training for employees.</p>	<ul style="list-style-type: none"> <li>Global Standard Compliance System Operation</li> <li>ISO 37001 Certification</li> <li>Constant monitoring and inspection of high-risk areas</li> <li>Process improvement for transparent internal process</li> </ul>	<ul style="list-style-type: none"> <li>Global top-tier level system operation</li> <li>Expand compliance management system</li> <li>Enhance supply chain compliance</li> <li>Reduce corruption-related risks to zero</li> </ul>
<p>Reduction of Environmental Pollution</p> 	<p>Advanced global companies have been making active efforts to minimize environmental impacts of their business activities. Besides water and air pollution, which are already well-known problems, the rapid increase in plastic usage is also emerging as a problem that causes a serious marine and soil pollution. It is important that companies feel the responsibility and make meaningful efforts to reduce emissions of environmental pollutants throughout their business processes.</p>	<p>LOTTE Chemical recognizes the seriousness of air, water, and soil pollution caused by the nature of the industry; we are taking a multifaceted approach to fulfill our duties as a socially responsible company. Representative activities include ISO14001 certification, expansion of environmental investment, wastewater/plastic emission management and recycling. Additionally, we have installed and are operating our own wastewater treatment plants in each production plant, where we constantly monitor the pollutant emission levels to meet international standards.</p>	<ul style="list-style-type: none"> <li>Monitor 100% of water intake and water quality for each water intake source</li> <li>Operate a water-leak management system that detects abnormal use of water resources and damage to pipes</li> <li>Establish internal standards that are stricter than the government requirements for wastewater management</li> </ul>	<ul style="list-style-type: none"> <li>Promote tasks to reduce waste emission</li> <li>Identify reliable recycling companies and develop recycling technology</li> </ul>
<p>Opportunity and Risk Management</p> 	<p>The global industry is experiencing rapid changes. By anticipating changes in the environment and preparing strategies for various crisis situations that may occur in business operations, we can seize new opportunities. In addition, we need to establish risk response strategies for existing and new business areas, so we can fulfill our responsibility as leader of the industry. In order to provide value to customers, employees, local communities, and shareholders in the ESG management environment, we identify the impact of corporate activities in relation to risks and opportunities.</p>	<p>Based on the management's interest and eagerness to apply risk management, LOTTE Chemical has established a company-wide integrated risk response system to identify and appropriately respond to social, economic, and environmental risks. Through the establishment and operation of a organized risk management system, we are concentrating on eliminating of potential internal and external risk factors to prevent them from developing into a crisis.</p>	<ul style="list-style-type: none"> <li>Identify of operational risks and implementation of response strategies</li> <li>Identify of financial risks and implementation of response strategies</li> <li>Identify of non-financial risks and implementation of response strategies</li> <li>Strengthen investment deliberation; regular inspection of major investment progress</li> <li>Constant monitoring and management of credit rating and financial flexibility</li> <li>Expand of safety investment, such as improving inspection of high-risk facilities</li> </ul>	<ul style="list-style-type: none"> <li>Predict and respond to the ESG management risks</li> <li>Operate of company-wide integrated risk management process</li> <li>Operate of governance and organic council; systematic integration</li> <li>Anticipate new business risks, identify opportunities, and respond to portfolio diversification</li> </ul>
<p>Human Rights Management</p> 	<p>Interest in human rights violations is increasing worldwide, as well as social awareness. Through human rights management that encompasses the whole value chain, a company can reduce the risk of direct and indirect human rights violations and improve corporate brand reputation.</p>	<p>LOTTE Chemical implements human rights violation prevention program and human rights education program to internalize a culture that respects human rights. Related organizations have been installed to continuously monitor and improve human rights risk identification, impact assessment processes, and goals.</p>	<ul style="list-style-type: none"> <li>Develop programs to establish a safe environment culture and improve organizational culture</li> <li>Develop key leader competency course and redesign expatriate training system</li> <li>Develop and implement new team leader/leader courses and special lectures on communication; introduce new performance management/evaluation/reward systems</li> </ul>	<ul style="list-style-type: none"> <li>Systematic recruitment of key talent, establishment of human resources development process</li> <li>Establish fair performance management and compensation system/culture</li> <li>Improve organizational culture and promote internalization</li> </ul>

Topics	Context	Our Approach	Key Performance	Next Plan
Talent Acquisition and Training 	In order to secure competitiveness as a global company amid diversified market demands and challenges, LOTTE Chemical recognizes the importance of securing excellent human resources and strengthening their capabilities. Accordingly, the company operates a systematic recruitment system and human resource support program. The company is dedicated to forming a sound organizational culture to fulfill the social responsibilities and continue sustainable management.	LOTTE Chemical strives to raise the proficiency of its employees through employee development programs and operates various systems and support programs to foster global human resources, ensure work-life balance, and support female human resources. Additionally, we are using various recruitment methods that reflect changes in technology and the environment to secure professional talent.	<ul style="list-style-type: none"> <li>Establishment of new hiring process according to technological and environmental changes</li> <li>Expansion of all-year-round basis hiring to acquire most suitable human resources in a timely manner</li> <li>Utilization of IT/AI technology (interview/PR, etc.) for recruitment</li> <li>Introduction of open recruitment system and flexible recruitment period/frequency</li> </ul>	<ul style="list-style-type: none"> <li>Expand of recruitment of new business professionals</li> </ul>
Sound Governance 	Creating a stable economic value through business operation and technological expertise is important, but it is equally important to build trust with stakeholders and protect them through a transparent and sound decision-making structure. In particular, the Board of Directors is an independent body that makes various contributions to corporate activities and should be able to exert influence on sustainability management.	LOTTE Chemical launched the ESG Committee, which serves as the highest decision-making body for the establishing of ESG management strategies and execution plans, and monitors investment decisions and execution performance. This is the result of the structural reform of the company in its attempt to fulfill its social and environmental responsibilities and achieve sustainable growth. We look forward to the future of the transparent governance.	<ul style="list-style-type: none"> <li>Hold regular board meetings once a month and hold emergency board meetings</li> <li>Establish five subcommittees, in which more than half of the members are outside directors</li> <li>Launch the ESG Committee</li> <li>Enhance the ESG information disclosure system</li> <li>Appoint outside directors as chairs in all committees to enhance committee independence</li> </ul>	<ul style="list-style-type: none"> <li>Report frequently to the board of directors on issues related to sustainability management, such as economy, society, and environment</li> <li>Propose ESG committee's core agenda, such as establishment of ESG management strategy</li> </ul>
Hazardous Chemicals Management 	LOTTE Chemical responds to regulations on registration and evaluation of hazardous chemicals and chemical management. The strengthened regulations and laws show the increased emphasis on sustainable ecosystem and safety of customers. Therefore, a strict management system is needed considering the environmental impact, as well as socio-economic impact on the areas where the business site is located.	LOTTE Chemical has developed a hazardous chemicals management system, through which the company conducts weekly inspection of the purchasing and sales channels and handling (storage, transport, etc.) of regulated hazardous chemicals. In order to ensure compliance with related regulations and prevent accidents, we are preparing data and evidence for customers and related organizations in line with global standards.	<ul style="list-style-type: none"> <li>Complete product MSDS revision (1,660 products)</li> <li>Improve hazardous chemicals management system (confirmed compliance with 200 domestic and foreign laws and regulations)</li> <li>Apply RPA and OCR technologies to the pre-evaluation of chemical substances and regulatory inspections</li> <li>Register chemical substances in all business sites (According to domestic and overseas government guidelines)</li> </ul>	<ul style="list-style-type: none"> <li>Register 20 chemical substances (1~1,000 tons of imported/ manufactured chemicals)</li> <li>Prioritize risk-assessment of high-risk hazardous substances</li> </ul>
Stakeholders Communication 	Decision-making through communication with stakeholders in accordance with the major recommendations of ISO26000 is already a major task and is recognized as a core element of sustainability management in Korea. In the rapidly changing economic and social environment, smooth communication with stakeholder is key to enhancement of sustainable management. Business strategies must be prepared by reflecting the needs of not only internal stakeholders, executives, and employees, but also external stakeholders within the influence of our business.	LOTTE Chemical places stakeholders at the core of strategy building and business execution and is gathering their opinions through various communication channels. We will always strive to facilitate stakeholders' communication through various means, such as expanding employee communication channels, implementing customer invitation programs and regional customer communication activities, conducting customer satisfaction surveys, monitoring, holding regular general shareholders' and partners' meetings, and offering diverse website-based services.	<ul style="list-style-type: none"> <li>Operate employee council, labor-management council, and ChemiTalk for communication with internal stakeholders</li> <li>Conduct customer satisfaction surveys</li> <li>Participate in national assembly debate and government hearings</li> <li>Hold general shareholders' meetings, IR Day, etc.</li> <li>Provide in-person consultations for partner companies; operate grievance channel</li> <li>Provide ESG support to partner companies</li> <li>Conduct CSR activities and communication with local communities</li> </ul>	<ul style="list-style-type: none"> <li>Continuously operate communication channel to hear voices of all employees</li> <li>Continuously operate ESG support activities for partners</li> </ul>

## 2021 ESG Highlights — Environmental

### Environmental 1. Carbon

**2030 Carbon-Reduced Growth** 25% reduction compared to 2019  
**2050 Net-Zero**



**Completed demonstration of new CCU technology applied with gas separation membrane**

for the first time in the domestic chemical industry,

**Commercialization plant design in progress**

Plan to capture 500,000 tons of carbon emission by 2030

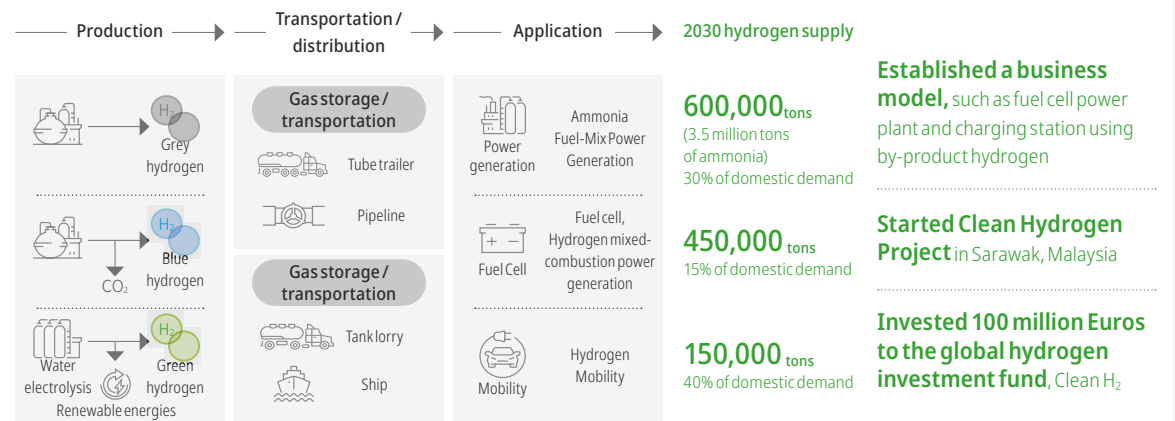


LOTTE Chemical-KAIST **establishes a Carbon Neutral Research Center** and promotes technology leadership and recruit of human resources



### Environmental 2. Hydrogen

**Established a goal of 1.2 million tons of hydrogen supply by 2030**



**Established a business model**, such as fuel cell power plant and charging station using by-product hydrogen

**Started Clean Hydrogen Project** in Sarawak, Malaysia

**Invested 100 million Euros to the global hydrogen investment fund**, Clean H<sub>2</sub>

### Environmental 3. Resource Circulation

**Build a circular ecosystem for plastic**

	Short-term (2021-2023)	Mid-term (2024-2027)	Long-term (Targets for 2030)	2030 Goal
<b>Physical</b>	r-ABS, r-PC (60KT) (2021)	Expansion of r-PP products	expansion of existing PCR* business (>440 KT)	Recycled plastics
<b>Chemical</b>	Ulsan r-PET (test production of 4 KT) (2022)	r-PET commercial production (110 KT) (2024)	r-PET total conversion (340 KT) Other (>70 KT)	<b>Annual sales of over 1 MT</b> (sales of KRW 2 trillion, cumulative investment KRW 1 trillion)
<b>Pyrolysis</b>	Pilot operation of pyrolysis of naphtha (2022)	Commercial production of pyrolysis naphtha (> 50KT) (2025)	Expansion of pyrolysis business (>150 KT)	

\*PCR: Post Consumer Recycle

## 2021 ESG Highlights — Social — Governance

### Social 1

#### Reinforced safety system/culture/organizational capacity to prevent major accidents

**Signed a technical collaboration business agreement** with Korea Gas Safety Corporation to strengthen safety management  
 Improve workplace safety, develop the latest safety technology, and conduct training on advanced management techniques



Announced a company-wide safety culture and **a pledge to become “the safest company in the world”**



**Signed a business agreement with Samsung Fire & Marine Insurance, “Risk Management Partnership Agreement for the Prevention of Serious Disasters”**  
 For risk assessment and accident prevention at LOTTE Chemical’s and partners’ business sites; share know-how’s to prevent accidents



### Social 2

#### Expansion of Project LOOP to improve awareness of resource circulation



#### Launched the first Project LOOP social venture to build a circulation system for plastics

- Established a virtuous resource circulation system and manufactured recycled PET products through the pilot project from the past two years
- Expanded the range of recycled materials from PET to general plastics, including PE, PP, and ABS through the launch of the first Project LOOP social venture

### Governance

#### Strengthening ESG management



#### Improved external ESG evaluation

Undisclosed CDP participation in 2020 → climate (A-) and water resources (A-) in 2021

**A-**

MSCI evaluation grade improved from BB in 2020 to BBB in 2021

**BBB**

#### Established ESG vision and strategies, and established the ESG Committee;

included ESG metrics in executive evaluation



Revised BOD regulations and introduced electronic voting system



Issued an ESG bond of KRW 200 billion and created the first ESG fund of KRW 50 billion



Received A grade in the KCSG evaluation in 2020 and 2021

**A**

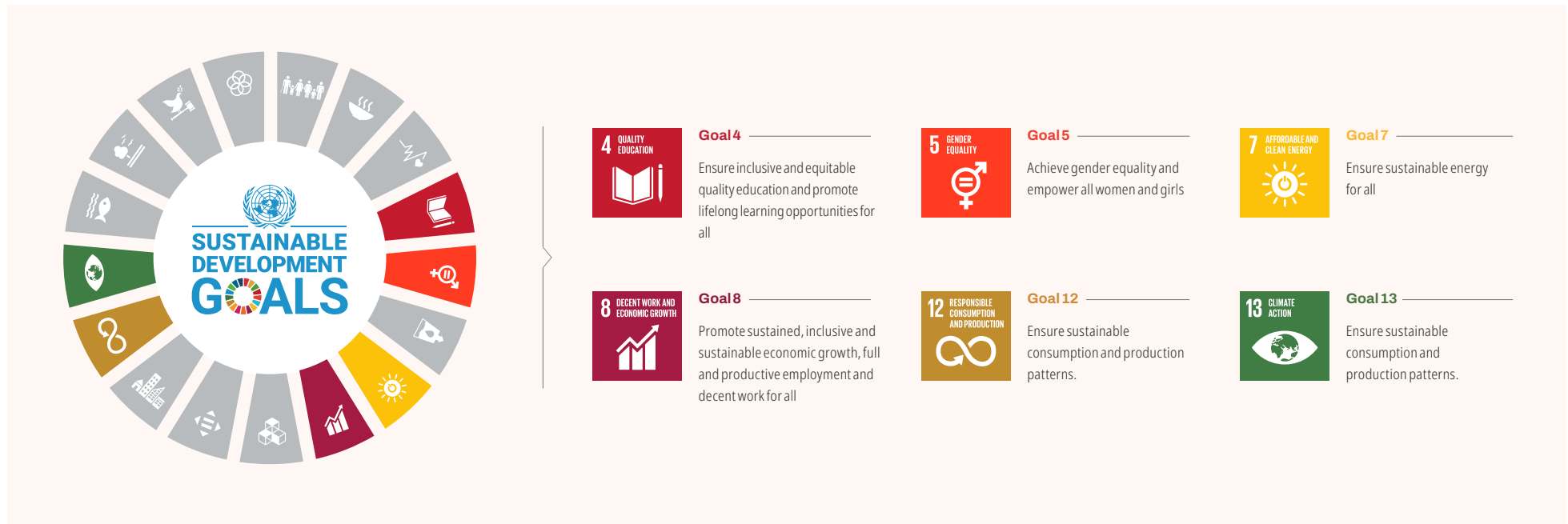
# UN SDGs







## Our impact on the UN SDGs

The UN Sustainable Development Goals (SDGs) are the global goals in economy, society, and environment to be pursued by the UN and the international community by 2030. Established under the principle of “leave no one behind,” the UN SDGs is consisted of 17 goals and 169 targets. LOTTE Chemical has set 6 goals in consideration of the nature of industry and

business capabilities. Countries around the world continue to make efforts to implement the Sustainable Development Goals (SDGs). In Korea, we are adding momentum to the implementation of each of the UN SDGs through government policies and laws, which include the Sustainable Development Act, the Framework Act on Low Carbon, Green Growth, and the Framework Act

on International Development Cooperation. As a member of the international community, LOTTE Chemical has established the ESG Committee to achieve the global task of sustainability and the long-term visions, “Green Promise 2030” and “Project LOOP”.









	<p><b>Goal 4</b></p> <p>Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all</p>		<p><b>Goal 5</b></p> <p>Achieve gender equality and empower all women and girls</p>		<p><b>Goal 7</b></p> <p>Ensure sustainable energy for all</p>
	<p><b>Goal 8</b></p> <p>Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all</p>		<p><b>Goal 12</b></p> <p>Ensure sustainable consumption and production patterns.</p>		<p><b>Goal 13</b></p> <p>Ensure sustainable consumption and production patterns.</p>



# UN SDGs

## Our impact on the UN SDGs

SDGs	SDG Targets	Our Approach	Key Performance
	<p><b>Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all</b></p> <p>4.4 Ensure inclusive and equitable training and education; promote lifelong learning opportunities</p> <p>4.5 Ensure access to education and vocational training for the vulnerable</p>	<ul style="list-style-type: none"> <li>· Mom-friendly music play: music therapy programs for psychological and emotional development of children with intractable diseases and for relieving the stress of caregivers, or parents, of those children.</li> <li>· LOTTE Green School: monthly training on recycling and separation of plastics at local children's centers</li> <li>· Project LOOP : installed 20 PET collectors in local schools in Incheon and developed and operated a resource circulation education program for students.</li> </ul>	Scholarships 234,000,000 KRW
	<p><b>Achieve gender equality, empower all women and girls</b></p> <p>5.1 End all forms of discrimination against women and children</p> <p>5.5 Encourage women's participation and ensure equal opportunities for leadership in political, economic, and public life</p>	<ul style="list-style-type: none"> <li>· Family-friendly management: mandatory parental leave; maternity leave and work system (maternity leave, fertility leave, etc.); enhance support for pregnant employees, etc.</li> <li>· Gender diversity of the BOD: eliminate qualification restrictions for female outside directors and chair</li> </ul>	Female managers 13.2%
	<p><b>Ensure sustainable energy for all</b></p> <p>7.3 Double the global rate of improvement in energy efficiency</p>	<ul style="list-style-type: none"> <li>· Expand green and renewable energy generation business, such as solar power generation and hydrogen fuel cell power generation</li> <li>· Improve energy efficiency and promote zero-energy building construction</li> <li>· Perform systematic energy-saving activities through participation in a government pilot project of voluntary energy efficiency target system</li> </ul>	Energy-consumption reduction 900TJ
	<p><b>Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all</b></p> <p>8.3 Encourage the formalization and growth of micro-, small- and medium-sized enterprises</p> <p>8.5 Achieve full employment and decent work for all men and women; create quality jobs; achieve equal pay for work of equal value</p>	<ul style="list-style-type: none"> <li>· Support ESG management of partner companies: ESG training support, on-site diagnosis and consulting</li> <li>· Provide financial support: subsidize interest for mutual growth fund loans, support payment bond issuance</li> <li>· Support welfare benefits: provide vacation and holiday gifts for partner companies</li> <li>· Support hiring/long-term employment: Naeil Chaemum (Brighter Future) Mutual Aid Program, operate online employment system for partner companies, support job fair</li> <li>· Provide technical support and protection: joint research / material analysis support, support for technology escrow</li> <li>· Improve productivity: consulting support, safety management and disaster prevention consulting support</li> </ul>	Mutual Growth Fund 112 billion KRW
	<p><b>Ensure sustainable consumption and production patterns</b></p> <p>12.4 Achieve the environmentally sound management and reduction of chemicals and all wastes</p> <p>12.5 Reduce waste through recycling and reuse</p>	<ul style="list-style-type: none"> <li>· Ensure proper management of chemical substances                             <ul style="list-style-type: none"> <li>- Check the toxicity of raw materials and products before purchase/sales, compliance with substance regulations</li> <li>- Manage substances in major products according to the Material Safety Data Sheet (MSDS), establish and operate a global-level in-house chemical management system (LCMS)</li> </ul> </li> <li>· Expand operation of Project LOOP: expand the project to build a circular economy system</li> <li>· Recycle waste packaging bags: establish a circulation system for waste packaging bags by developing PCR-PE bags</li> </ul>	Project LOOP Recycled waste plastic 50,534 PET bottles (Based on 500ml)
	<p><b>Take urgent action to combat climate change and its impacts.</b></p> <p>13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters</p>	<ul style="list-style-type: none"> <li>· Declare support for TCFD</li> <li>· Operate greenhouse gas energy- management system (GEMS)</li> <li>· Launch Petrochemical Carbon Zero Committee</li> <li>· Build and operate a carbon dioxide capture and liquefaction facility (CCUS)</li> <li>· Participate in the Carbon Disclosure Project</li> </ul>	GHG Emissions 6,540,000 tons



**SPECIAL FOCUS ON**  
SUSTAINABILITY






- 30 Special Focus 1:  
Roadmap to Carbon Neutrality
- 32 Special Focus 2:  
New Growth Roadmap
- 34 Special Focus 3:  
Resource Circulation
- 36 Special Focus 4:  
Strengthening Safety Management



**SPECIAL FOCUS**

# 01. Roadmap to Carbon Neutrality


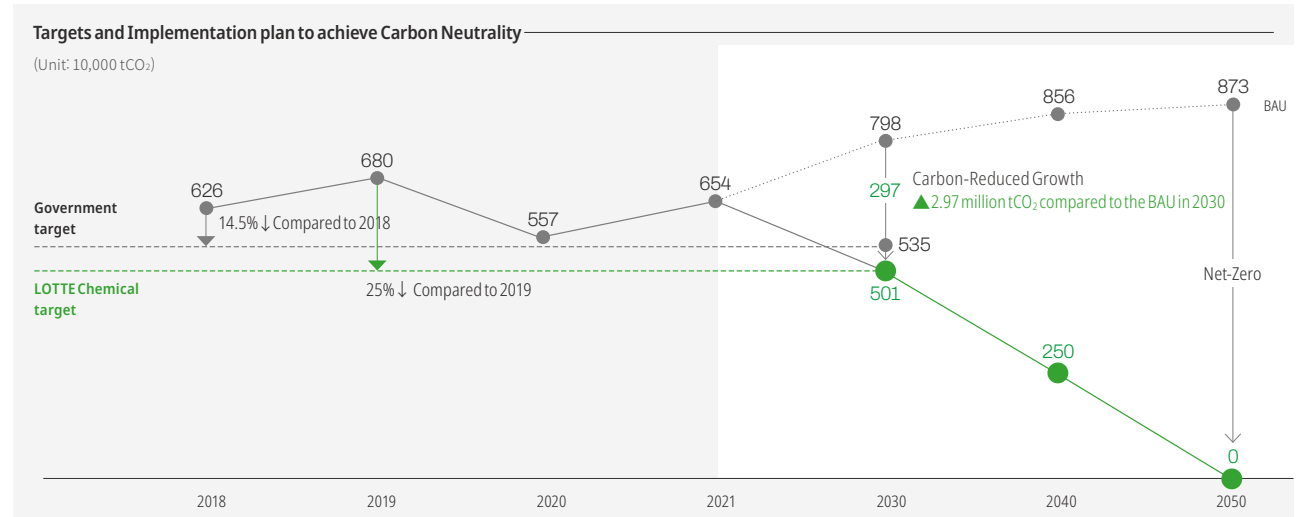


**Goal**

## 2030 Carbon-Reduced Growth

25% reduction compared to the peak (2019 emission)

**2050 Net-Zero**

### Green Promise 2030 Carbon Reduction Roadmap

#### 2030 Carbon-Reduced Growth, 2050 Net-Zero

LOTTE Chemical has set a goal to reduce carbon emissions by 25% by 2030 compared to the peak of 6.8 million tons in 2019. This would be 2.97 million tons reduction compared to the BAU (“business as usual,” or emissions that would occur if reduction measures were not implemented), which is more aggressive than the target set by the government (14.5% compared to 2018). Our long-term goal is to achieve net-zero and reduce carbon emissions by 8.73 million tons compared to BAU by 2050. This goal reflects our desire to take the lead in environmental protection, join the global movement, and accelerate the transition to eco-friendly business. As short-term measures, LOTTE Chemical intends to improve processes and build zero-energy buildings to achieve the carbon reduction goal. In addition, we plan to reduce carbon emissions through carbon capture measures, such as CO<sub>2</sub> separation membrane, carbonation process application, and overseas underground storage.

In the mid- to long-term, we plan to replace raw materials with low-carbon raw materials (LPG) and eco-friendly fuel (LNG). By installing solar-power generation and securing new and renewable energy such as hydrogen fuel cell power generation, we hope to achieve our goal of carbon neutrality.

#### Carbon Reduction Tasks and Target Reduction Amount

(Unit: 10,000 tCO<sub>2</sub>)

Tasks	Details	Targets for 2030	Targets for 2050
Improve energy efficiency	Process improvement, construction of zero-energy building (Daejeon, Uiwang)	39	330
CCUS	CO <sub>2</sub> membrane capture, application of carbonation process, etc.	50	261
Replace raw materials	Convert to low carbon raw material (LPG), eco-friendly power fuel (LNG), etc.	28	43
Renewable energy	Install solar power plant, hydrogen fuel cell generation plant, etc.	180	239
<b>Total</b>		<b>297</b>	<b>873</b>

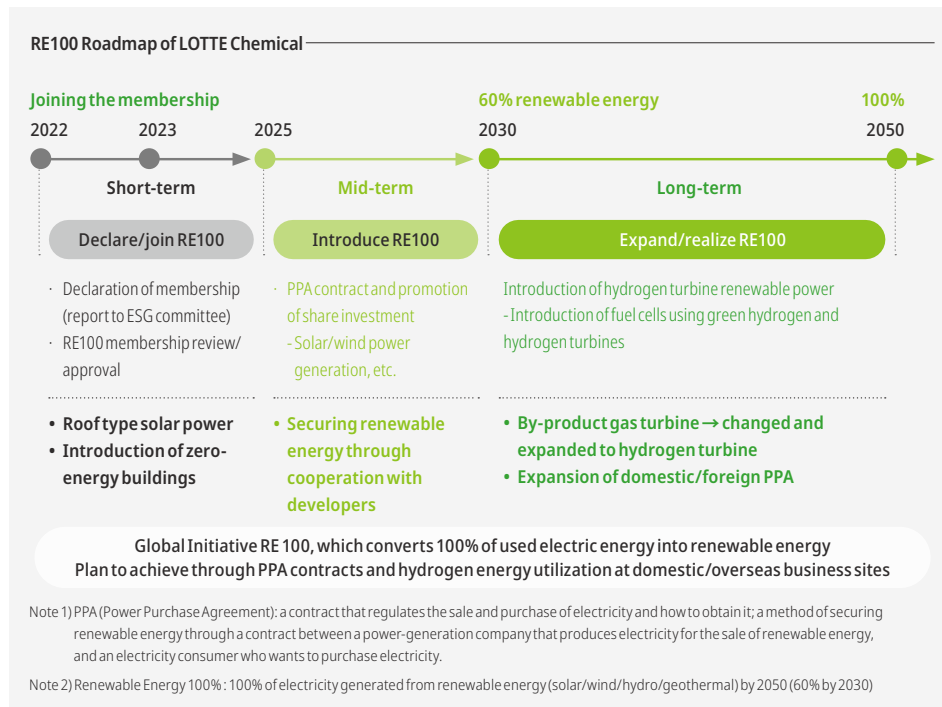


## Main Task 1. Renewable Energy

### Declaration of RE100 membership and implementation plan

As a measure to strengthen ESG management, LOTTE Chemical has joined the RE100 membership and declared the commitment to 100% renewable energy. By 2030, we plan to increase the share of renewable energy to 60% of total electricity through renewable energy purchase contracts at all domestic and overseas business sites. We will gradually switch to 100% renewable energy by 2050 by introducing fuel cells and power generation facilities that use green hydrogen.

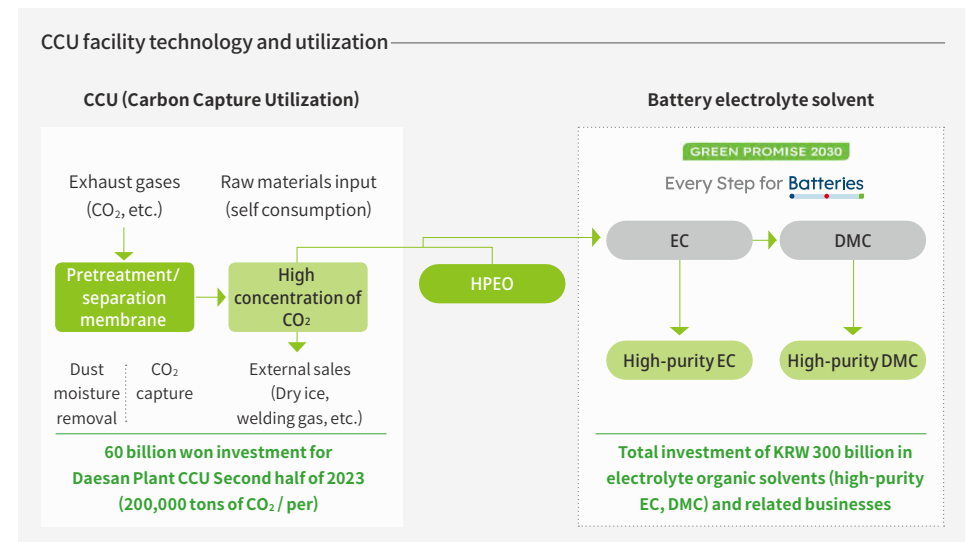
In order to achieve these goals, the Hydrogen Energy Business Group and the Battery Material Business Group have been newly established in March. The goal of each business group is to not only preoccupy the hydrogen market but also build a foundation for future growth; they are dedicated to achieving carbon neutrality while expanding the oil business capabilities and making the transition to new businesses.



