

Kumho Petrochemical

Sustainability Report 2022



beyond
the best

**KUMHO
PETROCHEMICAL**

About This Report

Report Overview

Kumho Petrochemical publishes a sustainability report every year to actively communicate with stakeholders about ESG management performance and activities. We are delighted to release our 2022 Sustainability Report this year, which contains Kumho Petrochemical's sustainability management efforts and major achievements. Kumho Petrochemical will continue to actively collect the opinions of stakeholders through our Sustainability Report and reflect them in management activities.

Reporting Principles

This report aligns with the GRI (Global Reporting Initiative) Standards. In order to address the issues that relate to the nature of our business, we comply with the disclosure recommendations of TCFD (Task Force on Climate-Related Financial Disclosure) and SASB (Sustainability Accounting Standards Board) Standards. When it comes to the financial data provided herein, we follow K-IFRS (the Korean Version of International Financial Reporting Standards).

Reporting Period

This Sustainability Report details our sustainability performance from January 2022 through December 2022. For some of key information, it contains data from the past three years from 2020 to 2022 to allow you to make comparisons. And the data that may have an impact on our stakeholders covers the years before 2022 and the first half of 2023.

Reporting Scope and Boundaries

This report covers the headquarters, Central R&BD Center and 10 business sites (Ulsan Synthetic Rubber Plant, Ulsan Synthetic Resin Plant, Yeosu Synthetic Rubber Plant I and II, Yeosu Specialty Chemicals Plant, Yeosu Energy Plant I and II, Asan CNT Plant, Yesan Building Materials Plant, Hwaseong Foam Plant) and key affiliates (Kumho P&B Chemicals, Kumho Polychem, Kumho Resort, Kumho T&L, Kumho Trading, Kumho Mitsui Chemicals) for sustainability performance. The reporting scope includes the headquarters and all branches and major affiliates, and some of the data with different reporting scopes are separately indicated.

Reporting data for consolidated subsidiaries

Consolidated subsidiaries	Qualitative	Quantitative	
Kumho P&B Chemicals	v	v	Financial performance, environmental (greenhouse gas, energy, water, air/water pollutants, waste, etc.), social (human resources, safety and health)
Kumho Polychem	v	v	Financial performance, environmental (greenhouse gas, energy, water, air/water pollutants, waste, etc.), social (human resources, safety and health)
Kumho Resort	v	v	Financial performance, environmental (energy), social (human resources, safety and health)
Kumho T&L	v	v	Financial performance, environmental (water, air pollutants, waste, etc.), social (human resources, safety and health)
Kumho Trading	v	v	Financial performance, social (human resources)
Korea Energy Power Plant	v		
KR Solar	v		
Kangwonschoolsolr	v		
Kumho Holdings(H.K.) Co.,Ltd.			
Kumho Petro Holdings			
Weihai Point Hotel & Golf Resort Co., Ltd			

Data Assurance

Kumho Petrochemical received a third-party verification from an external institution to enhance the reliability and quality of the report, and the results are listed on pages 120-121.

Additional Information

This report can also be viewed on the Kumho Petrochemical website.

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CEO Message



The past year was marked by many challenges, including unstable energy and food markets, high inflation rates, steep interest rate hikes, and economic downturns, while the COVID-19 pandemic is still not over. Despite this global economic downturn, Kumho Petrochemical achieved high performance with KRW 7.975 trillion in sales and KRW 1.147 trillion in operating profit as of the 2022 consolidated financial statements. We believe this is the result of our steadfast efforts to improve even in times of crisis, without losing our focus and emphasizing our principles.

In 2022, we achieved remarkable results in ESG management. In just over a year after announcing our ESG vision and establishing an ESG Committee and dedicated organization in 2021, we achieved an integrated 'A' grade in the ESG evaluation of the Korea Institute of Corporate Governance and Sustainability (KCGS), a step up from last year. We also maintained our ESG grade from Sustinvest after it was raised to 'A' in the first half of 2022. In December 2022, Kumho Petrochemical was also newly included in the Dow Jones Sustainability Index (DJSI) Korea 2022, which only includes the top 50 companies with excellent ESG management among the top 205 companies in Korea.

Dear Stakeholders,

I would like to extend my gratitude to our stakeholders including shareholders, customers, employees, suppliers, partners and local communities for unwavering support and encouragement you have shown to us for our journey towards ESG management for the past one year.

Dear Stakeholders,

The year 2023 is expected to be a more challenging business environment than in previous years. With high inflation and high interest rates globally, private consumption is expected to shrink and investment is expected to decline in most countries, and the petrochemical industry is expected to face tougher regulations such as the EU Carbon Border Adjustment Mechanism (CBAM) and the United Nations (UN) Plastics Convention, and there is a risk that these regulations will be used as protectionist barriers, making business conditions based on the existing production and export structure more difficult. However, despite these difficult conditions, Kumho Petrochemical will continue to grow by turning the crisis into an opportunity. To this end, we plan to implement the following strategies.

First, we will strengthen our internal management to expand the competitiveness of our existing businesses.

Our existing businesses are the cornerstones for moving the company forward into areas where we are competitive and can do best. In order to respond to customer needs in a timely manner and diversify our portfolio of high-value-added products, all employees, including sales, production, and research, will work together to proactively respond to the current uncertainty.

Second, we will proactively seek opportunities for future growth engines to respond to megatrends.

Despite the global economic crisis, sustainability and digital transformation remain mega trends. We have set three areas of future growth for the company: electric vehicle solutions, eco-friendly/bio, and high-value specialty. Based on our insights into the market, we will proactively identify undervalued companies and thoroughly verify them to expand our competitive business portfolio through acquisitions.

Third, we will refine our ESG strategy and accelerate its implementation.

ESG management is a requirement for a company to be sustainable. Based on our GHG reduction roadmap, we will actively respond to climate change and accelerate the development of eco-friendly products that meet customer needs.

In addition to the 'E (Environment)' field, which we are currently focusing on, we will create strategies to secure competitive advantages through the creation of social value. We will grow as a sustainable company by proactively and thoroughly preparing for global standards.

Dear Stakeholders,

Although the year 2023 will be a challenging environment both internally and externally, Kumho Petrochemical will take 'Onward!' as our management policy, accepting realistic challenges even in the midst of the economic crisis and actively prepare specific strategies to achieve its goals. All Kumho Petrochemical executives and employees will strive to enhance stakeholder value with a sense of responsibility in line with the corporate group vision of 'Solution Partner Creating Our Common Future With Value Beyond Chemistry'.

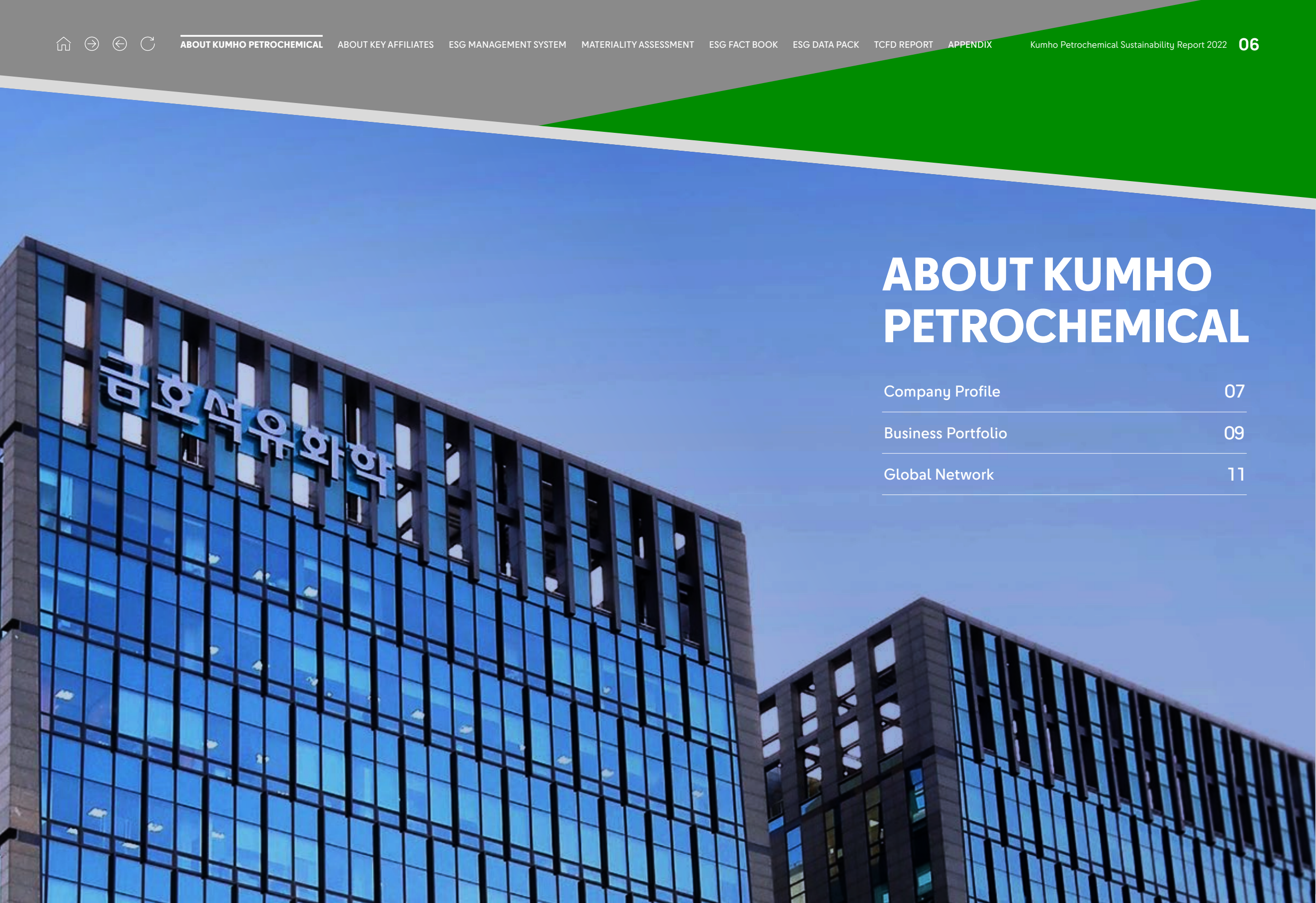
We hope that all of our stakeholders will believe in the experience and capabilities of our employees and follow us to the end. We ask for your unending interest and advice in the future.

Thank you.

June 2023

Baek Jong-hoon

CEO of Kumho Petrochemical



ABOUT KUMHO PETROCHEMICAL

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Company Profile

Company Overview

Kumho Petrochemical, founded in 1970, is one of the leading petrochemical companies in the world with the world's largest Synthetic Rubbers manufacturing capacity. Our primary focus is on the Synthetic Rubbers business with operations in Synthetic Resins, Specialty Chemicals, Carbon Nanotube (CNT), Energy and Building Materials. Over the past 50 years, we, as a reliable partner, have gone hand in hand with the Korea's industrial development. And now, we are becoming a global petrochemical company that unlocks and delivers the best value at the forefront of materials innovation.

'Change' towards the Center

Competing on the global stage requires the top-notch technological prowess and the largest manufacturing capacity. In order to secure them, we have devoted all our energies. And we have exhausted all resources, including IT, energy and logistics, to provide more valuable petrochemical products. We have kept innovating and challenging ourselves to move towards the center of the petrochemical industry.

'Trust' Underlying Our Business

Since our inception, we have established a robust partnership with the leading players in the tire and automotive sectors. And we have boasted the reliable and cooperative labor-management relations without a single strike. We always provide the best quality for customers.

'Environment' Comes First

Under our management philosophy, 'Environment overrides business,' we have taken the initiative in tightening environmental standards by adopting international environmental management systems. We are committed to developing technologies that serve both the environment and people, thereby creating a safer and healthier environment.

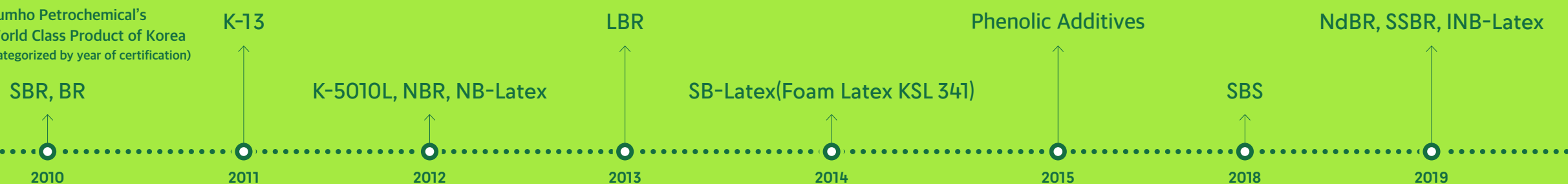
Company Name	Kumho Petrochemical
Business Operations	Synthetic Rubbers, Synthetic Resins, Specialty Chemicals, CNT, Energy, Building Materials, etc.
CEO	Baek Jong-hoon
Revenue on a consolidated basis in 2022	KRW 7.975 trillion
Date of Establishment	December 28, 1970
Headquarters	East Wing, Signature Towers 100 Cheonggyecheon-ro (Supyo-dong) Jung-gu, Seoul, Republic of Korea

Corporate Vision

Kumho Petrochemical aims to grow into an innovative leader that contributes to customer success, leads change, and creates new markets by strengthening its industry leadership. To this end, all employees are leading the company's growth together under the vision of 'Solution Partner Creating Our Common Future With Value Beyond Chemistry.'

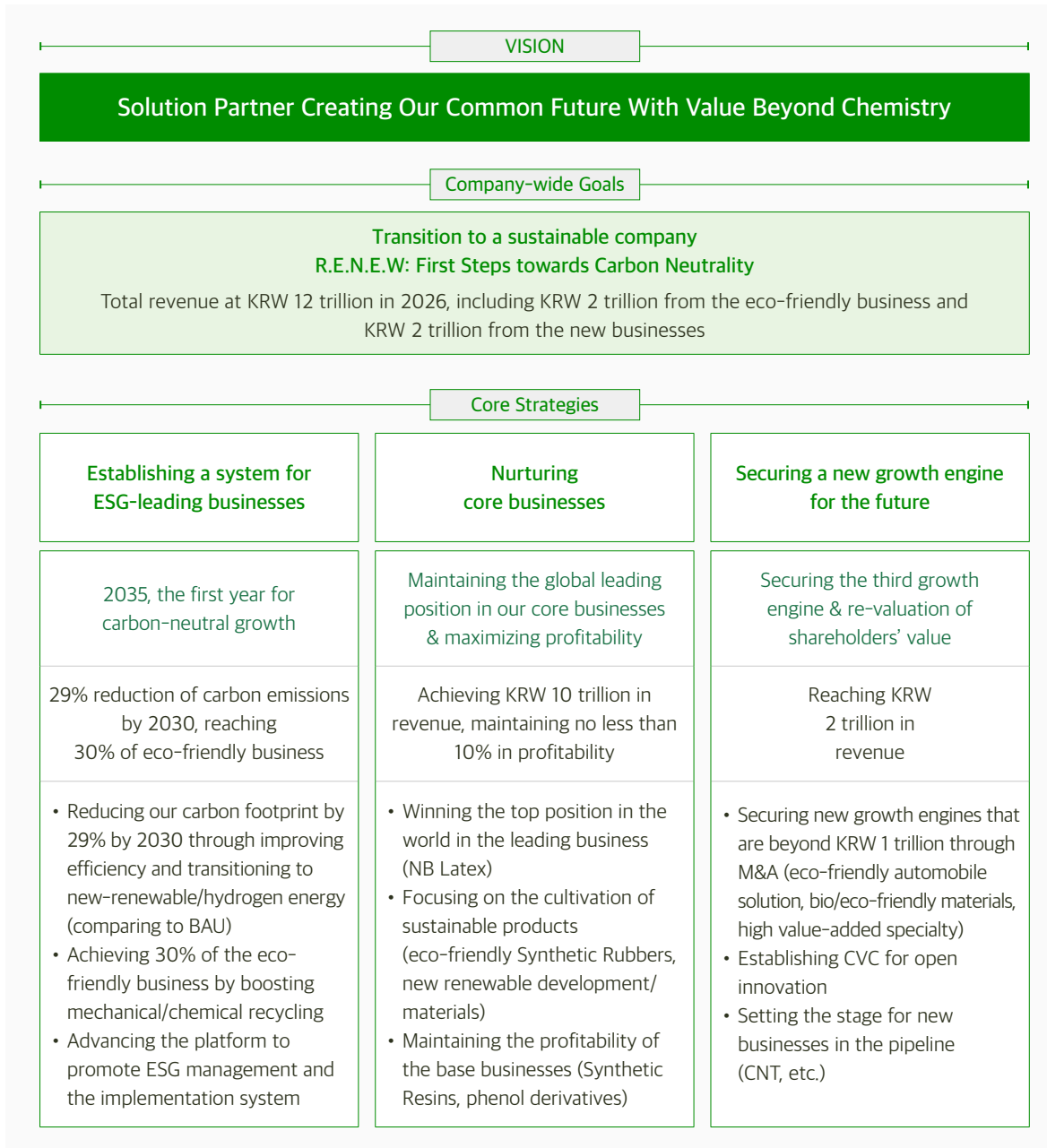
VISION	 <p>Solution Partner Creating Our Common Future With Value Beyond Chemistry</p>	
	<p>For Our Customers</p> <p>We create customer value with the best solutions and synergy</p>	<p>For Our Shareholder</p> <p>We deliver shareholder value by selecting and focusing to maximize profits</p>
MISSION	<p>For Our Employees</p> <p>We work to create a virtuous cycle of growth where both company and employees grow</p>	<p>For Our Humanity & Environment</p> <p>We will create green chemicals that coexist in harmony with people and nature</p>

Kumho Petrochemical's World Class Product of Korea (categorized by year of certification)



Sustainable Mid- to Long-term Growth Strategy

Kumho Petrochemical devised a mid- to long-term growth strategy to transform ourselves into a sustainably growing company. The three core strategies, establishing a system for ESG-leading businesses, nurturing core businesses, and securing a new growth engine for the future will serve as the foundation for opening a new future by realizing our vision, ‘Solution Partner Creating Our Common Future With Value Beyond Chemistry.’