## Main task 2. CCUS (Carbon Capture Utilization & Storage)

### Commercialization of CO<sub>2</sub> capture and strengthening of green battery material business

LOTTE Chemical completed the demonstration of its Carbon Capture Utilization (CCU) facility to which gas separation membrane was applied for the first time as a domestic petrochemical company, and started designing for commercialization. CCU is a technology that helps collect carbon dioxide in the atmosphere or exhaust gas, use it industrially, and store it safely for a long time. The CO<sub>2</sub> collected at the CCU facility will be used as raw material for high-purity EC (ethylene carbonate), which is an organic solvent used in electrolytes for electric-vehicle batteries, DMC (dimethyl carbonate), and PC (polycarbonate) to make dry ice, semiconductor cleaning liquid, etc. Furthermore, CCU technology will be applied for the expansion of the Yeosu facility, and for the production of green methanol, to achieve CO<sub>2</sub> capture and utilization of 500,000 tons per year by 2030, and 2.61 million tons by 2050.



SPECIAL FOCUS

# 02. New Growth Roadmap

(Hydrogen & Battery materials)

## Hydrogen energy



### Hydrogen Energy Business Goal

2030  
Hydrogen supply target of  
**1.2 million tons**



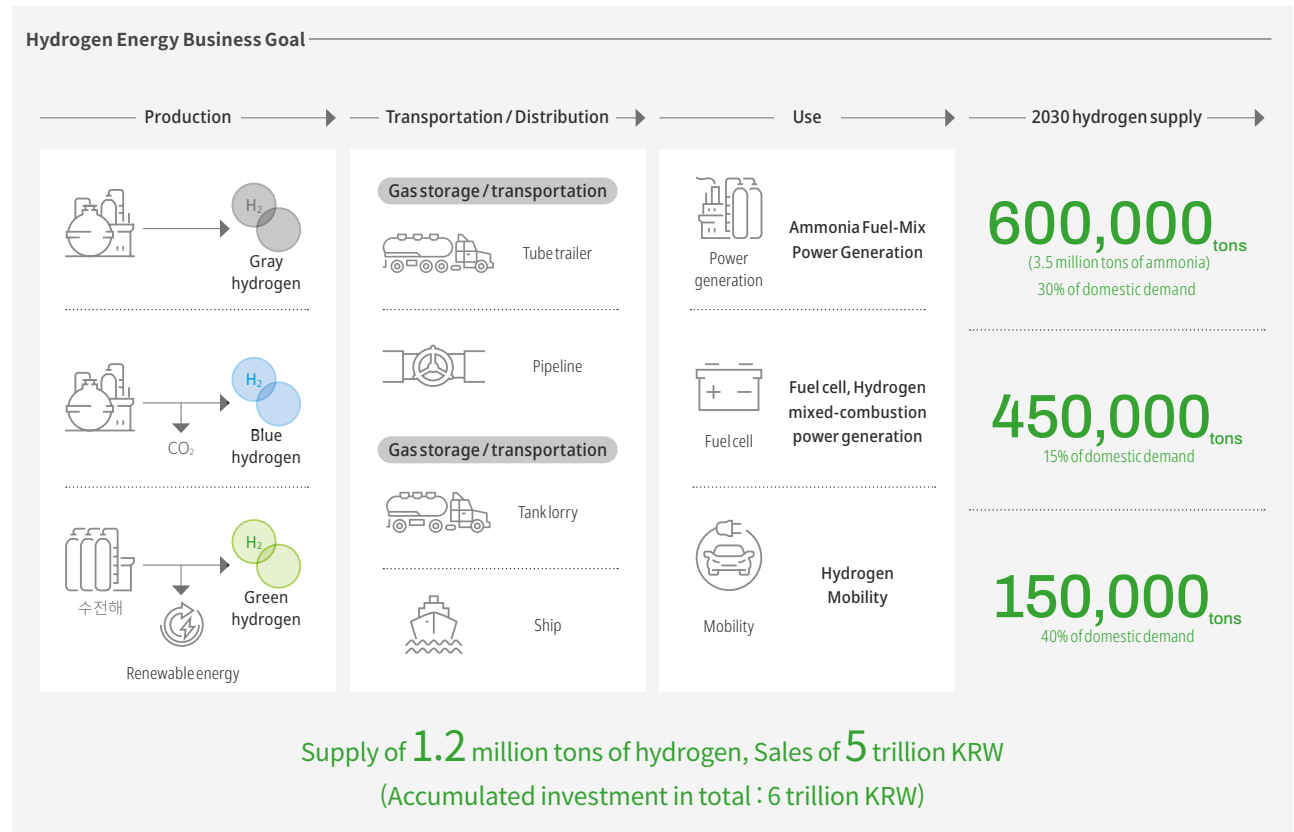
Sales Target  
**KRW 5 trillion**



## Green Promise 2030 Hydrogen Energy Business Roadmap

### Hydrogen-Energy Business Goal

LOTTE Chemical intends to establish a foundation for future growth by securing dominance in the hydrogen market as one of the business opportunities to respond to ESG trends. Hydrogen energy is essential to the carbon-neutral and green-energy market expansion that can bring a paradigm shift in the energy field. It has high potential, and is an important area in carbon neutrality. We set the goal of producing 1.2 million tons of hydrogen per year and achieving sales of KRW 5 trillion by 2030. We will be reborn as a chemical company leading the hydrogen market by continuously promoting businesses to acquire overseas ammonia, build the necessary infrastructure, develop vacant technologies, and expand hydrogen utilization.

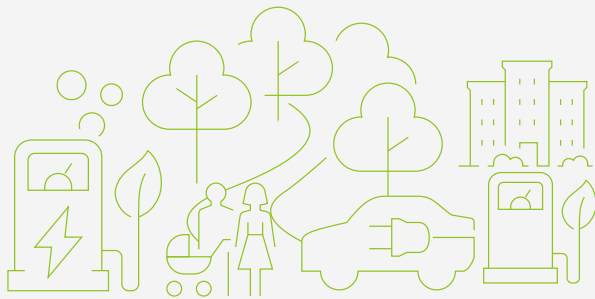


SPECIAL FOCUS

# 02. New Growth Roadmap

(Hydrogen & Battery materials)

## Battery materials



**Goal**  
 2030  
 Battery materials business sales of  
**KRW 5 trillion**  
 (investment KRW 4 trillion)



**Build supply chain network**  
 for battery materials



## Battery Materials Business Roadmap

### Goals and strategies for battery materials business

In response to the pressing demand for the growth of key battery materials due to the rapid increase in the production of green, electric vehicles, LOTTE Chemical has established the Battery Materials Business Division and set the 2030 targets and strategies.

With a goal of reaching KRW 5 trillion in sales by 2030, we are actively expanding the business of cathode materials, anode materials, separators, and electrolytes, which are the four core materials for lithium batteries. We are also actively engaging in new material businesses of the next-generation battery solutions, such as lithium metal cathode materials and vanadium electrode materials. We intend to advance into the global market and become a specialized battery material company.

### 2030 Battery Material Business Goal

#### Lithium Ion Battery Solutions



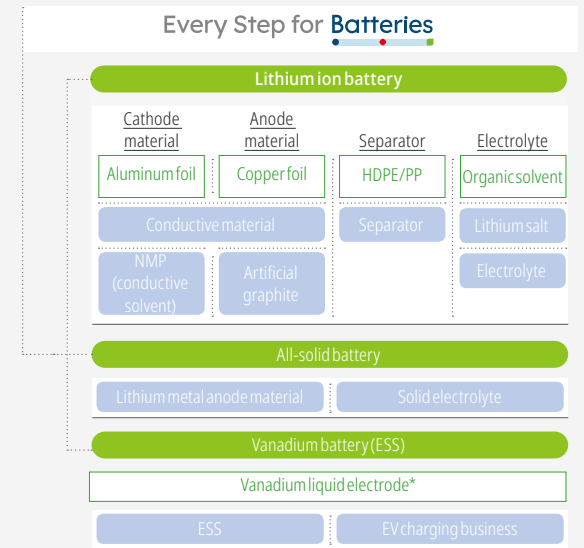
#### Lithium Ion Battery Solutions



### Battery Materials Business Roadmap

Emerging topics in the rapidly growing battery market are the expansion and reorganization of the supply chain centered on the US and the development of next-generation batteries with improved stability and capacity that go beyond the limitations of existing batteries. LOTTE Chemical plans to maximize synergy by utilizing the capabilities of its battery material business in LOTTE Group's chemical unit and quickly build local networks of material value chains for batteries based on the capabilities of existing manufacturing facilities and business bases in the US. To this end, we plan to establish a separate corporation to promote the battery materials business in the US and expand investment projects. In addition, we plan to engage in open cooperation with various partners that have competitive technology related to battery materials. At the same time, we plan to actively expand business partnership and development of next-generation battery material technology that will go beyond existing battery technologies.

### Battery Materials Business Roadmap



\* As an essential element for high-stability vanadium batteries for ESS, acts as cathode material, anode material, and electrolyte

○ Current businesses ● Expansion areas under review

SPECIAL FOCUS

# 03. Resource Circulation



**Goal**  
2030  
Annual sales of  
**1 million tons** of  
recycled plastic products

**Sales target**  
KRW **2 trillion**




## Green Promise 2030 Resource Circulation Roadmap

### Virtuous cycle of resources, transition from a linear economy to a circular economy

The amount of waste plastic generated increases every year, and the circular economy policies of major countries continue to strengthen.

As a plastic manufacturer, LOTTE Chemical acknowledges that it is time to change from a linear economy to a circular economy to achieve sustainable business operation and growth. Accordingly, LOTTE Chemical has established a plan to expand the production of recycled plastic products through introduction of chemical recycling technologies for main products (pyrolysis, PET depolymerization, etc.), as well as physical recycling using clean waste plastics. Lastly, we set a virtuous cycle goal of producing and selling one million tons of recycled products by 2030.

#### Resource Circulation Roadmap & Targets

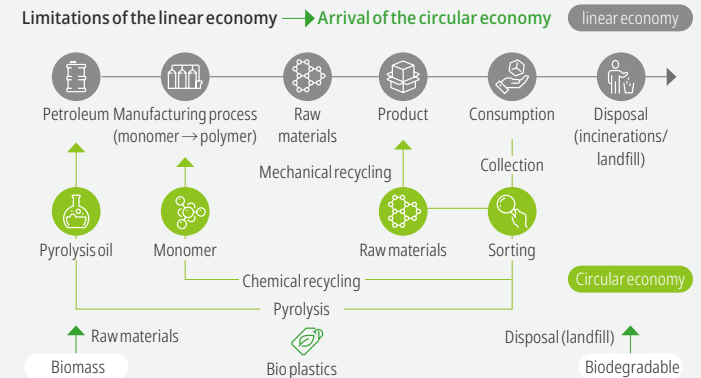
	2021~2023 Short-term	2024~2027 Mid-term	2030 Long-term targets	2030 Goal Recycled Plastics  Annual sales of over 1 MT (sales of KRW 1 trillion, cumulative investment KRW 1 trillion)
<b>Physical</b>	r-ABS, r-PC (60KT) (2021)	r-PP product expansion	Expansion of existing PCR* business (>440 KT)	
<b>Chemical</b>	Ulsan r-PET (test production of 4 KT); Review introduction of other technologies (r-PE/PP/SM, etc.) (2022)	r-PET commercial production (110 KT) (2024-); Build other production facilities (2024)	r-PET total conversion (340 KT); Other (>70 KT)	
<b>Pyrolysis</b>	Pilot operation of pyrolysis of naphtha (2022)	Commercial production of pyrolysis naphtha (> 50KT) (2025)	Expansion of pyrolysis business (>150 KT)	

\* PCR: Post Consumer Recycle

#### Physical Recycling and Chemical Recycling

There are two main ways of recycling plastic waste: mechanical recycling, and chemical recycling. Mechanical recycling is an open loop recycling, in which plastic waste is collected and sorted, then re-shaped into products by applying direct heat. The process is simple and the energy consumption in the recycling process is low, and hence the carbon emission reduction is relatively significant. However, there is a limitation in that only high-quality plastic waste can be reused and the number of recycling is limited. Ultimately, the waste will need to be disposed of in landfill or incinerated. Chemical recycling is a cyclical model that improves these shortcomings. In chemical recycling, plastic waste chemically decompose and become raw materials. It can use low-quality plastic waste as raw materials, unlike mechanical recycling, and still produces the same high-quality products as the initial products.

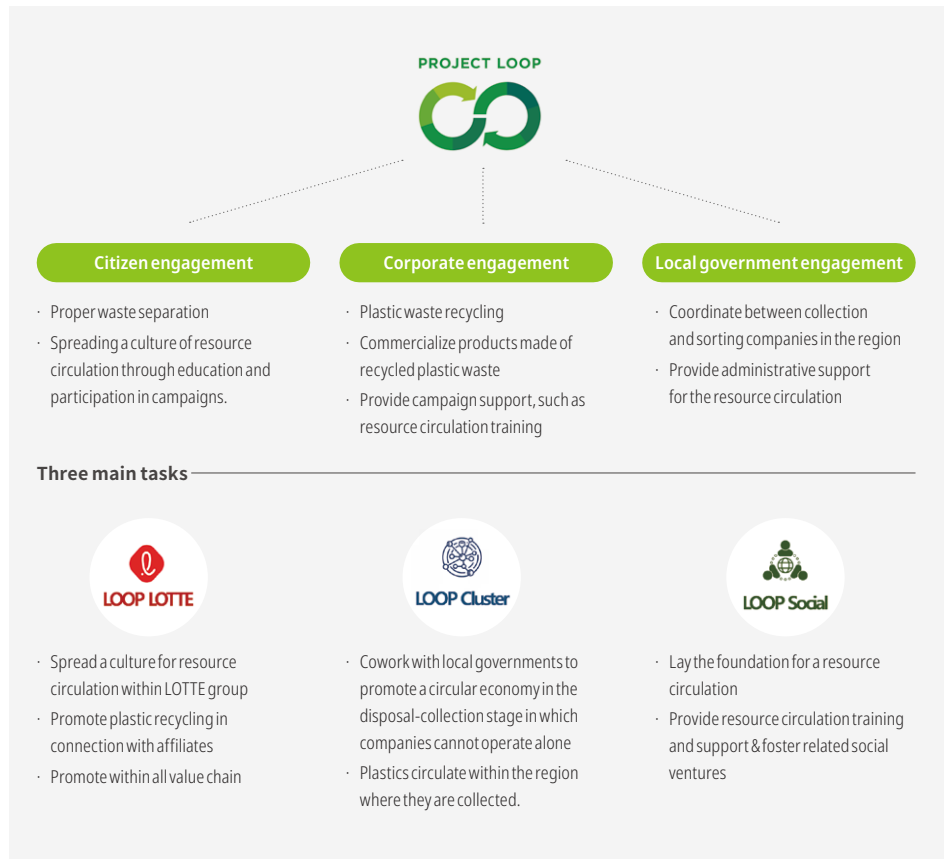
#### Paradigm Shift to circular economy





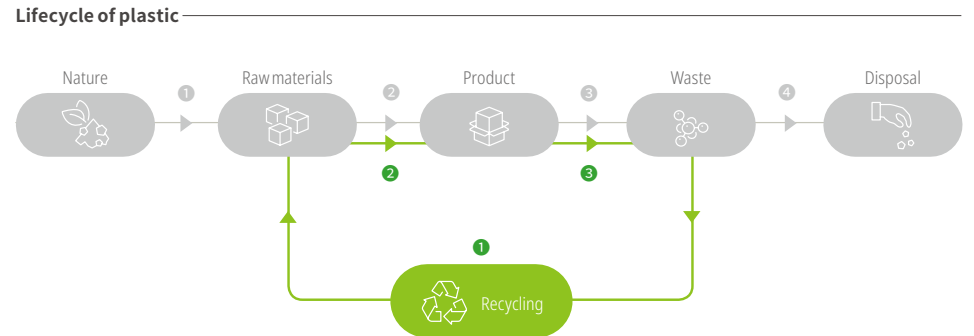
### Project LOOP, a platform for plastics circulation

Project LOOP was launched in March 2020 to develop a circular eco-system for plastics by finding ways to dispose of clean plastic waste, make raw materials from waste plastic, and reuse the product. Understanding that the plastic waste problem is not something that can be solved by citizens, businesses, or local governments alone, Project LOOP intends to serve as a platform where everyone who is interested in the problem can participate and contribute. We will further develop Project LOOP by encouraging participation from citizens, companies, and organizations.



### Reduce social carbon by resource circulation

The life of plastics begins with the separation and refinement of naphtha, the main raw material in the petrochemical industry, by drilling crude oil from nature (① in the figure). Various plastic products are produced from refined naphtha (②), and the used plastic is thrown away as waste (③). Most discarded plastics end up in the landfill or go through incineration (④). Carbon is emitted during the process of drilling crude oil for plastic production and disposing of it as waste. By reusing plastic waste as raw materials, LOTTE Chemical reduces carbon emissions throughout the lifecycle of plastics.



SPECIAL FOCUS

# 04. Strengthening Safety Management



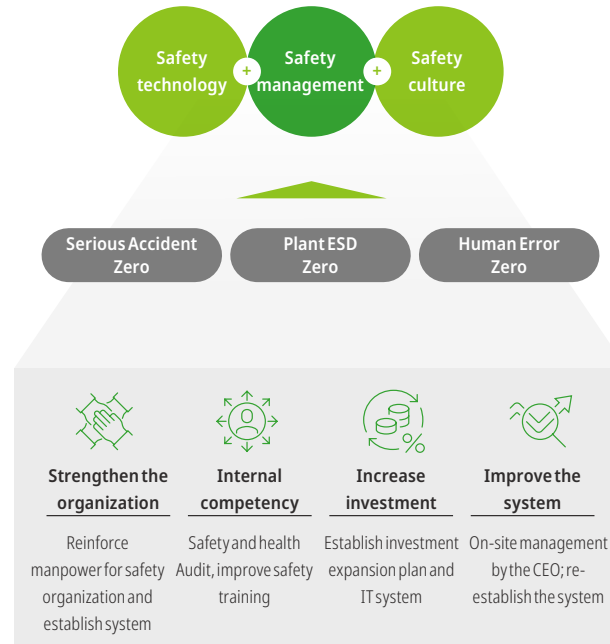
**Goal**  
The Safest Company in the world



## LOTTE Chemical roadmap for strengthening safety management

### Three-year intensive plan for safety innovation

In 2021, LOTTE Chemical set itself a goal of becoming the safest chemical company in the world by strengthening organizational and internal capabilities, improving systems, and making preemptive investments. In order to not only create a work environment where safety is considered as the top priority, but also to contribute to the advancement of safety culture in the industry, we have formulated a 3-year intensive plan, 4 detailed strategies, and 25 action items.



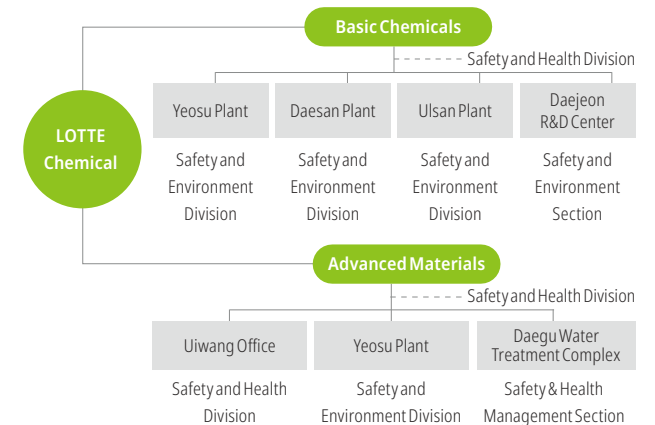
## Strategy 1. Organizational reinforcement

### Establishment of safety and health management system and reinforcement of manpower

With the declaration of "world's safest company," in 2021, LOTTE Chemical has reorganized the internal safety and health management system to ensure compliance with the newly enacted Severe Accidents Punishment Act. Prior to the enforcement of the Severe Accidents Punishment Act, dedicated organizations (Safety & Health Division and Safety & Health Management Team) were established directly under the CEO in each business division Basic Chemicals, Advanced Materials. In order to strengthen the safety environment of the company and partner companies, the Safety Division and Environment Division under the Director of Safety and Health Management, as well as the Process Safety Management Team and Inspection Team, were reorganized to be part of the Safety and Environment Division. The established system has allowed us to focus our competencies on checking compliance with safety and health-related laws and regulations.

We are planning to hire Safety Facilitators (SFs) dedicated to managing safety in the production lines on an ongoing basis. In addition, the Safety and Health Management System, which was introduced in 2008 (OHSAS-18001), was updated in accordance with ISO-45001 in 2020. In 2021, we obtained the certification for the head office and satisfied the requirements.

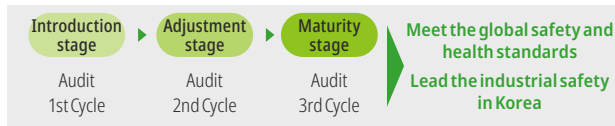
### Safety and Health Management System



## Strategy 2. Enhancement of internal capabilities

### Strengthening internal capabilities of the organization through the safety and health audit system

LOTTE Chemical has been implementing safety and health audits organized by the headquarters since 2019 to manage safety-related policies and internalize in-house culture. The purpose of this audit is to bring LOTTE Chemical's safety and health system to a global level and to establish a safety culture. We constantly monitor safety and health laws and in-house regulations to improve our health and safety level. During the 1st cycle (introduction stage), which was conducted in 2021, we successfully completed diagnosis of the current safety and health level at each business site. By 2025, LOTTE Chemical intends to have completed the 2nd cycle (adjustment stage) and 3rd cycle (maturity stage) and meet the global safety and health standards to be a leader of industrial safety in Korea.

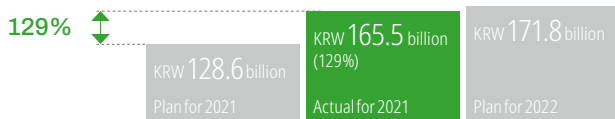


## Strategy 3. Strengthening safety and health investment

### Expansion of investment in safe environment and performance

With the goal of increasing intensive investment of more than KRW 500 billion over the next three years, LOTTE Chemical has allocated a budget of KRW 195 billion for 2021, and provided KRW 263.6 billion for the safety and environment sector, which is 135% of the planned budget. The budget implemented in 2021 amounted to KRW 128.6 billion in five areas of safety and health, including facilities, operating costs, DT/IT systems, consulting/diagnosis, and education/training. This generated performance of more than 129% of the planned budget. KRW 171.8 billion is planned for 2022 (KRW 132.5 billion for basic, KRW 39.3 billion for advanced technology). The total investment budget for 2022 is KRW 461.1 billion, including the environmental investment.

### Budgets planning and performance in the safety and health – (2021-2022)



## Strategy 4. System improvement

### Strengthening safety and health communication



In order to quickly convey the commitment to a safe environment to all executives and employees, the CEO organized on-site management (on-site inspections and meetings with managers) and safety environment executive meetings. The feedback collected through these channels is being incorporated into the safety system.

### Establishment and implementation of essential safety rules



In order to prevent serious accidents, LOTTE Chemical has established "12 Essential Safety Rules" that must be observed in all worksites. Benchmarking the best practices of global companies in terms of the existing rules for basic chemicals and advanced materials and reflecting upon the lessons learned from major safety accidents of LOTTE Chemical, as well as their implications, we have established the "12 Essential Safety Rules." After undergoing a period of adaptation, compliance with the essential safety rules was evaluated at each business site in 2021 and as of 2022, the 12 Essential Safety Rules are in the process of being instilled firmwide and reflected in the company guidelines as safety indicators.

### Safety management activities after the fire accident at Daesan Plant



#### Safety inspection TFT activities

After the fire accident at the Daesan Plant, LOTTE Chemical has organized and is operating its own safety inspection TFT to conduct safety inspections every month. An inspection team has been appointed, comprising practitioners in the fields of safety, health, firefighting/hazardous materials, and environment, respectively, and the team conducts inspections for each topic. Based on the inspection results, we produce and distribute the Safety Guidelines booklet to strengthen the capabilities of employees who conduct on-site safety management.



#### Safe work permit stamp system

LOTTE Chemical operates a stamp system for inspection of high-risk work. Works involving use of fire or entering a confined space have higher risk than other works, thus requiring closer management and planning prior to start of work. After verifying the preparation carried out by the production team, the safety team conducts additional inspections, such as secondary gas inspection, to prevent the risk of safety accidents.



#### Worker Safety Group Training

LOTTE Chemical conducts regular group training for workers to strengthen the safety competency and establish a safety culture. In 2021, work risk assessment group training was conducted for engineers at worksites to enhance their understanding of work risk assessment, and to change the risk assessment technique for the simple repairs (5Step → JSA). In order to comply with safety laws and improve safety culture, we conducted group training on the subject of serious accident punishment law, safety culture, and PSM.



**Environmental**

- 39 Strengthening Environmental Management
- 41 Climate Response
- 44 Minimizing Environmental Impact

**Social**

- Value Management
- 47 Securing New Growth Engines
- 50 Safety Management
- 53 Customer Value Creation
- 57 Pursuing Community Values

**Human Resource Management**

- 60 Human Rights and Diversity
- 62 Human Resource Development
- 64 Work-Life Balance

**Mutual Management**

- 67 Mutual Growth with Business Partners
- 71 Sustainable Supply Chain

**Governance**

- 72 Governance Structure
- 74 Risk Management
- 76 Compliance
- 79 Ethical Management

**ESG**

PERFORMANCE





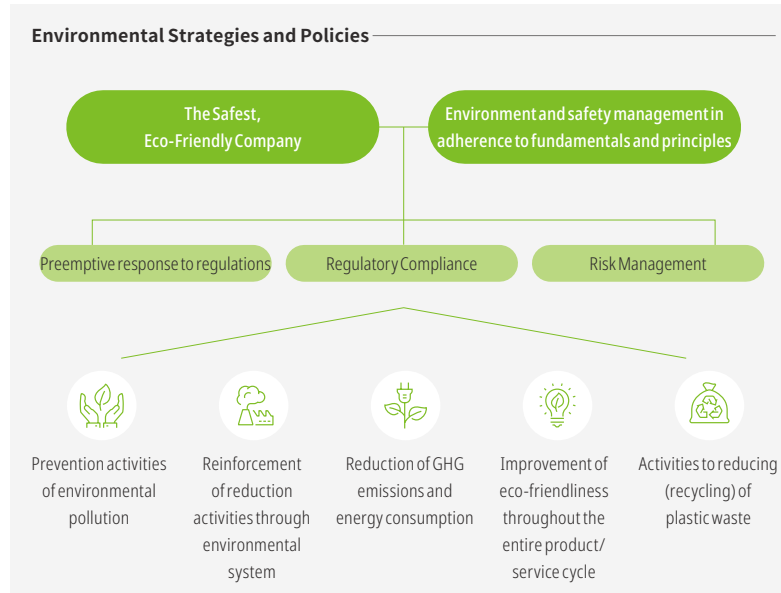
**ENVIRONMENTAL**  
Strengthening Environmental Management

**Environmentally Friendly Policies and Systems**



**Environmentally Friendly Policies and Response System**

Today's companies are being asked to actively participate in environmental policies to respond to rapid climate changes and to come up with a response system for global environmental trends and risks. Accordingly, LOTTE Chemical is expanding company-wide environmental management in consideration of global trends and environmental regulations with focus on reducing pollutant emissions.



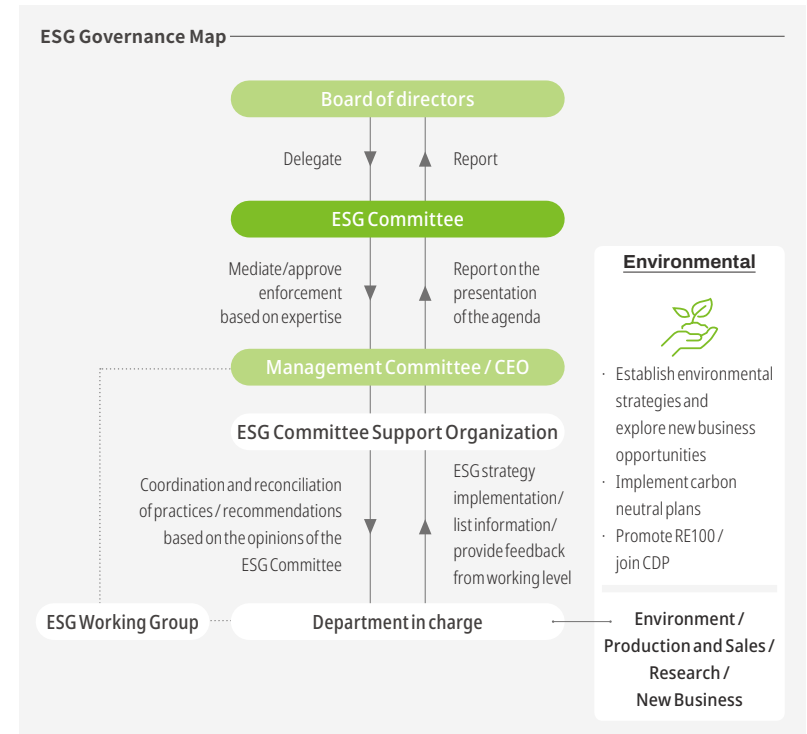
**Investment plan and performance for environmental management practice**

LOTTE Chemical established annual environmental investment plans to minimize emission of pollutants and conserve the surrounding environment. In 2021, we invested about KRW 98 billion in environmental facilities to detect/monitor/reduce pollutant emissions. Green Promise 2030 represents LOTTE Chemical's commitment to environmental investment and carbon-reduced growth with sales of KRW 10 trillion in the green businesses by 2030.