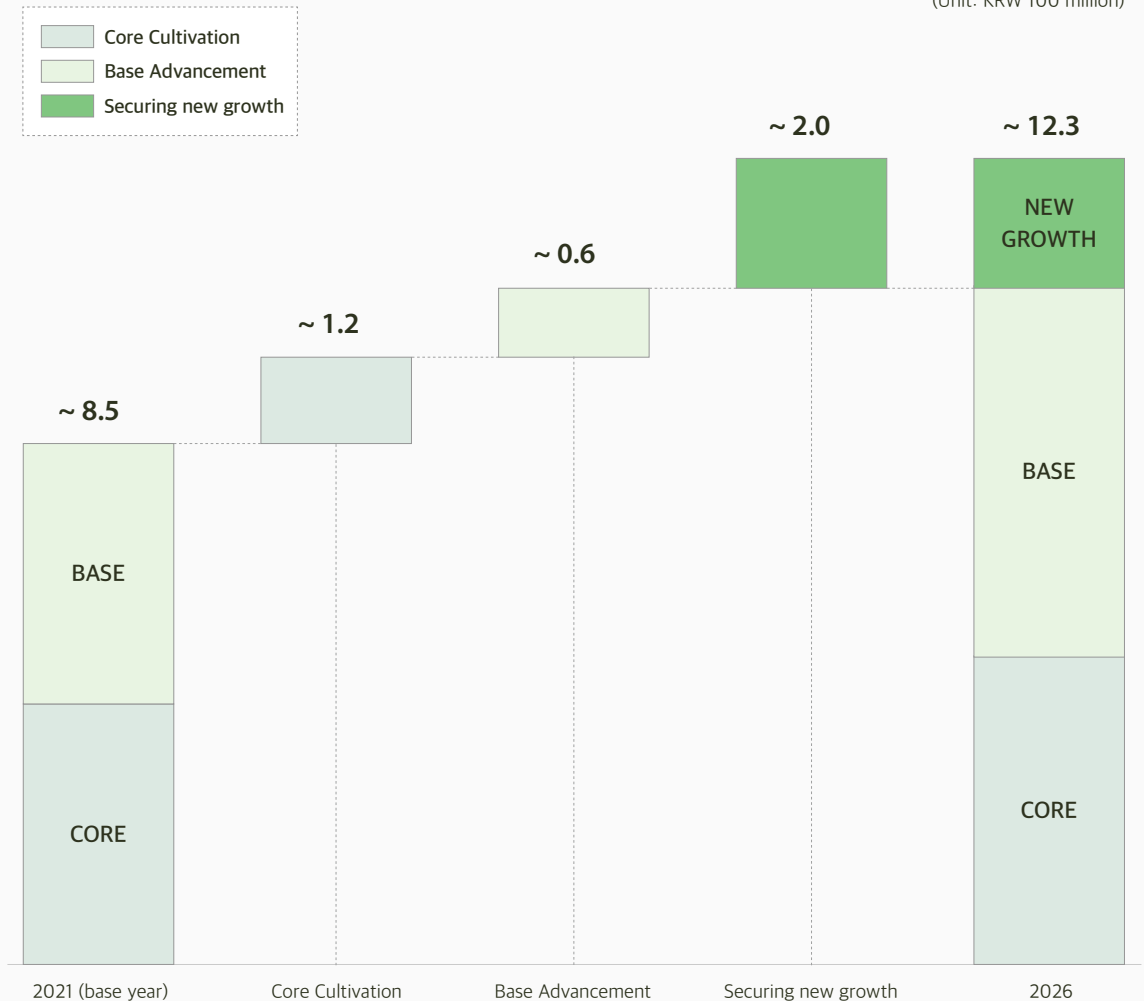


Goals for a Sustainable Future

Kumho Petrochemical's goal is to achieve annual sales of KRW 12 trillion by 2026 by reinforcing the existing core businesses and securing new growth engines. To this end, we are scheduled to invest about KRW 3.5 to 4.5 trillion by 2026.

Company-wide revenue goals

(Unit: KRW 100 million)



Business Portfolio

Kumho Petrochemical produces Synthetic Rubbers, Synthetic Resins and Specialty Chemicals as basic raw materials based on petrochemicals and apply them to automobiles, gloves, shoes, and interior and exterior materials. In addition, we are actively pursuing global business competitiveness and entering new markets through our Carbon Nanotube (CNT), Energy and Building Materials areas.

Synthetic Rubbers

Kumho Petrochemical was the first domestic player to manufacture Synthetic Rubbers along with the development of automobile and tire industries in Korea. We are equipped with the world's largest production capacity in the field of general purpose Synthetic Rubbers, including Styrene Butadiene Rubber (SBR) and Butadiene Rubber (BR). Recently, on the strength of the enhanced energy efficiency, the sales of Solution Polymerized Styrene Butadiene Rubber (SSBR) and Ultra High-cis Polybutadiene Rubber (NdBR) products are in full swing, which are the high performance Synthetic Rubbers optimized for the Tire Energy Efficiency Grading System. We also produce for the downstream industries, including the areas of tires, shoes, automobile parts, and medical gloves. In particular, we boast the world's No.1 manufacturing capacity in the NB-Latex sector. The material is used for latex gloves for medical use and industrial use. As the manufacturer of the material, we have pushed back the frontiers of the market and the scope of application.

Synthetic Rubbers



Synthetic Resins

Synthetic Resins

Kumho Petrochemical produces Synthetic Resins, the main raw materials for plastic or styrofoam, using primary oil as a raw material. Synthetic Resins are used for diverse purposes; automobiles, home appliances, food containers, building materials, and household goods. In recent years, we are seeing customers' needs diversify mainly due to the emergence of more complicated, advanced, and high value-added products. In line with the more stringent safety standards and rising demands for ecofriendly products, we have expanded our environment friendly portfolios such as eco-friendly compound materials and next generation plastics while concentrating on R&D and investments for high-functional and high value-added products.

Specialty Chemicals

Kumho Petrochemical produces antioxidants and paint additives to prevent the oxidation of rubber or Synthetic Resins and raise their stability and durability. Based on the vertical integration with the Synthetic Rubbers business, we have been equipped with a world-class production capacity and supply chain in the Specialty Chemicals sector. In response to more and more stringent environmental regulations, we make considerable efforts to develop eco-friendly alternatives. Globally, we take the lead in technologies and products in the field of epoxy paints and adhesives for buildings and ships. Research and development are also continuously conducted on high value-added new materials and eco-friendly manufacturing processes.

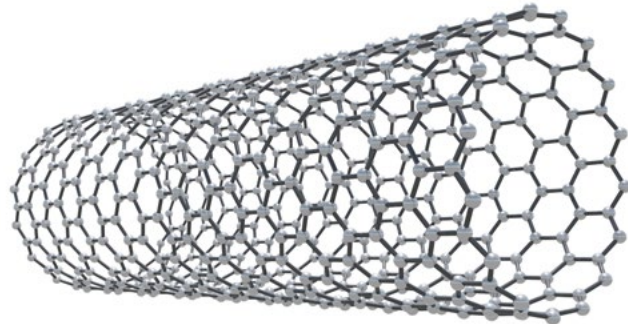
Specialty Chemicals



Carbon Nanotube

Kumho Petrochemical produces and supplies basic materials for Carbon Nanotube (CNT), a 'dream material' with excellent electrical, thermal and mechanical properties. We have continuously developed CNT used for rechargeable batteries in order to respond to the emerging electric vehicle market as well as the high-functional application products that combine Synthetic Rubbers, Synthetic Resins, and many more. Through these efforts, we seek the innovation of industrial materials and market expansion.

Carbon Nanotube



Energy



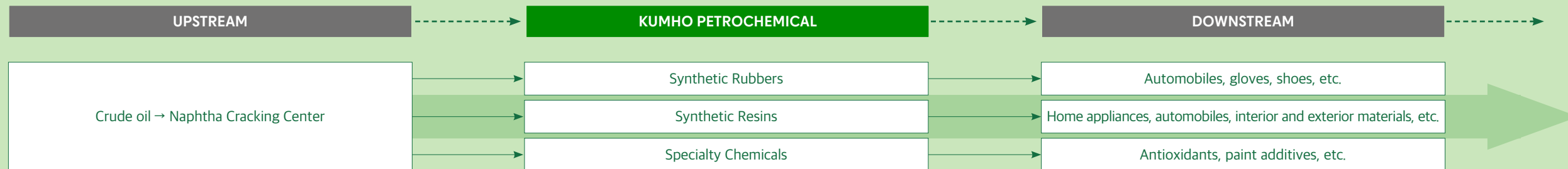
Energy

Kumho Petrochemical operates cogeneration plants as a group energy provider licensed to sell power. The heat energy generated at our highly efficient energy facilities is utilized for industrial processes, while electric energy is sold directly within the industrial complex or through power exchanges to make profits. The energy business is an integral part of our efforts to mitigate carbon emissions. The short-term goal is to reduce GHGs through the mixed use of biomass fuel, and in the midterm and long-term, we aim to realize carbon neutrality in the energy business through fuel conversion.

Building Materials

Kumho Petrochemical produces eco-friendly building materials through 'Hugreen,' an eco-friendly Building Material brand. We have introduced and operated the hazardous substance reduction system in our production line and produce low-carbon certified window systems. By researching and developing window systems in an innovative manner, we strive to make spaces for everyday life more beautiful and pleasant.

Building Materials



Global Network

America

Europe

Malaysia

China

Indonesia

Seoul

Hwaseong

Asan

Yesan

Daejeon

Ulsan

Daegu

Busan

Gwangju

Yeosu

Overseas Offices

America

- San Diego Office
- Atlanta Office

Europe

- Frankfurt Office

Malaysia

- Kuala Lumpur Office

Indonesia

- Jakarta Office

Investment Companies

China

- Kumho Petrochemical Shanghai Co. Ltd.
- Shanghai Kumho Sunny Plastics Co., Ltd.
- Rizhao Kumho Jinma Chemical Co., Ltd.
- Kumho Petro Holdings

Domestic Business Sites and Offices

Seoul

- Headquarters

Hwaseong

- Hwaseong Foam Plant

Asan

- Asan CNT Plant

Yesan

- Yesan Building Materials Plant

Daejeon

- Central R&BD Center

Gwangju

- Gwangju Sales Office

Yeosu

- Yeosu Synthetic Rubber Plant I
- Yeosu Synthetic Rubber Plant II
- Yeosu Specialty Chemicals Plant
- Yeosu Energy Plant I
- Yeosu Energy Plant II

Daegu

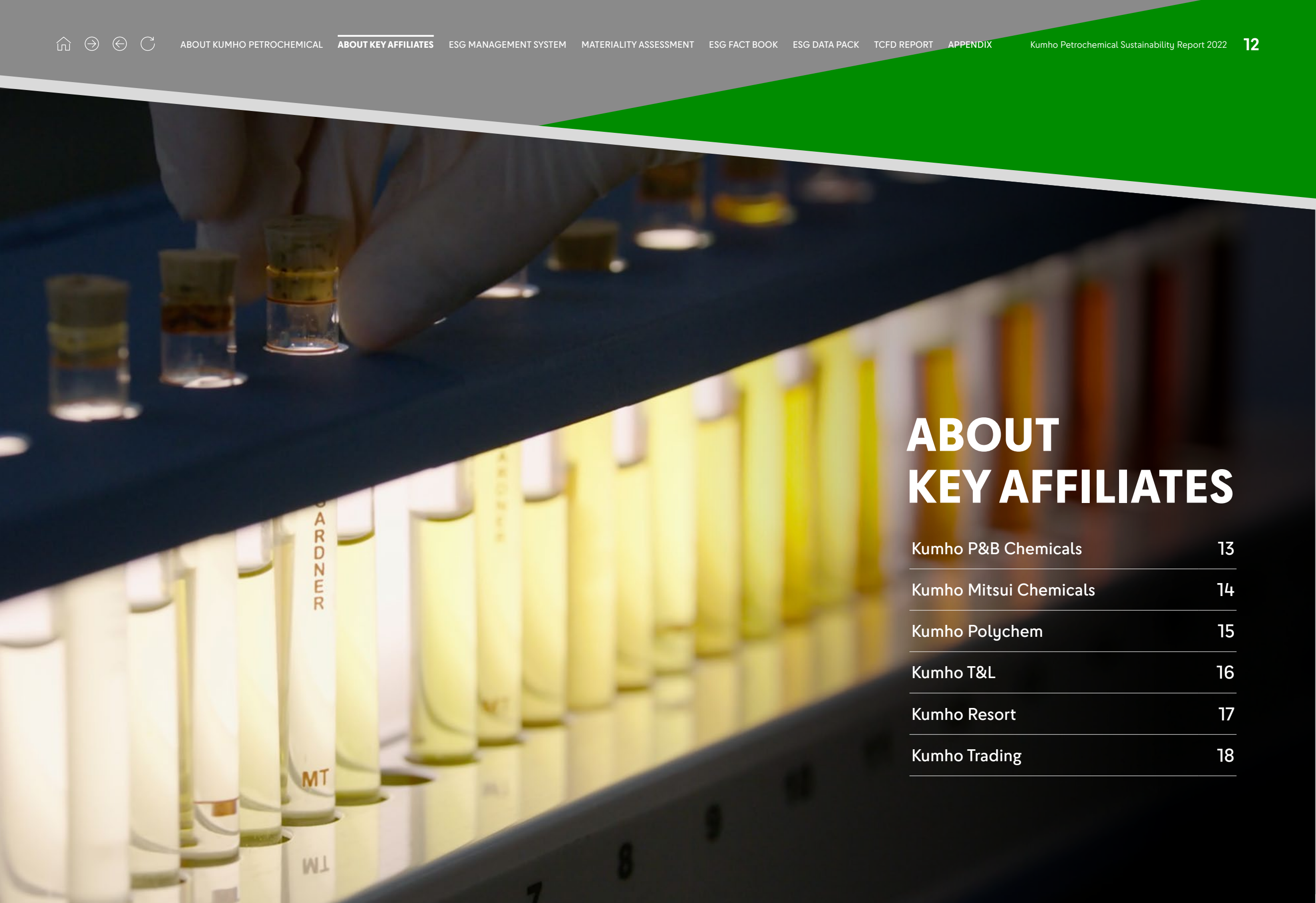
- Daegu Sales Office

Busan

- Busan Rubber Sales Office
- Busan Resin Sales Office

Ulsan

- Ulsan Synthetic Rubber Plant
- Ulsan Synthetic Resin Plant



ABOUT KEY AFFILIATES

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KUMHO P&B CHEMICALS

Kumho P&B Chemicals specializes in producing and selling BPA, Phenol, Acetone, MIBK, and Epoxy Resin, which are the core materials used across a wide range of industries such as architecture, shipbuilding, automobiles, electric and electronics, pharmaceuticals, and paint. Since its inception as the Korea's only phenol and acetone producer in 1976, the company has continuously innovated its technologies and expanded its facilities. It has grown into a petrochemical company equipped with a global competitive edge.

www.kpb.co.kr/eng/main

Key ESG Performance

- Established an ESG strategy and tasks
- Installed RTOs at Plant I and II
- Implementing a national initiative to develop epoxy for renewable energy infrastructure such as recyclable wind blades and hydrogen storage tanks
- Established a plan to convert corporate vehicles to zero-emission ones by 2030
- Supported emergency relief in Turkestan and Syria
- Obtained ISCC PLUS certification for 5 products: cumene, acetone, phenol, bisphenol A, and epoxy
- ISO 9001, ISO 14001, and ISO 45001 certified

Global Network

- Yeosu Plant I (HQ)
- Yeosu Plant II
- Seoul Office
- Gimpo R&BD Center
- D&K Chemtech (Joint Venture)
- LA Logistics Center
- Chicago Logistics Center
- Houston Logistics Center
- Savannah Logistics Center
- Newark Logistics Center
- Norfolk Logistics Center
- OCI Kumho (Joint Venture)
- Jiangsu Yangnong Kumho Chemical Co., Ltd. (Joint Venture)

(As of December 31, 2022)

Financial Information

Revenue	KRW 2.203 trillion
Net Income	KRW 231.4 billion
Percentage of ownership by Kumho Petrochemical	100%
World-class products	MIBK, Bisphenol A, Acetone, Phenol





KUMHO MITSUI CHEMICALS

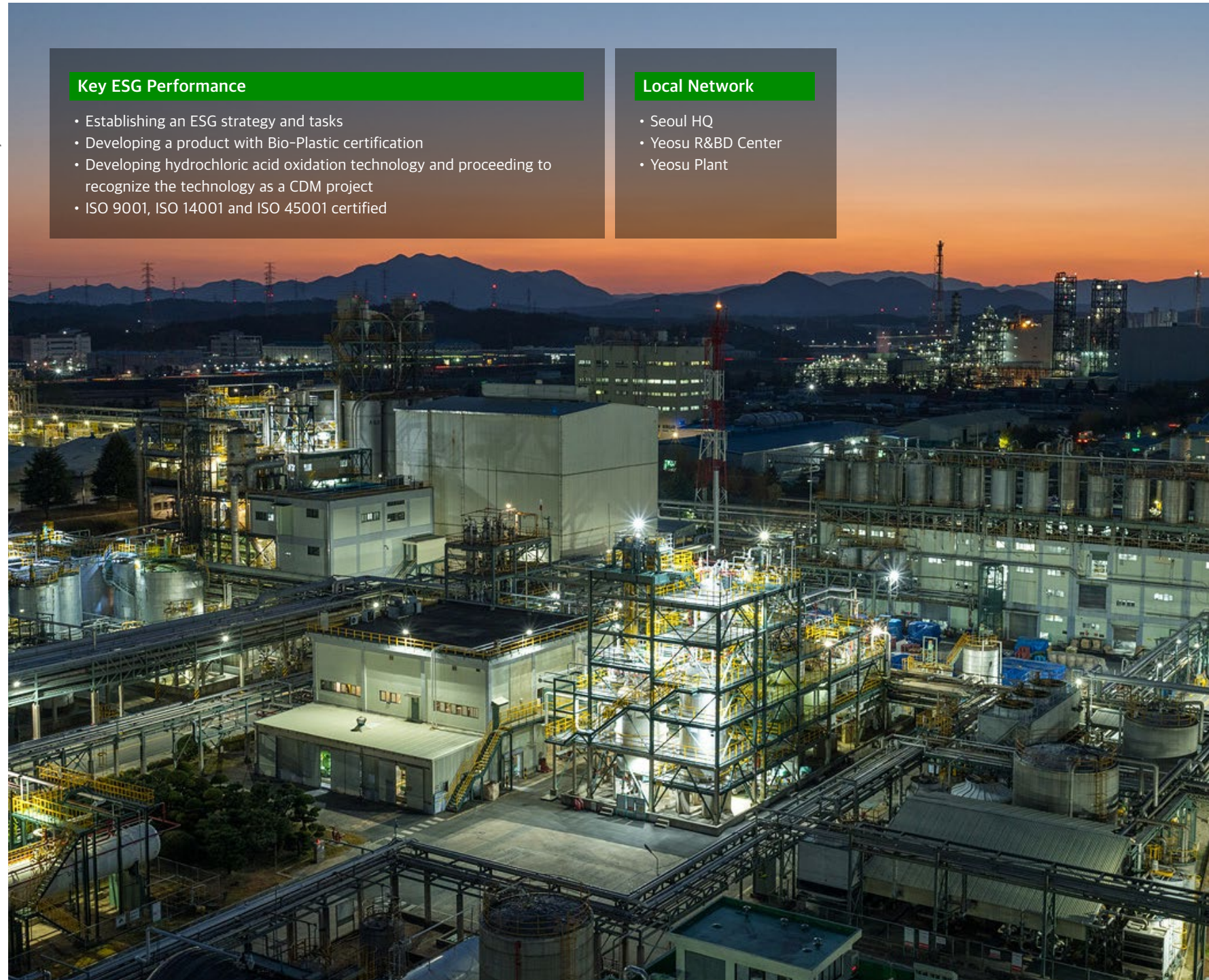
Jointly founded by Kumho Petrochemical and Mitsui Chemicals of Japan in 1989, Kumho Mitsui Chemicals manufactures and supplies MDI, a critical material for polyurethane. Based on the infrastructure built by Kumho Petrochemical and our advanced production technology, it became a global MDI manufacturer that supplies products to more than 420 companies in 70 countries around the world, and it is steadily expanding our production capacity through active investment to ensure the supply of the highest quality products. It has maintained the largest MDI production capacity in Korea since establishing a 350,000-ton production system in 2017, and built a 410,000-ton system by completing de-bottlenecking of 60,000 tons in 2019. It is currently working on a 200,000-ton expansion project with eco-friendly technology and plan to complete a 610,000-ton production system by 2024.