**Establishment and operation of environmental management governance**

LOTTE Chemical is making its best efforts to fulfill its commitment to the environment and contribute to the prosperity of human life. We share the ESG activities and vision with the LOTTE Group; the goal is to become a sustainable company by placing environmental and social values and governance at the core of corporate management activities.

LOTTE Chemical operates ESG Committee, and maintains the internal and external business channels through the environmental management team which is one of the ESG Committee Support Organization. The Management Council makes decisions on the company's environmental management strategies, goals, and policies, and receives regular reports on the achievement of environmental goals, activities, and performances. The important environmental management issues are reported on the ESG Committee as an agenda to make decision, and reported to Board of directors.



**ENVIRONMENTAL**

Strengthening Environmental Management

Environmentally Friendly Policies and Systems



CDP Water Security Excellence Award

**Environmental Impact Assessment**

LOTTE Chemical supports and conducts various inspections and monitors compliance with environmental regulations to prevent violations. To this end, all business sites conduct environmental impact assessments and compliance assessments in accordance with ISO 14001 every year and report the results to the management. The Environmental Management Team at the head office employs external experts, along with its own personnel, to conduct regular inspections on the environment and compliance.

The activities of LOTTE Chemical's PDCA cycle for the environmental impact assessment are confirmed through third party assurance and ISO 14001 certification.

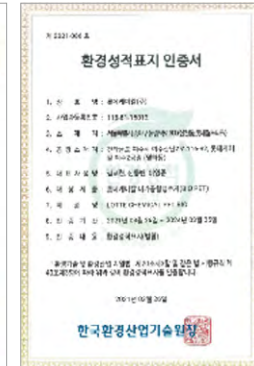
**Environmental Management System**

LOTTE Chemical has established an integrated operating system for environment, safety and health, and quality management to create synergies in these areas. To promote global-level environmental management, we are actively acquiring external certifications related to environmental while securing objective evidence through deliberation processes. In addition, in order to establish a system required by the international community, we have re-established and revised standards at each business site and conducted activities to improve work efficiency. All of LOTTE Chemical's business sites have been certified with ISO 14001 standard (8 locations, 100%). Eco-friendly buoys from EPP (environmental labeling) and PC compound products that used recycled PC (Polycarbonate) received the EPD certification in 2019 and 2021, respectively. Bio-PET products using bio-derived materials as raw materials acquired the environmental label in March 2021 and the environmental certification in October 2021.

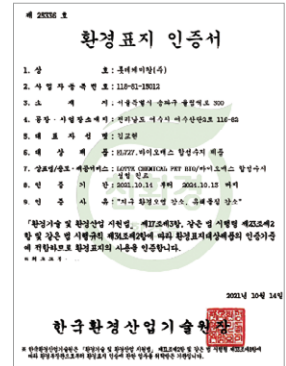
The entire process is evaluated internally and continuously by using a dedicated assessment tool, which also provides results to customers upon request. Moreover, the use of eco-friendly products as raw materials by customers is expected to reduce carbon emissions from disposing of the final products.



Environmental Management System Certificate



Environmental Product Declaration Certificate



Eco-Label Certificate

**ENVIRONMENTAL**

Climate Response

**Climate-Response Strategies**



**Climate-Change Governance**

Heavy reliance on fossil fuels like petroleum has exposed chemical companies to the risk of climate change. Recognizing its responsibility for climate change and greenhouse gases, LOTTE Chemical has identified climate response as one of its main tasks for a sustainable future. We are actively participating in global initiatives to keep the Earth's temperature-rise below 1.5°C, and in the government's carbon-neutral policy, etc., to become a leading company in climate response.

The CEO of LOTTE Chemical chairs the ESG Committee and the Executive Council, and oversees the climate response tasks at the company level. The ESG Committee is the highest body under the Board of Directors that sets the company's internal policies and goals to reduce dependence on fossil fuels and realize the transition to a low-carbon economy. The items of discussion considered important by the ESG Committee and those requiring the BOD decision are submitted to the BOD. The CEO has the final authorization for sustainable strategies and policies.

LOTTE Chemical has set goals of improving energy efficiency and achieving zero carbon emissions at all business sites by 2050 and reflects the results in the CEO's KPI. The CEO is evaluated for the achievement of KPIs and is compensated with an annual salary. In addition, non-financial performance indicators, such as corporate performance on climate-related sustainability indicators, are also reflected in the CEO evaluation.

LOTTE Chemical has set up its ESG Management Headquarters directly under the CEO to oversee work on environmental and climate issues. The Director of the ESG Management Headquarters is in charge of reviewing environmental strategies, including climate crisis response plans and projects. The Environmental Management Division within the ESG Management Headquarters establishes greenhouse gas reduction strategies; reviews and analyzes energy consumption at each facility; analyzes climate change risks and opportunities; establishes climate change strategies including company-wide greenhouse gas emission trading plans; and reviews and analyzes information on greenhouse gas reduction performance. Energy consumption and greenhouse gas emissions at each plant are reported and reviewed by the Director of the ESG Management. In addition, the Director of ESG Management reviews and approves climate policies and strategies, puts them on the agenda for deliberation, and helps the board of directors make the final decisions.

**Climate Change Strategies**

As suggested by the government in 2021, LOTTE Chemical has conducted climate scenario analyses based on the scenario of carbon neutrality by 2050, and a -14.5% reduction compared to 2018 by 2030. As part of measures to respond to climate change, create a green ecosystem, participate, and invest in green projects, and revitalize the circular economy, we declared Green Promise 2030 and outlined detailed stages and goals.

Our ultimate goal is to achieve carbon neutrality by 2050. The years 2025 and 2040 have been set as checkpoints for the 2030 and 2050 targets. This scenario has a direct impact on our business strategies goals; and hence, our goal is set to achieve carbon neutrality by 2050. To this end, we have evaluated specific projects and initiative plans and the expected emissions reduction. These include conversion to hydrogen, commercialization of CCUS, energy diagnosis, renewable energy purchase, and social reduction through plastic recycling. To reduce emissions by 2050, we plan to introduce high-efficiency processes, capture Scope 1 emissions through CCUS, produce new bio-based materials, and generate green hydrogen.

**Management of Climate Change Risks**

LOTTE Chemical's Environmental Management Division monitors changes in laws and key stakeholder trends. The division publishes internal newsletters and holds regular workshops for each business site to raise awareness of climate risks. In order to identify climate change risks and opportunities, the Environmental Management Division regularly conducts risk assessments in consideration of impact period (short-term/mid-term/long-term), relevance, materiality, and stakeholders' feedback. During the risk assessments, the Division performs checks on global standards, assessment criteria, and performs media analysis, as well as peer group benchmarking. Stakeholders' opinions (employees, customers, government, investors, partners, local communities) are collected through various communication channels reflected in the risk assessment.

LOTTE Chemical monitors material risks derived from risk assessment and develops counter-measures. These risks include physical risks (heavy rains, typhoons, and drought due to climate change), regulatory risks (regulatory policy such as GHG emissions trading system, increase in emission trading prices, etc.), and energy paradigm shift risks (reduction in demand for fossil fuel, consumer and investor behavior changes, etc.). The established climate change response strategies are then reported to the management, who make the decisions about implementation.

**ENVIRONMENTAL**

Climate Response

Climate-Response Strategies



Category	Issues	Classification	Risks	Opportunities and strategies
Regulatory aspects	Reinforcement of the emission trading system according to the strengthening of the national NDC	Short-term	Reduction in emission allocation increases LOTTE Chemical's financial costs	PFO→LNG→hydrogen fuel Investment in green hydrogen, ammonia production, Conversion to renewable energy, etc.
	Introduction of carbon price (carbon tax, Carbon Border Adjustment Mechanism, etc.)	Mid-term	Carbon Border Adjustment Mechanism reduces profits of LOTTE Chemical export products	Securing cost competitiveness by introducing low-carbon raw materials and strengthening LCA management
Physical aspects	Natural disasters (typhoons, floods, etc.)	Short-term	Increased frequency and intensity of storms, hurricanes and floods adversely affects production and logistics	Operation of emergency response system to prevent accidents and respond to risks
	Disruption in water supply	Long-term	Increased water supply instability due to an increase in the frequency of recent droughts	Expansion of water treatment business such as membrane
Change of energy paradigm	Carbon intensive business (petrochemical)	Long-term	Technology using fossil fuels is expected to increase raw material costs	Improve energy efficiency (optimize process)
	Change in consumer and market preferences	Mid-term	Decrease in sales of existing products due to changes in consumer preferences	Promote plastic recycling and manufacturing of post-consumer recycled (PCR) products as part of a circular economy
	Expand climate-related initiatives	Short-term	Negative financial impact due to loss of customer and investor trust	Improving eco-friendly brand image through active response



**Responses to Physical Risk** LOTTE Chemical regularly monitors physical climate change risks. As part of the emergency response system, LOTTE Chemical conducts storm and flood damage analyses.

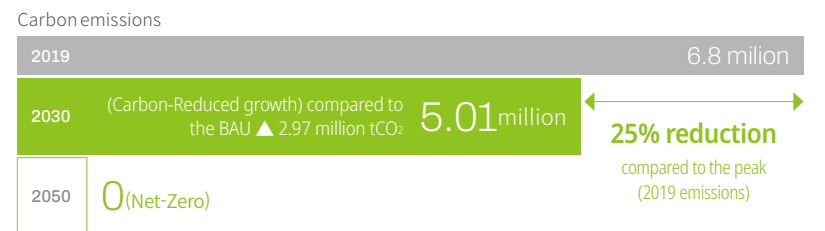


**Responses to Regulatory risk** LOTTE Chemical anticipates that as the demand for reduction of gas emissions increases in the future, financial risks may also increase due to the emissions regulations. Accordingly, LOTTE Chemical has established mid- to long-term strategies to reduce greenhouse gas emissions and improve energy efficiency and discovered opportunities to generate financial profits through emissions trading.

**Climate Change Indicators and Reduction Targets**

LOTTE Chemical has announced Green Promise 2030, an initiative for achieving low carbon growth by 2030, to show its commitment to overcome the climate crisis and reduce carbon emissions. Although expansion of the business might mean increase of carbon dioxide emissions, LOTTE Chemical plans to maintain the emission level at the level of 2019 (Scope 1 and 2) in 2030. To achieve carbon-reduced growth, LOTTE Chemical will reduce carbon emissions by 37% (2.97 million tons) of BAU by 2030, based on the emission of 6.8 million tons in 2019. Eventually, we would like to achieve a net carbon emissions of 0 tons (Net Zero) by 2050.

**Carbon-Neutral Growth Targets**



**Stakeholder Interview**

**AIRRANE** — Managing Director, Lee Chung-seop

**“A company that actively fulfills its responsibilities by responding to the climate crisis”**



LOTTE Chemical has been one of the most proactive companies in climate response. In the past, development projects related to climate response were mainly tasks of the government and there was no significant interest from private companies. LOTTE Chemical was the first among private companies to show interest in the development of carbon-capture technology and also the first to partner with domestic small and medium-sized enterprises (SMEs). Currently, it is under test operation for commercialization. While it had been a common practice to partner with overseas licensing companies with secure and stable technologies, not many Korean companies partnered with domestic SMEs. However, LOTTE Chemical has set an example by actively discovering and supporting technologies of domestic SMEs. I hope that LOTTE Chemical continues to secure new technologies through partnerships, and implements climate-response strategies for sustainable ESG management.



**ENVIRONMENTAL**

Climate Response

**Reductions of GHG Emissions**



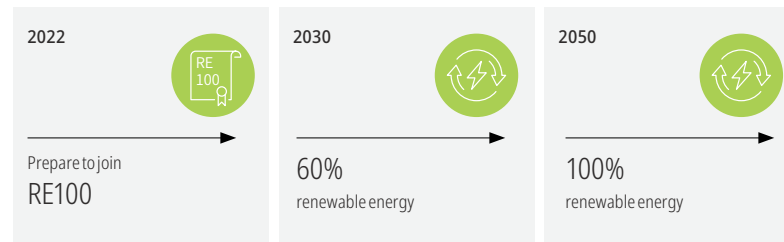
**GHG Emissions Reduction Activities**

The international community is actively promoting GHG reduction plans to reduce the absolute amount of greenhouse-gas emissions by 2030. We are fully engaged in the government's GHG reduction projects as we develop new GHG reduction technologies to reduce energy consumption and GHG emissions and apply them at the facilities and business sites to improve energy efficiency.

We are using solar power in some business sites, and are also considering the introduction of an AI-based FEMS system for more efficient workplace energy management. In addition, we plan to convert our research centers into eco-friendly buildings using renewable energy. In addition, we conduct an energy audit of the Yeosu Plant through specialized agency, and have plans to expand to all domestic plants in the future. This energy diagnosis takes integrated approach based on modeling a comprehensive solution of GHG/energy reduction, yield improvement, and operation improvement. Lastly, we are participating in a pilot project of a voluntary energy-efficiency target system (April 2021) by the government to achieve systemic energy reduction.

**Renewable Energy Alternative Scheme**

LOTTE Chemical plans to prepare for joining RE100 in 2022. RE 100 is a global initiative for using 100% renewable electricity. LOTTE Chemical plans to increase the use of renewable energy to 60% of total electricity through renewable energy purchase contracts at all domestic and overseas business sites by 2030. By 2050, we plan to use 100% renewable energy by introducing fuel cells and power generation facilities that use green hydrogen.



**GHG Emissions Trading**

Recently, companies have been diligently setting and achieving environmental goals to keep up with the rapid transition to the green era. Accordingly, LOTTE Chemical has announced carbon-reduced growth by 2030 and established company-wide mid- to long-term goals in response to the third phase of the emissions trading system.

In addition, we are striving to reduce business risks caused by the climate crisis by not only ensuring compliance, but also promoting efficiency in resource use and energy management. Incorporating climate change as a major issue in our management activities, we will continue to carry out the relevant strategies in line with the climate response efforts of the international community.

**Scope 3 GHG Management**

LOTTE Chemical analyzed SBTI's recommendations for chemical companies and Peers' CDP category to adopt 9 out of 15 categories in Scope 3.

Category		
SBTI's recommendations for chemical companies	Peers' CDP category	CDP evaluation method
1 Purchased products & services	6 Business trips	11 Use of sold products
2 Capital goods	7 Employee commute	12 Disposal of sold products
3 Excluded fuel and energy activities from Scope 1 & 2	8 Upstream leased assets	13 Downstream leased assets
4 Upstream transportation & distribution	9 Downstream transportation & distribution	14 Franchise
5 Waste generated at the business sites	10 Sales product processing	15 Investment

■ Data collection and calculation categories

**ENVIRONMENTAL**

Minimizing Environmental Impact

**Efficient use of resources and energy**



**Stable procurement of raw materials through Robotic Process Automation (RPA)**

In line with the advancement of IT technology and increased use of AI technology in clerical, administrative, and managerial work, LOTTE Chemical is promoting the use of RPA, and automation of the material acquisition process of regularly purchased materials, to minimize human error and improve productivity. Since the development of the RPA in late 2019, we have been striving to minimize error through automated and standardized work processes. The introduction of a sustainable and stable RPA system has brought optimized work environment that allows for maximum work efficiency in the least amount of time. We have automated 20% of all procurement activities with the RPA, which enabled us to focus on raw materials that require additional management.

**Procurement of Eco-Friendly Raw Materials**

To minimize the impact on the environment and to ensure efficient and sustainable use of resources, we are actively promoting green procurement from the early stages of purchasing. The promotion of Green Purchasing Guidelines demonstrates LOTTE Chemical's commitment to considering eco-friendliness of suppliers and materials in procurement decisions. The Green Purchasing Guidelines apply to office supplies, raw and subsidiary materials, and consumables used in production and sales process, as well as raw and subsidiary materials/products/packaging materials of domestic and overseas suppliers. In addition, we have formed a special partnership with suppliers to ensure observation of environmental policies in all stages of material acquisition. We are striving to fulfill our social responsibilities and comply with laws and regulations to preserve the environment and natural resources. The green purchasing performance is evaluated annually, and the results are reported in the annual sustainability report.

**Management of raw-material procurement risks**

Since LOTTE Chemical has a high ratio of sole suppliers for raw and subsidiary materials, it is important to mitigate the associated risks by establishing a stable supply-chain management system. While certain suppliers of raw and subsidiary materials are preferred by a certain licensor, we have continued to make efforts to expand our network and promote localization. As a result, we reduced the percentage of sole-supplier purchases from 61% in 2017 to 52% in 2021, as well as the overall costs. LOTTE Chemical will continuously strive for stable raw material supply and risk management.

**Energy Management System**

We have completed the second update of the Greenhouse Gas & Energy Management System (GEMS) in 2020, which was first introduced in 2010 and had the first update in 2013. GEMS is a comprehensive monitoring system, which performs GHG reduction target and performance evaluation, energy and inventory data integration, and performance management. GEMS analyzes data on the amount of greenhouse gases generated in each plant and proposes reduction targets.

**Recycling of plastic waste**

While concerns about global environmental pollution due to waste plastics increase, the severity of the situation has been amplified by the embargo by China, the largest consumer, since December 31, 2017. Therefore, we anticipate that recycling of plastic waste will be emphasized further as an essential element for business survival. To this end, LOTTE Chemical seeks to maximize corporate value and sustainability through the establishment and promotion of an innovative and differentiated recycling business strategy. Representative green companies in the downstream industries are promoting eco-friendly projects mainly for OA and TV, while the IT and cosmetics markets are also starting to take action. In line with the regulations on the use of plastics by country, the recycling reinforcing trend, and promotion of recycling by eco-friendly companies, the Advanced Materials Division is strengthening the use of eco-friendly materials and the sourcing system by discovering high-quality suppliers through blue ocean T/F activities.

**Case Study**

**PCR-PE packaging bag**

LOTTE Chemical has developed Post-Consumer Recycled Polyethylene (PCR-PE) packaging bags for the first time in Korea, and has been using it for packing and shipping since July 2021. PCR-PE, the raw material used to make the packaging, is made from the waste PE bags that are initially produced by LOTTE Chemical and collected by customers after use. The PCR-PE packaging bags contain about 30% recycled plastics. They have physical properties similar to those of regular PE bags. LOTTE Chemical started investing in R&D for the application of recycled plastic packaging bags in 2021. With the cooperation of customers, we were able to produce raw materials for PCR-PE bags and establish a circular loop for plastics. By the end of this year, LOTTE Chemical will be using them to pack 15,000 tons of PE and PP products per month. In addition, LOTTE Chemical plans to gradually increase the percentage of recycled plastics used in PCR-PE packaging bags.



**ENVIRONMENTAL**

Minimizing  
Environmental Impact

**Sustainable  
resource  
circulation**



**Water Resource Management**

**Management of risks related to water resources** Global warming is causing global water shortages. Due to the large fluctuations in regional/seasonal precipitation in Korea, there have been frequent droughts in recent years. In order to mitigate the effects of global warming, securing water resources has become an essential component to maintain quality of life.

LOTTE Chemical has expanded its portfolio from general-purpose products to high-value-added specialty products and is currently manufacturing and selling aromatic petrochemical products and olefin, such as synthetic resins and chemical fibers. In particular, fresh water used in production and utilities is essential for the manufacturing process. We understand that most of our suppliers also use fresh water to produce their products. Indirect supply of water is important because if a supplier is unable to deliver a product due to water shortages, production schedules may be delayed. For direct water-resource risk management, 100% of water intake and water quality are monitored for each water intake source. Using the WRI water stress index, we check the risk index of the area where LOTTE Chemical's domestic business sites are located. Of these, the Uiwang area was the only one to receive a high grade (40-80%), although the water intake rate at the Uiwang facility was very low at about 0.14% of the total water intake volume. The WRI Aqueduct is used in water stress assessment because it provides an intuitive understanding of water stress. LOTTE Chemical uses at least two water intakes\* for stable supply of industrial water and operates an emergency water storage for each site. In addition, we monitor the Real-Time Database (RTDB) to manage water leaks due to abnormal use of water resources and pipe damage.



**Water-Use and Recycling** LOTTE Chemical responds to global water-resource issues by managing the efficiency of water use, including activities to reduce the amount of discharged wastewater and inflow water. We are striving to minimize energy spent on water treatment by reducing water use through an efficient water-resource management system and using only the necessary amount of treated water. We are also analyzing the degree of pollution of wastewater to evaluate the possibility of reuse as process water, washing water, firefighting water, etc. In addition, by reducing water usage through process improvement and re-treatment of recyclable waste water, the company aims to reduce the amount of water and waste water to 50% of 2019's performance by 2030. Water supply shortages due to lack of water resources in recent years requires treatment of sewage water and wastewater using membranes. Our membrane is a submerged type, which is commonly used in wastewater treatment processes to treat and reuse water, industrial water, and wastewater. It is also eco-friendly compared to the existing wastewater treatment method because it produces higher-quality water. As such, LOTTE Chemical plans to continuously invest in water-resource conservation by introducing more advanced technologies and facilities.

**Reduction targets for water usage and waste by 2030** (compared to 2019 performance)



**Wastewater and Water-Pollution Management** LOTTE Chemical operates its own wastewater treatment plants in Daesan, Yeosu, and Ulsan, and there have been no accidental spillages of hazardous substances into the soil or seawater during the reporting period.

In Daesan Plant, the discharged wastewater is 20~30% of legally allowed amount, strictly following an internal standard that is stricter than the government's. In Yeosu and Ulsan plants, where wastewater is treated at the wastewater treatment plant within the industrial complex, we ensure that the water flowing into the wastewater treatment plant is treated to the final allowable level required by the relevant discharge standards.

**ENVIRONMENTAL**

Minimizing Environmental Impact

Sustainable resource circulation



**Air Pollution Management**

Understanding the seriousness of the problem and the need for improvement, LOTTE Chemical has signed a voluntary agreement with the government to reduce emissions of substances that cause fine dust (nitrogen oxide, sulfur oxide, dust, etc.). We are also investing in pollutant emission reduction facilities, such as ULNB (ultra-low NOx burner), SCR (selective catalytic reduction), filters, and RTO (regenerative thermal oxidizer) to reduce and manage various air pollutants. For systematic air quality management, we have extended tele-monitoring systems (TMS) and reinforced regular air monitoring. In order to predict and manage pollutant-emission concentrations in advance, we are actively promoting smart environmental management pilot projects using the IoT in partnership with the National Academy of Environmental Sciences.

LOTTE Chemical has independently identified nine air pollutants, and set goals to reduce the emissions thereof by 50% of 2019 by 2030. Through annual performance evaluation of short-, mid-, and long-term targets, we strive to reduce air pollutant emissions significantly and achieve sustainable, environmental management.

Reduction targets for air pollutant emissions

**50%**

(2030 goal)



**Soil Pollution Management**

LOTTE Chemical uses impermeable concrete in floor paving of its facilities, where there is a possibility of soil contamination. In some facilities, an additional environmental work permit is obtained before and after work to thoroughly prevent soil contamination caused by chemicals between the production process and transportation. In addition, we prevent soil contamination by checking buried underground pipes inside and outside the facilities at least once per quarter (electrical method, soil resistivity and pH measurement, direct excavation diagnosis, etc.). Furthermore, we conduct regular soil contamination tests to examine the impact on the soil around our business sites.

**Waste Management**

LOTTE Chemical is minimizing the amount of waste generated through intensive waste management. We are also promoting green management through waste sorting and recycling. We have introduced a real-name system for waste disposal to raise employee awareness on waste generation and waste sorting. The system has allowed us to track and manage waste generation by source and volume. The collected data are then used to make improvements and reduce waste generation. LOTTE Chemical's Allbaro System ensures that waste analysis is conducted regularly to understand the impact of the waste on the surrounding environment. The entire process of waste disposal and storage is strictly managed and monitored to minimize environmental impact.

For sustainable green management, LOTTE Chemical has set a goal of reducing the amount of waste that is being disposed of in landfills and incineration by 50% of 2019 by 2030. We will continue to identify recycling companies and develop technologies to achieve our goals.

Stakeholder Interview

LAR — CEO Kye Hyo-seuk



**“Close the gap in resource circulation starts with the first domestic supply-demand model of recycled PET”**

LAR joined LOTTE Chemical's vision of plastic recycling by participating in the pilot project of manufacturing shoes and bags using recycled plastic raw material, rPET. The goal of the project was to inform the general public and consumers of the resource recycling process and purpose. By having the consumers participate in the waste PET collection, we were able to raise their awareness of resource recycling. The domestic supply and demand of recycled PET could not have been possible if it were not for LOTTE Chemical's commitment to ESG management, interest and support for startup technology, and fair and transparent compensation for economic performance. We hope that LOTTE Chemical continues to implement more meaningful projects related to the resource circularity.



**SOCIAL**

Value Management-  
Securing New Growth Engines

**Research  
and  
Development**



**Center Overview**

LOTTE Chemical operates three bases: the Basic Chemical Research Center (Daejeon), which is dedicated to researching foundational petrochemical materials and products; the Advanced Materials Research Center (Uiwang), which researches materials for automobile, IT, and building materials; and the Innovation Center (Seoul), which continuously explores new mega-trend fields.

The Basic Chemical Research Center conducts research on polyolefin resins, olefin / aromatic-based specialty products, and base chemicals, as well as various resin products for the energy era. The center specializes in basic technologies for catalysts, processes, and properties, focusing on basic chemicals, and is laying the groundwork for advancing into new petrochemical industries. In addition, we have extended product development and technical support for overseas subsidiaries in China, Southeast Asia, the United States, etc., to nurture future-oriented global research centers.

In the Advanced Materials Research Center, technologies in various business areas, including interior

and exterior materials for home appliances and IT devices, architectural materials, medical devices, and cutting-edge materials for automobiles, are being developed. The center provides specialized material solutions by developing high-functional synthetic resin products and architectural interior materials. In addition, the Advanced Chemicals Research Center is developing water treatment membrane technology as a next-generation growth engine and expanding our market share in domestic and overseas sewage facilities.

In the Innovation Center, new future businesses of LOTTE Chemical are being analyzed in terms of four areas: hydrogen, battery, carbon neutrality, and bio. The center analyzes global markets and trends and uses diversified open innovation channels to explore new businesses and provide solutions for sustainable growth of LOTTE Chemical.

**Main Research Fields**



**R&D Details**

Category	Area/Category	R&D Details
<b>Polyolefin</b>	HDPE, LDPE, LLDPE, EVA, PP	We are conducting research on Polyolefin resin, a representative plastic polymer resin widely used in automobiles, home appliances, film, packaging and household goods.
<b>Monomer</b>	EO, EG, PIA	In terms of monomer research, we are focusing on developing new products and new processes in the fields of olefin, aromatics and EO derivatives.
<b>Functional materials</b>	ABS, ASA, LFT, HMSPP, TPO, EPP, TPE, etc.	Based on the reactive extrusion process technology, polymer composite manufacturing technology and foam technology, we are developing performance materials that have additional functions.
<b>Engineering plastic</b>	PET, PC, PC Compound	We are developing engineering plastic materials with sufficient heat-resistance and impact-
<b>Catalyst and process</b>	Catalyst and process optimization	In terms of catalysts, we are researching Ziegler-Natta catalyst for PO materials, metallocene catalyst, and catalysts for EP materials. We are looking to improve process efficiency based on design and analysis and continue research on new processes.
<b>Megatrend</b>	Water treatment business, New business development	To strengthen our core businesses and to discover new opportunities, we are conducting research in promising future sectors related to new technologies and the Digital Transformation.

**SOCIAL**

Value Management-  
Securing New Growth Engines

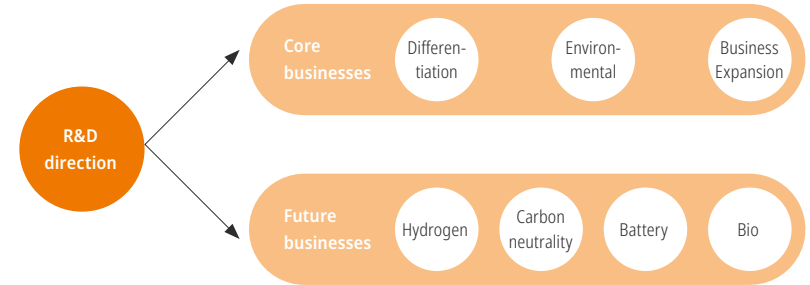
Research  
and  
Development



**R&D direction and organization**

LOTTE Chemical has established its R&D direction by specifying the business items for the core and future businesses. While existing core businesses employ differentiated strategies through customer-focused R&D, we plan to strengthen research in the environmental field and expand business to secure new growth engines. The future business plans to expand research in the hydrogen field to enter the new energy industry, gain competitive advantage, and lay the foundation for R&D of carbon neutrality. In addition, by strengthening research in the battery and bio fields, we hope to secure core competencies and lay the groundwork for entering new businesses.

In order to set the R&D direction and to establish a specialized organizational system for each business field, a tech center has been installed in the Basic Chemical Research Center. To further secure organizational flexibility, the existing divisions were reorganized into project units, and the Future Technology Team was established.



**Reorganization of Basic Chemicals Research Center**



**SOCIAL**

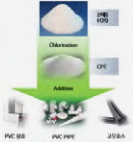
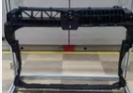


Value Management-  
Securing New Growth Engines

Research  
and  
Development


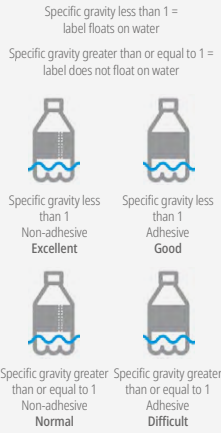



**Key R&D Performances for 2021**

**Securing differentiated products**

<p>HDPE powder product for CPE</p> 	<ul style="list-style-type: none"> <li>Development of HDPE powder product that can be used to manufacture Chlorinated Polyethylene (CPE)</li> <li>CPE is used in PVC windows and pipes, rubber/electric wires, etc. for its excellent impact resistance, flame retardancy, and weather resistance</li> <li>Uniform particle distribution, physical properties, and low molecular weight of the HDPE powder allow production of CPE in uniform and stable quality</li> <li>Continuous market expansion by developing products suitable for customer needs and building a diversified product portfolio</li> </ul>
<p>Development of Long-fiber Thermoplastics (LFT)</p> 	<ul style="list-style-type: none"> <li>Market growth of LFT for automobiles following the trend of lightweight materials</li> <li>Long-fiber thermal resistance is an important feature around the engine compartment of an automobile; expected to receive a passing grade and approval from customer evaluation</li> <li>Expect to enter new markets and make expansion (LFT: Long-fiber Reinforced Thermoplastic)</li> </ul>
<p>Development of ultra-high weather resistant Acrylonitrile Styrene Acrylate (ASA)</p> 	<ul style="list-style-type: none"> <li>Increased demand for ultra-high weather resistance performance of unpainted exterior automobile parts from global automobile manufacturers</li> <li>Passed weather assessment in harsh conditions similar to the climate of Southern Africa's Kalahari desert</li> <li>Approved for ultra-high weather resistance material by VW Europe</li> <li>Pioneer the high-gloss/high-weather-resistance automotive material market with supreme material technology</li> </ul>
<p>Development of Antiviral Material</p> 	<ul style="list-style-type: none"> <li>Increased interest in the development of differentiated material solutions due to COVID-19.</li> <li>Secure antiviral performance against COVID-19 through joint R&amp;D with Korea University Medical Center</li> <li>Acquired the SIAA certification and ISO21702 for its antiviral performance against the influenza A virus.</li> <li>Pioneer sustainable social valuable antiviral market</li> </ul>
<p>Technological awards and certifications</p>	<ul style="list-style-type: none"> <li>World-class products (HDPE for CPE, PP for medical use, PP for Lamination, flame retardant ABS, ASA)</li> <li>Eco-Label certification (Bio PET)</li> <li>New technology certification (PO-based shrink label)</li> <li>IR52 Jang Yeong-sil Award (material for ultra-slim TV)</li> <li>Korea Engineer Award (Senior Manager Kwon Oh-sung from LOTTE Chemical PC polymerization team)</li> </ul>

**Response to social/environmental issues**

<p>Bio-PET</p> 	<ul style="list-style-type: none"> <li>Increased demand for bio-PET due to environmental and carbon reduction issues</li> <li>Yeosu PET Plant Production Capacity 70,000 tons/year</li> <li>Acquired the environmental labels (EL702 and EL727) of Korea's Ministry of Environment</li> <li>28% reduction in carbon dioxide emissions compared to petroleum-derived PET</li> <li>5,400 tons of carbon dioxide reduction when producing 8,000 tons of bio-PET</li> </ul>
<p>Development of PO material for water-separable shrink film</p>  <p>Specific gravity less than 1 = label floats on water</p> <p>Specific gravity greater than or equal to 1 = label does not float on water</p> <p>Specific gravity less than 1 Non-adhesive Excellent</p> <p>Specific gravity less than 1 Adhesive Good</p> <p>Specific gravity greater than or equal to 1 Non-adhesive Normal</p> <p>Specific gravity greater than or equal to 1 Adhesive Difficult</p>	<ul style="list-style-type: none"> <li>Developed PO material for non-adhesive shrink label with a specific gravity of less than 1 with the "highest recyclability" by the Ministry of Environment</li> <li>Ministry of Trade, Industry and Energy; acquired New Technology Certification (NET) (2021)</li> <li>Technology: Water-floating Multi-layered Label and Resin Manufacturing Technology for Recyclable PET Bottle</li> <li>Continuous market expansion by developing products for the ESG and chemical BU's Green Promise 2030</li> </ul>
<p>Development of PO material for water-separable shrink film</p> 	<ul style="list-style-type: none"> <li>Contribute to resource circulation by recycling waste plastics, the main cause of marine environmental pollution</li> <li>Realized high rigidity and durability for laptops and obtained the UL ECV certification</li> <li>Strengthened customer cooperation for green development (applying HAITI OBP, participating in community outreach programs)</li> <li>Pioneer the green product market (diversification of recycling sources) (OBP: Ocean Bound Plastic, waste plastic near the ocean)</li> </ul>

**SOCIAL**

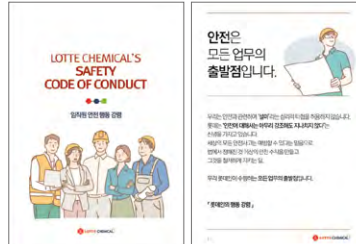
Value Management-  
Safety Management

**Internalization  
of Safety and  
Health Culture**



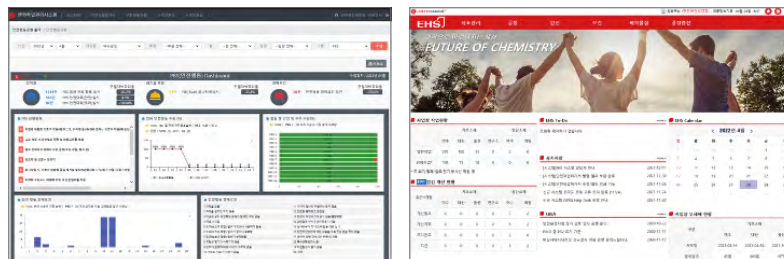
**Internalization of Safety Code of Conduct**

LOTTE Chemical has established its Safety Code of Conduct to raise awareness, change employee behaviors, and develop a global-level, sustainable safety culture. In order to internalize Safety Code of Conduct and prevent major accidents, special training was provided to executives and department heads to encourage reinforcement of safety awareness and practice from managers and executives. We are promoting the internalization of the Safety Code of Conduct through company-wide training and sharing best practices.



**Upgrade the EHS management information system**

In 2018, LOTTE Chemical established an integrated EHS Management Information System, which is a joint project between three chemical companies for building a consolidated IT system. In December 2021, the first system upgrade was completed, which improved the limitations, such as lack of a distinct management and information system for each business site. The second system upgrade will consist of measures to establish infrastructure, including digitization of tasks, non-face-to-face safety training, process risk assessment, and partner management and monitoring program. The EHS Management Information System, which applies upgraded data management & performance analysis tools, will be used to conduct safety inspections; the results will be used to continuously to carry out safety management.



**Discretionary safety inspection at business sites**

In order to establish an autonomous safety culture, LOTTE Chemical conducts its own discretionary inspections for safety at business sites. The company makes efforts to internalize a safety and health culture by conducting safety inspections in various safety fields at business sites. These efforts include daily operation of the STG 0810 (Safety Golden Time) by leaders; daily inspections; monthly safety inspections on 12 PSM themes; operation of a joint safety inspection day (monthly) conducted by plant managers/executives; and special safety inspections conducted before cold/typhoon/flooding seasons or holidays.



**Implementation of STG 0810 system**

The STG 0810 system was launched in response to the growing needs of strengthen preemptive safety measures for accident prevention resulting from strengthened Industrial Safety and Health Act and enactment of the Severe Accidents Punishment Act. The STG 0810 was designed to minimize the risk of safety accidents between 08:00 and 10:00, which was determined as the "safety golden hour" or the most vulnerable time for safety accidents based on the record from the past five years. Since the start of the system in 2021, we have been conducting daily on-site inspections led by business site leaders and having the day-shift employees and the Disaster Prevention Office within the Safety Team cross-check during those times to achieve zero accident rates.





**SOCIAL**

Value Management-  
Safety Management

Internalization  
of Safety and  
Health Culture



**Accident Investigation Process**

LOTTE Chemical operates an accident investigation system, under which an accident investigation team is formed for each type of accident, such as safety accidents/environmental accidents/process accidents. The investigation team establishes an accident investigation plan, carries out investigations, and reports the investigation result. In addition, we identify the causes of the accident, take corrective actions, and implement countermeasures to prevent recurrence. We also analyze near-miss accidents to identify potential risks, make improvements, and eliminate causes fundamentally.



**Identify, reduce, and eliminate health-related risks**

At each business site, a person who has obtained a health and medical certificate is appointed as a health manager to identify, reduce, and remove various health-related risks. First aid and CPR training are conducted, in addition to work space assessment, which includes preliminary investigation, hazard identification, hazard analysis, and on-site measurement. Moreover, we operate a health program to discover hazards to the musculoskeletal system and conduct risk assessments through on-site inspections for working conditions and health improvement of workers.

**Occupational Safety & Health Committee**

At each LOTTE Chemical business site, the Occupational Safety and Health Committee holds quarterly meetings to facilitate communication between labor and management. The committee is composed of an equal number of representatives from labor and management and decides on important safety and health issues. The resolutions of the meetings are shared with workers. After the meetings, the departments that submitted the agenda and those in charge of the committee follow up to see whether the committee's deliberations/decisions have been faithfully implemented.

**Training System to Reinforce Competency for Safety & Health**

LOTTE Chemical operates a variety of training programs for all employees, including legal and job training, as well as basic courses and core competency courses to strengthen safety and health capabilities. Special and safety training are provided for new employees or those who are assigned to new jobs. The core-competency strengthening program includes introductory course, foundation course, and advanced course designed for each position. In addition, we support external education and training that are helpful in meeting the needs of each business site and position. The company covers training-related expenses.

Classification	Legal/job training courses	Basic competency courses	Core competency courses	
Executive	Supervisor/Senior/ Manager Training		Core-competency_ executive course (safety management, leadership, etc.)	
Team Leader			Core-competency_ manager course (safety culture, leadership, mentoring)	
Required course for supervisors	Regular safety/ before dispatch/ special safety, etc.	Supervisor competency enhancement course (leader/foreman/CW/etc.)	Safety Code of Practice (Common)	
More above Professional S1				Core-competency_ Master course
M Professional S2				
SA Professional J1	Job safety training	Basic competency foundation course (SA, persons eligible for promotion to Professional J1)	Core-competency_ enhancement course	
New employee (A/ Professional J2)				Basic competency introductory course (All employees in business management and technical positions)
Employees eligible to receive training	Employees and executives	Employees and executives	Employees in business management positions (eligible candidates are selected)	



**SOCIAL**

Value Management-  
Safety Management

Internalization  
of Safety and  
Health Culture



**Zero Accidents at business sites**

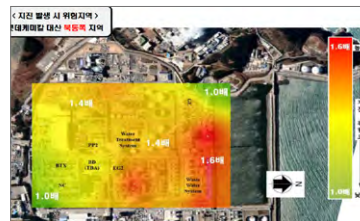
In January 2022, as the Act on Punishment of Serious Accidents was passed, in addition to the existing chemical substance-related laws, the social demand for the safe operation of businesses is growing. In response to this, the management and all employees actively participate in safety activities to achieve an accident-free business sites. Reinforcement of disaster prevention facilities has been completed to prevent the leakage of hazardous chemicals. Protective walls around hazardous chemical storage facilities have been installed and floors have been constructed with impermeable materials. In the event of a leak, the entire amount is transferred to a wastewater treatment plant for treatment. In addition to regular inspections required by the law, we are carrying out monthly inspections of hazardous chemical storage facilities, process safety management (PSM), off-site impact assessment, and risk-management plan preparation. Through these, we are made aware of risks that may arise in the process of purchasing, storing, handling, and using hazardous chemicals, and are able to take preemptive measures to deal with anticipated problems. We provide annual training on hazardous chemicals to all employees and have appointed a hazardous chemical manager for each department to provide legal training and outside training. As a result of these efforts, LOTTE Chemical has not had any hazardous chemical leaks in the past three years.

**Risk Assessment**

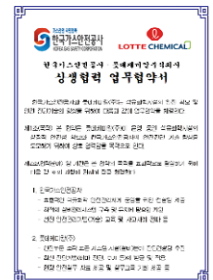
LOTTE Chemical performed 11,320 risk assessments in 2021, including the Hazard and Operability Analysis (HAZOP) conducted in cooperation with specialized agencies to prevent recurrence of fire accidents in the production process at NC plant at Daesan in 2020. By estimating the risks associated with hazards and establishing and implementing mitigation measures for 1,530 cases, which were identified to have higher risks than the standard, we eliminated and reduced risk factors. In addition, we are striving to improve our partners' safety management level and prevent major accidents by providing risk assessment consulting support.

**Quantitative risk assessment**

LOTTE Chemical has entered a partnership with Samsung Fire & Marine Insurance as part of the ESG safety management practice for risk management. Risk assessment was conducted to analyze and minimize risks that may occur in the workplaces of suppliers. In the analysis, we have moved away from the framework of the existing process/work/hazardous chemical risk assessment; instead, we conducted hazard-based safety assessments for natural disasters, such as fire safety/wind and flood damage/earthquake and are making improvements to eliminate the identified risks.



Earthquake Risk Map within Business Sites



Mutual Growth MOU

**Reinforcement of internal capabilities through MOU**

LOTTE Chemical seeks to improve its professionalism through exchanges with external organizations. By signing MOU with Korea Gas Safety Corporation, we are hoping to secure the safety of petrochemical facilities and improve safety diagnosis technology. Based on technical and human exchanges between the two companies, we plan to improve the practical safety at our business sites and be able to contribute to the development of safety technology in the chemical industry in Korea.

**Efforts to Promote Employee Health**

LOTTE Chemical offers employee health checkups to promote a healthy and safe working environment. A person who has obtained a health and medical certificate is appointed as a health manager in charge of providing care and support for occupational illnesses, diseases, infectious diseases, etc. In addition, a resident psychological therapist helps enhance the mental health of employees, who may be affected by lethargy due to the prolonged COVID-19 and stress from work. We provide health checkups once every two years for employees and their spouses over 35 years of age and offer smoking cessation clinics and body fat clinics to further improve the health of our employees.



Operation of counseling room

**SOCIAL**  
Value Management-  
Customer Value Creation

**Enhancing  
Customer  
Satisfaction**



**Strategies to Increase Customer Satisfaction**

Today's market environment is becoming increasingly competitive as customer needs are constantly changing. As a result, companies are making various efforts to enhance corporate competitiveness through customer-oriented thinking and by prioritizing customer satisfaction, improving the quality of their products and services, and strengthening customer service. LOTTE Chemical places the highest priority on realizing customer value and strives to meet customer needs by improving the quality of products and services. Moreover, we are committed to providing customer-centric services to lessen inconveniences. We will continue to lead the market trends, develop and provide products of the highest quality through communication, and realize customer satisfaction through customer-centered thinking.



**Operation of VOC system**

LOTTE Chemical has established a procedure to systematically manage VOC (Voice of Customer). Through an organization dedicated to handling VOC (Voice of Customer), we manage the entire process from receipt of customer complaints to resolution. During the VOC process, relevant departments promptly work together to resolve VOCs received and manage them on an ongoing basis to analyze the trend. At regular quality meetings, we discuss preventive measures as well as follow-up measures.

**A showroom, Chemi Lounge, reopens after renovation**

LOTTE Chemical reopened Chemi Lounge, a showroom that introduces future technologies and products of LOTTE Chemical to customers and visitors, after a renovation. The space is designed based on the concept of making the world better with chemicals, and consists of three themed areas: Specialty, Future Growth, and Environment. In line with changes in the global trends of the chemicals industry, C-rPET, recycled PP, and other recycled materials are being exhibited. A space for hydrogen and battery materials has been created to inform visitors about the emerging future industries.



**Stakeholder Interview**

Dream Chem Co., Ltd. — Kim Tai-hoon, Vice President

**"A company with high customer satisfaction through constant communication"**



LOTTE Chemical has secured a diverse product lineup with competitive prices through steady technological development and investment. The company also has stable product supply and demand and has earned trust from customers by fulfilling its promises. In particular, the purchasing process and system are created with customer convenience in mind, and there is an ongoing effort to improve communication with customers through customer satisfaction surveys and operation of VOC. I believe that LOTTE Chemical will be able to make more progress by continuing to engage in communication with customers and reflecting customer needs in its products. With the tightening regulations related to the chemicals and manufacturing industries and increasing environmental demands, some small and medium-sized enterprises (SMEs), who are LOTTE Chemical's clients, are at a disadvantage due to limited financial and non-financial capacity to respond to the regulations or social needs. Given the circumstances, sharing LOTTE Chemical's infrastructure and expertise with these customers will create new opportunities and increase customer value.

**Case Study**

**Redesigning of website**



LOTTE Chemical opened the redesigned website last year. The main website contains information about company history, ESG management, global businesses, hiring, and company news, while the product website contains information about the characteristics, technical data, and uses of products. The main website has simplified navigation for customers who visit the website; by placing menus, such as company information, IR, ESG, and hiring on the main page, customers can easily access information. The product website has improved searching function for faster and easier retrieval of product information. LOTTE Chemical will make further efforts to provide information more quickly and accurately with the redesigned website as an online communication platform.

**SOCIAL**  
Value Management-  
Customer Value Creation

**Enhancing  
Product Safety**



**Product-Safety System**

In order to determine the direction and scope of environmentally friendly product design, LOTTE Chemical is continuously following domestic and international regulatory trends. We conduct compliance check with hazardous substances and regulated substances before purchasing or sales products. We control the use of substances that have been found to be harmful to the human body and the environment by employing stricter control measures than required by domestic and international standards. As interest in ESG increases, responsibility for product life-cycle management is being stressed. Product risk-assessment results are being incorporated as major ESG evaluation indicators, and are having a great impact on companies. By managing the potential impact of products from the stage of using raw materials through the reduction of hazardous chemicals and the development of alternative products, we are reducing regulatory risks in advance, enhancing product stability and transparency, and enhancing customer trust. In addition, we continue to promote win-win partnerships by sharing revised laws and regulations and providing relevant training to our partners.

**Strengthening Management of Chemical Substances**

LOTTE Chemical is reorganizing its chemical-management process and taking preemptive measures pertaining to applicable laws and regulations in order to ensure compliance with domestic and global regulations that are becoming increasingly strict. We are managing substances in major products according to the Material Safety Data Sheet (MSDS) and establishing and operating a global-level in-house chemical management system (LCMS\*). We conduct life-cycle assessment of products from purchase of raw materials to sales, in order to ensure compliance with regulations and monitor their usage. In addition, we take various approaches and regularly interact with employees in development, purchasing, quality, and sales departments to discuss matters related to product management and customer feedback.

Material Safety Data Sheets (MSDS) of about 460 basic chemicals and 1,200 advanced chemicals have been updated; and products that fall under the hazardous category and warning label have been reported to the Occupational Safety and Health Agency within the legal period to meet the relevant obligations. Furthermore, in October 2021, we performed maintenance of the existing chemical substance database and updated regulatory items. The newly added substances and real-time compliance with about 200 domestic and foreign legal items have been verified to ensure that we are up-to-date in our record and management. Lastly, by applying Robotic Process Automation (RPA) and Optical Character Recognition (OCR) technologies to simple and repetitive tasks, such as pre-evaluation and regulatory checks of chemical substances, we have not only significantly reduced work time and errors but also laid the foundation for preemptive responses to complex chemical substance regulations. Using such AI technology allowed departments to quickly check each other's work and improved the overall work speed, which resulted in improved customer satisfaction.

\* LCMS(LOTTE Chemical Management System): LOTTE Management Systems for Chemical Substances

**Response to Regulations on Chemical Substances**

Starting with the EU REACH that came into effect in June 2007, laws on registration and evaluation of chemical substances are expanding globally. For example, In Korea, the Act on Registration and Evaluation of Chemical Substances, and the Chemical Substances Control Act was enacted in 2015; KKDIK in Turkey in 2019; and UK REACH in 2021. Through collaboration with domestic and overseas agents, we are registering all chemical substances used at LOTTE Chemical's business sites without delay in accordance with domestic and international government guidelines and responding to customer-specific requirements.

**LOTTE Chemical's EU REACH and other substance registration status**

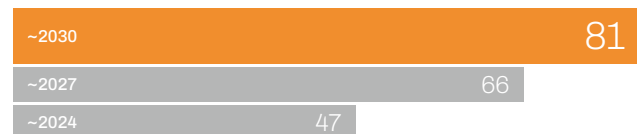
- EU REACH: About 30 substances registered and subject to follow-up management
- Act on Registration and Evaluation of Chemical Substances: Pre-registration\* for about 300 substances completed; registration for about 94 substances completed (1st in 2018 and 2nd 2021)
- Turkey KKDIK: Pre-registration for 92 substances completed
- UK REACH: Pre-registration for 29 substances completed (in preparation for registration in 2023)

\* Pre-Registration: registering substances for registration grace period (if grace period is not granted, registration is required immediately)

**LOTTE Chemical Substance Registration Performance and Plan per Act on Registration and Evaluation of Chemical Substances**

	1st registration (2015-2018)	2nd registration (2019-2021)	3rd-5th registration (2022-2030)
<b>Ministry of Environment Guidelines</b>	Identified 510 substances subject to registration	Registration of imported/ manufactured chemicals over 1,000 tons	Registration of 1~ 1,000 tons of imported/ manufactured chemicals
<b>LOTTE Chemical Performance (Plan)</b>	Registration of 21 substances (13 manufactured, 8 imported)	Registration of 73 substances (38 manufactured, 31 imported)	3rd (~2024): 47 substances 4th (~2027): 66 substances 5th (~2030): 81 substances

**Plan for registration of substances per Act on Registration and Evaluation of Chemical Substances** (unit: type)





**SOCIAL**

Value Management-  
Customer Value Creation

Enhancing  
Product Safety

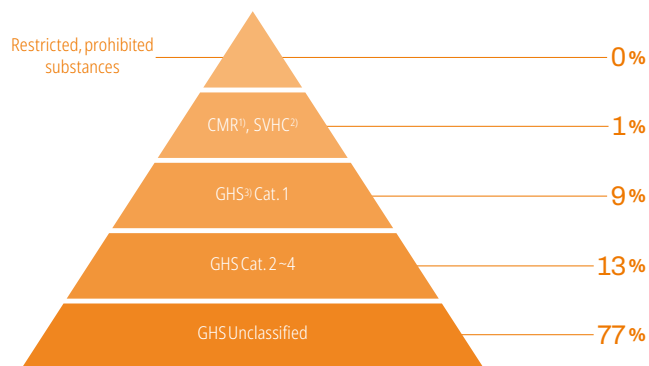


**Product Hazard Management Standards**

There is a recent global demand for transparent information disclosure in terms of product safety. The hazard analysis focusing on consumers and products is one of them, which is used as an ESG evaluation index at home and abroad, as a tool for realizing ESG management of a company.

Hazard information of chemical substances handled by LOTTE Chemical is available in the Material Safety Data Sheet (MSDS). Purchase of the raw materials with identified risk is strictly prohibited in advance. In December 2021, LOTTE Chemical restructured the hazard grade system for all chemical substances from three levels to five levels for more methodical management. By checking the impact on human health and the environment at the stage of introduction of chemical substances, regulatory risks can be detected in advance. Therefore, the system allows us to enhance the brand value, strengthen sense of responsibility for products, and gain consumer trust.

LOTTE Chemical's Hazard Chemical Management Standards consist of 77% unclassified by GHS; 13% in the GHS Cat. 2~4; 9% in the GHS Cat. 1; 1% containing CMR and SVHC; and 0% of prohibited substances. Using the chemical management system, we can check the category of hazardous chemicals in real time, and hence can reduce the content of hazardous chemicals in products and develop alternative substances to ensure the safe use of chemical substances. Additionally, in the second half of 2022, we plan to conduct a product hazard analysis starting with highly-hazardous substances. By doing so, we hope to be able to lower the hazard category of substances that are currently in the high hazard category and develop products with improved safety.



1) CMR: Carcinogenic, Mutagenic, Reprotoxic  
 2) SVHC: Substances of Very High Concern  
 3) GHS: Globally Harmonized System of Classification and Labeling of Chemical  
 (an internationally agreed-upon standard managed by the United Nations)

**Product Stewardship**

In order to strengthen the response to environmental regulations, LOTTE Chemical's Environmental Management Division has been organizing information exchange meetings for working-level managers in development, procurement, quality, and sales teams. At the exchange meetings, environmental regulatory trends in Europe, the United States, China, etc., and global customers' requests for product environment are discussed to establish in-house policies. We promote environmental audits, through which we verify our partners' compliance with regulations such as EU REACH SVHC\*, RoHS\*\*, and conflict minerals regulations in advance. LOTTE Chemical immediately issues these documents through the LCMS for customers upon request to maintain trust relationship.

In addition to internationally regulated RoHS substances (Cd, Pb, Hg, Cr6+, PBBs, PBDEs, BBP, DBP, DEHP, DIBP) and EU REACH SVHC, LOTTE Chemical separately manages chemicals that may have a negative impact on the environment and human body, such as halogen, antimony, and flame retardants. The use of regulated substances is strictly prohibited, and when the substances already in use are newly designated as hazardous chemical substances, they are being substituted with alternate substances. In October 2021, we substituted five products, including flame retardants that are harmful to the human body, with safer and less toxic substances. Products that have been identified as hazardous are monitored and strictly managed from the raw material introduction stage.

\* SVHC (Substances of Very High Concern): 223 high-hazard substances designated by the ECHA (as of Jan. 2022)  
 \*\* RoHS (Directive on the Restriction of Use of Hazardous Substances in Electrical and Electronic Equipment): European Directive on restriction of use of certain hazardous substances in electronic equipment

**SOCIAL**  
Value Management-  
Customer Value Creation

**Information  
Security**



**Information Security Management System**

In order to comply with recommended standards and ensure compliance with external recommendations, LOTTE Chemical has acquired and maintains the standard information security management system (ISO 27001) established by the International Organization for Standardization (ISO) since 2015.

LOTTE Chemical's information security management system covers all areas of security management, from management to physical security and technology, rather than just one specific area; it establishes and shares fundamental security principles and detailed guidelines for all employees. In addition, the system is updated once a year in consideration of the new and revised related laws and internal and external environmental changes. The group-level diagnosis for information-protection-level is also conducted once per year to identify and improve vulnerabilities in the information security management system, and to maintain a high level of security accident prevention. We have appointed information security managers for domestic research centers and plants, overseas corporations, and subsidiaries to operate a unified information security management system through joint response in case of emergency.



ISO 27001 Certification

**Information Security System**

LOTTE Chemical's monitoring system detects external attacks and viruses in real time, and provides timely responses in cooperation with LOTTE Group's Cyber Security Control Center. In addition, a security-threat detection system has been established to detect new and evolving security threats. Our information assets are protected in accordance with Security Solution Management Policy, which provides guidelines for use of vaccines, document encryption, and media control. In response to security threats at the production sites, we are expanding the use of vaccine solutions for production and laboratory equipment and installing firewalls in the workplace. We also conduct periodic mock hacking/system security checks to discover and improve major system vulnerabilities.

**Personal Information Leakage Status**

Category	Unit	2019	2020	2021
Number of leakage cases	Cases	0	0	0

**Privacy Protection**

LOTTE Chemical strives to protect the private information of all stakeholders as well as employees by establishing an internal private-information management plan.

The plan consists of the company's personal-information encryption and disposal policies that reflect the standard measures for privacy protection. We store and regularly monitor records related to personal information, including unauthorized inquiry or download of personal information through the company system and history of permission changes. In addition, we conduct annual inspections to ensure that personal information of customers managed by a third party is safely managed and protected at our own level.

**Information-Security Education and Training**

LOTTE Chemical offers annual information security training to employees and stakeholders to raise their awareness on the subject. In 2021, the training was conducted online to reflect the expanded non-face-to-face working environment from prolonged COVID-19. Every other month, we publish an information security newsletter containing the company's information protection activities and external security issues.

To prevent email security accidents, we are conducting quarterly virus training. In addition, to prevent fraud trade accidents, we send an official letter about our account registration/change policy to customers twice every year.



Information-Security Newsletter

**Information-Security Training Status**

Category	Unit	2019	2020	2021
Employees	Hours of training	Hours	1	1
	No. of employees who completed the training	Persons	2,009	4,544

**SOCIAL**

Value Management- Pursuing Community Values

**Social Contribution Strategies**



**Social Contribution Strategies**

Under the vision of "Green Circulation," LOTTE Chemical's social contribution activities focus on three areas: Nature, People(women/children), and Community.

For the theme of nature, we are organizing activities to improve social awareness of resource circulation and promote ecological conservation. For the theme of people, customized programs for women and children from multicultural families are being prepared. Lastly, for the society theme, LOTTE Chemical supports the underprivileged class in the region near each business site, promotes safety campaigns to improve living conditions, and provides support for firefighters.

**CSR Vision and Theme**

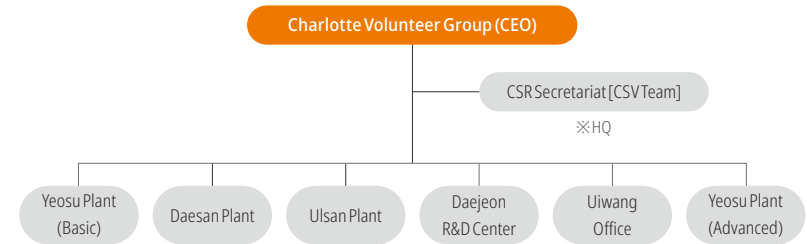
LOTTE Chemical strives to create a world in which people and the environment are in harmony under the vision of "Sustainable Companion for Green Circulation."