(As of December 31, 2022)

Financial Information

Revenue	KRW 1.332 trillion
Net Income	KRW 166.9 billion
Percentage of ownership by Kumho Petrochemical	50%
World-class products	Polymeric MDI, Monomeric MDI

www.kmci.co.kr/eng



Key ESG Performance

- Establishing an ESG strategy and tasks
- Developing a product with Bio-Plastic certification
- Developing hydrochloric acid oxidation technology and proceeding to recognize the technology as a CDM project
- ISO 9001, ISO 14001 and ISO 45001 certified

Local Network

- Seoul HQ
- Yeosu R&BD Center
- Yeosu Plant



KUMHO POLYCHEM

Kumho Polychem was established in 1985 as a joint-venture between Kumho Petrochemical and Japan Synthetic Rubber (currently JSR), a Japanese company. In 2021, Kumho Petrochemical made the company an affiliate 100% owned by it. The company produces EPDM, TPV, KEPA for automobiles and industries for the first time in Korea, contributing to the advancement of the Korean automobile industry. With a current production capacity of 240,000 tons of EPDM (EPDM/TPV/KEPA combined, totaling 252,000 tons), Kumho Polychem has the supply capacity of the Global Big 2 in EPDM and is further enhancing its status as a 'Global EPDM Leader', striving to develop eco-friendly materials and provide stable supply of high-quality products.

(As of December 31, 2022)

Financial Information

Revenue	KRW 781.6 billion
Net Income	KRW 117.7 billion
Percentage of ownership by Kumho Petrochemical	100%
World-class products	EP(D)M

www.polychem.co.kr/eng



Key ESG Performance

- Established an ESG strategy and tasks
- Earned a Silver rating from EcoVadis
- Completed the 4-Line MVR Installation
- Created a 2030 carbon reduction roadmap
- ISO 9001, ISO 14001, ISO 45001 and IATF 16949 certified

Local Network

- Seoul HQ
- Daejeon R&BD Center
- Yeosu Plant I
- Yeosu Plant II
- Busan Sales Office

beyond
the best
KUMHO T&L

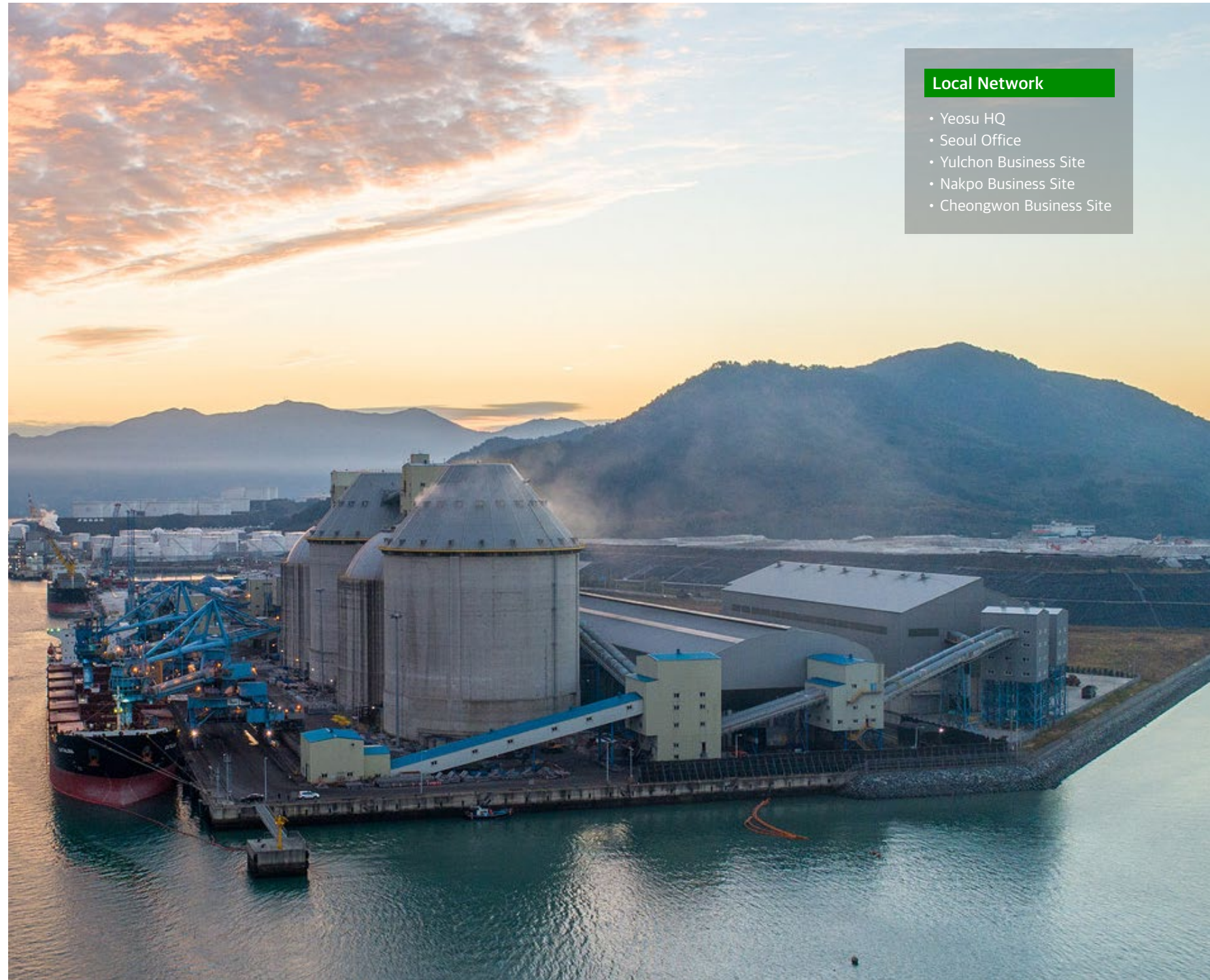
Since its foundation in 2009, Kumho T&L has served as a logistics hub dedicated to major power plants in Yeosu Industrial Complex that reduces logistics costs and supplies raw materials smoothly. It currently operates port cargo handling, land transportation, power plant transfer/maintenance service business, and Tire Derived Fuel (TDF) supply business. In terms of port cargo handling, the company operates a closed facility system from unloading to transfer and storage, aiming at 'eco-port,' and in TDF supply business, it has carried out a project of recycling waste tires to make fuels since 2015. In the future, it plans to expand the waste tire recycling business in addition to entering the overall logistics business.

(As of December 31, 2022)

Financial Information

Revenue	KRW 78.8 billion
Net Income	KRW 3.4 billion
Percentage of ownership by Kumho Petrochemical	100%

www.ktnl.co.kr



Local Network

- Yeosu HQ
- Seoul Office
- Yulchon Business Site
- Nakpo Business Site
- Cheongwon Business Site

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KUMHO RESORT

Kumho Resort is a comprehensive leisure company that operates facilities for tourism and leisure, such as condominiums, glamping & caravanning, water parks, and golf clubs in and outside Korea. All facilities blend harmoniously with the natural surroundings of the area, creating a relaxing experience and beautiful memories. It owns four condominiums in Korea (Tongyeong, Hwasun, Seorak, Jeju), Asan Spafore, a nature experimental glamping & caravanning club, and Asan Spavis, a natural hot spring water park. In addition, it operates a prestigious membership golf club in Korea called 'Asiana CC (36H, Yongin)' as well as a golf resort 'Weihaipoint Hotel & Golf Resort (18H, Weihai, China)'.

www.kumhoresort.co.kr



Global Network

- Seoul HQ
- Gwangju Sales Office
- Busan Sales Office
- Asiana CC
- Asan Spavis
- Kumho Tongyeong Marina Resort
- Kumho Seorak Resort
- Kumho Hwasun Spa Resort
- Kumho Jeju Resort
- Weihai Point (China)

(As of December 31, 2022)

Financial Information

Revenue	KRW 97.7 billion
Net Income	KRW 2.2 billion
Percentage of ownership by Kumho Petrochemical	66.72%



KUMHO TRADING

Kumho Trading, which was established in 2000, operates in the trading and insurance divisions. The Trading Division supplies core petrochemical raw materials such as synthetic rubber, synthetic resin raw materials, and auxiliary materials domestically and overseas, and enters countries with weak import and export regulations and logistics services to improve trade infrastructure and develop niche markets. The Insurance Division provides various property and casualty insurance contracts such as fire insurance, property insurance, machinery insurance, and construction insurance to corporations and individuals, including group companies, and conducts compensation and insurance consulting services in the event of accidents. Kumho Trading plans to expand its bioenergy-related businesses by not only trading bioenergy raw materials, but also securing the right to procure and sell raw materials through equity investments and establishing domestic and overseas raw material supply bases. In addition, the company is promoting new businesses for sustainable growth, such as the waste plastic recycling business, real estate investment, and asset management operations.

(As of December 31, 2022)

Financial Information

Revenue	KRW 71.4 billion
Net Income	KRW 2.9 billion
Percentage of ownership by Kumho P&B Chemicals	100%

www.kumhotrading.com



Local Network

- Seoul HQ



ESG MANAGEMENT SYSTEM

ESG Management Strategy of Kumho Petrochemical 20

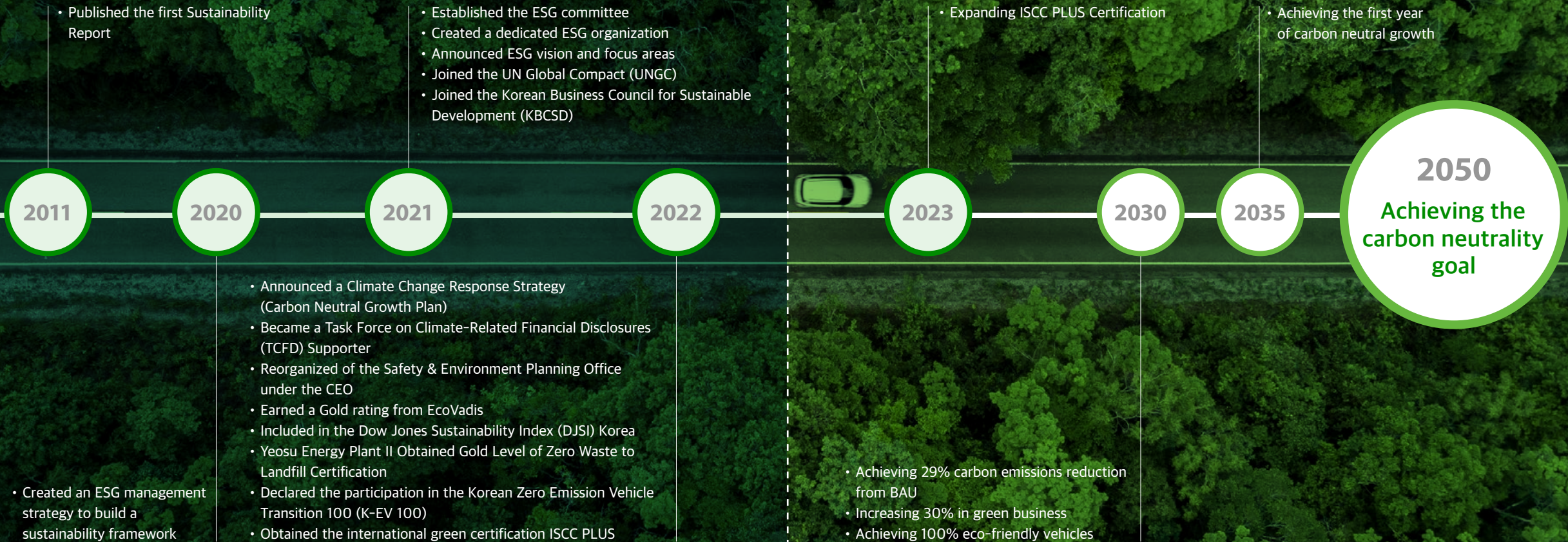
ESG Management Strategy of Affiliates 25

ESG Management Strategy of Kumho Petrochemical

Sustainability Milestone

Performance

Plan



ESG Management Framework

Kumho Petrochemical is moving toward its ESG vision of ‘Let’s Act, Advance, and Accelerate for ESG!’ by making ESG management a top priority in corporate operations. In particular, we have advanced our ESG management system and internalized it into company-wide management activities, and through this, all employees are driving sustainable growth together.

Governance

Kumho Petrochemicals reviews corporate ESG issues through the BOD and ESG Committee, the highest decision-making bodies of the company, and establishes systematic ESG governance by operating a dedicated organization that oversees ESG management and ESG councils that includes key affiliates.

BOD and ESG Committee

Kumho Petrochemical’s BOD and ESG Committee are actively engaged in ESG management to establish a management system based on respect for the environment, society, and stakeholder trust. The BOD has been approving plans and performance on safety and health since 2021. The ESG Committee leads the establishment of a sustainable management system by supporting the establishment of ESG-related policies and managing related performance. The ESG Committee is chaired by an environmental policy expert, and more than 2/3 of the committee is composed of independent directors.

In 2022, the committee held four meetings and approved the company-wide ESG management strategy implementation plan, publication of the Sustainability Report, ESG Policy and Practice Guideline, establishment of ESG Investment Policy, and joining the K-EV100, and discussed the climate change response strategy, detailed GHG reduction implementation roadmap, and ESG management strategy implementation results. In March 2023, the BOD discussed specific ESG directions, approving the results of Kumho Petrochemical’s materiality assessment, publication of Sustainability Report, and receiving the results of climate risk analysis.

Establishment of Dedicated ESG Team

Kumho Petrochemical operates a dedicated organization, the ESG Management Team, to strengthen the company’s ESG management execution. The ESG Management Team is responsible for establishing company-wide ESG management strategies and goals, managing the implementation of detailed activities, ESG communication, and supporting ESG Committee. In particular, the Team operates an internal ESG Councils centered on business units within Kumho Petrochemical and a Kumho Petrochemical Group ESG Council to explore directions for group companies to move toward common goals and to implement and support practical tasks.

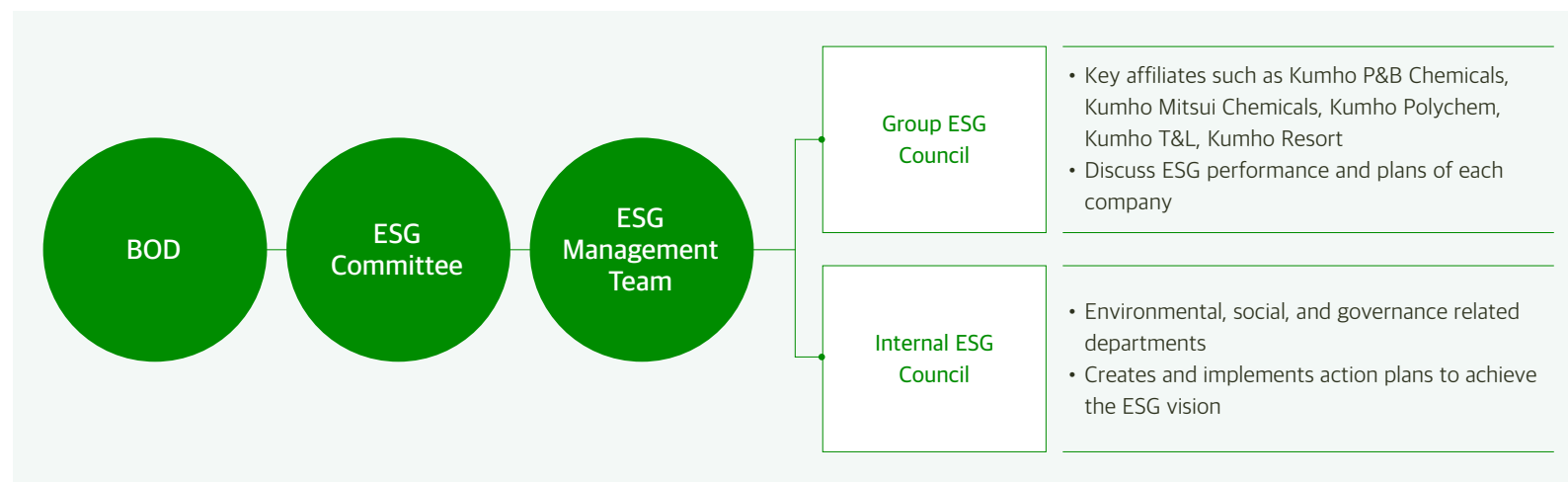
Group ESG Council

Kumho Petrochemical formed a Group ESG Council with its major affiliates, including Kumho P&B Chemicals, Kumho Mitsui Chemicals, Kumho Polychem, Kumho T&L, and Kumho Resort, to share the status of each company’s ESG management and review the common direction of the group to achieve the ESG vision. In 2022, the Council held quarterly meetings to discuss the previous quarter’s performance and future plans, and shared ESG-related trends through trainings and seminars.