 <p><b>Nature</b> <u>Green Circulation for Nature</u> Activities to raise awareness of resource circularity and conserve the environment</p>	 <p><b>People(women/children)</b> <u>Green Circulation for People</u> Operate programs for women and children from multicultural families</p>	 <p><b>Society</b> <u>Green Circulation for Society</u> Support the underprivileged class in the region; support well-being of firefighters; safe living conditions</p>
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**CSR Activities Organization and Major Programs**

LOTTE Chemical operates CSR organizations at each business site to communicate with local stakeholders. In order to practice the value of sharing with the local community, we have been operating Charlotte Volunteer Group since 2015, through which we encourage voluntary participation of employees. Additionally, major social contribution activities are submitted to the ESG committee's agenda for review and approval.



**Social Contribution Fund**

LOTTE Chemical has been operating Matching Grant since 2008. Matching Grant is a system in which the company raises funds by sponsoring the same amount as the donations voluntarily made by executives and employees. The Matching Grant Fund in 2021 was used for supporting firefighters' welfare and various social contribution activities at each local workplace.



**SOCIAL**

Value Management- Pursuing Community Values

Social Contribution Strategies



**Nature**

Raise awareness of resource circulation; conservation of environment

**LOTTE Green School, Green Science Camp** Every month, a LOTTE Chemical employee from the research center visits local children's centers in Daejeon to give class on recycling and separation of plastics. Through the training, children, who are leaders of the future, can learn about the importance of nature and become more aware of plastic circulation.

**EM clay balls revive the river** To improve water-quality and revive river ecology, our employees placed EM (effective microorganisms) clay balls, which are full of useful microorganisms, in rivers near Yeosu, Ulsan, and Daejeon business sites.

**Project LOOP creates culture of resource circulation for youth** Incheon Metropolitan City Office of Education and Korea Federation for Environmental Movements signed a business agreement to raise awareness of resource circulation and create a culture of proper waste separation. We are striving to establish a recycling process for the collected waste plastic bottles by installing 20 PET collectors in local schools in Incheon and developing and operating a resource circulation program for students.

**People**

Operate programs for women and children from multicultural families

**Music play for children with disabilities and their families** Since 2018, we have been providing music therapy programs for psychological and emotional development of children with intractable diseases and for relieving the stress of caregivers, or parents, of those children. More than 3,000 music play classroom sessions are offered every year, and in 2021, a research paper was published in the Journal of the Korean Society for Music Therapy, proving the physical and emotional effects of music play.

**Support for remodeling of childcare center, a space for children to dream** To create a childcare center that can serve more parents and children, we helped remodel the childcare center in Bugok-dong, Ansan-si, Gyeonggi-do, and provided developmentally appropriate learning materials for special themed programs.

**Cooking class for marriage immigrants, kimchi-making event with LOTTE Chemical** We held a hands-on kimchi-making class and invited marriage immigrant women to learn how to make kimchi from a kimchi master to help with settling and adjusting to a new culture.





**SOCIAL**

Value Management- Pursuing Community Values

Social Contribution Strategies



Sponsoring Families from KBS Documentary, "Companion," community companionship

Rice donation to communities marginalized due to COVID-19

Cultural sponsorship event for firefighters, LOTTE Chemical families and the firefighters' families invited to the Organ Odyssey

**Society**

Support the underprivileged class in the region; support welfare and wellbeing of firefighters; safe living conditions

**Sponsoring Families from KBS Documentary, "Companion," community companionship** We have been providing housing, furniture, and goods to the underprivileged in the local community through "Companion," a documentary show that has been aired on KBS, to reinforce social safety and improve civic awareness. Starting in 2021, we have been improving the living conditions of and donating goods to the families on the show and helping children in need to grow up healthy and safe.

**Food donation to communities marginalized due to COVID-19** To promote mutual growth with local communities and support those who are marginalized due to COVID-19, LOTTE Chemical purchased rice from a farmhouse near business sites and donated 7,100 bags of white rice worth KRW 220 million to the underprivileged families in Songpa-gu and the Korea Single-parent Family Welfare Facility Association. We have converged mutual development and partnership with the local community and social contribution to support the marginalized under difficult circumstances due to COVID-19.

**Cultural activities event for firefighters, LOTTE Chemical families and the firefighters' families invited to the Organ Odyssey** Cultural Performance for fire fighters is an event that first started in 2019 as LOTTE Chemical Group's representative social contribution program. LOTTE Group's Chemical Unit extends gratitude and appreciation to firefighters and their families by inviting them to a cultural performance of Organ Odyssey.

**Case Study**

**LOTTE Chemical-National Fire Agency-Korean Society of Retired Fire Officers signed an agreement to promote firefighters' welfare and prevent fire among the underprivileged**

**Agreement Details**

LOTTE Chemical will provide 500 million for three years from 2021 to 2023 for activities to support the psychological counseling for firefighters, safety keeper for the silver generation, etc. The National Fire Agency will provide fire safety training to LOTTE Chemical along with various support for the relevant activities, and the Korean Society of Retired Fire Officers will provide necessary support, in terms of purchasing fire safety equipment.

**Related activities**

**Activity 1. Psychological counseling for firefighters**

The mental health and wellbeing of firefighters who are repeatedly exposed to risky situations, we sponsor a psychological counseling vehicle that visits each fire station.

**Activity 2. Elderly-Generation Safety Keeper**

Retired firefighters with expertise in firefighting safety visit the homes of the elderly living alone, install fire extinguishers and fire alarms, and conduct fire-safety training.



Sign an Agreement on Firefighter Welfare Promotion and Fire Prevention for the Underprivileged



Elderly-Generation Safety Keeper



Cultural sponsorship event for firefighters (2019-)



Creation of 365 safe village in Uiwang, Gyeonggi-do (2020)



Commendation from the Commissioner of the National Fire Agency to commemorate the Day of Firefighting (2021)

**SOCIAL**

Human Resource Management-  
Human Rights and Diversity

**Human Rights Management  
Respect for Diversity**



**Human Rights Policy**

As investment decisions are greatly affected by non-financial factors like ESG, along with their impact on the economy, society, and politics, companies are becoming increasingly interested in human rights management. The international communities, including the UN and OECD, call for extended corporate responsibility to encompass human rights management in the supply chain. Companies are being asked to establish systems and policies that ensure prompt response and prevention of human rights violations. Accordingly, LOTTE Chemical is making various efforts and paying the utmost attention to prevent human rights violation in all areas of business operation through the declaration of human rights.

\*More details about LOTTE Chemical's human rights policy can be found in the CEO's statement on page 90.

**Internalization of Human Rights Management Culture**

To internalize culture that respects human rights, LOTTE Chemical identifies and raises awareness of executives and employees in areas that can potentially have human rights violation issues. In 2021, we conducted company-wide online training on sexual harassment prevention and improving awareness for the disabled. LOTTE Chemical's remedy process of human rights violation guarantees protection of the identity of victims and ensures open reporting through the channel. We resolve disputes and restore victims' rights by thoroughly investigating each case.

**LOTTE Chemical Human Rights Violation Reporting Channel**



**Open Recruitment with Respect for Diversity**

LOTTE Chemical strives for an equitable world, free of discrimination on the basis of gender, academic affiliation, disability, or origin. We believe that respecting people with diverse backgrounds is essential for the growth of an individual and a company. We recruit talents who are passionate about and have a sense of responsibility for making a more mature society. Respect for diversity is the basis of our hiring process for new employees, professional/experienced talents, the disabled, and veterans. Through cooperation with the Korea Employment Agency for Persons with Disabilities and local governments, we have been endeavoring to create remote work for the disabled.

**Internalizing a Culture That Respects Diversity**

The 2021 LOTTE Diversity Forum was held to show the company's dedication to embrace diversity in the workplace, in terms of generation, gender, disability, and nationality. We strive to create a corporate culture that respects diversity by recognizing employees who demonstrate non-discriminatory behavior in the workplace and sharing best practices in each field to encourage participation. In addition, we operate mentoring for female leaders through which we expect to encourage continued growth and secure competitiveness.



**SOCIAL**

Human Resource Management-  
Human Rights and Diversity

**Fair  
Evaluation  
Communication  
and Respect**



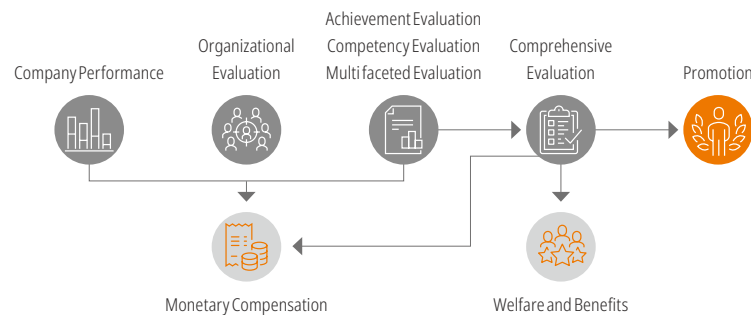
**Fair Evaluation**

LOTTE Chemical ensures implementation of fair evaluation by reflecting various evaluation factors in a comprehensive manner. The evaluation consists of performance evaluation, which is based on the MBO (Management By Objectives), competency evaluation, and 360 review. For objective evaluation, we have established KPIs (Key Performance Indicators) in accordance with the relevant standards and assess the achievement. Competency evaluation is divided into general competencies and job competencies and evaluates the potential and capabilities of the employee. The results are used to further develop the employee's strengths and improve the weaknesses. Lastly, the 360 review, which was launched in 2020, supplements the one-way, vertical evaluation structure between the evaluator and the person under evaluation. The 360 feedback provides a multifaceted perception of the employee under evaluation and enhances objectivity of evaluation. In addition, the goal achievement progress is evaluated on an ongoing basis throughout the year to ensure fair evaluation. This enables evaluators to provide immediate feedback & coaching and the person under evaluation can gain objective understanding about the progress.

**Reasonable Compensation**

LOTTE Chemical operates a reasonable compensation system, which ensures that employees are compensated based on their performance. We are continuously strengthening the duty/responsibility-based compensation, in which managers receive compensation corresponding to their position and responsibility. Each individual receives the salary increase at the rate determined based on the evaluation results, which are also being used in determining bonuses and incentives to ensure performance-based compensation. LOTTE Chemical's compensation system ensures that employees are compensated based on their roles and performances and not put at a disadvantage due to gender, age, disability, etc., to enhance employee diversity.

**Performance Management**



**Organizational Culture Based on Communication and Respect**

LOTTE Chemical strives to create an organizational culture with focus on employee happiness. We carry out various team-building activities to boost our pride in the company and to improve the sense of unity and communication among other members of the LOTTE Group. In addition, the CEO communication channel, Chemi Talk, is being operated to improve employee communication and organizational culture.



We promote an open organizational culture Chemi Talk, which serves as a platform to share management performance, future projects, etc., and facilitates two-way communication with the CEO on various aspects, including HR system, welfare, and working environment. By launching an Organizational Culture Task Force, we attend to the opinions of all executives and employees to set and implement major tasks. Since 2021, the Organizational Culture Committee has been striving to improve working conditions and system by launching leaders' channels, appointing a Fearless Leader, and operating Chemi Flex Day, etc.

**Number of Chemi TALK session with CEO**

(year of 2021)

10



**Stakeholder Interview**

LOTTE Chemical Human Resources Team — Lee Seon-je, Manager



**“LOTTE Chemical recognizes the importance of human rights management and makes responsible efforts”**

LOTTE Chemical has organized an Organizational Culture TFT to establish a culture that values human rights of employees. The TFT focuses on human rights management with the CEO serving as the team leader. Despite the inevitable differences in the operational conditions at the head office and business sites due to the nature of the business, the CEO makes sure that the same human rights management principles are applied without exception by visiting business sites. Our employee benefits and welfare program is receiving positive reviews compared to those of our peers; our employees have relatively high job satisfaction levels since the offering of paternity leave and flexible working hour system, which help maintain the work-life balance and improve work efficiency. LOTTE Chemical will lead human rights management in the chemical industry by continuing to practice hiring stability, fair compensation, and promotion of employee diversity.

**SOCIAL**  
Human Resource Management-  
Human Resource Development

**Development  
Process  
of Human  
Resources**



**Desired Qualities for Employees**

LOTTE Chemical puts more weights on future potential than on current achievements. Based on the four desired qualities for employees, LOTTE Chemical recruits global human resources who have the passion and responsibility to mature our society with their growth.

**Desired Qualities for Employees**

<p><b>Challenger</b></p> <p><b>Top person driving execution</b> Top person in their fields who takes on new opportunities and tough challenges with high energy and enthusiasm</p> <hr/> <ul style="list-style-type: none"> <li>· Attracts Top Talent</li> <li>· Action Oriented</li> </ul>	<p><b>Harmonizer</b></p> <p><b>Harmonious person respecting diversity</b> Person who recognizes values of different perspective and culture to organization therefore collaborates for shared objectives</p> <hr/> <ul style="list-style-type: none"> <li>· Collaborates</li> <li>· Values Differences</li> </ul>
<p><b>Expert</b></p> <p><b>Person with business Insight and Strategic Mindset</b> Person who anticipates future possibilities and builds strategies within knowledge of business and the marketplace to reach organizational goal</p> <hr/> <ul style="list-style-type: none"> <li>· Strategic Mindset</li> <li>· Business Insight</li> </ul>	<p><b>Motivator</b></p> <p><b>Person who is self-develop under responsibility</b> Person who does their best to achieve organizational goal based on sense of ownership and accountability</p> <hr/> <ul style="list-style-type: none"> <li>· Drives Engagement</li> <li>· Ensure Accountability</li> </ul>



**Recruiting New Employees**

LOTTE Chemical hires new employees, mid- to senior-level managers, physically disabled persons, veterans, industry-university scholars etc., by utilizing diverse channels. In line with technological and environmental changes, we apply IT and AI technologies to the hiring process to effectively secure human resources and ensure fair process. We are effectively verifying applicants' competencies through AI-based competency tests for some jobs and are responding to a new hiring paradigm through expanded non-contact selection, and online recruitment counseling. Through the introduction of an open recruitment system and flexible recruitment period/frequency, we are building an environment where we can hire talented people at the right time. In order to secure outstanding R&D human resources, we are working with the human resources organization of the research institutes to hire industry-university scholars and promote the target lab in the research field. Additionally, we are conducting offline promotional activities for academic conferences, including the Polymer Society and Chemical Engineering Society.

**Human Resource Development Strategies**

We are developing and supporting various programs to more nurture our human resources in effective and innovative ways. In order to transfer the knowledge and know-how of skilled workers, we have launched a production process technology program and produced online courses and lesson plans on standardization of basic process, personal work process, and know-how. At the same time, we are providing training on leadership competencies, such as coaching, performance management, and generational understanding, for new team leaders and managers. Through these training programs, we are ensuring that the new leaders understand change in their roles and learn to coach and give feedback to their team members. In addition, we provide mentorship to nurture female leaders and offer courses on leadership, performance management, communication, adjustment assistance, and foreign language for new and returning expat employees. Lastly, we are requiring on-site supervisors and safety and health organizations to acquire relevant certifications and are encouraging all employees to acquire safety certification, in accordance with the strengthening of safety and health laws.



**SOCIAL**

Human Resource Management-  
Human Resource Development

**Development  
Process  
of Human  
Resources**



**Training by position and job**

**Support system for degree acquisition (academic training)** To nurture experts with field experience as well as academic competency, we select researchers with excellent technical and development capabilities annually and support the educational expenses needed to acquire master's/doctoral degrees in sciences and engineering from prestigious universities.

**Training and Meetings for Field Professionals** We operate a vocational training school for future field employees before start of work to reinforce early development of job competency. The school provides theoretical and practical learning on environment and safety, factory operation, and process. For field employees who have been newly promoted, we provide a leadership training and executive-leader meeting to facilitate communication within the team and improve problem-solving skills.

**Training for Job Experts** The financial qualification certification process, which has been conducted annually since 2013 to strengthen the expertise of employees in financial departments, consists of a total of three courses: a practical course; an in-depth course; and a strategy course for each job-level and position. The courses are designed to nurture talents in the mid- to long-term and include Fundamentals of Financial Accounting, Risk Management, Ethical Management and Compliance, and New Role of CFO, etc. In order to expand data-based management culture and expand data-based management culture, in response to rapidly changing IT technology development, we have established a detailed training course for not only DT personnel but also non-DT personnel and are operating a DT talent nurturing program.

**New team-leader course** We have developed and are operating a new course on new team-leader training to improve the skills needed for the changed role of a leader. In 2021, a total of 32 employees in new positions received the training, in which personality/values assessment was performed to identify their strengths and weaknesses of leadership style. Furthermore, experts in each field were invited to provide courses on identity and practical concerns of leaders, expectations and common misunderstanding about leadership, generational conflict, etc.

**New-Employee Training**

**New-employee onboarding** The curriculum is designed to aid soft-landing of new employees and equip them with practical and theoretical knowledge about work. It includes introduction of each business division and business site, company vision, theoretical training on basic petrochemicals, product theory, and two-week on-site training, allowing new employees to combine theory and field experience. In addition, we are strengthening the practical skills of new employees through simulations of real work situations, Excel/PowerPoint training, etc.



**Enhancing Global Competencies**

**Launching strategic language courses**

LOTTE Chemical offers a number of language courses internally to cultivate the global capabilities of employees. In addition to the existing courses on English, Chinese, and Japanese, we are operating strategic language courses for Indonesian, Russian, Spanish, and French. We also support external programs, online language lessons, and micro-learning contents to encourage employees to learn new languages according to their own schedules.



**Training for new and returning expatriate employees using the metaverse platform**

As our expatriate training curriculum becomes more advanced and new work competencies such as digital literacy and team-ship suitable for the changed work environment are required, we utilize the metaverse platform to train new and returning expat employees. Learning materials on the role of expatriate, problem-solving and analysis skills, and communication skills are presented as an online game to reduce the fatigue from online learning and improve concentration.

**Infrastructure for Online Learning**

Training for new employees and expatriates was conducted in real-time, non-face-to-face using Metaverse and Zoom. We share basic competencies and group issues through Acropolis and offer the EDRC course online, actively promoting online, non-face-to-face training.



**Acropolis**

A smart learning platform to share/search/watch about business insights and issues within the LOTTE Group



**EDRC**

DT-based convergence technology (process design, process safety simulator, etc.) training offered by Seoul National University and five other universities

**SOCIAL**

Human Resource Management-  
Work-Life Balance

**Labor-  
Management  
Culture of Trust**



**LOTTE Chemical’s Labor-Management Culture**

LOTTE Chemical promotes active labor-management communication based on trust and respect to establish value creation culture. We conduct wage and collective bargaining with the labor unions at each business site to improve working conditions and discuss major business and system changes to enhance understanding of the issue and establish a smooth communication system.

In addition, we hold briefing sessions to build consensus among employees. Through two-way communication, we instill a sense of belonging and pride in our employees and strengthen creative organizational management and mutual trust. We are building a labor-management relationship of win-win and cooperation at each business site, where we hold a quarterly labor-management meeting to discuss various issues, such as improving welfare and work environment and designing a reasonable system.

**Operation of Labor-Management Council**

LOTTE Chemical utilizes various channels to provide a place for regular communication between labor and management. In addition to operating the labor-management council and employee council, we hold regular meetings to make decisions on major issues. Labor-management council and employee council play a central role in communication between labor and management and serve as a representative body for employees. Improvements and changes to working conditions, HR system, etc., are discussed at the labor-management council in each business site, through which we learn about the needs of employees and reflect them in the company policy after further discussion.



**SOCIAL**

**Human Resource Management-  
Work-Life Balance**

**Changes in  
Working Style**



**Work-Life Balance**

Work-life balance is one of the most sought-after qualities of the MZ- generation when choosing an employer. In line with this trend, LOTTE Chemical introduced various measures to enhance employees' work-life balance. To increase work efficiency and create a flexible working environment, we have introduced a flexible working-hours system, selective working hour system, and a PC-OFF system. These systems are created in response to the rapidly changing environment in today's world. We are employing a smart work system and making various efforts to improve the quality of life and work efficiency of our employees. In addition, we strongly promote the use of sabbatical (one month vacation and vacation expense support), healing vacation day (vacation expense support if five consecutive days of vacation days are used, limited to twice per year), work-life balance day (recommended vacation), and a special day (e-coupon given to people that take paid time off to celebrate anniversaries, etc.) and support vacation accommodation expenses.

**LOTTE Chemical Flexible Working Hour System**

**Flexible Working Hours System**

Employees decide their working hours according to their personal needs and schedule

\*Basis: at least 4 hours per day and within the required hours per month.

**Smart Work**

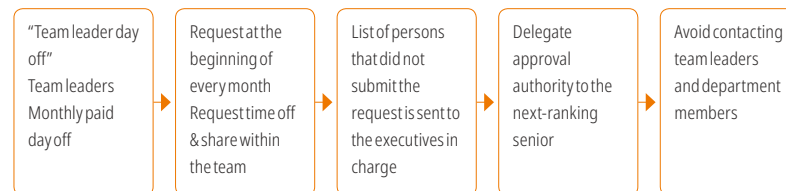
Establish infrastructure, such as mobile office (Mobile S-Moin) and external communication network (Terminal Management Service, or TMS), to allow working from outside the office (including working from home)

**Encourage Use of Vacation Days**

E-coupons for vacation use on special days (anniversaries, etc.); make the day before and after a holiday as an official day off, promote it in advance and frequently, and refrain from having official events on that day to encourage use of vacation time

**Team-Leader Day Off**

For a relaxing working environment, we have a monthly team leader day off for all team leaders working at the headquarters. Team leaders take paid holiday on the third Friday of every month to create a relaxing working environment for team members.



**Family Friendly Management**

LOTTE Chemical endeavors to support work and family balance and help reduce the concerns about career interruption of female employees due to pregnancy, childbirth, and childcare by extending the duration of the childcare leave, promoting maternity protection policies and support, etc. In Seoul, we are operating an in-house daycare center in conjunction with LOTTE World and LOTTE Hotel for head office employees with children aged one to four years.

In addition, we operate a variety of family-friendly welfare programs, which include provision of family medical expenses, comprehensive checkups, and condos/resorts vouchers, to support the health and leisure activities of our employees' families.

**LOTTE Chemical Family Friendly Management**

**Mandatory childcare leave system**

Childcare leave automatically starts following the maternity leave (up to 1~2years)



**Mandatory childcare leave for men**

Mandatory childcare leave for men (100% of basic rate for the first month)



**Parenting 101 for Dads**

Require attending Daddy School before or after childcare leave



**Maternity leave and work system**

Pregnancy leave (10 months), infertility leave (1 year), child/school enrollment care leave (1 year), Reduce working hours during childcare period and relieve the burden of pregnancy, childbirth, and childcare; gifts and supplies for pregnancy and childbirth



**Strengthening support for pregnant employees**

Provide office supplies for a comfortable working environment, snacks for pregnant women, parking assistance, etc.



**In-house daycare center**

Operation of a daycare center with quality teachers and facilities



**Family medical expenses support**

Enrolled in group accident insurance that covers medical expenses for spouses/children and comprehensive medical checkups for spouses/parents



**Leisure and vacation support**

Reimburse vacation expenses when using vacation days and offer member price/vouchers for nationwide condos/resorts owned by LOTTE Group (five times per year)



**SOCIAL**

Human Resource Management-  
Work-Life Balance

**Employee  
Welfare**



Mental Health Campaign

**Mental Health Care**

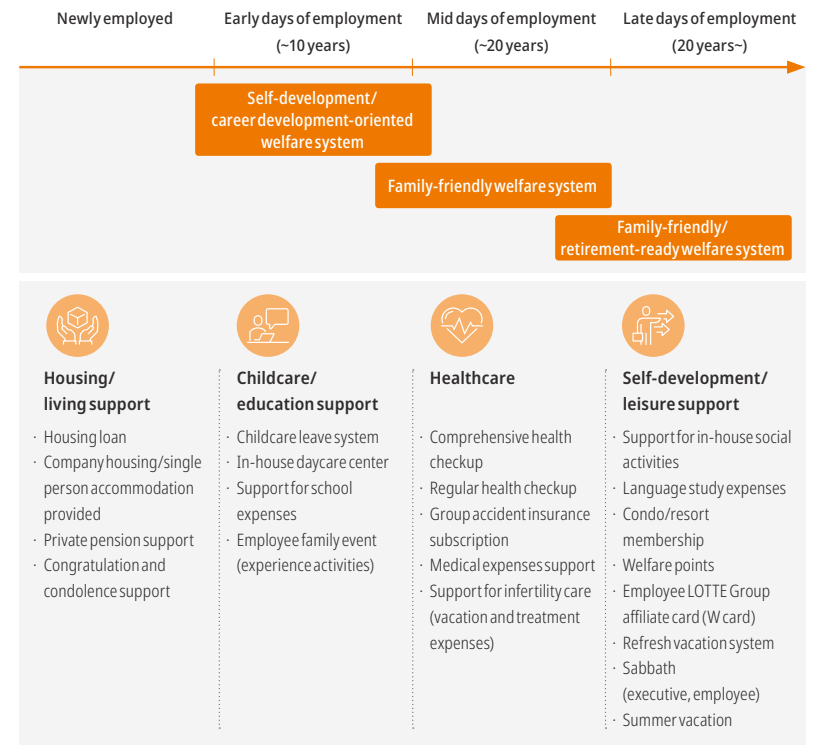
To help manage the mental health of employees and improve their resilience, LOTTE Chemical operates an in-house counseling room with a resident therapist and meditation room. The counseling can help employees relieve stress, anxieties, and conflicts from work or private life, and ultimately enhance quality of life. Additionally, to improve employees' awareness of mental health and increase use of counseling rooms, we regularly distribute "healing letters" on topics related to mental health. We have been recently providing virtual counseling in line with the non-contact era.

**Welfare Program**

With the emergence of digital transformation and MZ generation, the needs of employees are becoming more diversified. The core of the welfare program is to identify the needs and latest trends of our employees and promote the mutual growth of the company and individual members. Believing that the company can grow only when employees and their families are happy, LOTTE Chemical operates a variety of welfare and benefits programs tailored for each stage in the life cycle of employees. We are creating a flexible and enjoyable workplace by establishing a virtuous circulation where employee happiness returns company happiness. Self-development and career development-

oriented welfare program is offered to employees in the early stage of their career (within 10 years); family-friendly welfare program is offered to those in the mid-stages of employment (10-20 years); and family-friendly program in combination with the retirement program is offered to those in the late stage of their career (more than 20 years). In addition, we provide detailed information on all welfare benefits on the internal bulletin board so that employees can easily find the information and make the maximum use of the program.

**LOTTE Chemical Lifecycle Welfare System**





**SOCIAL**

Shared Growth-  
Mutual Growth with  
Business Partners

**Mutual Growth  
Implementation  
System**



**Partners of LOTTE Chemical**

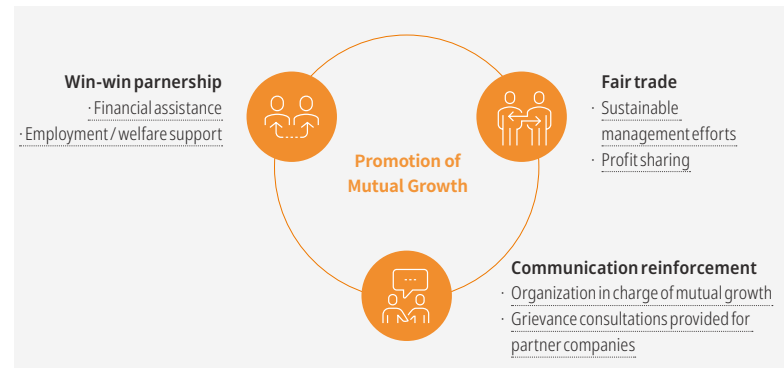
LOTTE Chemical strives to grow with about 360 partners in all business areas based on a systematic and consistent mutual growth policy. They are mostly located nearby Yeosu, Ulsan, and Daesan plants, in addition to the Seoul headquarters and Uiwang business site. As of the end of 2021, a total of 2,886 employees of partner companies performed packaging, loading and unloading, facility maintenance, and plant and housing management works at the business sites of LOTTE Chemical.

**Mutual Growth Strategies**

LOTTE Chemical is promoting mutual growth activities by applying three strategies: fair trade; win-win partnerships; and communication reinforcement. We are striving to meet mutual growth index evaluation as well as domestic and overseas ESG evaluation criteria.

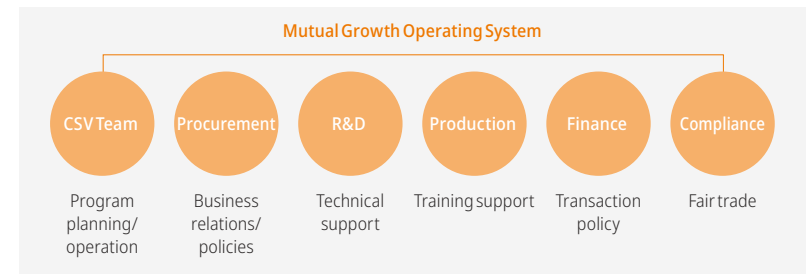
To strengthen fair trade, we comply with and provide training related to the guidelines for contract signing, fair selection and operation of partners, internal deliberation committee for subcontract transactions, and issuance of written documents when concluding fair trade agreements with suppliers. In addition, we are promoting a win-win partnership through ESG training, on-site diagnosis, financial support, employment support, welfare support, technical support, and consulting support. We operate an online channel, Shinmungo, to listen to suppliers' opinions, hold briefing sessions, and conduct quarterly surveys. As a result of these efforts, we received an excellent rating in the 2020 Win-Win Cooperation Index evaluation announced by Korea Commission for Corporate Partnership following the previous year. LOTTE Chemical will continue to develop long-term partnerships with partners by supporting various competency-training and ESG programs.

**Promotion of Mutual Growth**



**Mutual Growth Operating System**

LOTTE Chemical promotes close communication and cooperation among various departments for mutual growth activities. The CSV team, an organization in charge of mutual growth, is responsible for program planning, operation, and public relations, while the procurement department takes care of discovering support items in business relationships with partners and improving transaction-related policies. In addition, the Compliance Team works on improving the fair trade system and the Finance Team is in charge of operating the win-win payment policy. We are also working with production departments and research institutes to further promote mutual growth.



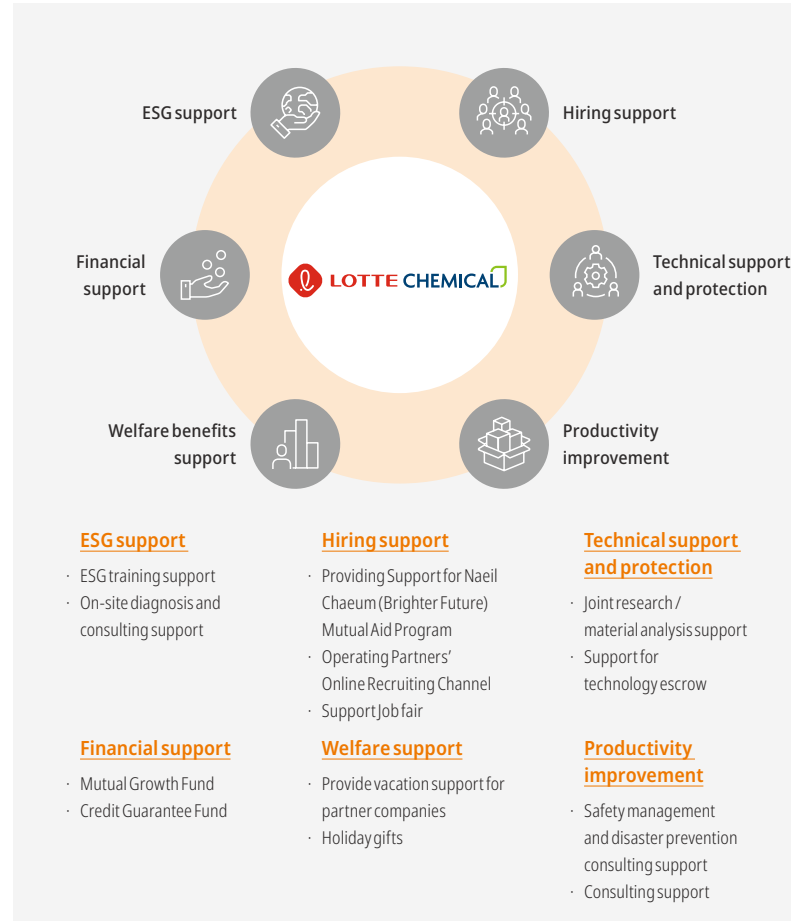
**SOCIAL**

Shared Growth-  
Mutual Growth with  
Business Partners

**LOTTE Chemical  
Mutual Growth  
Programs**



**Mutual Growth Programs**



**ESG Management Support**

We have been participating in the Small and Medium Enterprise ESG Support Project organized by the Korea Commission for Corporate Partnership for three years to enhance partners' ESG capabilities. Since 2019, we have been contributing KRW 150 million annually as win-win cooperation fund to promote the ESG development of partners considering the type and size of their business. Every

year, we provide ESG training and consulting to 30 partner companies. Under the Small and Medium Enterprise ESG Support Project, LOTTE Chemical supports training of partner companies in the ESG-related areas and dispatches experts to provide on-site diagnosis and consulting. The organizer of the project, Korea Commission for Corporate Partnership, selects a company that has established an excellent management system among our partner companies participating in the project, awards certificates and plaques, and provides benefits. This shows that LOTTE Chemical is striving to secure supply chain soundness and enhance sustainable competitiveness by developing management standards in line with global standards and detailed guidelines that reflect domestic laws and regulations in major ESG areas.

**Small and Medium Business ESG Support Project Process**



Deriving common topics, such as human rights, labor, environment, and safety ethics, through global index analysis

**Global ESG Index**

**Development direction**

Analysis of the effectiveness of indicators confirmed through the ESG support project for SMEs organized by the Korea Commission for Corporate Partnership  
Development of universal and effective indicators through analysis of global ESG standards and evaluation criteria of global corporate partners

**E (Environmental)** Establish environmental goals in relation to climate action, energy conservation, etc.

**S (Social)** Labor, human rights, safety, intellectual property, fair trade

**G (Governance)** Board of directors, ethical management, management system, stakeholders

**Considering domestic circumstances**

Considering latest laws and regulations and the nature of manufacturing industry

Derive customized indicators for LOTTE Chemical partners  
Develop guidelines that can be used for field improvement of small and medium-sized enterprises

**SOCIAL**

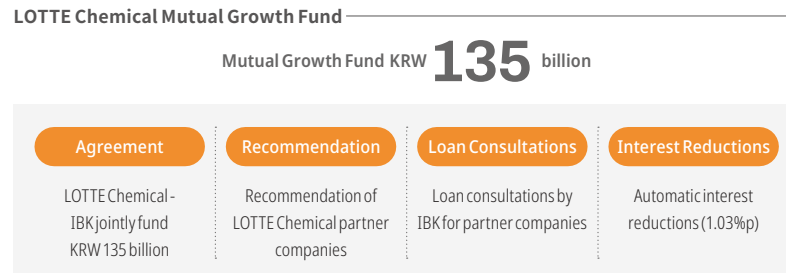
Shared Growth-  
Mutual Growth with  
Business Partners

**Mutual Growth  
Programs**



**Financial Support for Partner Companies**

**Mutual Growth Fund** For business stability of partners through smooth cash flow, LOTTE Chemical and IBK jointly operate a mutual growth fund of KRW 135 billion. The raised funds are being used as loans to assist partners at rates about 1.03 ~ 2.43%p lower than the market rate. In 2021, we used KRW 112 billion to support 132 partners.



**Credit Guarantee fund** To assist financing of partners with difficulty in getting loans due to credit rating and guarantee limits, LOTTE Chemical provides KRW 105 billion in credit. In 2021, we supported the issuance of payment guarantee worth KRW 1.4 billion to four companies.

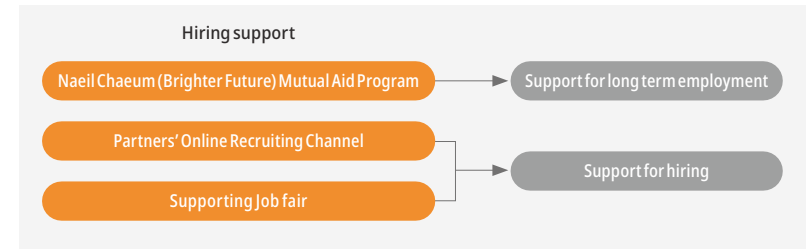
**Welfare Supports for Partner Companies**

**Provide vacation support for partner companies** By subsidizing a portion of the partner company's contribution of the Vacation Fund for Workers promoted by Korea Tourism Organization, LOTTE Chemical strives to improve the welfare of partner employees.

**Holiday gifts** We provide welfare benefits to business partners in charge of packaging/shipping/logistics/security within our business site and give them gifts on Lunar New Year and Chuseok.

**Providing hiring support to partner companies**

LOTTE Chemical operates a variety of hiring support programs to ensure stable manpower management of business partners.



**Providing Support for Naeil Chaem (Brighter Future) Mutual Aid Program** LOTTE Chemical supports long-term employment of key persons at partner companies by subsidizing a portion of their contributions to the Naeil Chaem Mutual Aid Program. Under the Naeil Chaem Mutual Aid Program, the Korea SMEs and Startups Agency, the Ministry of Employment and Labor, individual employees, and their employer make a joint contribution of funds over a certain amount of time and the matured fund is provided to the employees in full to promote long-term service of employees at SMEs. In 2021, we provided support for 25 key persons in 10 partner companies, and in 2022, we plan to provide for more, reflecting the needs of our partners.

**Operating Partners' Online Recruiting Channel** Through a business agreement with IBK, LOTTE Chemical opened an online hiring channel for LOTTE Chemical's partner companies on i-One Job. At the online partners' recruiting channel, we help secure human resources for partner companies that are experiencing difficulties. In 2021, we uploaded 16 job postings for 15 partner companies.

**Supporting Job fair** LOTTE Chemical encourages partner companies to participate in various job fairs to engage in active recruitment activities by subsidizing their participation and preparation expenses. In consideration of the transition to an online job fair due to COVID-19, we provided support for online hiring activities performed by partners.

**SOCIAL**

**Shared Growth-  
Mutual Growth with  
Business Partners**

**Mutual Growth  
Programs**



**Technological support for partner companies**

LOTTE Chemical strives to strengthen the technological competitiveness of partners by conducting joint research projects, in addition to tasks for product development and process improvement. In addition, we offer our research facilities to partners for analysis of physical properties. A total of 10 joint research projects and 3,312 cases of physical property analysis were completed in 2021.

**Protection of partner technology**

LOTTE Chemical operates a technical data escrow system to protect partner companies' technologies. The technical data escrow system refers to storing of the core technical data and trade secrets of partner companies in the technical data escrow center to prove that the technology is under development. LOTTE Chemical supports for protection of partner companies' technologies by covering the associated expenses.

**Support productivity improvement of partners**

LOTTE Chemical operates a variety of consulting programs to strengthen competencies of partner companies.

**Safety management consulting** LOTTE Chemical strongly recommends acquisition of ISO 45001 certification: Occupational Safety and Health Management System to improve the safety-management capabilities of partner companies. External experts are dispatched to partner companies to support consulting to improve the management system as measuring the working environment. In 2021, 14 partner companies were supported for developing the selfassessment capability for risks with the support of LOTTE Chemical. In addition, Samsung Fire & Disaster Prevention Research Center and LOTTE Chemical jointly offered fire-safety consulting and consulting for risks associated with natural disasters, such as damage from floods, storms, and earthquakes, to partner companies.

**Consulting support** LOTTE Chemical subsidizes the consulting expenses of partner companies to support strengthening of their competitiveness. Partners can determine a subject and hosting organization at their discretion and get consulting to improve competitiveness in the chosen fields. In 2021, we supported 4 consulting cases in the fields of labor, safety, and hazard prevention.

**Communication with Partners**

LOTTE Chemical resolves issues and improves cooperative relationships with partner companies through strengthened communication. In 2021, we visited partners located in the areas of our business sites to listen to grievances and promote win-win partnership. We also held briefing sessions to explain LOTTE Chemical's mutual growth program and encourage the active participation of partners. When it was impossible to hold physical meetings, we sent mails and emails to partners to share the details of the program.

LOTTE Chemical established a direct CEO reporting system to report the results of the briefing sessions. The direct CEO reporting system allows the CSV Team, Procurement Team, and Compliance Team to collect and respond to grievances of partner companies. The identity and details of the informant are kept confidential to protect against disadvantages.

**Stakeholder Interview**

**Young-il OnC — General Manager Shin Hyung-chul**

**"A company that manages its supply chain with sincerity and steadfastness"**



LOTTE Chemical actively listens to the opinions of small and medium-sized business partners and implements various programs to promote mutual growth with partners. We have been maintaining a cooperative relationship with LOTTE Chemical through diversified communication channels and a culture of caring for and respecting partners. As such, partners propose technical suggestions or improvement measures freely and production efficiency is improved through mutual cooperation. Chemical industry is highly impacted on external volatilities (natural disasters, exchange rate fluctuations) meaning that reducing risks through systematic supply chain management is crucial. We will continue to support LOTTE Chemical's endeavors to maintain a stable supply chain relationship between SMEs and conglomerates and look forward to seeing them become a global top company.



**SOCIAL**  
Shared Growth-  
Sustainable Supply Chain





## Responsible Supply Chain Management



### Supply chain management

LOTTE Chemical has introduced and complies with the 4 Major Guidelines of Fair Trade for responsible supply-chain management. We strive to spread a fair trade culture so that a sense of compliance, which is the basis for corporate sustainability, can be internalized in our business practices with partners.

#### 4 Major Guidelines of Fair Trade

 <p><b>Guidelines to Fair Agreement</b></p> <p>Build infrastructure that ensures fair agreement for all parties; comply with relevant guidelines; and reflect interests of each party</p>	 <p><b>Guidelines to the Selection of Partners and Operation of Vendor Pool</b></p> <p>Enhance transparency and fairness in the process of selecting partners / operating vendor pool; contribute to the establishment of fair order of subcontract transactions; and prevent violation of the Fair Transactions in Subcontracting Act, and violations of other laws and regulations.</p>
 <p><b>Guidelines to the Issuance and Retention of Subcontract Agreements</b></p> <p>Comply with the issuance and retention guidelines recommended by the Fair Trade Commission for the establishment and dissemination of a proper subcontract culture</p>	 <p><b>Guidelines to the Setting-up of Internal Deliberation Committees</b></p> <p>Perform advanced review on fairness, legality, etc., of subcontract agreement exceeding a certain amount to ensure establishment of fair order in subcontract transactions</p>

### Fair Subcontractor Agreement

In compliance with the 4 major guidelines of fair trade, including the guideline to fair agreement for win-win partnership, we ensure that the interests of each party are reflected fairly in every contract. Hence, a fair and reasonable conclusion is arrived at between the parties.

We have established and comply with the contract method according to the type of transaction and allow prospective partners to directly propose a business agreement through our website. In addition, we ensure fairness in the contract-signing process by issuing documents in advance and determining the unit price through a fair process.

### Fair Selection and Operation of Partners

LOTTE Chemical has introduced and complies with the guidelines for fair selection of partners and operation of vendor pool. We strive to enhance transparency and fairness in the selection of partners and operation of vendor pool, and to contribute to the establishment of a fair order of subcontract transactions. We disclose the supplier-selection criteria, procedures, and results for selecting partner companies, and give equal opportunities to all registered suppliers. We clearly state and manage the reasons for canceling registration of partner companies so that no one is at a disadvantage due to an arbitrary decision made by the person in charge.

### Fair Trade Monitoring System

LOTTE Chemical has established a fair trade promotion department to help prevent violation of laws in the company's internal decision-making processes and implementations. We operate a subcontract deliberation committee, which consists of a chair, members, and secretary, under the fair trade deliberation organization and the committee holds monthly meetings and reports results. In 2021, 12 meetings were held, reviewing relevant matters stipulated in the regulations, such as legality and procedural aspects of large-scale contracts and business suspension of partners. When a subcontract is terminated, the internal deliberation committee conducts a follow-up assessment to verify whether all payments have been made according to the schedule, and whether there was an unfair transfer of defect repair liability. In addition, we have introduced the guidelines to the issuance and retention of written documents; created and issued standard contract forms and annexes for each contract type; and managed the contracts accordingly. An electronic contract system linked to an electronic payment system allows use of standard contract forms in compliance with internal regulations, and facilitates the management of issued documents.

### Expansion of Fair Trade Culture

LOTTE Chemical disseminates a fair trade culture through contracts that incorporate anti-corruption clauses. As part of our anti-corruption efforts, we require partners to submit a compliance certificate, which is issued upon the completion of self-inspection of transactions above a certain amount.

## GOVERNANCE

### Governance Structure

## Operation of BOD



### Board of Directors

As of March 2022, LOTTE Chemical's Board of Directors consists of 11 members, including 6 outside directors, 4 in-house directors, and 1 non-executive director. Executive directors are recommended by the BOD and outside directors are recommended by the Outside Director Candidate Recommendation Committee after careful examination of the candidate's qualifications based on the guideline upon diversity. The recommended directors are appointed through the resolution of the general shareholders' meeting.

In order to be able to perform checks and balances on the management and to realize sound corporate governance, the BOD consists of more than 50% outside directors. In addition, the BOD

#### LOTTE Chemical Board of Directors

Category	Name	Gender	Area of Expertise	Role (Position)
In-house director	Shin, Dong-bin	Male	Overall business management	Current Chairman of LOTTE Group, CEO of LOTTE Chemical
In-house director	Kim, Gyo-hyun	Male	Overall business management	Current Head of LOTTE Group's Chemical Unit, CEO of LOTTE Chemical
In-house director	Lee, Young-jun	Male	Overall business management	Current Head of LOTTE Chemical Advanced Materials, CEO of LOTTE Corporation
In-house director	Hwang, Jin-koo	Male	Overall business management	Current Head of LOTTE Chemical Basic Chemicals, CEO of LOTTE Chemical
Non-executive director	Lee, Hun-ki	Male	General management	Current Head of Management Innovation Office, Vice President of LOTTE Holdings Co., Ltd.
Outside director	Choi, Hyon-min	Male	Tax	Current Advisor of Jipyong LLC / Outside Director of Handsome Corp.
Outside director	Nam, Hye-jeong	Female	Accounting	Current Professor of Accounting, Dongguk University Business School / non-executive director of Korea Trade Insurance Corporation
Outside director	Jeon, Woon-bae	Male	Labor-management / employment policies	Current Advisor of Law Firm, Deatons Lee
Outside director	Lee, Keum-ro	Male	Legal	Current Representative Lawyer of Law Firm, Sol / outside director of TY-Holdings Co., Ltd.
Outside director	Kang, Jeong-won	Male	Industry/R&D	Current Professor, Department of Chemical and Biological Engineering, Korea University
Outside director	Cho, Woon-haeng	Male	Finance	Current director at Financial Scholarship Foundation

enhances transparency, professionalism, independence, and diversity and promotes balanced decision-making activities for the happiness of stakeholders and improvement of long-term corporate values. In particular, the Articles of Incorporation requires equal representation of genders in the BOD. Hence, we have been appointing female outside directors since 2015.

### Operation of BOD

The LOTTE Chemical Board of Directors is the highest decision-making body within the company. A total of 11 experts and directors discuss various issues and determine the company's mid- to long-term strategies. The board meeting is held once per month, in general, and for urgent matters, an emergency meeting is convened. In 2021, a total of 11 board meetings were held.

In addition, 5 committees, including the Audit Committee, have been established within the BOD to reinforce expertise and efficiency in decision-making. In order to increase independence, more than half of the committee members are outside directors. An outside director is appointed as the chair of each committee to further ensure checks and balances on the BOD. In addition, they frequently report to the Board of Directors on major issues that may affect the company's sustainability in economic, social, and environmental aspects and incorporate their expertise to company policies.

#### Operation of BOD

Category	2019	2020	2021
No. of agenda	91	56	66
No. of BOD meetings	16	14	11
Attendance rate (%)	Excl. In-house Directors*	67	90
	Outside Directors	95	81**

\* Non-executive directors are included in the attendance rate of inside directors

\*\* The attendance rate shown here is the average for all directors who served during the period.

(Excluding the retired outside directors, the attendance rate of the 6 current outside directors is 99% for 2020)

### Independence and Diversity of the Board

LOTTE Chemical appoints directors based on their career and expertise. The qualifications, background of appointment, and independence of directors are disclosed through public announcements or disclosures. The areas of expertise of our outside directors include industry, accounting, tax, labor management, law, and finance. With their expert knowledge in the respective fields, the outside directors help make rational decisions.

In addition, to enhance diversity and independence in the governance structure, female outside directors have been appointed since 2015 and restrictions on qualifications for the chairman position have been removed completely. We have incorporated the clause related to separate election of audit committee members from the amended Commercial Act in the Articles of Incorporation to ensure the independence of outside directors and reflect shareholders' interest in a balanced manner.

## GOVERNANCE

### Governance Structure

### Operation of BOD



### Board's Expertise

LOTTE Chemical makes continuous efforts to enhance the expertise of the BOD for sustainable management and rational decision-making. Board members are nominated and appointed through careful examination in consideration of their contributions to promoting major business activities. By doing so, we ensure that all of the board members have a high level of understanding of our business. To further reinforce outside directors' understanding of our company and business, we frequently invite them to the plants and research centers and regularly communicate issues at hand.

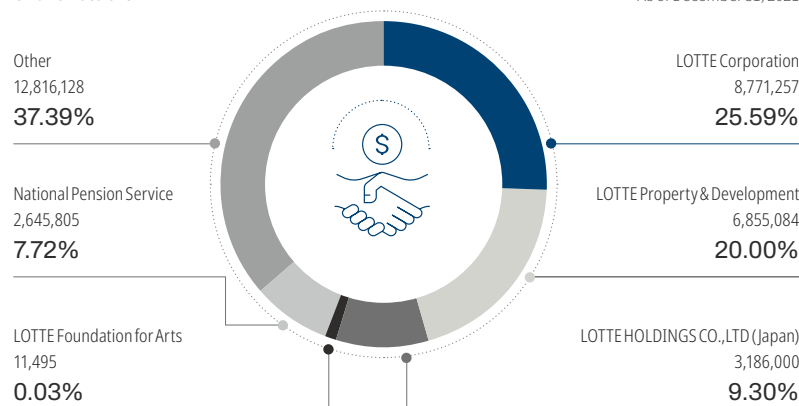
### Performance Evaluation and Compensation of the BOD

Each year, LOTTE Chemical conducts independent evaluation of outside directors and in-house directors whose terms are about to expire and determines reappointment based on the contribution to the BOD, internal and external influence, and expertise. The Compensation Committee within the BOD manages outside directors' remuneration, which is determined by a resolution of the general shareholders' meeting. The remuneration limit of in-house directors is determined by a resolution of the Compensation Committee and general shareholders' meeting. The individual remuneration limit is set by reflecting the company's major values and the remuneration of outside directors is determined to be within the limit approved at the general shareholders' meeting. Compensation of the Audit Committee members is decided separately in consideration of their legal responsibilities, time, and effort. The remuneration limit for directors approved at the 2021 general meeting of shareholders was KRW 10 billion; the total amount of remuneration paid to directors was KRW 9.12 billion. Remuneration of each director and auditor over KRW 500 million is disclosed in the business report in accordance with relevant laws.

### Transparent Disclosure

LOTTE Chemical strives to provide timely and accurate information to shareholders and stakeholders regarding the company's overall business activities. When the Board of Directors makes important management decisions, or in the event of critical issues affecting investment decisions, we immediately inform the relevant parties. In response to the growing demand for ESG information disclosure by domestic and overseas stakeholders, we offer discretionary disclosure and disclosure in English for ESG information. English-language disclosures are posted on the website so that overseas investors receive the same level of information as domestic investors. We will continue to actively communicate with investors and stakeholders about our business activities.

Shareholders As of December 31, 2021



Composition and Operation of Subcommittees within the BOD As of March 2022

Subcommittee	Main Role	Number of Members	Members	No. of Meetings in 2021
Outside Director Candidate Nomination Committee	Outside Director Candidate Verification and Nomination	3	Lee, Keum-ro(Chairman), Jeon, Woon-bae, Hwang, Jin-koo	1
ESG Committee	Review and proposal of ESG policy	5	Jeon, Woon-bae(Chairman), Choi, Hyon-min, Nam, Hye-jeong, Kang, Jeong-won, Lee, Young-jun	1
Transparent Management Committee	Deliberation on internal transactions and private contracts over a certain amount; proposal of internal policies related to fair trade	3	Lee, Keum-ro(Chairman), Nam, Hye-jeong, Cho, Woon-haeng	6
Audit Committee	Accounting and audit	3	Choi, Hyon-min(Chairman), Nam, Hye-jeong, Cho, Woon-haeng	4
Compensation Committee	Executives (including registered directors) Deliberation of remuneration limit for executives and proposal of remuneration policy	3	Jeon, Woon-bae(Chair), Choi, Hyon-min, Kang, Jeong-won	4

## GOVERNANCE

### Risk Management

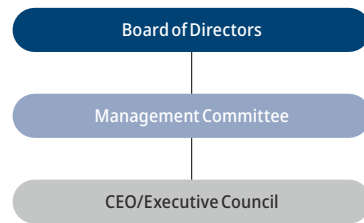
## Operation of integrated risk-management system



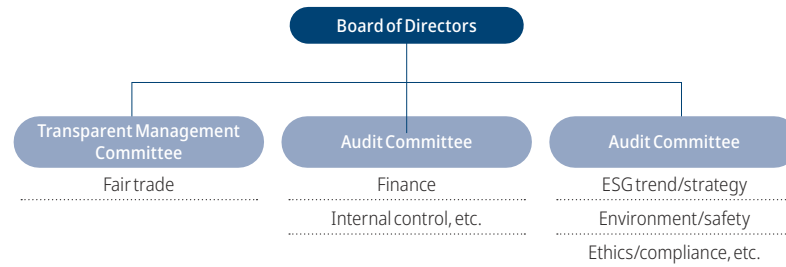
### Risk-Management Governance

When there are growing uncertainties, such as COVID-19 and the global economic downturn, companies must thoroughly manage risks. LOTTE Chemical identifies and responds to potential risk factors that may occur throughout its business through systematic risk management. LOTTE Chemical manages these risks by classifying them into daily risk and special risk. Daily risks are responded to at all times by forming a committee and consultative body under the leadership of the Management Committee and the CEO. Special risks have a greater impact, and hence require expert legal/technical knowledge. Relevant committees are formed within the BOD to establish a solid risk management system and prevent them in advance.

#### Daily risk approval/oversight

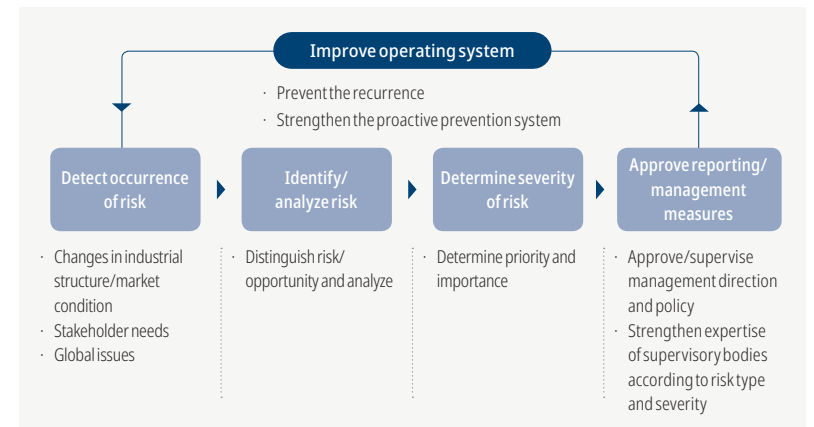


#### Special risk approval/oversight



### Risk-Response Process

When risks related to industrial structure, market changes, and global issues are detected, risks and opportunities are identified and analyzed for each business, and the severity of the analyzed risks and opportunities is determined. According to the severity of risk, we assign a supervisory body and strengthen its expertise for the specific risk. LOTTE Chemical constantly strives to improve its operating system to prevent recurring risks and to strengthen the proactive prevention system.





## GOVERNANCE

### Risk Management

## Operation of integrated risk-management system



### Risk Types and Countermeasures

LOTTE Chemical manages risks beyond the operational and financial risks, which are normally present in corporate activities. Under the strengthened ESG management, the company manages non-financial risks related to the environment, safety, information security, ethics and compliance in a comprehensive and systematic manner. We strive to minimize losses due to these risks by establishing risk analysis and response strategies for each type of risk.

Category	Type	Details	Countermeasures (Solutions)
Operational risks	Management Strategies	<ul style="list-style-type: none"> <li>Failure to upgrade business portfolio in a timely manner due to changes in industry structure/market</li> <li>Reduced resource input efficiency</li> </ul>	<ul style="list-style-type: none"> <li>Reinforce periodic sensing of industry/market and company-wide portfolio inspection</li> <li>Concentrate business capabilities on high value-added specialty areas</li> <li>Strengthen investment deliberation; regular inspection on the progress of major investments</li> </ul>
	Raw materials	<ul style="list-style-type: none"> <li>Loss of business/production due to failure in raw material acquisition</li> </ul>	<ul style="list-style-type: none"> <li>Propose long-term contracts with suppliers</li> <li>Diversify raw materials such as LPG and ethane</li> <li>Diversify suppliers and supply regions for raw materials</li> </ul>
	Logistics	<ul style="list-style-type: none"> <li>Delivery risk due to lack of ships and accidents</li> </ul>	<ul style="list-style-type: none"> <li>Propose long-term contracts with partners</li> <li>Regular monitoring by related departments</li> <li>Introduce post-evaluation system for logistics companies</li> </ul>
Financial risks	Liquidity/credit	<ul style="list-style-type: none"> <li>Loss due to liquidity management failure</li> <li>Risk of lowered credit due to non-compliance with trade and financial contracts</li> </ul>	<ul style="list-style-type: none"> <li>Periodic financial forecast and adjustment</li> <li>Constant monitoring and management of credit rating and financial flexibility</li> </ul>
	Internal control	<ul style="list-style-type: none"> <li>Company loss and damage to brand image due to misconduct</li> </ul>	<ul style="list-style-type: none"> <li>Establish internal accounting regulations and procedures</li> <li>Regular monitoring and control activities by dedicated departments</li> </ul>
	Finance	<ul style="list-style-type: none"> <li>Impact of exchange rate fluctuations related to global business expansion</li> <li>Increased interest rate volatility due to changes in the financial market</li> </ul>	<ul style="list-style-type: none"> <li>Regular monitoring by related departments</li> <li>Use of hedging tools such as SWAP of interest rate and exchange rate</li> <li>Minimize financial expense by realizing an appropriate long-term and short-term borrowing structure</li> </ul>
Non-financial risks	Environmental	<ul style="list-style-type: none"> <li>Violation of environmental laws</li> <li>Increased expense due to lack of emission permits</li> <li>Environmental pollution adversely affecting the brand image and resulting in production sanction</li> </ul>	<ul style="list-style-type: none"> <li>Reinforce law monitoring and compliance process</li> <li>Establish carbon-neutral roadmap and reinforce its implementation</li> <li>Reduce energy use, expand investment and secure emission rights</li> <li>Expand investment in environmental facilities such as air pollution prevention facilities</li> </ul>

Category	Type	Details	Countermeasures (Solutions)
Non-financial risks	Safety	<ul style="list-style-type: none"> <li>Recovery cost and loss in case of safety accident</li> <li>Chemical accidents and violations of laws resulting in negative brand image</li> </ul>	<ul style="list-style-type: none"> <li>Improve safety system and reinforce employee training</li> <li>Expand safety investment, such as improving inspection of high-risk facilities</li> <li>Conduct regular safety inspections for all business sites and suppliers</li> <li>Establish chemical substance management system</li> </ul>
	Information Security	<ul style="list-style-type: none"> <li>Loss/suspension of work due to information security accidents resulting in negative brand image</li> </ul>	<ul style="list-style-type: none"> <li>Regular monitoring and inspection by related departments</li> <li>Employee training</li> </ul>
Non-financial risks	Ethics compliance	<ul style="list-style-type: none"> <li>Violations of laws and regulations such as fair trade, anti-corruption, and safety environment acts</li> <li>Violation of corporate/employee ethics regulations</li> </ul>	<ul style="list-style-type: none"> <li>Establish compliance regulations and procedures</li> <li>Continuous monitoring system</li> <li>Employee training</li> </ul>

### Compliance Management and Internal Control System

LOTTE Chemical has established an organization and process that supports systematic identification and preemptive management of economic, social, and environmental risks present in a rapidly changing business environment. We are committed to establishing an efficient risk management system that identifies such risks and implement suitable measures to respond to the identified risks.