Internal ESG Council

Kumho Petrochemical operates an internal ESG Council composed of relevant departments in the areas of environment, society, and governance, centered on the ESG Management Team. The internal ESG Council establishes an action plan for each team to achieve the ESG vision and discusses implementation tasks and major activities according to the plan. In 2022, the overall action plan was reorganized in light of the 2023 ESG strategy direction and changes in the internal and external environment to establish a direction for practical ESG management activities.

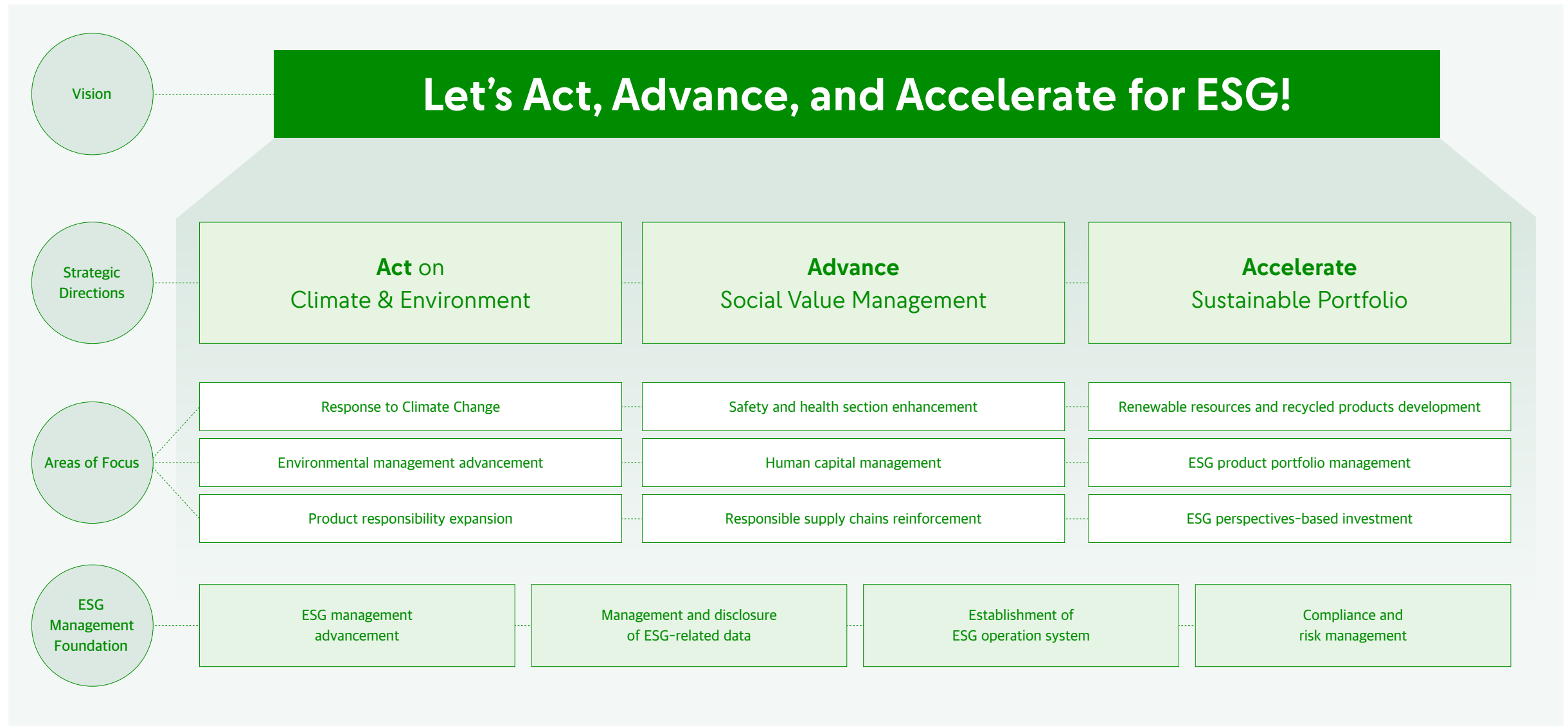
ESG Governance



Strategy

In September 2021, Kumho Petrochemical established and disclosed our ESG vision and strategies in order to fully implement ESG management. The core strategy of our ESG vision is ‘Triple A,’ which includes three strategic directions centered on Act, Advance, and Accelerate in ESG management. We have selected nine focus areas and key tasks under the three strategic directions to actively promote the achievement of our ESG vision.

ESG Vision and Strategies



Establishing and Implementing Tasks by Areas of Focus

Strategic Directions	Areas of Focus		Key Achievements in 2022 and 2023	Future Plans
Act on Climate & Environment Advancing the management system in response to climate change	Response to Climate Change	Reduce greenhouse gas emissions and expand eco-friendly energy adoption	<ul style="list-style-type: none"> Established a detailed 2030 GHG reduction implementation roadmap Aligned executive KPIs with carbon emissions Completed CCUS investment approval Joined K-EV 100 Identified climate change risks/opportunities and analyzed the financial impact of physical risk 	<ul style="list-style-type: none"> Enhance allocation of GHG emissions targets by business site Conduct Scope 3 calculation and third-party verification Build a CCUS facility and sales of liquefied carbon dioxide Convert 100% of corporate vehicles to zero-emission vehicles by 2030 Analyze the financial impact of climate change transition risk
	Environmental management advancement	Reduce environmental impact including waste, water, air and water pollutants, and soil contamination management and protect biodiversity	<ul style="list-style-type: none"> Established an environmental management governance system centered on the Safety & Environment Planning Office Obtained Zero Waste to Landfill (ZWTL) GOLD level certification (Yeosu Energy Plant II) Pursued a campaign to use green products 	<ul style="list-style-type: none"> Create a mid- to long-term plan for waste reduction/recycling measures
	Product responsibility expansion	Produce responsible products and develop solutions that consider social and environmental impacts	<ul style="list-style-type: none"> Started building a product carbon labelling system (LCA*) Obtained ISCC PLUS certification 	<ul style="list-style-type: none"> Calculate and disclose product-level carbon emissions based on LCA Expand application of ISCC PLUS certification
Advance Social Value Management Putting emphasis on social value creation through business operation	Safety and health-care section enhancement	Manage proactively for the safety and health of employees and suppliers	<ul style="list-style-type: none"> Established a safety and health governance system centered on the Safety & Environmental Planning Team Established a safety and health vision and goals Built an emergency response process (E-Plan) Nurtured dedicated first aid staff for headquarters employee 	<ul style="list-style-type: none"> Identify activities to improve supplier safety management Drive upward leveling for safety and health management of small business sites Conduct a headquarters employee musculoskeletal health survey
	Human capital management	Human rights management and organizational culture management, and efforts to retain and attract top talent	<ul style="list-style-type: none"> Created women's leadership course Conducted an employee engagement survey Conducted a human rights impact assessment Declared a new type of talent we pursue, and core values Improved HR systems and organizational culture through HR Innovation TFT activities 	<ul style="list-style-type: none"> Carry out expanded human rights impact assessments Expand recruitment for new hires in 2023 (second half → first/second half) Recruit students for scholarship program in second half of 2023
	Responsible supply chains reinforcement	Support supply chain ESG risk management and ESG management activities	<ul style="list-style-type: none"> Expanded the number of suppliers covered by ESG assessments 	<ul style="list-style-type: none"> Expand supply chain ESG assessments and introduce third-party assessments Conduct due diligence on key supply chains
Accelerate Sustainable Portfolio Identifying ESG-related ideas and turning them into businesses for the spread of sustainable management	Renewable resources and recycled products development	Develop and increase production of renewable, recycled, biodegradable and biomaterials	<ul style="list-style-type: none"> Continued development of biodegradable NB-Latex and NB-Latex with bio-based materials Signed MOU for waste polystyrene recycling business Pursued Eco-SSBR commercialization Developed recycled EPS Signed MOU to sell and purchase bio-SM 	<ul style="list-style-type: none"> Launch prototype of biodegradable NB-Latex and NB-Latex with bio-based materials Pursue waste polystyrene pyrolysis and recycled styrene business Commercialize Eco-SSBR
	ESG product portfolio management	Establish eco-friendly product standards, manage and expand sales	<ul style="list-style-type: none"> Established an ESG product classification system and analyze research subjects based on the classification system 	<ul style="list-style-type: none"> Establish measures to expand research activities in bio- and biodegradation-related fields
	ESG perspectives-based investment	Incorporate ESG factors into investment evaluation criteria and the medium to long term perspective investing	<ul style="list-style-type: none"> Established ESG Investment Principle and detailed rules of operation Revised Investment Management Regulations following the establishment of ESG Investment Principle 	<ul style="list-style-type: none"> Incorporate ESG Investment Principle into investment decisions

*LCA: Life Cycle Assessment is a technique used to systematically evaluate the entire life cycle of a product or service from collection of raw materials to manufacturing, transportation, treatment and disposal and analyze its impact on the environment

Risk Management

Integrated Risk Management System and Risk Management

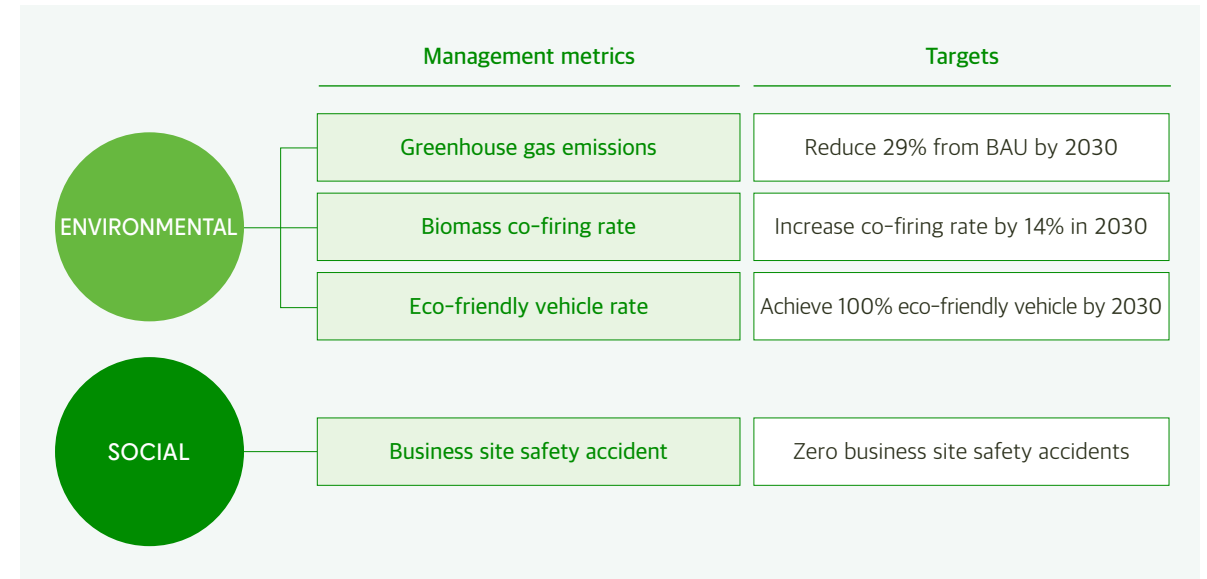
Kumho Petrochemical systematically manages risks by risk type based on the expertise of designated departments. Each department implements proactive and reactive risk management, identifies risks aligned with its responsibilities and report them to the head of each department. In addition, the department in charge of risk management reviews the identified risks, comes up with countermeasures and reports to the BOD, which is followed by the deliberation of the risks by the Management Committee, the Related Party Transaction Committee, the ESG Committee or the Audit Committee when needed.

In terms of risk types, we manage financial and non-financial risks in an integrated manner. We categorize risks into financial, management strategy, ethics, compliance, and ESG, and continuously monitor issues inside and outside the company to identify risks. We also check the domestic and international business environment related to each risk, as well as stakeholders' requirements for suppliers, competitors, policies, and regulations, and reflect them in our management activities to implement systematic risk management. In addition, we reclassify the identified risks according to their importance to check the direction of response and improvements, and seek ways to identify and proactively respond to potential risks that reflect the characteristics of the business. Furthermore, we provide risk-related materials and conduct training to raise awareness of the importance of risk management among all employees.

Metrics & Targets

ESG Management Metrics and Targets

Kumho Petrochemical selected management metrics and set targets for more practical management in each area of ESG. Through continuous checks on performance against targets and deficiencies, we are seeking practical measures for sustainable ESG management.



Building an ESG Data Management System

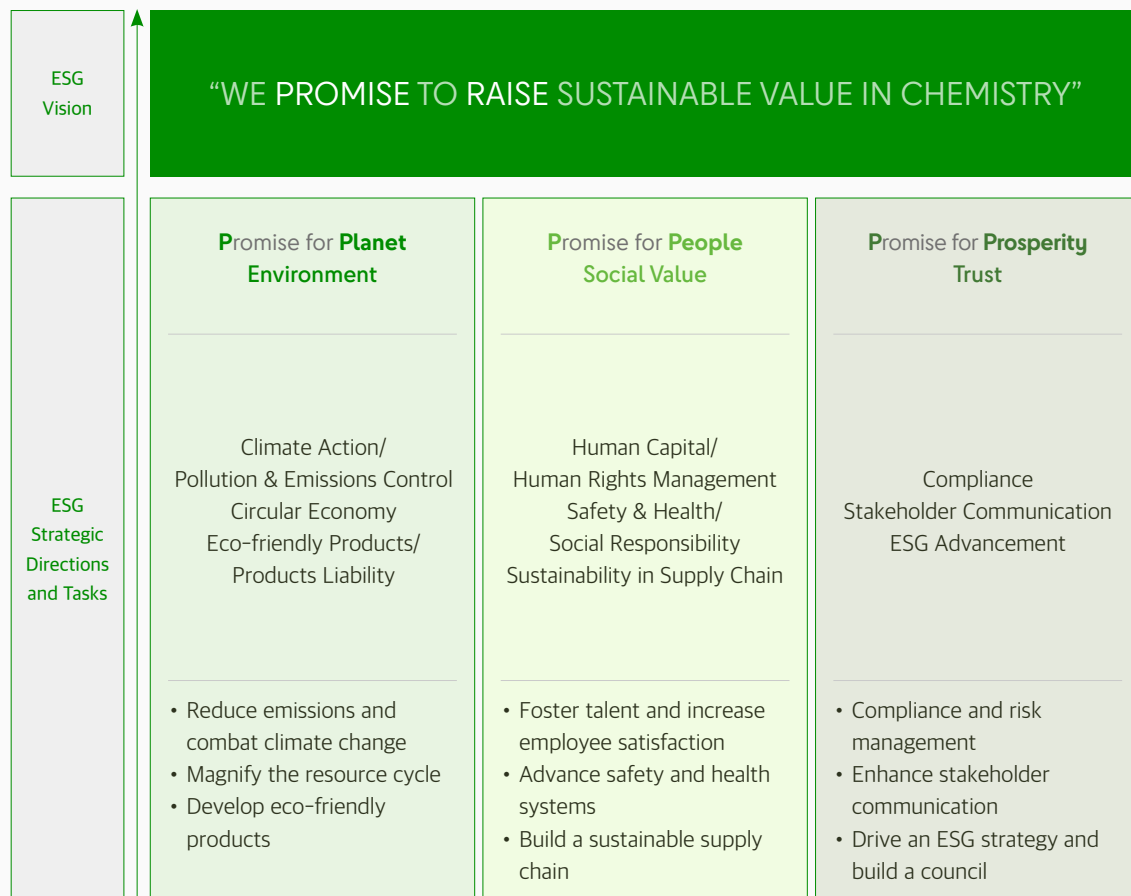
Kumho Petrochemical established an ESG data management system to systematically manage ESG data. Prior to establishing the system, management metrics were selected, and the management direction was discussed in consultation with the relevant departments that manage each metrics. Through the establishment of the ESG data management system, we have been able to integrate and manage data managed by each department, and at the same time, improve the efficiency of performance management against ESG targets. In the future, Kumho Petrochemical plans to expand the scope of the system to its affiliates to enhance the reliability and accuracy of ESG data disclosed.

ESG Management Strategy of Affiliates

Kumho Petrochemical Group is establishing ESG strategies centered on its petrochemical affiliates. In the first half of 2023, Kumho P&B Chemicals and Kumho Polychem established strategic tasks for implementing ESG management and declared their missions and visions, while Kumho Mitsui Chemicals plans to complete the formulation of strategy by the second half of 2023.

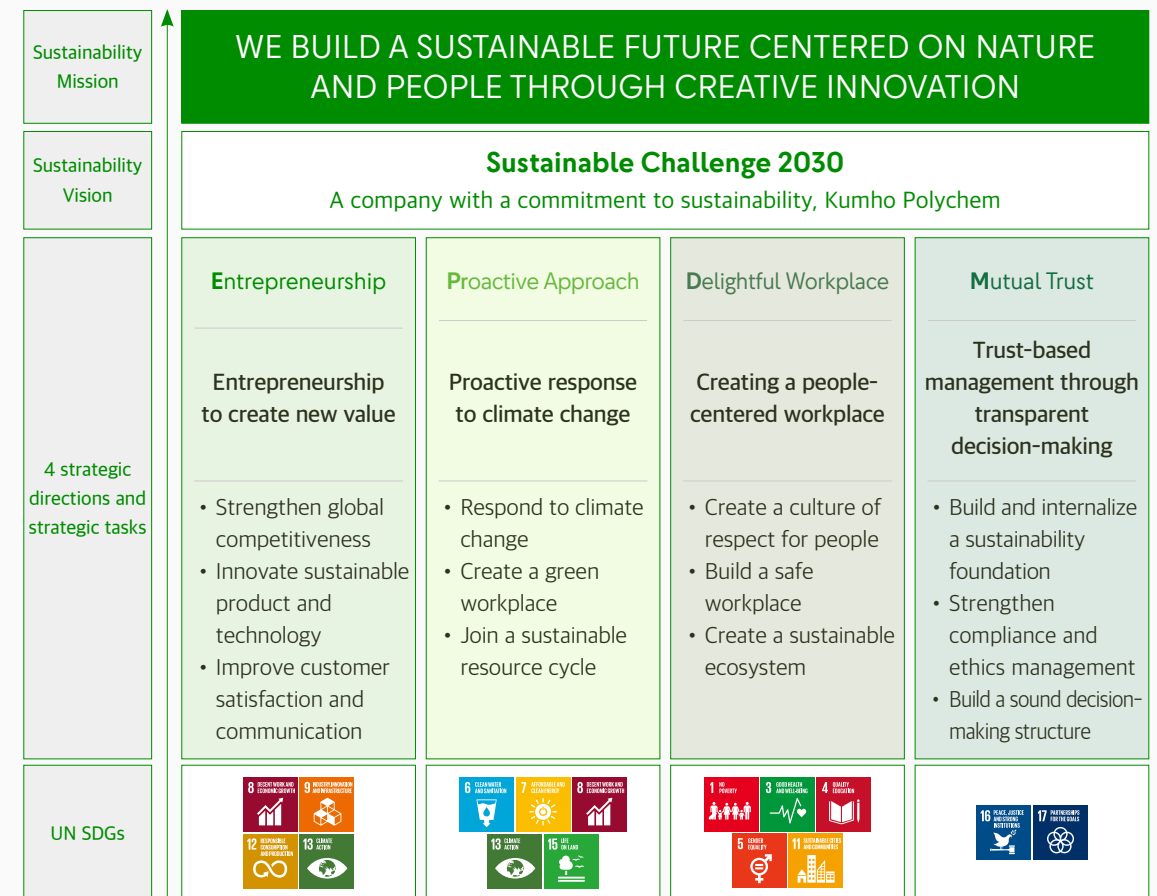
Kumho P&B Chemicals

To establish an ESG management system, Kumho P&B Chemicals has set up a vision of ‘A Company That Adds Value Through Sustainable Chemical Products’ and a strategic direction of ‘3 Promises’ Going forward, Kumho P&B Chemicals will promote practical ESG management by creating sustainable ESG performance based on a mid- to long-term roadmap and specific tasks.



Kumho Polychem

Under the sustainability management vision of ‘Sustainable Challenge 2030’, Kumho Polychem has laid the foundation for ESG management by establishing detailed strategic tasks under the four strategic directions of EPDM. Kumho Polychem will continue to promote ESG management activities to create a sustainable future centered on nature and people.





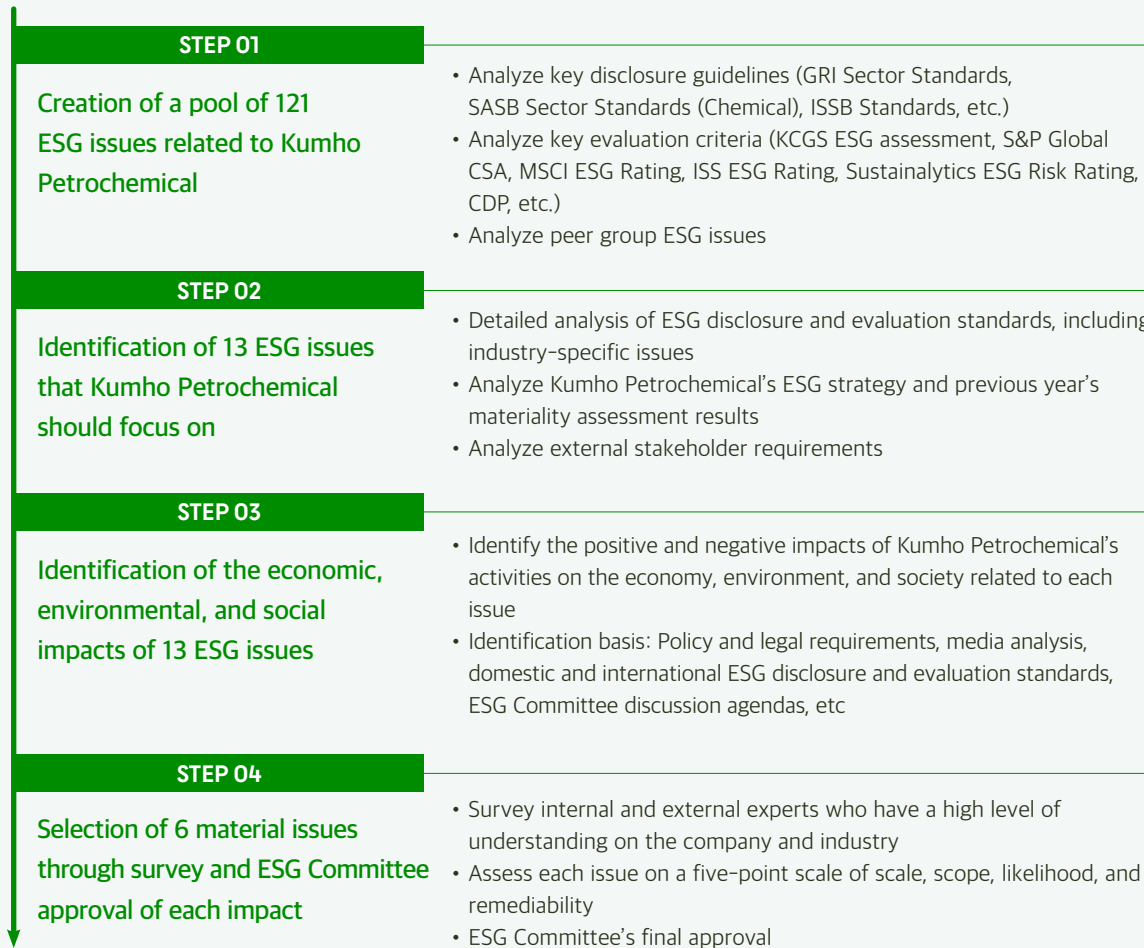
MATERIALITY ASSESSMENT

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Materiality Assessment Results 28

Materiality Assessment Process

Kumho Petrochemical conducts a materiality assessment every year to identify ESG issues to be managed in a focused manner. In 2022, we applied the revised Global Reporting Initiative (GRI) materiality principles to identify the ESG issues that Kumho Petrochemical should focus on and identified the impact of each issue. We then surveyed internal experts with a strong understanding of the company and industry, as well as external experts in the petrochemical industry and ESG field, regarding the materiality and impact of the issues. The survey was structured based on four evaluation criteria for positive and negative impacts of each issue: scale, scope, likelihood, and remediability. For likelihood and remediability, the survey asked about the timeline (short-, medium-, and long-term). Based on the survey results, we conducted a quantitative evaluation of the impact of each issue, and selected the final six material issues through the ESG Committee's approval of the evaluation process and evaluation results.



Kumho Petrochemical's Material ESG Issues

6 Material Issues



Materiality Assessment Results

HIGH MEDIUM LOW

Category	Issue	Impact	Character of the Impact	Significance of the Impact				Overall Results	Kumho Petrochemical's Responses and Plans
				Scale	Scope	Likelihood	Remediability		
Environmental	Climate change response	<ul style="list-style-type: none"> Contribute to sustainable business and social development by managing climate risk and achieving carbon neutrality Generate revenue by selling carbon credits based on greenhouse gas emissions 	Positive	H	H	H	N/A	H	<ul style="list-style-type: none"> Accelerate GHG reductions across all business sites with a transition to clean energy (p.107) Transition to bio-based raw materials and expand eco-friendly product development (p. 39) Expand recycling (p.37, 40~42) Digital transformation of carbon asset management (p.107)
		<ul style="list-style-type: none"> Increase in cost of managing physical risk due to the increase in natural disaster caused by acceleration of climate change Increase in transition risk, such as the cost of carbon credits for failing to reduce greenhouse gas emissions 	Negative	H	H	M	H		
Environmental	Energy efficiency	<ul style="list-style-type: none"> Increased production process efficiency and reduced operating costs with improved energy efficiency 	Positive	H	H	H	N/A	H	<ul style="list-style-type: none"> Advancing plans to transition to hydrogen and LNG at energy plants (p.108) Drive energy efficiency improvements at each business site (p.33) Plan to transition of corporate vehicles to zero-emission vehicles by 2030 (p.108) Prepare to respond to the demand for more renewable and clean energy (p.42)
		<ul style="list-style-type: none"> Increase in costs due to higher renewable energy purchasing prices Deteriorate supply and demand stability of energy due to failed energy transition 	Negative	L	L	L	M		
Environmental	Hazardous chemicals management	<ul style="list-style-type: none"> Mitigate regulatory risk and improve competitive positioning in the marketplace by managing potential impacts during the use phase of products containing hazardous chemicals 	Positive	H	M	H	N/A	H	<ul style="list-style-type: none"> Establish and comply with chemical management processes (p.36) Provide safety data sheets in accordance with EU REACH regulations (p.36) Implement Responsible Care (p.36) Establish hazardous chemical accident prevention measures for each business site (p.36)
		<ul style="list-style-type: none"> In case of a hazardous chemical spill, the health of employees and suppliers' workers could be compromised, and nearby communities could be affected In case of a hazardous chemical spill financial risks include losses due to operational disruption, compensation costs for stakeholders and payment of fines and penalties 	Negative	H	H	H	M		
Environmental	Air pollutants emissions management	<ul style="list-style-type: none"> Minimize operational costs, compliance costs, etc. by establishing an air pollutant management strategy and improving emissions-related technologies and processes 	Positive	M	H	H	N/A	M	<ul style="list-style-type: none"> Installing additional Regenerative Thermal Oxidizers (RTOs) to prevent air pollution (p.34) Deploy NOx Selective Catalytic Reduction System (SCR) and Smoke-stack Tele-Monitoring System (TMS) (p.34)
		<ul style="list-style-type: none"> Causes negative environmental and social impacts, including environmental diseases* caused by air pollutants and ecosystem impacts Costs due to strengthened regulation on air pollutant emission, non-compliance with air pollutant quotas, etc. 	Negative	L	M	L	H		
Social	Safety and health risk management	<ul style="list-style-type: none"> Minimize potential safety costs related to internal and external stakeholders (employees, suppliers' workers, community members, etc.) Increase the productivity of employees and suppliers' workers by maintaining a safe work environment 	Positive	M	M	L	N/A	M	<ul style="list-style-type: none"> Safety and environment organization directly under the CEO (Safety & Environment Planning Office) (p.51) Establish safety and health vision and goals (p.50) Establish an emergency contingency process (E-Plan) (p.52) Introduce an employee health empowerment program (p.55) Consulting on strengthening safety management at small business sites (p.55)
		<ul style="list-style-type: none"> In case of a safety accident, material damage and injuries to employees, suppliers' workers, and community members can occur. In case of a safety accident, management risks arise due to production disruption, loss of corporate reputation, loss of labor, deterioration of labor relations, etc. 	Negative	H	H	L	L		
Governance	ESG Governance	<ul style="list-style-type: none"> Maximize ESG performance and enhance stakeholder satisfaction through effective and systematic ESG governance, such as controlling irrational decision-making and reflecting stakeholder requirements Build sound governance to advance ESG management and enhance corporate credibility 	Positive	H	H	H	N/A	M	<ul style="list-style-type: none"> Manage and oversee ESG strategy and management activities by the ESG Committee (p.21) Establish a dedicated ESG organization and reporting process (p.21) Set up ESG strategy and implement action items (p.22~23) Operate internal ESG Councils and Group ESG Council (p.21)
		<ul style="list-style-type: none"> Reduce corporate sustainability and value due to failure of managing ESG risk and making strategic decisions by BOD and executives 	Negative	L	L	L	M		

*Environmental diseases: diseases that can occur when people are exposed to toxic environmental pollutants which irritate the outside of the body or absorbed and accumulated

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Environmental

Corporate business activities have various impacts on the environment, and companies should have a sense of responsibility for this. In particular, indiscriminate production activities of companies lead to adverse impacts on the environment and ultimately threaten our living conditions.

Kumho Petrochemical is actively promoting environmental management activities based on corporate responsibility for the environment. To respond to climate change, we aim to achieve carbon-neutral growth and established a roadmap for achieving it. We are also reducing the environmental impact of our business activities by diminishing various pollutants and wastes generated from production activities. In addition, to expand the share of eco-friendly businesses in our business portfolio, we are strengthening the eco-friendliness of our existing businesses and continuously discovering new business items that is considered eco-friendly products and services.

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Response to Climate Change

- Reinforcing the governance structure to respond to climate change
- Establishing a strategy to counteract climate change
- Implementing a detailed roadmap to achieve GHG reduction by 2030
- Aligning GHG emission targets with management KPIs
- Allocating carbon emission targets to business sites
- Calculating and verifying Scope 3 emissions
- Promoting carbon LCA system
- Joining K-EV100

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Reducing Environmental Impact

- Reducing pollutants, including air pollutants, water pollutants, waste, and wastewater
- Diminishing resource input such as energy and water

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Eco-friendly Business Portfolio

- Establishing and implementing targets to increase the share of eco-friendly business (16% or more by 2026, 30% by 2030)
- Advancing ESG product categorization

Response to Climate Change

Response to Climate Change 2022 Material Issue

Kumho Petrochemical recognizes the impact that climate change can have on a company's business activities and seeks to expand corporate sustainability through the best possible response. To this end, in 2022, we declared our support for the Task force on Climate related Financial Disclosures (TCFD), joined the TCFD Supporters, and disclosed our climate change response activities in accordance with the TCFD guidelines. In 2022, we further enhanced our disclosure of climate change response activities by faithfully reporting the financial impact in this Sustainability Report, which was measured based on physical risk scenario analysis. More information on Kumho Petrochemical's response to climate change can be found in the TCFD section of this report (pages 98~110).

 <p>Governance</p>	 <p>Strategy</p>	 <p>Risk Management</p>	 <p>Metrics and Targets</p>
<p>BOD and ESG Committees</p> <ul style="list-style-type: none"> • Manage and oversee climate change and environmental issues • Approval to join K-EV100 • Detailed 2030 GHG reduction roadmap, CCUS investment and commercialization, etc. <p>Reporting on the climate change agenda</p> <ul style="list-style-type: none"> • Discuss the results of identifying climate risks and financial impacts <p>Executives and working organizations</p> <ul style="list-style-type: none"> • ESG Management Team directly under the CEO • Appointment of a climate change officer directly under the CEO and promotion of climate change response activities led by the Environmental Management Team • Operation of internal ESG Council and Council for Climate and Environment 	<p>Identify climate risks and opportunities</p> <ul style="list-style-type: none"> • Identify physical-transition risks and opportunities according to TCFD guidelines <p>Physical risk assessment</p> <ul style="list-style-type: none"> • Select sites and scenarios for analysis • Scenario-based risk probability and financial impact assessment <p>Transition risks and opportunities assessment</p> <ul style="list-style-type: none"> • Conduct a materiality assessment based on the likelihood and business impact of each factor <p>Establishment of a climate change response strategy</p> <ul style="list-style-type: none"> • Establish five strategies to achieve the goal • Establish a goal to achieve carbon neutrality by 2050 and detailed roadmap for GHG reductions by 2030 	<p>Risk monitoring</p> <ul style="list-style-type: none"> • Analyze regulations and trends • Analyze carbon emissions and workplace climate change issues <p>Risk Identification</p> <ul style="list-style-type: none"> • Construct climate risk pool and identify risks <p>Risk assessment</p> <ul style="list-style-type: none"> • Identify key risks through materiality assessments • Identify risk impact trends based on scenario analysis <p>Risk management and mitigation</p> <ul style="list-style-type: none"> • Management and oversight by the BOD and ESG Committee • Planning and implementing actions for mitigating climate risks 	<p>Selecting Key Metrics</p> <ul style="list-style-type: none"> • GHG emissions/intensity and energy use/intensity metrics <p>Setting climate change targets</p> <ul style="list-style-type: none"> • 29% reduction from 2030 BAU, start carbon neutral growth in 2035, reach carbon neutrality by 2050 <p>Managing GHG emissions metrics</p> <ul style="list-style-type: none"> • Disclosure of GHG emissions and intensity data • Inclusion of GHG emissions-related targets within CEO and key executive KPIs • Scope 3 calculation and disclosure

Reducing Environmental Impact

Environmental Management System

Environmental Management Governance

Kumho Petrochemical promotes environmental management centering on the Environmental Management Team within the Safety & Environment Planning Office, directly under the CEO. As the control tower for environmental affairs, the Team is responsible for monitoring environmental regulations and policies, responding to climate change, and reducing pollutants and waste. Each business site has a separate organization in charge of environmental affairs, and manages them according to the status and characteristics of the business site.

When environmental issues arise, executives from the Safety & Environment Planning Office report to the CEO, and depending on the case, they are reviewed and approved by the ESG Committee. In 2022, the ESG Committee approved the establishment of ESG Policy and Guideline which include environmental management policies for local pollution, water quality, chemicals, waste, and biodiversity.

ISO 14001 Certification

ISO 14001 certification is an international standard for environmental management systems that is applicable to all industries and activities, which certifies a systematic approach to managing environmental issues with the participation of all employees. Major affiliates, including Kumho Petrochemical, have obtained and maintained ISO 14001 certification.

ISO 14001 Certified Affiliates:

Kumho Petrochemical, Kumho P&B Chemicals, Kumho Mitsui Chemicals, Kumho Polychem

Environmental Compliance Implementation Checks

Kumho Petrochemical conducts annual environmental compliance implementation checks to proactively respond to increasingly stringent environmental regulations and comply with relevant laws. In 2022, we conducted two compliance implementation checks in all areas of the environment with an external expert organization for all business sites.

In the first half of the year, we identified 68 improvement needs, reported the implementation check results and improvement plans to the CEO, and implemented improvement measures by reflecting related investments and costs in the budget. In the second half of the year, we monitored the improvement status based on the results of the first half checks. In 2023, we will continue to conduct compliance implementation checks for pre-diagnosis in preparation for regular inspections by the Ministry of Environment under the environmental permission and the Act On The Integrated Control Of Pollutant-discharging Facilities.

Raising Employees' Environmental Awareness and Empowerment

Kumho Petrochemical conducts environmental education to raise the environmental awareness of its employees. In 2022, we conducted training and seminars to enhance the competency of employees in charge of climate change, lectures by external experts on climate change, environmental management system training, training on installing and operating water and air prevention facilities, managing hazardous chemicals, and waste. In addition, we provided employees with a safety, environment, and climate news clipping service, a weekly/monthly safety and environmental law monitoring service, and a campaign to use eco-friendly green products. In 2023, we plan to promote education by position and task to enhance the capabilities of employees in charge of environmental affairs across the company.

(Unit: hour)

Category	2020	2021	2022
Employee environmental training hours	3,980	2,409	4,323

Buying Eco-friendly Office Supplies

Kumho Petrochemical purchases eco-friendly office supplies. Various papers used in the office are certified as eco-friendly, such as FSC (Forest Stewardship Council) and PEFC (Programme for the Endorsement of Forest Certification), and employee diaries are also made using paper that is certified as eco-friendly. In addition, we use multifunctional printers that have obtained domestic eco-labelling certification.