LOTTE Chemical has introduced a compliance management system in consideration of strengthening global regulations on compliance management, growing stakeholder examination, and increasing exposure to compliance risks. We are making a transition from the improvised/reactive response system of the past to the preemptive monitoring and management of specific risks. Through the compliance management system, we have realized a support system for anti-corruption; anti-monopoly and fair trade; environment, health, and safety; human resources; tax and accounting; and trade secret protection. In addition, a compliance officer is appointed to make continuous improvement to the system through internal inspection and consulting.

LOTTE Chemical has enacted and operates an in-house accounting management system in accordance with the internal accounting management regulations; as per Article 8, Paragraph 4 of the Act on External Audit of Stock Companies, etc. (hereinafter referred to as the External Audit Act), the operation of the internal accounting management system is reported at the general shareholders' meeting, the Board of Directors and the Audit Committee. Furthermore, in accordance with Article 8, Paragraph 5 of the External Audit Act, the company's audit committee members evaluate the operating status of the internal accounting management system and report it to the Board of Directors every business year; and in accordance with Article 8, Paragraph 7 of the External Audit Act, an external auditor audits the company's internal accounting management system and includes his/her opinions in the audit report.

## GOVERNANCE

### Compliance

## Compliance Management



### Compliance Management System

LOTTE Chemical has established the Compliance Team within the Compliance Management Office, which is directly under the CEO, to manage overall compliance-related risks in business activities. To realize the compliance system that meets the global standards, we have established a mid-to long-term vision for compliance management, developed a standard model to promote the culture of compliance management in subsidiaries, and implemented action plans with a goal of creating a culture trusted by stakeholders. LOTTE Chemical has amended the Compliance Management Charter and regulations related to compliance management, anti-corruption, and fair trade. We conduct online/offline compliance training on a regular basis. We have been maintaining the anti-corruption management system certification (ISO 37001) since acquisition in 2019 and additionally, we are analyzing our current system to develop a global-level compliance model, which can be applied to all domestic subsidiaries and overseas business sites.



### Compliance System

<b>Audit and recurrence prevention</b>	<ul style="list-style-type: none"> <li>Investigate violation and penalize those involved</li> <li>Ensure anonymity of the reporting system</li> </ul>
<b>Update and manage internal regulations</b>	<ul style="list-style-type: none"> <li>Establish and publish Compliance Management Charter and Compliance Management Regulation</li> <li>Develop anti-corruption and fair trade-related regulations</li> <li>Create handbooks, Do's &amp; Don'ts and other checklists that employees can refer to and use in the field</li> </ul>
<b>Creation and operation of a specialized team</b>	<ul style="list-style-type: none"> <li>Create and operate Compliance Team within the Compliance Management Office under direct supervision of CEO</li> </ul>
<b>Internal whistleblowing, monitoring; risk detection</b>	<ul style="list-style-type: none"> <li>Operate an internal reporting channel</li> <li>Monitor, respond, and process risks through electronic monitoring system</li> </ul>
<b>Regular training and counseling</b>	<ul style="list-style-type: none"> <li>Conduct online/offline training</li> <li>Provide compliance counseling on a regular basis</li> </ul>
<b>Internal accounting controls</b>	<ul style="list-style-type: none"> <li>Operate an effective internal accounting management system</li> </ul>

### Compliance program and training

In order to raise awareness of compliance among employees, LOTTE Chemical conducts group training by job, topic, and business site, and company-wide online training. In 2021, the CEO conducted virtual training on compliance management to raise employee awareness on compliance management. The company regularly publishes a compliance newsletter and compliance management webtoon on the intranet. In order to respond promptly to the tightening internal and external regulations and laws, we are strengthening activities of the Transparent Management Committee by extending advice on fair trade and anti-corruption, introducing standard contracts, and adapting mandatory anti-corruption clauses. LOTTE Chemical is strengthening its response to evaluation indicators at home and abroad to not only comply with global standards but also to meet the demands of corporate social responsibility.

### Enhancing Compliance in Supply Chain

In recent years, as companies are making global expansions beyond Korea, the importance of supply-chain compliance management is growing more than ever. LOTTE Chemical builds sustainable business and seeks to fulfill its social responsibilities by identifying, monitoring, and preventing third-party risks in domestic and overseas supply chains in advance. To ensure transparent and fair transactions with partners, LOTTE Chemical requires agreement to a pledge of integrity necessarily, and has been requiring the use of standard contracts and expanding the use of the Electronic Contract System (ECS).

### Supply Chain Compliance Activities

2019	2020	2021
<ul style="list-style-type: none"> <li>Applied amended standard subcontract agreement</li> <li>Incorporated anti-corruption clause in the standard contract and had the legal team review the contract through the electronic purchasing system</li> <li>Standardized unit price contract; investigated actual use of written subcontract document</li> <li>Offered compliance training to employees of partner companies (publication of handbook)</li> <li>Established anti-corruption management system (ISO 37001)</li> </ul>	<ul style="list-style-type: none"> <li>Required certain partners to obtain compliance certificate before signing a contract and extend compliance management to our supply chain</li> <li>Compiled subcontract management tips into a guideline</li> <li>Updated standard subcontract and performed inspection of subcontract transactions of domestic subsidiaries; compliance check when signing a purchase contract</li> <li>Subcontractor manager training; reviewed the written conditions of subcontracts; Compliance Program (CP) update; diagnosed internal transaction risks and provided guideline consulting</li> </ul>	<ul style="list-style-type: none"> <li>Inspected subcontract activities of related departments and teams; established and applied improvement measures</li> <li>Revised standard subcontract agreement and Compliance Program for each contract type</li> <li>Implemented various in-house training programs, including revision and distribution of the compliance handbook</li> </ul>

**GOVERNANCE**

Compliance

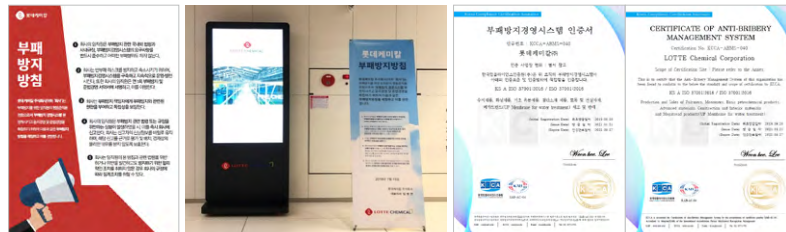
**Anti-corruption management**



**Anti-corruption management certification (ISO 37001)**

In 2019, LOTTE Chemical acquired ISO 37001, an international standard for anti-corruption management systems, from an accredited certification body for the first time in Korea as a chemical company. With this, LOTTE Chemical embarked on laying the foundation for sustainable growth. We have been renewing the certification to keep it up to date and strengthen anti-corruption management and compliance management culture. The certification is granted by an accredited certification body through strict screening of the company's anti-corruption measures, leadership, as well as identification, evaluation, and improvement activities for company-wide risks. The acquisition and renewal of the certification means that LOTTE Chemical has achieved a global-level anti-corruption management system.

The commitment to anti-corruption of LOTTE Chemical's leadership is expressed through the approval of the anti-corruption policy, the anti-corruption pledge by the CEO and the BOD, and annual training. We have appointed and trained the persons in charge of detecting and evaluating potential corruption risks in each department and enacted the manual and regulation for the anti-corruption management system. Through internal and external audits by internal auditors and certification agencies, respectively, we have acquired and are maintaining the certification status, establishing a global-level compliance management culture and advancement of the anti-corruption management system.



Anti-Corruption Policy

Kiosk and X-banner

Anti-Corruption Management System (ISO 37001) Certificate

**Anti-corruption training**

Anti-corruption training status

Year	Training of internal auditors	Training of persons in charge in each department	Departments subject to internal audit
2019	50	151	146 departments
2020	66	266	207 departments
2021	81	235	214 departments

**Operation of anti-corruption electronic monitoring system**

LOTTE Chemical operates an electronic anti-corruption monitoring system on an ongoing basis. Regarding the provision of money, etc., which is restricted by the Anti-Graft Act, the system requires submission of an application for prior review and approval. When the work involves interaction with public officials, the system requires submission of a pre & post report to prevent related anti-corruption risks.

**Donation/Sponsorship Review**

LOTTE Chemical requires that all donations and sponsorships at all business sites be reviewed by the Compliance Team in advance. By examining the purpose of the donation, the suitability of the donor, the applicability of the Anti-Graft Act, and the adequacy of quid pro quo, the risk is prevented in advance. We thus instill a proper donation culture by only allowing donations and sponsorships from organizations whose eligibility has been confirmed in a lawful manner.

**Number of donations and sponsorship reviews** As of December 31, 2021



**CEO's message and letter for compliance management**

The CEO's message and compliance letters are sent to all employees and partners on a regular basis to show our determination to practice compliance management and to build a transparent business culture. This is to encourage fair and transparent transactions between our employees and partner companies and urge them not to exchange or request money, gifts, or entertainment from each other. LOTTE Chemical demonstrates continuous efforts to establish a fair and transparent transaction culture by announcing our commitment to compliance management to all stakeholders, including shareholders, customers, business partners, competitors, local communities, and employees.



CEO's message and letter for compliance management

## GOVERNANCE

### Compliance

## Fair Trade Culture



### Operation of fair trade compliance program

Introduced first in 2006, LOTTE Chemical's Compliance Program serves as a clear guideline for employees to prevent violations of laws and encourages voluntary compliance. LOTTE Chemical distributes the Compliance Handbook, which regularly gets updated per enactment and revision of related laws. Through an electronic monitoring system, we conduct pre-screening. In our internal SOP for fair trade (regulations, checklists, Do's & Don'ts List, handbooks, guidelines, etc.), we present a clear code of conduct for each business situation to ensure compliance. In addition, we are using the standard chemical subcontract recommended by the Fair Trade Commission to strengthen voluntary compliance.

### Internal transaction management

The appropriateness of the selection of a transaction party, the appropriateness of trading conditions, and the reasons for concluding a contract must be reviewed in accordance with relevant laws and internal regulations. In order to prevent violations in advance, LOTTE Chemical's Transparent Management Committee, which is composed of outside directors, reviews the possibility of fair trade law violations for internal transactions of a certain size. In addition, all tasks related to fair trade and anti-corruption undergo a preliminary review by the Compliance Team, a dedicated organization; preliminary reviews and follow-up audits are conducted for major business units.

Number of Transparent Management Committee Meetings	Number of internal transaction-related audits		
Year	Year		
2019	9	2019	106
2020	8	2020	97
2021	6	2021	148

### Compliance with the Subcontract Act and Mutual Cooperation Act

LOTTE Chemical requires that all subcontract transactions at all business sites be reviewed by the Compliance Team in advance. By examining subcontract payment terms, checking for unfair conditions, and ensuring use of standard contracts, subcontract-related risks are mitigated in advance; through continuous monitoring, we are striving to ensure balanced development and mutual growth. Furthermore, in order to ensure compliance with the Mutual Cooperation Act, we are pursuing win-win partnerships and mutual growth with small and medium-sized enterprises by having our Compliance Team advice and monitor the contract/consignment transactions at all times.

### Compliance with Fair Trade in Partner Companies

To ensure fair trade with partners, we offer compliance-training to suppliers and subcontracting law training to the departments that work most closely with suppliers. In addition, we conduct case studies of unfair trade with our business partners. On the other hand, if a partner company is found to be not complying with the fair trade standards, we terminate the existing contractual relationship. In 2018, we standardized contracts and in 2019, we conducted compliance training for overseas subsidiaries. Our fair-trade compliance standards for partners are being applied regardless of country or region. In 2020, we shared compliance guidelines with our subsidiaries within Korea, investigated the subcontract compliance status, and expanded the scope of fair trade inspection. Starting in 2021, we have been reviewing and inspecting the Mutual Cooperation Act for SMEs that are not subject to the Subcontracting Act.

### Training on Fair Trade

LOTTE Chemical's Compliance Team offers fair-trade training to emphasize the importance and impact of fair trade. The training program covers related laws and regulations, the latest court decisions and precedents, and internal SOPs. The program includes separate courses for executives, managers, and new employees, as well as various job-specific ones for expatriates, persons in charge of subcontract, and sales, etc.

### Number of Implemented Fair-Trade Training

Year	Unit	Employees	Partners
2019	Sessions	17	4
2020	Sessions	13	1
2021	Sessions	17	1

### Channel for reporting unfair trade

LOTTE Chemical operates an online reporting channel, "Shinmungo," on the company's ethical management website, through which employees can report any unfair or unreasonable conduct at any time.

Online Shinmungo



**GOVERNANCE**

Ethical Management

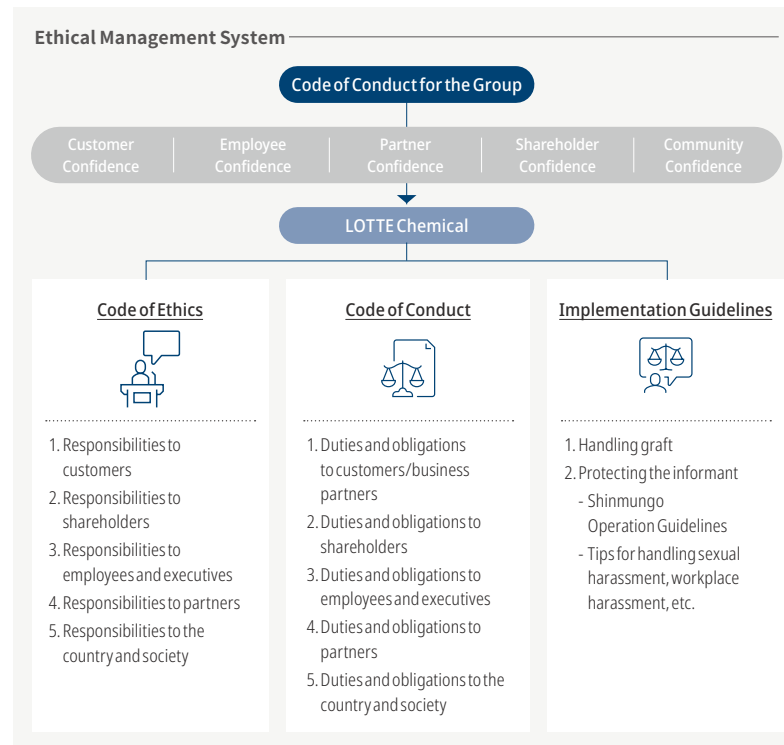
**Ethical-  
Management  
Implementation  
System**



**Ethical Management System**

Based on the LOTTE Group's Code of Conduct, LOTTE Chemical has established and operates an ethical management system that includes the Code of Ethics, Code of Conduct, and Implementation Guidelines in consideration of LOTTE Chemical's work and business conditions. Our commitment to ethical management is shared internally and externally through the CEO's message. We are building a transparent ethical culture through ethical regulations and management systems and operating them to continuously inspire ethical awareness among our employees.

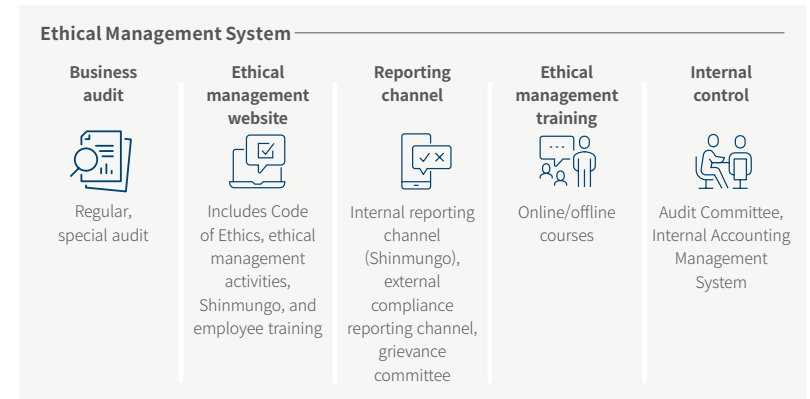
The Compliance Management Office is established directly under the CEO. In addition to the Management Improvement Team in charge of ethical management within the Compliance Management Office, departments that manage legal risks, compliance issues, and internal control are working together in various aspects. We support all executives and employees to internalize the ethical management mindset and perform their work in a transparent, fair, and rational manner based on the ethical Code of Ethics.



**Ethical Management System**

LOTTE Chemical has established an Ethical Management System that monitors and shares the culture of ethical management with all employees. The status of ethical management is regularly inspected through business audits; the company-wide Code of Ethics is shared internally and externally through our ethical management website (<http://ethics.lottechem.com>).

In addition, we operate a channel through which internal and external stakeholders can report unethical practices. Through weekly online training of employees and non-regular offline training, we are trying to instill the culture of ethical management. Furthermore, we regularly audit and monitor accounting and business processes through the Audit Committee within the BOD and Internal Accounting Management System.



**Diagnose and Improve Ethical Management**

LOTTE Group has established the Code of Conduct, which clearly sets the direction of ethical management, and the Code of Ethics, which provides supplementary guidelines. LOTTE Chemical monitors employees and makes sure that they conduct their due diligence and comply with the specifics provided in the guidelines to improve the business processes.

In addition, through compliance assessments conducted for the entire LOTTE Group, in which employees carry out self-evaluation, we learn about current level and status of the ethical management and what needs to be done to make improvements. Lastly, the grievance committee conducts investigations and consultations on sexual harassment, workplace harassment, and other grievances in the workplace.



**GOVERNANCE**

Ethical Management

**Ethical Management Programs**



**Training on Ethical Management**

LOTTE Chemical provides regular training to all employees, including non-permanent employees, on ethical management through a variety of methods, including online and group training for internalization of the ethical management culture. The training covers a variety of topics, including ethical management at the individual/organizational level, Anti-Graft Act, information ethics, and global ethics. In 2021, we conducted a case-oriented, on-site training to share business irrationalities with other businesses after improving them.

**Ethical Management Training Status**

Category	Unit	2019	2020	2021	
<b>Group Training (Employees)</b>	Number of courses	Ea.	1	4	4
	Total hours of training	hours	2	11	9
	Actual number of persons that completed the training / Total number of people to take the course (%)	Persons (%)	65/65 (100)	147/188 (78.2)	89/103 (86.4)
<b>Group Training (Partners)</b>	Number of courses	Ea.	1	1	1
	Total hours of training	hours	4	2.5	0.5
	Actual number of persons that completed the training / Total number of people to take the course (%)	Persons (%)	136/136 (100)	29/29 (100)	22/22 (100)
<b>Online courses</b>	Number of courses	Ea.	52	52	54
	Number of courses	hours	3	3	3
	Actual number of persons that completed the training / Total number of people to take the course (%)	Persons (%)	2,957/3,090 (95.7)	3,968/4,349 (91.2)	3,807/4,311 (88.3)




**Ethics Audit**

LOTTE Chemical conducts regular audits, which are performed on a regular basis according to the annual audit plan, and special audits, which are conducted according to the direction of the CEO, or as deemed necessary when there are complaints or accusations from outside. To ensure that standardized procedure is followed, standards and procedures for audit are stipulated in the Internal Audit Guidelines. In addition, we recommend taking appropriate measures in accordance with the Reward and Discipline Rules and disseminate them through special training and company-wide notices to prevent the recurrence of the same problem.

<b>Regular audits</b>	<ul style="list-style-type: none"> <li>· Inspection of non-face-to-face business process for overseas subsidiaries</li> <li>· Inspection of sales price</li> <li>· Inspection of recruitment process</li> </ul>	<b>Special audits</b>	<ul style="list-style-type: none"> <li>· Inspection of project-cost settlement</li> <li>· Inspection of unit-price contract process</li> <li>· Inspection of insolvency of trade receivables</li> </ul>
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**Protection of internal reporting channel and informant**

LOTTE Chemical operates various channels, including e-mail, postal mail, landline, and online website, so that internal and external stakeholders can easily consult and report unethical practices and unfair trades at any time. In 2021, an independent reporting channel through an external law firm was added as an additional channel for employees. Reports received are managed in accordance with the procedures stipulated in the Guidelines for Shinmungo Operation and External Compliance Report Channel Operation and Case Handling Guidelines. In particular, we have stipulated provisions for confidentiality of information, protection of informants, and prohibition of retaliation.

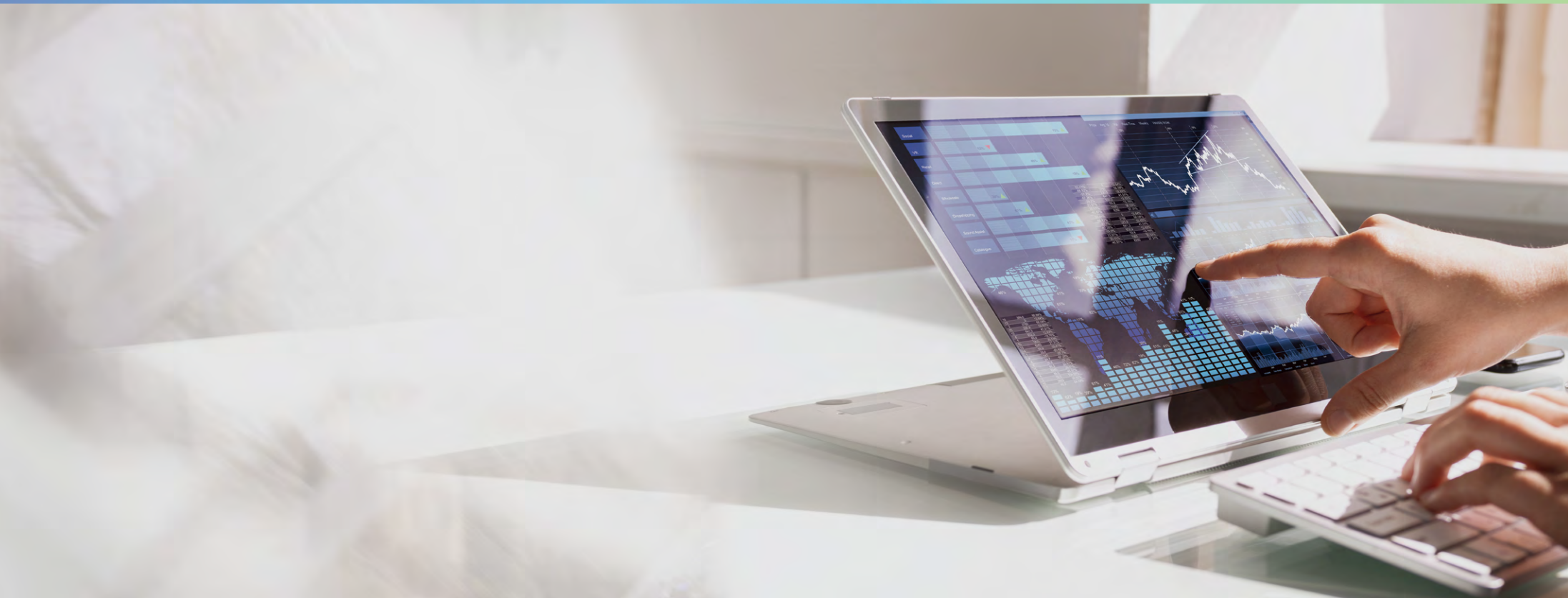
Protection of informant		
Confidentiality	Protection of informants	Reduction or exemption of liability
		
Maintaining the confidentiality of the informant; in case of violation, disciplinary action may be taken against the violator	Measures, such as transfer of department, change of position, etc., are taken to protect informants from inconveniences or disadvantages due to reporting	If the report is related to the informant or is mistaken by the informant, disciplinary action is reduced or exempted

**Reported Cases of Unethical Conduct and Resolutions**

Category	Unit	2019	2020	2021
<b>Reports received</b>	Cases	13	20	23
<b>Reports resolved</b>	Cases	13	20	23
<b>Measures and disciplinary action for unethical conducts</b>	Cases	1	2	3

# APPENDIX

82	Targets and Achievements
87	GHG Verification
88	Third Party Assurance
90	LOTTE Chemical Declaration of Human Rights
91	GRI Content Index
94	TCFD, SASB Index
96	Memberships of Associations
96	About this Report



## Targets and Achievements

### Environment

#### [Achievements in 2021]

Category	Key Issues	Targets for 2021	Achievement Index	Target Date	Performance by Target	Achievement Status
Response to Climate Change	Carbon Neutral Growth	Reduce carbon emission by 2% compared to 2021 quota	Stay within 98% of carbon emissions compared to quota	~2021	6.54 million tons of emission compared to the quota of 6.88 million tons in 2021 (340,000 tons reduced, 4.9%)	●○○
Environmental Management	Create green ecosystem	Establish a plan to reduce incineration/landfill waste, air pollutant emissions, and wastewater emissions by 50% compared to 2019 by 2030	① Allocate 2030 reduction targets by business site ② Allocate reduction targets for each unit plant within the business site ③ Establish and implement specific short-term (2021-2023) reduction goals and action plans ④ Encourage engagement by using performance goals, rewards, etc.	~2021	Achieve all detailed goals - Establish and implement detailed goals for each business site/unit plant - Encourage engagement by offering rewards to outstanding contributors in environmental management → Enhance willingness to practice through goal quantification	●○○
Chemical Substances	Reduce hazardous substances emissions	Upgrade hazardous substance emission measurement system	Improve hazardous substances emission measurement system and conduct measurement	~ First half of 2021: establish the system	Changed goal to improving the measurement management system (to be completed in 2022)	●○○
	Substance registration in accordance with the Act on Registration and Evaluation of Chemical Substances	Complete registration of 50 manufactured/imported substances	Registration of more than 1,000 tons of chemical substances in progress	~ Second half of 2021: measurement once a month	Completed registration of over 1,000 tons of imported chemicals - number of registered chemicals: 71	●○○
Sustainability Management	Continuous environmental energy investment	Invest KRW 120 billion	Invest KRW 120 billion	~2021	KRW 98.1 billion	●○○

(Achievement Status: ●○○)

#### [Targets for 2022]

Category	Key Issues	Targets for 2022	Achievement Index	Target Date
Climate Change	Carbon neutrality	① Establish a new vision for 2050 ② Declare carbon neutrality according to TCFD initiative ③ Establish carbon neutrality action plan	① Announce new vision for 2050 ② Declare support for TCFD ③ Set 2030 reduction targets for each business site	~2022
Environmental Management	Create green ecosystem	Reduce air/water pollutants and waste by 2022 - Plan to establish reduction targets for each business site and invest in environmental facilities	Reduce quantified emissions target by pollutant	~2022
Chemical Substances	Selection of 100 tons ~ 1,000 tons of registered substances; hazard assessment of products/chemical substances that are in the process of registration	Register 100 ~ 1,000 tons of chemical substances - Select registered substances - Form consultative body and draft agreement Conduct risk assessment from an ESG Perspective - Number of substances assessed for risk - Confirmation of hazard index (HI)	Number of registered chemical substances 100 ~ 1,000 tons - Number of constituent substances and risk assessment - Degree of reduction in hazard index (HI) of substances	~2022
Sustainable Management	Continuous environmental energy investment	Invest KRW 33.4 billion	Investment fulfillment rate	~2022

## Targets and Achievements

### Safety and Health

#### Achievements in 2021

Category	Key Issues	Targets for 2021	Implementation Plan	Target Date	Performance by Target	Achievement Status
Promote safety innovation tasks	Strengthen organization and internal capabilities; system improvement; expansion of safety investment	Execute, plan and support key tasks for safety innovation	Complete safety innovation tasks (more than 9 out of 25 tasks over 3 years)	~ 2023	10 completed, 10 in progress, and 5 planned	●○○
Response to the Serious Accidents Act/ Occupational Safety and Health Act	Strengthen government/regulations	Strengthen safety management	Derive / implement tasks (policy and system improvement, regulation enactment/amendment, etc.)	~ 2023	Improvement to safety and health system and derivation of tasks complete: Enactment/amendment of safety and health obligations (1 enactment, 9 amendments) Occupational Safety and Health Act System Improvement: Reported the 2021 Safety and Health Plan for approval of the BOD (completed on March 3, 2021) Enactment and amendment of the Serious Accidents Act/Occupational Safety and Health Act (registration complete in Jan, 2022)	●○○
Promotion of ESG safety action items	Safety business model considering corporate sustainability	Discover tasks, sign mutual business and promote tasks	Implement safety management through collaboration with external organizations	~2023	Signed a business agreement with Samsung Fire & Marine Insurance (July 6, 2021) Established action plan; completed 4 business sites; completed diagnosis of 10 partners; completed performance report (Sep 15, 2021, Oct 13, 2021)	●○○

(Achievement Status: ●○○)