Water

Water Use Management

Kumho Petrochemical is continuously paying attention to reducing water use and expanding recycling. We are applying water use reduction measures tailored to each site, such as using steam condensate water, reused coolant and dehydration and mother liquor. The Hwaseong Foam Plant and the Yesan Building Materials Plant have established a process to continuously recycle groundwater and reuse it in full. Major affiliates are also implementing activities to reduce water usage. Kumho P&B Chemicals has installed a facility to regulate the cooling water in its cooling towers, and Kumho T&L is reducing water usage by changing the way it manages and stores cargo.

Water Risk Management

Kumho Petrochemical monitors our exposure to water risks in areas near its business sites using the World Resource Institute's (WRI) Aqueduct tool. In addition, we continuously review water risks such as drought and communicate and cooperate with government agencies. In particular, we are paying attention to the shortage of industrial water due to drought in Jeollanam-do, and in 2023, the CEO attended the 'KBCSD CEO Policy Meeting Invited by the Minister of Environment' and delivered recommendations regarding water supply in the Yeosu Industrial Complex to the Ministry of Environment.

Business Sites	Water stress	
	Present 2022	Future 2030 (BAU)
Headquarters	High	Low-medium
Central R&BD Center	Medium-high	Medium-high
Yeosu Synthetic Rubber Plant I*	Medium-high	Medium-high
Yeosu Synthetic Rubber Plant II*	Medium-high	Medium-high
Yeosu Energy Plant I	Medium-high	Medium-high
Yeosu Energy Plant II	Medium-high	Medium-high
Yeosu Specialty Chemicals Plant	Medium-high	Medium-high
Ulsan Synthetic Resin Plant	Medium-high	High
Ulsan Synthetic Rubber Plant	Medium-high	High
Asan CNT Plant	Medium-high	High
Yesan Building Materials Plant	Medium-high	High
Hwaseong Foam Plant	Medium-high	High

* For Yeosu Synthetic Rubber Plant I and II, it was analyzed based on the dong where the business sites are located due to lack of water stress information based on latitude/longitude

in 2023. In addition, the plant reduced energy use by improving thermal efficiency through the replacement of RTO (Regenerative Thermal Oxidizer) thermal storage materials, and reduced the use of medium-pressure steam through the replacement of flare stack tips.

At the Ulsan Synthetic Resin Plant, we have identified energy use reduction items through energy use diagnosis and are promoting facility investment. In the case of electricity use, we promoted reductions by increasing the efficiency of high-capacity facilities that use a lot of electricity. For example, we optimized the performance of cooling water pumps installed in cooling towers, replaced old chillers, minimized compressed air usage by installing additional PCM (Phase Change Material) dryers in air compressors, and improved the stability of compressed air usage automation facilities. In the case of steam use, we conducted a diagnosis of waste heat in the process and derived steam reduction measures for the process with the highest steam usage, and are building a facility to recover waste heat from air pollution prevention facilities and utilize it in the process. Besides, the Ulsan Synthetic Rubber Plant and the Ulsan Synthetic Resin Plant are conducting inspections on power-intensive facilities such as chillers and cooling water pumps and promoting activities to increase power efficiency.

At smaller plants, such as the Yesan Building Materials Plant, Hwaseong Foam Plant, and Asan CNT Plant, we plan to reduce electricity use by introducing high-efficiency transformers and installing inverters in cooling water pumps.

Renewable Energy Generation and Usage

Kumho Petrochemical uses biomass to generate renewable energy. The renewable energy generated is used in our production processes in addition to external sales through the issuance of RECs (Renewable Energy Certificates). In 2022, we improved the mixing rate of WCF (Wood Chip Fuel) by implementing facility improvement activities, and we plan to expand renewable energy generation by securing additional wood chips in the future.

Energy 2022 Material Issue

Energy Use Management

Each Kumho Petrochemical plant is striving to reduce energy consumption and greenhouse gas emissions by changing energy sources and replacing facilities.

To improve steam efficiency, the Ulsan Synthetic Rubber Plant switched facilities from medium-pressure steam to low-pressure steam, and improved power efficiency by checking the status of unnecessary power usage. Furthermore, the plant purchases waste heat steam from external sources for a portion of its steam purchases, and plans to invest in additional facilities to increase the maximum amount of waste heat steam

Air Pollutants 2022 Material Issue

Air Pollutants Management

Kumho Petrochemical established emission targets based on air pollutant emission allowance for each business site in accordance with the Special Act On The Improvement Of Air Quality In Air Control Zones and we thoroughly manage related performance. We also manage air pollutants by establishing internal standards that are tighter than the legal permissible standards.

First, each business site measures and monitors air pollutants in real time through the TMS (Tele Monitoring System). The headquarters aggregates the emission results of each site every month, and requires sites that need to improve their measurement results to take corrective measures and make improvements.

Targets of Air Pollutant Emissions (quota)*

(Unit: ton)

구분	2021	2022	2023	2024
NOx	1,064.5	1,004.5	944.9	884.6
SOx	673.3	653.7	634.2	614.7
PM	72.6	70.9	69.3	67.7

* The amount of air pollutant emissions allocated under Special Act On The Improvement Of Air Quality In Air Control Zones

Reducing Air Pollutant Emissions

Kumho Petrochemical is improving its air pollutant management system and expanding emission reduction facilities. The Environmental Management Team inspects environmental compliance implementation to identify deficiencies, and business sites implement improvement tasks to address the deficiencies.

Air Pollutant Emission Reduction Facilities Construction Status

Facility	Purpose
TMS (Tele-Monitoring System)	Measure and monitor air pollutants
SCR (Selective Catalytic Reduction)	Remove nitrogen oxides (NOx) through chemical reactions
SNCR (Selective Non-Catalytic Reduction)	Remove nitrogen oxides (NOx) by injecting ammonia urea solution
RTO (Regenerative Thermal Oxidizer)	Combust and remove volatile organic compound (VOC)
VCU (Vapor Combustion Unit)	Combust and remove volatile organic compound (VOC)
Activated carbon tower	Eliminate low NOx burners and VOC capture

CASE STUDY

Affiliate Air Pollutant Management

Kumho T&L regularly inspects air pollutant emission facilities once a month through an external specialized company, and periodically replaces consumables and filter clothes based on the inspection results. Due to the nature of the logistics business, it operates dust suppression facilities to reduce fugitive dust generated during loading and unloading operations, and it also removes fugitive dust from cargo vehicles through cleaning vehicles, spraying vehicles, and three-wheeled facilities. Furthermore, Kumho T&L measures and manages the air quality around its business sites semi-annually to manage the impact of air pollutants on local communities.

Water Pollutants

Water Pollutants Management

Kumho Petrochemical managed sewage and wastewater generated from our plants in an efficient manner to prevent water pollution. In detail, we ensure seamless supervision based on the criteria for sewage and wastewater treatment and we have applied more stringent standards than legal emission allowance to manage water pollutants.

The Safety & Environment Planning Office supervises the overall wastewater treatment process while the department in charge of the operation of wastewater treatment plants conducts the maintenance work of discharge and prevention facilities, monitors the process, and entrusts the test and analysis of wastewater. In the event of abnormal water generated, it identifies the root causes, and asks each team for management and improvement to solve the issue.

CASE STUDY

Kumho Mitsui Chemicals Reducing Wastewater with Wastewater Electrolysis Technology

Kumho Mitsui Chemicals is investing in 'salt concentration and electrolysis technology in wastewater' that recycles wastewater into chlorine, caustic soda (sodium hydroxide), and hydrogen. After the investment, if the technology is actually applied to the process, 550,000 tons of wastewater can be electrolyzed and recycled annually, reducing wastewater emissions. Kumho Mitsui Chemicals applied for a patent for the related technology in November 2021, obtained a decision letter for patent registration in January 2023, and completed patent registration in April 2023.

Reducing Water Pollutant Discharge

Kumho Petrochemical checks water quality standards for wastewater generated at our business sites according to the type of wastewater, including sewage, wastewater, incoming wastewater, outgoing wastewater, and abnormal wastewater. The Ulsan Synthetic Rubber Plant and Ulsan Synthetic Resin Plant operate their own wastewater treatment plants to conduct physical, biological, and chemical treatments for wastewater generated, and treat water pollutants within the legal standards (discharge water permit standards) and discharge them to a nearby public wastewater treatment plant (Yongam Public Wastewater Treatment Facility).

In addition, the Ulsan Synthetic Rubber Plant installed a pollutant monitoring system for general drainage ditches to prevent pollutant leakage, and the Ulsan Synthetic Resin Plant installed a T-N removal facility to reduce the concentration and emissions of T-N in wastewater.

The Yeosu Specialty Chemicals Plant also operates its own wastewater treatment plant and discharges it to the final treatment plant in Yeosu Industrial Complex after conducting physical, biological, and chemical treatments. We are also conducting research to reduce the amount of wastewater itself with the Technical Team at the Central R&BD Center, and plan to apply the research results to future plants.

Kumho T&L conducts sampling at public wastewater treatment facilities that discharge wastewater and implements pollutant concentration management based on the analysis results. It also analyzes the water quality of 12 sites around its plants on a semi-annual basis.



Hazardous Chemicals 2022 Material Issue

Hazardous Chemicals Management

Kumho Petrochemical has established and is complying with our chemical management procedures in all areas from purchase to sales. In particular, we have drawn up the workplace safety standards and guidelines regarding the transportation and handling of hazardous substances, and the criteria for safe handling of hazardous substances. And we specify the person in charge of responding to possible accidents, distributed guidelines that raise awareness of risk and have our employees write up their work plans.

In addition, Kumho Petrochemical thoroughly implements the management of hazardous chemicals in compliance with domestic and international laws and regulations. In this regard, we operate the registration, evaluation, and management processes for hazardous chemicals in accordance with the Act On Registration And Evaluation Of Chemical Substances and the Chemical Substances Control Act. In particular, we have established and implemented an internal management process to comply with the Material Safety Data Sheet (MSDS) system required by Occupational Safety And Health Act from 2021. The MSDS requires detailed information on hazardous chemicals (substance name, ingredients, hazards, risks, handling precautions, protective equipment, and emergency measures), and Kumho Petrochemical is strengthening its management system for hazardous chemicals by faithfully responding to each requirement.

Furthermore, we register and continuously manage chemical substances in accordance with the European Union's REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) regulation and provide SDS (Safety Data Sheets). In particular, each site issues a RoHS (Restriction of Hazardous Substances Directives) report and an SVHC (Substance of Very High Concern) Candidate List confirmation for the use of SVHC to demonstrate the safety of such substances.

Percentage of RoHS Statements and SVHC Confirmations Issuance by Business Site

Business Site	Percentage of RoHS statements and SVHC confirmations issuance by business site	Product
Yeosu Synthetic Rubber Plant	100%	HBR, SSBR, etc.
Ulsan Synthetic Rubber Plant	100%	SBR, NB-Latex, etc.
Ulsan Synthetic Resin Plant	100%	ABS, PS, etc.
Yeosu Specialty Chemicals Plant	100%	Antioxidants, etc.

Classification of Hazardous Chemicals

Kumho Petrochemical applies the GHS (Globally Harmonized System of Classification & Labeling of Chemicals) regulations, which classify the hazardous risks of chemicals based on internationally harmonized standards, to its classification and labeling system for hazardous chemicals. In addition, we introduce an internal chemical classification** and labeling system that includes regional classifications* according to the circumstances of each business site.

*Example: TSCA (Toxic Substances Control Act in the US), IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)

**Example: CLP (Classification, Labelling, and Packaging)

Strengthen Hazardous Chemicals Management and Prevent Accidents

Kumho Petrochemical applies stricter standards for hazardous chemicals than those specified by law and strive to minimize accidents caused by hazardous chemicals. We have an emergency response system to ensure the safety of facilities related to hazardous chemicals and minimize damage in the event of an emergency, and based on this, we have created a chemical accident prevention and management plan. In addition, at workplaces that handle hazardous chemicals, we thoroughly train and manage the use of protective equipment such as full-face gas masks, protective clothing, gloves, and boots when working.

In particular, workers involved in handling hazardous chemicals and processes (employees of Kumho Petrochemical and workers of suppliers) are provided with separate safety training to raise awareness of hazardous chemical accidents and prevent accidents. In addition, we establish and implement various measures to prevent accidents involving hazardous chemicals, such as creating and cross-checking check sheets for safety items when preparing for work, as well as building and supplementing safety facilities such as LEL (Lower Explosion Limit) detectors, rupture disks (pressure relief devices), and PT (Pressure Transmitters), and monitoring facilities such as gas detectors and CCTVs.

Yeosu Synthetic Rubber Plant, Yeosu Specialty Chemicals Plant, and Yeosu Energy Plants are strengthening their management system for hazardous chemicals by expanding the scope of reporting when awarding a contracts. The reporting procedure requires employees to make a report on the reasons and safety management plans when a contracts is awarded to a business operator that does not handle hazardous chemicals. In the case of the five plants in the Yeosu region, we are gradually expanding the scope of reporting requirement even when a contracts is awarded to those that do not directly handle hazardous chemicals, in order to minimize the damage that can be caused by hazardous chemicals.

Moreover, the Yesan Building Materials Plant switched from ink containing MEK (Methyl Ethyle Ketone), a hazardous chemical, to a laser printer to print product identification numbers, and the Asan CNT Plant conducted separate training for employees and suppliers on hazardous chemicals to raise awareness and strengthen safety management.

Chemical Safety Management Council

Kumho Petrochemical formed the Chemical Safety Management Council to share how to safely treat chemicals with our suppliers and strengthen safety management of hazardous chemicals. In particular, the Council inspects the storage, transportation, and management of chemical substances once a year, provides information on chemicals management along with management methods and technical assistance to workers of suppliers.

Waste

Waste Management

Kumho Petrochemical is strengthening its efforts to reduce waste generation by establishing a waste recycling plan. In the case of the Ulsan Synthetic Rubber Plant, we have formulated a long-term plan to mitigate waste and kept monitoring activities and in 2023, we plan to expand it to all of our plants and establish targets for waste reduction and recycling by site. In the case of the Ulsan Synthetic Resin Plant, we signed a contract with a company that can recycle latex waste into ABS raw materials, and the Yeosu Synthetic Rubber Plant completed a contract with a recycler of waste synthetic rubber. In addition, we are collecting and reusing packaging materials to reduce waste generated by packaging materials. In this regard, the Ulsan Synthetic Rubber Plant collects totes for domestic use and reuses them after cleaning. In addition, we regularly conduct environmental assessments on our waste disposal partners to review and manage their legitimacy.

Zero Waste to Landfill Certification

Kumho Petrochemical's Yeosu Energy Plant II has been awarded the Zero Waste to Landfill (ZWTL) Gold operation by global safety standard certifier UL, which is awarded to plants with a recycling rate of 95-99%. The Yeosu Energy Plant II achieved a recycling rate of 97% by applying a method that recycles combustion ash from the plant's boilers as raw materials for cement.

Soil Pollution

Soil Pollution Management

Kumho Petrochemical manages soil pollution in areas near our business sites based on environmental management guidelines and work standards by business site, and revise the guidelines to keep pace with the changing policies and business environment. As part of its soil contamination management activities, the company conducts periodic inspections of areas where soil pollutants are likely to leak, and in 2022, the Yeosu Synthetic Rubber Plant I and Yeosu Specialty Chemicals Plant carried out soil restoration work. Kumho P&B Chemicals also establishes practical guidelines for soil pollution management and manages work standards for each business site, and receives regular inspections for soil pollution through the external soil-related specialized agencies. In order to efficiently manage soil pollutants and facilities and prevent pollution accidents, Kumho Polychem has established management standards and regularly measures pollution levels to manage soil pollution. In the future, it plans to inspect soil contamination through specialized agencies.

CASE STUDY

Improvements in Process to Reduce Environmental Impact

Kumho Petrochemical is promoting process improvement activities to reduce the environmental impact of its production processes. In the case of the ABS (Acrylonitrile Butadiene Styrene) manufacturing process, we have reduced waste by removing a large amount of phosphoric acid generated during production, reducing the generation of VOCs (Volatile Organic Compounds) and improving water quality. In addition, in the case of K-3020, one of the high-value Specialty Chemical products, we have applied a process to reduce the amount of wastewater generated during manufacturing and changed the input of raw materials to reduce wastewater generation and raw material usage.

Biodiversity

Biodiversity Management

Kumho Petrochemical recognizes biodiversity as one of the important factors that must be addressed urgently in order to run a sustainable business. In order to value biodiversity and minimize the negative impact of our business activities on biodiversity, we have established the 'Guideline for Biodiversity'. Based on the guidelines, we are also working to preserve ecosystems destroyed by our business activities.



Identifying Biodiversity Risks

Kumho Petrochemical applies part of the LEAP approach proposed by the 2022 Taskforce on Nature-related Financial Disclosures (TNFD) framework to identify biodiversity risks in areas near its business sites. We identified important natural heritage sites, national parks, and protected areas around our sites and utilized WWF's Biodiversity Risk Filter* to identify potential risks. Kumho Petrochemical categorized biodiversity risks into physical and reputational risks to identify the level of biodiversity risk for each business site. In 2023, based on the results of the risk identification, Kumho Petrochemical will identify species and habitat management areas near its business sites and review its activities to protect biodiversity. In addition, Kumho Petrochemical will conduct an assessment of the dependencies and impacts on biodiversity caused by its business activities from a long-term perspective and continue its efforts to restore biodiversity beyond preventing the destruction of ecosystems caused by its business activities.

* WWF Biodiversity Risk Filter(<https://riskfilter.org/biodiversity/home>)

Biodiversity Risk Identification Criteria

Physical Risk	Biological resources	Freshwater resources, forests (timber), wildlife, marine life
	Ecosystem	Soil conditions, water conditions, atmospheric conditions, ecosystem conditions, farmland surroundings
	Biodiversity pressure	Changes in land, freshwater, and ocean use, loss of forest resources, invasive and alien species, and soil and water pollution (fertilizers, nitrogen, pesticides, etc.)
Reputation Risk	Local environmental factors	Proximity to protected/conserved areas, proximity to key biodiversity areas, proximity to other important areas, ecosystem conditions, and range rarity (based on a measure of species endemism)
	Socioeconomic factors	Food and water scarcity and air quality, labor/human rights, financial inequality
	Other reputation factors	Media research, political situation (freedom index), Ramsar and World Natural and Cultural Heritage sites, biodiversity-related country-level risk preparation

Results of Biodiversity Risk Identification by Business Site

Level of Risk: 1(Low) ~ 5(High)

		Seoul	Daejeon	Yeosu	Ulsan	Hwaseong	Yesan	Asan
Physical	Biological resources	4.5	2.5	3.5	3	4.5	3	3.5
	Ecosystems	4	4	2.5	2.5	4	4	4
	Biodiversity pressure	1.5	2	1.5	3	1.5	4	4
Reputation	Local environmental factors	2.5	2.5	4	4	2.5	2.5	2.5
	Socioeconomic factors	3.5	3.5	3	3.5	3.5	3.5	3
	Other reputation factors	2.5	2.5	4.5	4.5	4.5	2.5	2.5

Biodiversity Areas Near Business Site*

Business Site	Key Biodiversity Areas	Classification	Distance to key biodiversity areas (in straight line distance)			
			within 1km	1~2km	2~5km	5~20km
Headquarters	Han River	KBA Biodiversity Area	-	-	V	-
	Han River Bam Island	Ramsar sites	-	-	-	V
	Bukhansan National Park	National Park	-	-	-	V
Asan CNT Plant	Asan Bay	KBA Biodiversity Area	-	-	-	V
Yesan Building Materials Plant	Sapgyo Lake	KBA Biodiversity Area	-	-	-	V
	Asan Lake	KBA Biodiversity Area	-	-	-	V
Yeosu plant (Yeosu Synthetic Rubber Plant, Yeosu Specialty Chemicals Plant, Yeosu Energy Plant)	Suncheon Bay Tidal Flat	UNESCO World Natural Heritage	-	-	-	V
		Ramsar Sites	-	-	-	-
		KBA Biodiversity Area	-	-	-	-
	Suncheon Dongcheon Estuary	Ramsar Sites	-	-	-	V
	Hallyeohaesang National Park (Odongdo)	National Park	-	-	-	V
Ulsan plant (Ulsan Synthetic Resin Plant, Ulsan Synthetic Rubber Plant)	Evergreen Forest on Mokdo Island, Ulju	Natural Monument (No. 65)	-	-	-	V
Hwaseong Foam Plant	-	-	-	-	-	-
Daejeon Central R&BD Center	-	-	-	-	-	-

*Biodiversity Areas: Key Biodiversity Areas(<https://www.keybiodiversityareas.org/>)

Biodiversity Conservation Activities

Each of Kumho Petrochemical's business sites and major affiliates strive to preserve biodiversity in the neighborhoods where they are located. The Ulsan Synthetic Resin Plant was designated as a green company by the Ministry of Environment in recognition of its performance in reducing water, air pollutants, and waste, as well as its investment in the environment, and regularly participates in public-private environmental cleanup activities. The Ulsan Synthetic Rubber Plant participates in 'One company One stream' and 'One Company One Road' activities, and the Yeosu Synthetic Rubber Plant conducts 'Neighborhood clean-up campaign' near the plant area, contributing to the improvement of the environment and biodiversity in the surrounding area.

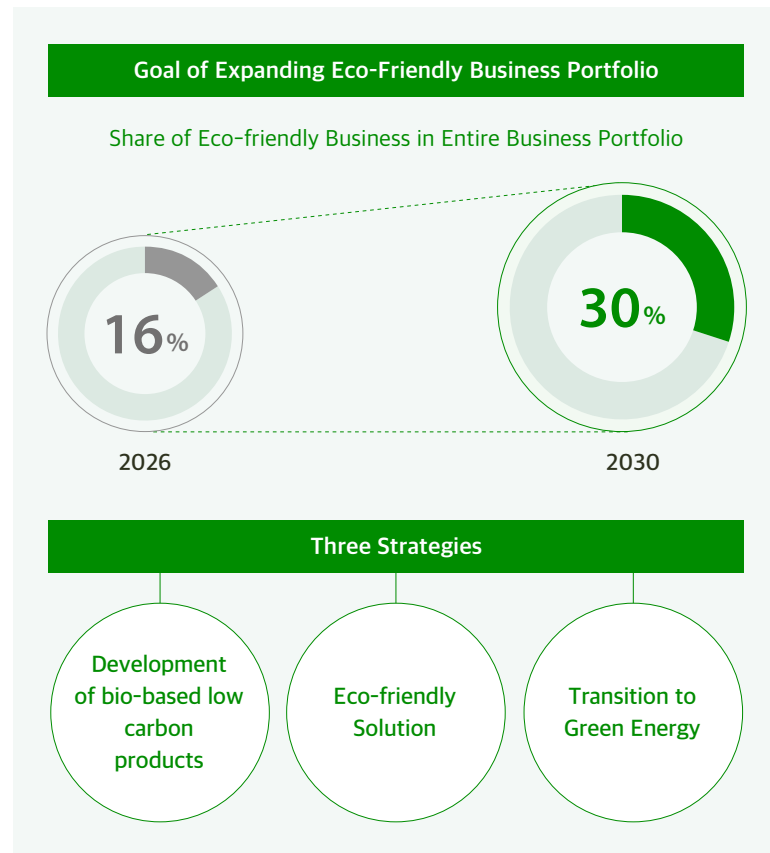
Besides, the Yeosu Energy Plant I monitors pollution and biodiversity impacts through inspections of rivers and stormwater drains near the plant. In particular, if pollution is identified, we analyze the cause through emergency cleanup and water collection to minimize damage.

Kumho T&L conducts post-environmental impact ecological surveys on marine flora and fauna at 10 locations around its business sites twice a year. It also installs and operates oil fences to prevent marine pollution accidents that may occur during loading and unloading operations.

Eco-friendly Business Portfolio

Strategies for Expanding Eco-friendly Business

Kumho Petrochemical intends to transform our existing business portfolio into a portfolio of eco-friendly businesses. We plan to have eco-friendly business account for more than 16% of our entire portfolio in 2026 and 30% in 2030 and have set three strategies to achieve this goal.



Eco-friendly Products and Technologies

Bio-based NB-Latex

Kumho Petrochemical is working to enhance the eco-friendliness of our flagship product, NB-Latex. NB-Latex is a material for all commercialized latex gloves, including medical, industrial, laboratory, and kitchen gloves. Kumho Petrochemical has the world's largest manufacturing capacity for NB-Latex and currently has a manufacturing capacity of 710,000 tons/year through a plant expansion in 2021. We are also recognized for our high productivity, quality consistency, and high strength by adopting the world's first and only continuous polymerization method. In 2022, we continued research to develop biodegradable NB-Latex based on biotechnology and Green NB-Latex utilizing low-carbon bio raw materials derived from plants.

Bio-degradable NB-Latex is an eco-friendly product that reduces carbon emissions from incineration by inducing biodegradation of waste gloves. In 2022, we conducted basic research on cross-linkers and monomers, which are key technologies for developing biodegradable NB-Latex, and plan to launch a prototype in 2023. In addition, through basic research on green NB-Latex, we increased the amount of bio raw materials used to 10%, and plan to launch a prototype in 2024. We are also strengthening the eco-friendliness of our product production process by conducting research to reduce waste generated in the NB-Latex manufacturing process.

Purchase of Biomaterials

Kumho Petrochemical is planning to enter the bio SM sales and purchase market. In 2023, we signed a business agreement with Japan's Idemitsu Kosan and Sumimoto for renewable/circular business, including the sales and purchases of bio SM. Through the agreement, we will establish mutual cooperation on renewable polymers and chemicals and continue discussions on mutual benefits and priorities for the sale and purchase of bio SM in the Republic of Korea. Furthermore, we plan to expand the scale of our bio-SM business to 3,000 tons to 5,000 tons by 2024.

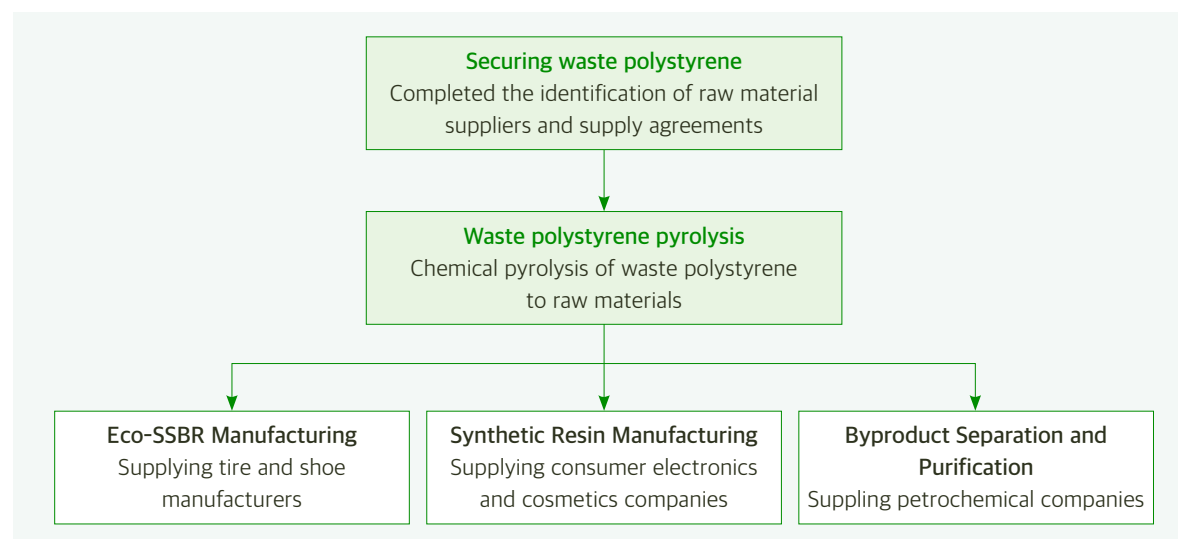


Recycling Waste Polystyrene

Kumho Petrochemical is pursuing business related to Recycled Styrene Monomer (RSM) through pyrolysis of waste polystyrene. Polystyrene is a type of plastic that can be found in everyday life, including food containers such as dairy products and disposable cup lids and styrofoam for packaging agricultural products and home appliances. In the past, waste polystyrene was either physically recycled and used to make low-quality plastics or was disposed of in landfills or incinerated because it could not be physically recycled if the product was contaminated, such as in food packaging. We aim to realize a virtuous cycle of resources by collecting waste polystyrene which was not easily recycled and utilize a chemical recycling method.

In 2021, we formalized the promotion of recycled styrene business and expanded related businesses in cooperation with various companies. In 2022, we signed an MOU with Technip Energies (T.EN), a company specializing in engineering services to collaborate on waste polystyrene pyrolysis and recycled styrene business. In the future, we plan to gradually expand our business fields utilizing recycled styrene, including Eco-SSBR (Solution Styrene Butadiene Rubber) manufacturing, synthetic resin manufacturing, by-product separation and refining. Meanwhile, in March 2022, we signed an MOU with hy (formerly Korea Yakult) to recycle beverage containers. Under the MOU, the two companies plan to press, crush, wash, and dry hy's waste plastic containers and produce raw materials for synthetic resin products through our recycling technology. The synthetic resin products produced will be used in new lineup products of large domestic home appliance companies such as air conditioners, refrigerators, vacuum cleaners, and air purifiers. Product testing with major customers has been finalized.

Waste Polystyrene Pyrolysis and Recycled Styrene Business Plan



Eco-SSBR

Kumho Petrochemical is preparing to commercialize Eco-SSBR, an eco-friendly SSBR made from Recycled Styrene Monomer (RSM). SSBR is a product that improves the wear and fuel efficiency performance of automobile tires due to its superior viscosity and elasticity compared to conventional synthetic rubber materials. We produce 123,000 tons of SSBR annually and has recently been actively promoting the commercialization of Eco-SSBR, which uses recycled styrene instead of basic raw materials. We plan to conduct customer evaluations of the pilot product in the first half of 2023 for commercialization in 2025. In particular, Eco-SSBR obtained ISCC PLUS certification, an international certification system that complies with the EU's Renewable Energy Directives, proving the product's eco-friendliness. In addition to Eco-SSBR, we also completed a pilot test of bio-SSBR with monomers derived from sugarcane.

Carbon Capture, Utilization, and Storage Technology (CCUS)

Kumho Petrochemical plans to build a 70,000-ton-per-year CCUS (Carbon Capture, Utilization and Storage) facility by 2024 in Yeosu National Industrial Complex that will capture carbon dioxide emitted from cogeneration plants. It is a method that selectively captures only carbon dioxide from greenhouse gases generated in the steam and electricity production processes of power plants. Kumho Petrochemical signed a memorandum of understanding (MOU) with Korea Special Gas in July 2022 to facilitate the project. We will capture carbon dioxide and, together with Korea Special Gas, convert it into liquefied carbon dioxide, which will be sold by both companies. Liquefied carbon dioxide is used for a variety of purposes, including welding gas in shipyards, dry ice manufacturing, facility gardening, and semiconductor manufacturing.

CASE STUDY

Signed MOU to Develop Eco-friendly Tires with Eco-SSBR

In May 2023, Kumho Petrochemical signed an MOU with Hankook Tire & Technology to develop eco-friendly tires using Eco-SSBR. We plan to respond to the growing market demand for sustainable raw materials and products by providing ISCC PLUS certified Eco-SSBR.

CPP with Eco Friendly Liquid Initiator

CPP(Copolymer Polyol) is a polyol product used to strengthen the hardness of urethane foam. Kumho Petrochemical developed eco-friendly CPP to solve the harmful substances and safety issues of existing CPP. In 2022, we succeeded in developing mass-production technology for CPP with an eco-friendly liquid initiator based on peroxide that does not generate harmful substances and completed the application of the technology to all CPP products.

Recycled EPS

Kumho Petrochemical is developing EPS (Expandable Polystyrene) utilizing recycled raw materials. EPS is a polystyrene resin impregnated with a foaming agent, used for construction and packaging. It is especially eco-friendly because it contains fewer volatile substances. Kumho Petrochemical is developing technology to produce recycled EPS based on GPPS (General Purpose Polystyrene) produced through waste styrofoam. Currently, we have increased the recycling rate of waste styrofoam up to 50% and are conducting reliability evaluations with domestic home appliance companies, planning to complete quality and reliability evaluations in the first half of 2023.

Electric Vehicle Solutions

Carbon Nanotube for Electric Vehicle Batteries

Kumho Petrochemical is developing and producing CNT (Carbon Nanotube) for electric vehicle batteries in line with the trend of the eco-friendly automotive industry.

Carbon Nanotube are used in electric vehicle batteries, semiconductor process trays, automotive electrostatic field exteriors, and surface heating elements to facilitate the flow of electricity and electrons and are used as core materials for rechargeable batteries. When applied to electric vehicle batteries, Carbon Nanotube increase conductivity by more than 10% compared to existing materials, which increases battery capacity and lifespan.

We secured Carbon Nanotube manufacturing technology in August 2022 and is currently conducting evaluations with rechargeable battery companies. We also have a 120-ton production plant in Asan and are considering expanding production facilities to meet future market growth.

Latex for Electric Vehicle Battery Binders

Since the successful development of latex for rechargeable battery binder, Kumho Petrochemical is on the verge of commercializing it. Through evaluations by external institutions and domestic rechargeable battery manufacturers, the product has been recognized for its adhesive strength and processing quality that are equal to or better than those of competitors. We are conducting mass production tests for commercialization in 2023, and are conducting research to expand its uses such as primers for dry processes, in addition to binders for cathodes.

In addition, we are developing NBR and XSBR binders for solid-state batteries that satisfy adhesion, electrochemical properties, and processing characteristics that can effectively express the ionic conductivity of sulfide-based solid electrolytes. We are currently conducting active research with national research institutes and battery manufacturers.

High-functional EP Material for Electric Vehicle

Kumho Petrochemical is developing highly functional and lightweight Engineering Plastic (EP) materials that can be applied to the interior and exterior of electric vehicles. EP is a material made by improving the flaws of general plastics. It features excellent strength, elasticity, and heat resistance with a lighter weight than metal. Its mechanical and physical properties are superior to general-purpose plastics, showing high capability in molding and processing. In addition, it does not rust easily and is resistant to fire, which makes it high value-added Synthetic Resin widely used in automobile parts and precise machinery areas as a substitute for metal.

In addition to interior and exterior materials for electric vehicles, we are considering expanding the scope of utilization of EP materials to include wire protectors and battery module housing materials.

Recycled Oil Resistant Paper Latex

Kumho Petrochemical is developing oil resistant paper used for food packaging as an eco-friendly product. Previously, PE (Polyethylene) or PP (Polypropylene) was used for the oil resistant paper, making it impossible to recycle, but by replacing it with SBR (Styrene Butadiene Rubber), the oil resistant paper can be recycled. We plan to proceed with quality approval and initial sales after customer evaluation in the first half of 2023.

Eco-friendly Certified Building Materials

Kumho Petrochemical sells eco-friendly windows and insulation through its eco-friendly building materials brand Hugreen. In the case of eco-friendly windows, we acquired energy efficiency grades based on the test report for each product and glass specification. In the case of insulation, our flagship product, Gold Foam, obtained the Environmental Product Declaration Certification and the Eco-Label Certification from the Korea Institute of Environmental Industry and Technology, and has been recognized for its effectiveness in improving resource circularity, saving energy, reducing environmental pollution, and reducing harmful substances.

We operate a hazardous substance reduction system in the production of Hugreen products and produce low-carbon certified window materials. In 2023, we plan to participate in EPR (Extended Producer Responsibility) recycling to achieve the mandatory recycling rate and pay its share.

Renewable Energy Production

Kumho Petrochemical aims to expand the production of renewable energy in line with the external environment where the demand for and use of renewable energy is increasing due to the introduction of the EU Carbon Border Adjustment System. In particular, we produce and supply eco-friendly energy through our major affiliates, including Yeonggwang Baeksu Wind Power and Korea Energy Power Plant.

Yeonggwang Baeksu Wind Power was established in April 2013 as a special purpose corporation to sell electricity and RECs (Renewable Energy Certificates) and began commercial power generation in June 2015 by installing wind power generation facilities in Yeonggwang, Jeollanam-do. It operates a total of 20 wind turbines and ESS (Energy Storage System) facilities, with a total installed capacity of 40 MW. Korea Energy Power Plant started commercial power generation in July 2013 by installing a solar power generation facility in Sacheon, Gyeongsangnam-do. The total facility capacity, including subsidiaries such as KR Solar and Kangwonschoolsolar is 35.5 MW, and the company generates more than 46,500 MW of electricity annually, enough to supply about 12,700 households, contributing to the domestic power supply.