#### Targets for 2022

Category	Key Issues	Targets for 2022	Achievement Index	Target Date
Promotion of safety innovation tasks	Strengthening of organization and internal capabilities; system improvement; expansion of safety investment	Execution, planning, and support of key tasks for safety innovation	Completion of safety innovation tasks (more than eight tasks complete)	~ 2023
Promotion of 2nd Cycle of Business Site Audit (LSHEA)	Upgrading the safety and health level of domestic worksites and fostering in-house professional auditors	Organization of an audit team composed of personnel selected from each business site; inspection of improvement items from the 1st cycle and enhancing the PDCA system level	Execution of at least 16 self-inspections by the head office every year (Seven plants + nine teams)	~ 2023
Advanced Hazard Assessment	Risk reduction to prevent serious accidents and disasters	Completion of hazard assessment for critical processes and jobs	External consulting by the head office for domestic business sites (work + process 18 times/year)	~ 2022
Severe disaster prevention and management	Intensive management of hazards for serious disasters (fall, jamming)	Inspection of falling or jamming points and improvement of facilities	Rate of improvement (completion/total cases)	~ 2022
Securing safety and health of business partners	Compliance with laws and prevention of major accidents by leveling up the safety management system of partner companies	Introduction of customized safety and health management system for each type of supplier	Supplier evaluation (completed/planned)	~ 2022
Improvement of safety leadership	Prevention of unsafe behavior and accidents by requiring managers to safely and properly guide and manage workers	Establishment of guidelines for each position; implementation and monitoring of guidelines	Safety leadership level evaluation (once/year) - Site supervisor, general manager/head of departments, etc.	~ 2022

# Targets and Achievements

## Employees

### Achievements in 2021

Category	Key Issues	Targets for 2021	Achievement Index	Target Date	Performance by Target	Achievement Status
HR Management	Improving HR policy	Establishment of career development program	① Establish program and system to promote individual career development	~2021	① Introduction of job-posting system for overseas expatriates and new jobs; continuous operation of manpower rotation system : Providing employees with opportunities to develop quality work experience	●○
		New evaluation system / early stabilization of system	① Early stabilization of new evaluation system ② Monitor through analysis and audit of evaluation data and survey results ③ Evaluator training to establish a coaching/ feedback-oriented, nurturing evaluation system	~2021	① Introduction of a new system : Comprehensive evaluation by supplementing the shortcomings of relative evaluation through budget-based evaluation and expanding multifaceted evaluation ② Establishment of a new evaluation system : Survey of all persons under evaluation; frequent training of evaluators; early establishment of a new evaluation system	●
	Setting up and upgrading systems	① Grand opening of integrated HR management system ② Stabilization of the new system to increase work efficiency	① Successful introduction of integrated HR management system ② Increase work efficiency through the new HR management system	~2021	Introduction of Hi-HR system : Improving HR work efficiency by introducing a new HR management system; improving accessibility and transparency in salary/welfare benefits/evaluation, etc.	●
Respect for Human Rights	Promoting creative labor-management culture	① Expansion of trust-based labor-management culture	① Restore mutual trust between labor and management and establish mutual understanding in labor-management relations	~2021	① Strengthened communication - Expansion of management-employee communication channels; Chemi Talk, Hi Talk Talk, etc. Operation of leaders' channel for communication with department heads	●
Employee-Friendly Organizational Culture	Improving organizational culture	① Employee counseling program ② Organizational culture promotion activities	① Expand employee counseling program ② Conduct organizational culture promotion activities in consideration of internal/external conditions	~2021	① Expansion of mental care program - Mental health program; expansion of virtual counseling infrastructure, etc. ② Implementation of small events in a non-face-to-face environment (Chemi Flex, etc.)	●
		Innovating workplace culture	① Implementation of Smart Work	① Expand smart work culture ② Draw conclusion from the HR Innovation TF; improve system; launch new system	~2021	① Expansion of smart work culture, including work from home and flexible working hours system ② Launching of new HR system
	Continuing to improve corporate culture	① Operation of Organizational Culture TFT ② Implementation of activities to improve the value creation culture evaluation result	① Expand communication channel ② Promote activities to build employee consensus	~2021	① Operation of organizational culture TFT - Organizational culture improvement campaign, working condition improvement, etc.	●
Talent Development	Strengthening capabilities of key leaders and global competency	① Establishment of key leadership development system ② Establishment of new team leader development system ③ Reinforcing training of expatriates	① Implement key leadership development program in 3 stages ② Conduct new team leader course ③ Develop curriculum for new/returning expat employees	~2021	① Implementation of a female leadership program ② Development and implementation of special lectures and training courses for new team leaders ③ Renewal and implementation of the company's new/returned expatriate course	●
		Strengthening job competency	① Enhancing understanding and competency of production staff	① Plan and operate programs to transfer work knowledge ② Train-in-house instructors for production jobs	~2022	① Completed development of basic process technology course

(Achievement Status: ●○)



# Targets and Achievements

## Employees

### Targets for 2022

Category	Key Issues	Targets for 2022	Achievement Index	Target Date
Talent Development	Strengthening capabilities of key leaders and global competency	① Develop the next-generation leader course ① Enhance global talent development	① Implementation of next-generation leader course ② Development and operation of information-sharing platform for expatriates ③ Development and implementation of soft-landing programs for returning expatriates	~2022
	Strengthening job competency	Enhance understanding and competency of production staff	① Expansion of training targets for production process technology courses ② Master instructor system (develop instructor candidate pool)	~2022
Respect for Human Rights	Promoting creative labor-management culture	Promote a trusting labor-management culture	Restoring mutual trust between labor and management and establish mutually understanding in labor-management relations	~2022
Employee-Friendly Organizational Culture	Innovating workplace culture	Implement Smart Work	Expansion of Smart Work Culture	~2022
	Continue improving corporate culture	① Operate Organizational Culture TFT ② Implement activities to improve the value creation culture evaluation result	① Expansion of communication channel ② Promotion of activities to build employee consensus	~2022
	Improving organizational culture	① Employee counseling program ② Organizational culture promotion activities	① Expansion of employee counseling program ② Promotion of organizational culture activities	~2022
HR Management	Improving manpower utilization	Reorganize and activate the present system	① Diversification of positions in job postings; encouragement of participation ② Expanded opportunities for job and department transfer through reorganization of job rotation	~2022
	Securing and retaining excellent manpower	Enhance employee motivation; improve voluntary engagement	Implementation of research fellow system; establishment of excellent manpower management system	~2022

# Targets and Achievements

## Customers

### Achievements in 2021

Category	Key Issues	Targets for 2021	Achievement Index	Target Date	Performance by Target	Achievement Status ● ○ ○ ○
Customer Communication	Customer Satisfaction Survey	Periodic monitoring of customer satisfaction rate	Continued implementation, feedback on quality improvements	~2021	Continuous implementation of customer satisfaction survey and quality	●
	Award events for the most outstanding customers	Continued communication through invitational events	Continued implementation	~2021	Continue providing personable customer service	●
	Communication event for customers in each region	Communication activities for customers in each region	Continued implementation	~2021	Collect and reflect customer needs to make improvements	●

(Achievement Status: ● ○ ○ ○)

### Targets for 2022

Category	Key Issues	Targets for 2022	Achievement Index	Target Date
Customer Communication	Customer Satisfaction Survey	Periodic monitoring of customer satisfaction rate	Continued implementation, feedback on quality improvements	~2022
	Award events for the most outstanding customers	Continued communication through invitational events	Continued implementation	~2022
	Communication event for Customers in each region	Communication activities for customers in each region	Continued implementation	~2022

## GHG Verification

### Verification Statement on 2021 Greenhouse Gas Emission Report



#### Verification Target

Korean Foundation for Quality (hereinafter "KFQ") has conducted the verification of "2021 Report on Quantity of emitted Greenhouse gas Consumption (hereinafter 'Inventory Report') for LOTTE Chemical Corporation

#### Verification Scope

KFQ's verification was focused on all the facilities which emitted the greenhouse gas during the year of 2021 under LOTTE Chemical Corporation's operational control and organizational boundary.

#### Verification Criteria

The verification process was based on 'Rule for emission reporting and certification of greenhouse gas emission trading Scheme (Notification No. 2021-112 of Ministry of Environment)', 'Rules for verification of operating the greenhouse gas emission trading scheme (Notification No. 2021-278 of Ministry of Environment)' and 'ISO14064-3' for every applicable part.

#### Verification Procedure

The Verification has been planned and conducted as the 'Rules for verification of operating the greenhouse gas emission trading scheme', and the level of assurance for verification shall be satisfied as reasonable level of assurance. And it confirmed through the internal review whether the process before the verification conducted effectively.

#### Verification Limitation

The verification shall contain the potential inherent limitation in the process of application of the verification criteria and methodology.

#### Verification Opinions

Regarding to the data of the Greenhouse Gas Emission Consumption from the report through the verification, KFQ provides our verification opinions as below;

- ① The Inventory Report has been stated in accordance with 'Rule for emission reporting and certification of greenhouse gas emission trading Scheme'
- ② The result of Material discrepancy satisfied the criteria for an organization that emits more than 5,000,000tCO<sub>2</sub>-e shall not exceed 2% from total emission as per 'Rules for verification of operating the greenhouse gas emission trading scheme'
- ③ Thus, KFQ conclude that the Greenhouse Gas Emissions of LOTTE Chemical Corporation in 2021 is correctly calculated and stated in accordance with 'Rule for emission reporting and certification of greenhouse gas emission trading Scheme'.

(unit: ton CO<sub>2</sub>e)

Report Year	Emission of Scope1	Emission of Scope2	Total Annual Emission
2021	4,442,336	2,099,776	6,542,106

May 10th, 2022  
 (CEO Ji-Young Song  
 Korean Foundation for Quality (KFQ))

*Ji Young Song*

## Third Party Assurance

### LRQA Independent Assurance Statement



#### Relating to Lotte Chemical Corporation's Sustainability Report for the calendar year 2021

This Assurance Statement has been prepared for Lotte Chemical Corporation in accordance with our contract but is intended for the readers of this Report.

#### Terms of engagement

LRQA was commissioned by Lotte Chemical Corporation to provide independent assurance on its '2021 Lotte Chemical Sustainability Report' ("the report") against the assurance criteria below to a "moderate level of assurance and materiality of professional judgement" using "Accountability's AA1000AS v3", where the scope was a Type 2 engagement.

Our assurance engagement covered Lotte Chemical Corporation's operations and activities in Korea and specifically the following requirements:

- Evaluating adherence to the AA1000 AccountAbility Principles<sup>1</sup> of Inclusivity, Materiality, Responsiveness and Impact
- Confirming that the report is in accordance with GRI Standards<sup>2</sup> and core option
- Evaluating the accuracy and reliability of data and information for only the selected indicators listed below:
  - GRI 200 (Economic): 201-1, 201-2, 205-2, 205-3, 206-1
  - GRI 300 (Environmental): 301-2, 302-1, 302-3, 302-4, 303-1, 303-2, 303-3, 303-4, 303-5, 305-1, 305-2, 305-4, 305-5, 305-7, 306-1, 306-2, 306-3
  - GRI 400 (Social): 401-1, 401-2, 401-3, 403-1, 403-2, 403-3, 403-4, 403-5, 403-6, 403-7, 403-9, 403-10, 404-1, 404-2, 404-3, 405-1, 412-2

Our assurance engagement excluded the data and information of Lotte Chemical Corporation's suppliers, contractors and any third-parties mentioned in the report.

LRQA's responsibility is only to Lotte Chemical Corporation. LRQA disclaims any liability or responsibility to others as explained in the end footnote. Lotte Chemical Corporation'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 Lotte Chemical Corporation.

#### LRQA's Opinion

Based on LRQA's approach nothing has come to our attention that would cause us to believe that Lotte Chemical Corporation has not, in all material respects:

- Met the requirements above
- Disclosed accurate and reliable performance data and information as all errors or omissions identified during the assurance engagement were corrected
- Covered all the issues that are important to the stakeholders and readers of this report.

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

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

#### LRQA's approach

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:

- Assessing Lotte Chemical Corporation's approach to stakeholder engagement to confirm that issues raised by stakeholders were captured correctly. We did this through reviewing documents and associated records.
- Reviewing Lotte Chemical Corporation's process for identifying and determining material issues to confirm that the right issues were included in their Report. We did this by benchmarking reports written by Lotte Chemical Corporation and its peers to ensure that sector specific issues were included for comparability. We also tested the filters used in determining material issues to evaluate whether Lotte Chemical Corporation makes informed business decisions that may create opportunities that contribute towards sustainable development.
- Auditing Lotte Chemical Corporation's data management systems to confirm that there were no significant

1 <https://www.accountability.org>

2 <https://www.globalreporting.org>

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 GHG emissions and energy consumptions in the report were transposed correctly from the GHG inventory which was verified by the third-party assurance provider.
- Reviewing additional evidence made available by Lotte Chemical Corporation at its headquarters in Seoul.
- Checking that the GRI Content Index allows stakeholders to access sustainability indicators.

### Observations

Further observations and findings, made during the assurance engagement, are:

- **Inclusivity:** We are not aware of any key stakeholder groups that have been excluded from Lotte Chemical Corporation's stakeholder engagement process.
- **Materiality:** We are not aware of any material issues concerning Lotte Chemical Corporation's sustainability performance that have been excluded from the report. It should be noted that Lotte Chemical Corporation has established extensive criteria for determining which issue/aspect is material and that these criteria are not biased to the company's management.
- **Responsiveness:** Lotte Chemical Corporation reported its sustainability objectives and targets with progress. Especially Lotte Chemical Corporation established and reported the long-term targets for environment including climate change and material recycling.
- **Impact:** Lotte Chemical Corporation has various stakeholder communication channels in place and these communication channels are becoming a part of monitoring method or tool for environmental and social impacts.
- **Reliability:** Lotte Chemical Corporation's data management system for the selected indicators are well defined.

### 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.

Dated: 30 June 2022

**Tae-Kyoung Kim**

LRQA Lead Verifier

On behalf of LRQA



**AA1000**  
**Licensed Report**  
**000-11/V3-RTOZ3**

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LRQA reference: SEO00000821

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## LOTTE Chemical Declaration of Human Rights

As a global chemical company working to build a healthy and prosperous future for humankind, LOTTE Chemical practices social responsibility and aims to achieve sustainable growth based on the trust of all of its stakeholders. LOTTE Chemical hereby declares its support for the international principles set forth in documents, such as the Universal Declaration of Human Rights and the UN Guiding Principles on Business and Human Rights; Ruggie Framework, and pledges to fulfill all related responsibilities. We will do our best to prevent any violations of human rights in the course of doing business, and we publicly pledge our commitment, as fully stated fully below, to respecting and protecting the human rights and free will of all of our stakeholders, including customers, members, local communities, partner companies and others.

### Human Rights of Employees



- Preventing discrimination based on gender, race, religion, disability, origins, etc.
- Fundamentally preventing wrongful labor practices such as forced labor and child labor
- Complying with all labor principles recommended by the International Labour Organization (ILO) and ratified by the Korean government, including those on health and safety, working hours and others

### Human Rights of Customers



- Requesting, recording and storing only the minimum amount of personal information needed to comply with laws and regulations
- Establishing strong security systems, such as encryption, to prevent leaks of personal information
- Using personal information responsibly and limiting its use to providing services and marketing

### Human Rights of Local Communities



- Recognizing our responsibilities and participating actively in social contribution activities for the development of local communities
- Measuring and managing the impacts of activities that can cause environmental and social problems in local communities

### Human Rights of Partner Companies



- Establishing fair and equal business relationships as a win-win partner
- Prohibiting discrimination against members of partner companies and preventing forced labor and child labor

As a corporate citizen with a sense of responsibility in the global business environment, LOTTE Chemical will do its utmost to ensure that subsidiaries and partner companies adhere to these human rights policies. We will work to be a leader in the promotion of human rights management. Thank you.

June 30, 2022  
LOTTE Chemical CEO Kim Gyo-hyun

## GRI Content Index

GRI Topic	Disclosure	Page	
<b>GRI 102: General Disclosures 2016</b>			
<b>Organizational profile</b>	102-1	Name of the organization	4
	102-2	Activities, brands, products, and services	8-10
	102-3	Location of headquarters	4
	102-4	Location of operations	6
	102-5	Ownership and legal form	4, Page 407 of Business Report
	102-6	Markets served	6-8
	102-7	Scale of the organization	4
	102-8	Information on employees and other workers	67, Page 416 of Business Report
	102-9	Supply chain	6-7, 67
	102-10	Significant changes to the organization and its supply chain	11
	102-11	Precautionary Principle or approach	74-75
	102-12	External initiatives	LOTTE Group has joined the UNGC principle to support a preventive approach.
	102-13	Membership of associations	96
<b>Strategy</b>	102-14	Statement from senior decision-maker	2-3
<b>Ethics and integrity</b>	102-16	Values, principles, standards, and norms of behavior	76, 79-80
<b>Governance</b>	102-18	Governance structure	72-73

GRI Topic	Disclosure	Page	
<b>Stakeholder engagement</b>	102-40	List of stakeholder groups	19
	102-41	Collective bargaining agreements	ESG Data Book p.12
	102-42	Identifying and selecting stakeholders	19
	102-43	Approach to stakeholder engagement	19
	102-44	Key topics and concerns raised	19
	<b>Reporting practice</b>	102-45	Entities included in the consolidated financial statements
102-46		Defining report content and topic boundaries	20
102-47		List of material topics	20
102-48		Restatements of information	N/A
102-49		Changes in reporting	11-12
102-50		Reporting period	96
102-51		Date of most recent report	96
102-52		Reporting cycle	96
102-53		Contact point for questions regarding the report	96
102-54		Claims of reporting in accordance with the GRI Standards	96
102-55	GRI content index	91-93	
102-56	External assurance	88-89	

## GRI Content Index

GRI Topic	Disclosure	Page
-----------	------------	------

### GRI 200 : Economic Standards Series

Economic			
<b>GRI 103: Management Approach 2016</b>	103-1,2,3	Explanation of the material topic and its boundary. The management approach and its components. Evaluation of the management approach	21 (Securing New Growth Engines)
<b>GRI 201: Economic Performance 2016</b>	201-1	Direct economic value generated and distributed	ESG Data Book p.15
	201-2	Financial implications and other risks and opportunities due to climate change	41-42
<b>GRI 103: Management Approach 2016</b>	103-1,2,3	Explanation of the material topic and its boundary. The management approach and its components. Evaluation of the management approach	22 (Ethical Management)
<b>GRI 205: Anti-corruption 2016</b>	205-2	Communication and training about anti-corruption policies and procedures	77-78
	205-3	Confirmed incidents of corruption and actions taken	80
<b>GRI 103: Management Approach 2016</b>	103-1,2,3	Explanation of the material topic and its boundary. The management approach and its components. Evaluation of the management approach	22 (Compliance and Fair Trade)
<b>GRI 206: Anti-competitive Behavior 2016</b>	206-1	Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	ESG Data Book p.11

GRI Topic	Disclosure	Page
-----------	------------	------

### GRI 300 : Environmental Standards Series

<b>GRI 103: Management Approach 2016</b>	103-1,2,3	Explanation of the material topic and its boundary. The management approach and its components. Evaluation of the management approach	44
<b>GRI 301: Materials 2016</b>	301-2	Recycled input materials used	ESG Data Book p.6
<b>GRI 103: Management Approach 2016</b>	103-1,2,3	Explanation of the material topic and its boundary. The management approach and its components. Evaluation of the management approach	41-43
<b>GRI 302: Energy 2016</b>	302-1	Energy consumption within the organization	ESG Data Book p.1
	302-3	Energy intensity	ESG Data Book p.1
	302-4	Reduction of energy consumption	ESG Data Book p.2
<b>GRI 103: Management Approach 2016</b>	103-1,2,3	Explanation of the material topic and its boundary. The management approach and its components. Evaluation of the management approach	21 (Sustainable Resource Circulation)
<b>GRI 303: Water and Effluents 2018</b>	303-1	Interactions with water as a shared resource	45
	303-2	Management of water discharge-related impacts	45
	303-3	Water withdrawal	ESG Data Book p.3
	303-4	Water discharge	ESG Data Book p.3
	303-5	Water consumption	ESG Data Book p.2
<b>GRI 103: Management Approach 2016</b>	103-1,2,3	Explanation of the material topic and its boundary. The management approach and its components. Evaluation of the management approach	21 (Climate Response)
<b>GRI 305: Emissions 2016</b>	305-1	Direct (Scope 1) GHG emissions	ESG Data Book p.1
	305-2	Energy indirect (Scope 2) GHG emissions	ESG Data Book p.1
	305-4	GHG emissions intensity	ESG Data Book p.1
	305-5	Reduction of GHG emissions	ESG Data Book p.2
	305-7	Nitrogen oxides (NOX), sulfur oxides (SOX), and other significant air emissions	ESG Data Book p.4

## GRI Content Index

GRI Topic	Disclosure	Page
<b>GRI 103: Management Approach 2016</b>	103-1,2,3 Explanation of the material topic and its boundary. The management approach and its components. Evaluation of the management approach	21 (Sustainable Resource Circulation)
	306-1 Waste generation and significant waste-related impacts	46
<b>GRI 306: Waste 2020</b>	306-2 Management of significant waste-related impacts	34-35
	306-3 Waste generated	ESG Data Book p.5-6
<b>GRI 400: Social Standards Series</b>		
<b>GRI 103: Management Approach 2016</b>	103-1,2,3 Explanation of the material topic and its boundary. The management approach and its components. Evaluation of the management approach	23 (Talent Acquisition and Training)
	401-1 New employee hires and employee turnover	ESG Data Book p.7
<b>GRI 401: Employment 2016</b>	401-2 Benefits provided to full-time employees that are not provided to temporary or part-time employees	65-66
	401-3 Parental leave	ESG Data Book p.8
<b>GRI 103: Management Approach 2016</b>	103-1,2,3 Explanation of the material topic and its boundary. The management approach and its components. Evaluation of the management approach	21 (Management of health and safety at workplace)
	403-1 Occupational health and safety management system	36
<b>GRI 403: Occupational Health and Safety 2018</b>	403-2 Hazard identification, risk assessment, and incident investigation	50-52
	403-3 Occupational health services	52
	403-4 Worker participation, consultation, and communication on occupational health and safety	50
	403-5 Worker training on occupational health and safety	ESG Data Book p.11
	403-6 Promotion of worker health	52, 66
	403-7 Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	68
	403-9 Work-related injuries	ESG Data Book p.9
	403-10 Work-related ill health	ESG Data Book p.9

GRI Topic	Disclosure	Page
<b>GRI 103: Management Approach 2016</b>	103-1,2,3 Explanation of the material topic and its boundary. The management approach and its components. Evaluation of the management approach	23 (Talent Acquisition and Training)
	404-1 Average hours of training per year per employee	ESG Data Book p.11
<b>GRI 404: Training and Education 2016</b>	404-2 Programs for upgrading employee skills and transition assistance programs	63
	404-3 Percentage of employees receiving regular performance and career development reviews	ESG Data Book p.10
<b>GRI 103: Management Approach 2016</b>	103-1,2,3 Explanation of the material topic and its boundary. The management approach and its components. Evaluation of the management approach	60
	<b>GRI 405: Diversity and Equal Opportunity 2016</b>	405-1 Diversity of governance bodies and employees
<b>GRI 103: Management Approach 2016</b>	103-1,2,3 Explanation of the material topic and its boundary. The management approach and its components. Evaluation of the management approach	22 (Human Rights Management)
	<b>GRI 412: Human Rights Assessment 2016</b>	412-2 Employee training on human rights policies or procedures

## TCFD

Recommendation	Page
<b>Governance</b>	
a) Describe the board's oversight of climate-related risks and opportunities	41
b) Describe management's role in assessing and managing climate-related risks and opportunities	41
<b>Strategy</b>	
a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term	41
b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning	41
c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario	41

Recommendation	Page
<b>Risk management</b>	
a) Describe the organization's processes for identifying and assessing climate-related risks.	41
b) Describe the organization's processes for managing climate-related risks	41
c) Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organization's overall risk management	41
<b>Metrics &amp; targets</b>	
a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process	42
b) Disclose Scope 1, Scope 2 and, if appropriate, Scope 3 greenhouse gas emissions and the related risks	42, ESG Data Book p.1
c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets	42



# SASB

## Chemicals

Topic	Category	Code	Response
Greenhouse Gas Emissions	① Gross global Scope 1 emissions	Quantitative	RT-CH-110a.1 4,442,335.9tCO <sub>2</sub> e (only including emissions from domestic business sites)
	② percentage covered under emissions-limiting regulations (eg. K-ETS)	Quantitative	RT-CH-110a.1 100%
	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	Discussion and Analysis	RT-CH-110a.2 p. 41-43
Air Quality	Air emissions of the following pollutants:	Quantitative	RT-CH-120a.1 8,182 tons
	① NOX (excluding N <sub>2</sub> O)	Quantitative	RT-CH-120a.1 209.9 tons
	② SOX	Quantitative	RT-CH-120a.1 120 tons
	③ volatile organic compounds (VOCs)	Quantitative	RT-CH-120a.1 65 tons
Energy Management	④ hazardous air pollutants (HAPs)	Quantitative	RT-CH-120a.1 65 tons
	① Total energy consumed	Quantitative	RT-CH-130a.1 125,889 TJ
	② percentage grid electricity	Quantitative	RT-CH-130a.1 100%
	③ percentage renewable	Quantitative	RT-CH-130a.1 0.1% or below
Water Management	④ total self-generated energy	Quantitative	RT-CH-130a.1 16,924 TJ
	① Total water withdrawn in regions with High or Extremely High Baseline Water Stress	Quantitative	RT-CH-140a.1 No business sites with high risk of water stress
	② total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress	Quantitative	RT-CH-140a.1 No business sites with high risk of water stress
	Number of incidents of non-compliance associated with water quality permits, standards, and regulations	Quantitative	RT-CH-140a.2 1 incident
Hazardous Waste Management	Description of water management risks and discussion of strategies and practices to mitigate those risks	Discussion and Analysis	RT-CH-140a.3 p. 45
	Amount of hazardous waste generated	Quantitative	RT-CH-150a.1 ESG Data Book p.5-6
Community Relations	percentage recycled	Quantitative	RT-CH-150a.1 80.7%
	Discussion of engagement processes to manage risks and opportunities associated with community interests	Discussion and Analysis	RT-CH-150a.1 p. 19

Topic	Category	Code	Response	
Workforce Health & Safety	① Total recordable incident rate (TRIR)	Quantitative	RT-CH-320a.1 ESG Data Book p.9	
	② fatality rate for (a) direct employees and (b) contract employees	Quantitative	RT-CH-320a.1 ESG Data Book p.9	
	Description of efforts to assess, monitor, and reduce exposure of employees and contract workers to long-term (chronic) health risks	Discussion and Analysis	RT-CH-320a.2 p. 50-52	
Product Design for Use-phase Efficiency	Quantitative	RT-CH-410a.1	244,129,398,898 KRW	
Safety & Environmental Stewardship of Chemicals			① & ② not reported LOTTE Chemical evaluates the use of substances that have been investigated to be harmful to the human body and the environment from a customer's perspective and employs stricter control measures than required by legal standards. Our activities regarding product safety and chemical management systems are reported on p.54-55	
	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	Quantitative	RT-CH-410b.1	
	② percentage of such products that have undergone a hazard assessment			
	Discussion of strategy to ① manage chemicals of concern	Discussion and Analysis	RT-CH-410b.2	p.54-55
Genetically Modified Organisms	② develop alternatives with reduced human and/or environmental impact	Discussion and Analysis	RT-CH-410b.2	p.47-79
	Percentage of products by revenue that contain genetically modified organisms (GMOs)	Quantitative	RT-CH-410c.1	N/A
Management of the Legal & Regulatory Environment	Discussion of corporate positions related to government regulations and/or policy proposals that address environmental and social factors affecting the industry	Discussion and Analysis	RT-CH-530a.1	p.74-76
Operational Safety, Emergency Preparedness & Response	① Process Safety Incidents Count (PSIC)	Quantitative	RT-CH-540a.1	3 cases
	② Process Safety Total Incident Rate (PSTIR)	Quantitative	RT-CH-540a.1	Not an internal indicator
	③ Process Safety Incident Severity Rate (PSISR)	Quantitative	RT-CH-540a.1	Not an internal indicator
	Number of transport incidents	Quantitative	RT-CH-540a.2	0 case

## Memberships of Associations

### Memberships of Associations

Korea Industrial Safety Association	Korea Management Association	Korea AEO Association
Korea Chamber of Commerce and Industry	The Membrane Society of Korea	Korea Engineering and Consulting Association
The Federation of Korean Industries	Korea International Trade Association	Korea Association for Exterior Insulation
Korea Business Council for Sustainable Development	Korean Association for Radiation Application	Korea Personal Improvement Association
Korea Responsible Care Council	Korea Industrial Technology Association	Korea Fine Chemical Industry Promotion Association
Korea Enterprises Federation	Korea Listed Companies Association	Korea Intellectual Property Association
Korea Economic Research Institute	Korea Water & Wastewater Works Association	Korea Plastics Pipes Research Society
The Polymer Society of Korea	Korea Productivity Center	The Korean Institute of Chemical Engineers
The Korean Society of Industrial and Engineering Chemistry	Korea Petrochemical Industry Association	Korea Chemicals Management Association
Korea Fair Competition Federation	Korea Fire Safety Institute	Korea Chemical Industry Council
Korea Customs Logistics Association	Korea Hydrogen Industry Association	Korea-Japan Economic Association

## About This Report

LOTTE Chemical has been publishing the sustainability report every year since 2007, and the current report for 2022 is the 15th issue. The 2021 LOTTE Chemical Sustainability Report contains the financial and non-financial performance of the company, through which we intend to communicate openly with stakeholders.

<b>Reporting Standard</b>	GRI Standard(Core Option)
<b>Reporting Scope</b>	LOTTE Chemical's headquarters; the Daejeon R&D Center; plants in Yeosu, Daesan and Ulsan; subsidiaries; and overseas business sites (partial performance)
<b>Reporting Boundary</b>	LOTTE Chemical
<b>Reporting Period</b>	January 1 ~ December 31, 2021 (first half of 2022 included for partial performance)
<b>Reporting Cycle</b>	Annual (Previous issue: June 2021)
<b>Assurance</b>	Lloyd's Register
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Sustainability Report



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