Yeonggwang Baeksu Wind Power



Korea Energy Power Plant

Power Plant	Location	Capacity	Revenue (Unit: KRW 1 million)		
			2020	2021	2022
Korea Energy Power Plant	78, Gongdan 1-ro, Sanam-myeon, Sacheon-si, Gyeongsangnam-do, Korea	11.51MW	3,506	3,817	5,048
KR Solar	101-3, Jangsu-dong, Gwangsan-gu, Gwangju, Korea	2.42MW	470	657	896
Kangwonschoolsolar	197, Nambu-ro, Gangneung-si, Gangwon-do	21.6MW	6,101	6,689	9,542
Yeonggwang Baeksu Wind Power*	479-60 Baeksu-ro, Baeksu-eup, Yeonggwang-gun, Jeollanam-do	40MW	10,935	8,426	14,150

* Kumho Petrochemical owns 51% of its stake, not included in consolidated subsidiaries

Advanced Classification System for ESG Products

Kumho Petrochemical established its own ESG product classification system to strengthen product development that can reduce environmental impact and fulfill social responsibility, and to suggest future research directions. The Central R&BD Center organized evaluation items (3 areas, 9 categories, and 28 diagnostic items) to diagnose ESG factors of products by referring to domestic and international guidelines on ESG. The 28 diagnostic items serve as criteria for judging the sustainability of products and technologies that are currently being researched and future research projects, and the diagnostic results are used to set the direction of research and product portfolio composition.

In 2022, we analyzed 52 ongoing research projects and found that the proportion of projects related to Energy Saving and materials is high, and the proportion of projects related to Bio and Degradation is relatively low. We also analyzed the distribution of research projects by rubber, latex, resin, and new business sectors, and plan to utilize the analysis results to establish measures to strengthen the promotion of research projects with high strategic importance.

ESG Product Diagnostics Items

Area	Category	Diagnostic Item
Environmental	Air	<ul style="list-style-type: none"> • Air pollutant recycling • Air pollutant reduction • Air pollutant capture
	Bio	<ul style="list-style-type: none"> • Use of bio raw materials
	Degradation	<ul style="list-style-type: none"> • Developing polymer degradation technology • Biodegradable products
	Pollution	<ul style="list-style-type: none"> • Waste (byproducts) reduction • Toxics reduction
	Energy Saving	<ul style="list-style-type: none"> • Reduction of energy generated by clients • Production yields improvement • Energy use reduction • Renewable energy production technologies • Product insulation improvement • Product fuel efficiency improvement
Material		<ul style="list-style-type: none"> • Anhydrous hydrogen production • Developing products to replace hazardous materials • Substitution of hazardous raw materials • Use of renewable raw materials • Development of raw materials to build a renewable energy ecosystem • Improving the wear resistance of products • Developing raw materials to build an eco-friendly energy ecosystem
	Waste	<ul style="list-style-type: none"> • Water use reduction • Wastewater reduction
Social	Social	<ul style="list-style-type: none"> • Development for supply chain accountability • Flame retardant performance improvement • Partnership with small businesses for shared growth
Governance	Governance	<ul style="list-style-type: none"> • Development for commercialization of new strategic products



CASE STUDY

Affiliates' Eco-friendly Product Development Status

Kumho P&B Chemicals produces and sells various epoxy products used in renewable energy-related infrastructure such as wind power blades and hydrogen storage tanks. In 2022, it carried out a national project for the development of recyclable epoxy for wind power blades and a national project for the development of epoxy for large hydrogen storage tanks for commercial vehicles. Besides, Kumho P&B Chemicals is promoting the development of eco-friendly water-soluble epoxy resins. In 2023, it obtained the ISCC PLUS certification, an international eco-friendly certification, for five products (cumene, acetone, phenol, bisphenol A, and epoxy). As a result, Kumho P&B Chemicals laid the foundation to convert phenol derivatives and benzene raw materials to low-carbon series, and plan to procure benzene in a way that can achieve a circular economy, including waste plastic pyrolysis treatment. Kumho Mitsui Chemicals is jointly developing polyurethane system products with a client company to obtain bioplastic certification as part of its efforts to develop eco-friendly sustainable products. Bioplastics certification is an eco-friendly certification system that is granted to products that use 25% or more biomass. It started research and development in January 2022 to secure relevant technology and is continuing efforts to increase the biomass content in MDI. Product development and certification acquisition will be completed by the end of next year.

Social

Our vision of ‘Solution Partner Creating Our Common Future With Value Beyond Chemistry’ can only be achieved through cooperation with our employees and all of our stakeholders. In this regard, Kumho Petrochemical actively communicates with various stakeholders to promote sustainable growth of the company and society and prepare for a new future. First, we are improving the working environment to develop employees’ capabilities and increase their satisfaction. We are also protecting the human rights of stakeholders and creating an environment in which employees and workers of suppliers can work safely. In addition, by spreading positive influence to our stakeholders, including customers who use Kumho Petrochemical’s products and services, suppliers in the value chain, and local communities near our business sites, we are laying the foundation for shared growth.

		45
	Employee	49
	<ul style="list-style-type: none"> • Establishing of the talent we seek and core values • Conducting employee engagement survey • Improving HR systems and organizational culture through HR Innovation TFT activities 	
	Human Rights	50
	<ul style="list-style-type: none"> • Conducting a human rights impact assessment • Revising Human Rights and Labor Management Policy 	
	Occupational Safety and Health	57
	<ul style="list-style-type: none"> • Founding of Safety & Environment Planning Office under the CEO • Establishing of emergency plan (E-Plan) • Linking safety and health items to PM and KPI 	
	Supply Chain Management	59
	<ul style="list-style-type: none"> • Expanding ESG risk assessment of suppliers • Fostering a culture of fair trade 	
	Local Community	61
	<ul style="list-style-type: none"> • Promoting social contribution activities at the business site level • Promoting social contribution activities in line with business characteristics 	
	Data Security and Personal Data Protection	62
	<ul style="list-style-type: none"> • Building a DRM and DLP system • Virus outbreak response drills 	
	Customer Management	62
	<ul style="list-style-type: none"> • Building a CRM system 	

Employee

Ideal Talent We Seek

Kumho Petrochemical aims to prepare for a new future by securing and cultivating excellent talents who will be the key drivers of corporate growth. In 2022, we declared a new ideal talent we seek and core values; 'Solution Mate' and 'PRIDE (Passion, Respect, Integrity, Development)' that employees should internalize. Based on the new ideal talent we seek and core values, Kumho Petrochemical employees will strive to create a 'Solution Creating Culture' that achieves a virtuous cycle of continuous success and growth based on a cultural soil that enables the expansion of positive energy, and to grow together with various stakeholders.

Ideal Talent We Seek and Core Values

Ideal
Talent We
Seek

Core
Values

Solution Mate
People who provide the best solution with keen insight and achieve mutual growth with various stakeholders in order to reach the vision of our group

PRIDE

- **Passion**
Devoting themselves to elevate expertise to the highest level with enthusiasm
- **Respect**
Paying respect to the opinions of various stakeholders and building a positive relationship underpinned by trust
- **Integrity**
Sticking to the basics based on the principles in a fair and transparent manner and creating shared value
- **Development**
Achieving growth by taking a fresh approach from a new perspective in a constant manner

Human Resource Policy

Kumho Petrochemical promotes fair and equitable personnel management based on the regulations on personnel management and establishes directions on our views on human rights and diversity of employees based on the 'Human Rights and Labor Management Policy'. The Human Rights and Labor Management Policy applies not only to employees but also to our stakeholders, including customers and suppliers, and provides a process for reporting and remedying human rights violations.



Employee Recruitment

Kumho Petrochemical considers fairness, transparency, and diversity in the entire recruitment process. At the group level, recruitment of new employees is conducted regularly, and occasional, career recruitment of experienced employees is conducted irregularly by affiliates.

Identifying Hiring Needs

We identify recruitment needs by departments before starting the recruitment process. At least once a year, we survey the recruitment needs of individual departments and reflect the results in our recruitment process. In particular, we proactively recruit R&D experts to fulfill our company vision and strategy, and in 2022, we secured an excellent talent pool by selecting industry-university scholarship students in R&D. We support tuition and living expenses for each semester, and provide various programs to enhance their capabilities, such as overseas training, conference attendance, and one-on-one mentoring.

Protecting Candidate Human Rights

Our top priority is to protect the human rights of applicants throughout the hiring process. We check whether interviewers have completed recruitment-related training to prevent problems that may arise in during interview session, and send a message of comfort to those who fail to pass. In addition, to prevent leakage of personal information of applicants, we are operating a system to allow applicants to request for the return of original documents they submitted.

Securing Employee Diversity

Kumho Petrochemical conducts blind recruitment to secure diversity in the recruitment process and enhance fairness and transparency. Blind recruitment is a system that excludes personal information such as gender, age, and standardized specifications from the evaluation criteria and evaluates applicants based on their potential and job skills. Through efforts to secure diversity in the workforce, including blind recruitment, we have gradually raised the ratio of female entrants (15.5%) and the female employees (15.5%). In addition, we give additional points or conduct a separate hiring process to hire more people from minority groups such as the vulnerable or veterans, securing both diversity and inclusion in the workforce.

Labor and Management Relations

We boast a cooperative relationship with labor unions without conflict. We have three labor unions (Ulsan Synthetic Rubber Plant, Ulsan Synthetic Resin Plant, Yeosu Plant), and each business site actively communicates with them through regular labor-management council meetings. In the event of collective bargaining, we unify the unions into one communication channel to efficiently reach an agreement, and as of 2022, we have achieved 35 consecutive years without a labor dispute due to our long-standing trusting relationship.

Work-Life Balance

Improving Work Systems

Kumho Petrochemical implemented the PC-OFF system and the flexible working system to improve employees' work efficiency and job satisfaction. In principle, we send a reminder 15 minutes before quitting time and automatically block the use of PCs after 15 minutes of working time. In addition, we implement flexible working systems such as flex-time work, telecommuting, and alternative work schedules so that employees can manage their working hours flexibly and efficiently according to their choice.

Childcare Support System

Kumho Petrochemical provides various maternity and childcare programs to help employees balance work and family life. As part of the effort, we guarantee shorter working hours to pregnant employees at a very early stage or near the end of the pregnancy and also ensure that there are no disadvantage for employees who return to work after taking parental leave by guaranteeing them their job position in the same department they left. In addition, our employees enjoy diverse childcare-related benefits. Congratulatory money at the time of childbirth and when entering kindergarten to high school, tuition fees for employee's children, and post-partum care expenses are supported as well as 'pregnant gift kit' which contains items that are necessary during pregnancy. Furthermore, we are striving to provide a better working environment for employees who need childcare by installing a nursing room for female employees in the headquarters building.

Company Club Activities

Kumho Petrochemical supports in-house club activities. Currently, we are operating various hobby-based clubs, including clubs related to sports activities such as tennis, soccer, marathon, mountain climbing, and baseball, encouraging employees to share their hobbies and communicate with each other.

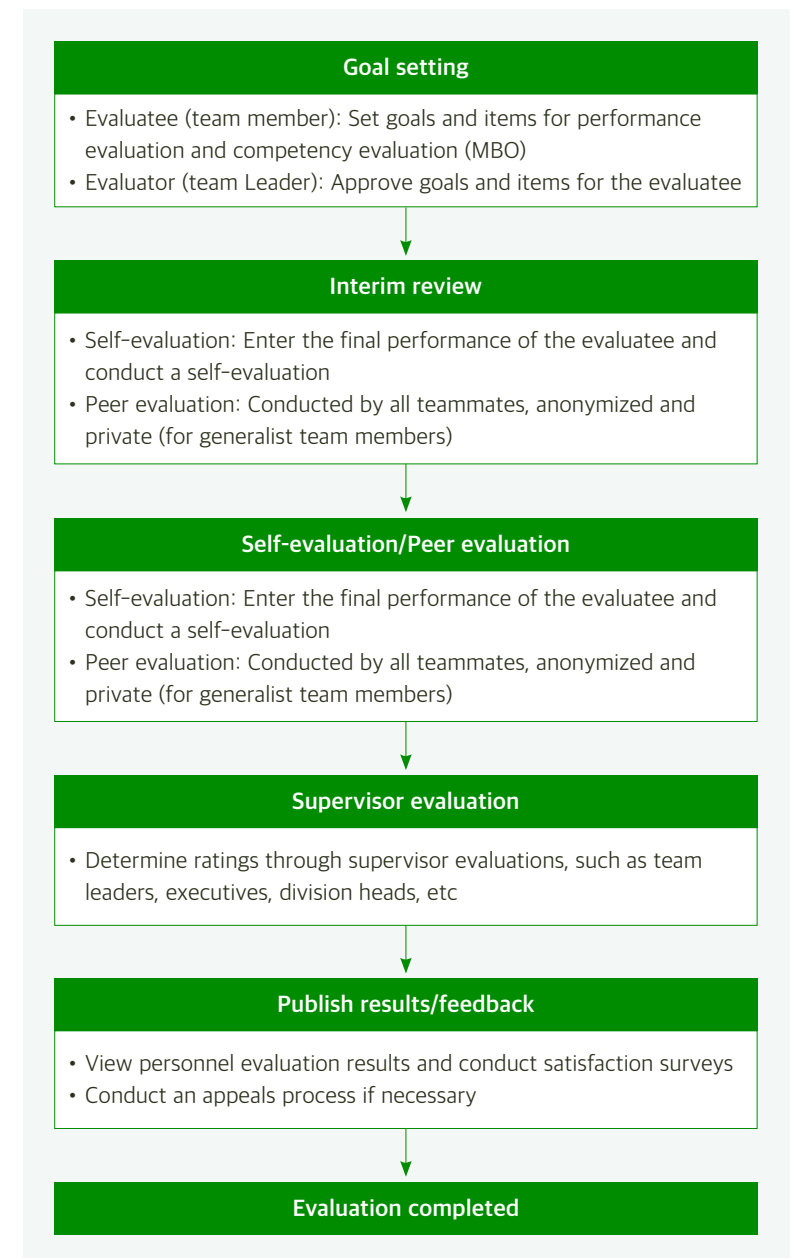
Employee Performance Evaluation and Compensation

Kumho Petrochemical applied a reasonable and fair performance evaluation system to all employees. Through the evaluation, we support each employee to voluntarily manage their career and develop their own capabilities.

Our performance evaluation system is comprised of two evaluations; performance evaluation and competency evaluation. The performance evaluation is made based on annually established KPIs (Key Performance Indicator) while the competency evaluation evaluates three categories; common competencies, work behavior competencies and job-specific skills. In particular, our detailed annual competency evaluation helps employees understand their strength and weakness in depth which ultimately leads to their capability improvement. We also directly link the results of both evaluations to promotions and wage increases to enhance employees' work motivation. In addition, each team leader conducts an interim review of the performance evaluation once a year and conducts interviews any time to check the development of team members' performance management capabilities.

Moreover, to evaluate the leadership of team leaders from all sides, we implement a reverse evaluating system for team leaders (bottom-up evaluation). To secure objectivity of the evaluation and prevent the occurrence of side effects, we do not disclose the evaluation scores given by employees to team leaders. Also, we conduct employee satisfaction evaluation on personnel evaluations and collects opinions on each employee's career development to improve the evaluation and compensation system. The HR Innovation TFT, which was implemented in 2022, gathered opinions and reviewed improvements in the form of questions, evaluation methods, and coverage of supervisor, peer, and subordinate evaluations, of which the results of the review will be reflected in the future HR evaluation system.

Personnel Evaluation Process



Improving Organizational Culture

Enhancing Employee Communication

We are creating a horizontal and inclusive organizational culture by considering the generational diversity of employees. In 2022, we implemented a reverse mentoring program where employees of Generation MZ serve as mentors for senior executives. The topics of the reverse mentoring program consisted of: the communication style of Generation MZ, sharing ideal company image, life after work of Generation MZ, and learning digital competencies. Mentors and mentees shared each other's values by watching concerts and caravan camping together. At each business sites, staff-level meetings were also held to collect the grievances and suggestions of each employee, which were reflected for improving personnel systems through job rotation, approval process, performance pay, and mourning leave. In addition, the Ulsan Synthetic Rubber Plant and the Ulsan Synthetic Resin Plant held meetings for new employees and birthday celebrants, and held movie nights, coffee trucks, love lunches, and lottery events for all employees, including suppliers.

Kumho P&B Chemicals is expanding employee communication through the 'Luncheon with the CEO' program for each team, and Kumho Polychem is conducting workshops to promote cross-functional communication. Kumho T&L is matching teams every two months to create a 'neighborly organizational culture' and conducts meetings to share issues and build consensus among teams.



Generation MZ's after-work experience: going to a concert and company image: caravan camping

Employee Engagement Survey

Kumho Petrochemical conducted an 'Employee Engagement Survey' to analyze the strengths and weaknesses of the organization and seek ways to improve the organizational culture.

The employee engagement survey consisted of 47 questions in seven areas, including communication, evaluation, compensation, and leadership, and 40% of all employees, excluding executives, participated in the survey. The result of the 2022 employment engagement survey showed a score of 3.257 out of 5. Through the Importance-Performance Analysis of the survey, the areas of evaluation and compensation were identified as key improvement areas, and the HR Innovation TFT conducted a review.

Kumho P&B Chemicals conducts a leadership organization assessment to diagnose organizational energy and engagement. The results of the 2022 assessment showed that the productive/comfort factor increased and the selfish/cynical energy factor decreased compared to the past. Kumho P&B Chemicals conducted separate workshops for business sites with poor assessment results to discuss ways to increase employee engagement.

Support for Retirees

In an effort to help retirees design the path for second life, we provide programs to support reemployment after retirement. Especially for retirees aged 50 or above, we provided diverse programs ranging from career counseling and design to job training and job placement, supporting successful career extension for retirees. In 2022, we expanded the support period so that retirees can receive tuition assistance for their children for a certain period of time even after retirement.

HR Innovation TFT

We aim to grow together with our employees by reviewing the existing HR system and creating a better organizational culture. To this end, in 2022, we formed a TFT to promote HR innovation and conducted a detailed review of the company's HR system and organizational culture, and identified and implemented improvement tasks.

Activity Direction	Improvement Activities
Personnel management system reform	<ul style="list-style-type: none"> Introducing promotion system Changes to evaluation/compensation system Improvement in HR governance, including the creation of Business Management Team
Internalization of core values	<ul style="list-style-type: none"> Distributing the core values commitment booklet to employees Employee engagement events Designing an EVP (Employee Value Proposition)
Creation and execution of tasks for achieving the vision	<ul style="list-style-type: none"> Conducting an employee engagement survey Conducting human rights impact assessment Introducing an academic cooperation program

Employee Education and Training System

Kumho Petrochemical provides various learning opportunities for employees to grow as ‘Solution Mates’. We operate training programs for each position, from new employees to executives, and support employees’ self-directed improvement of competencies.

New Employee Training

Kumho Petrochemical provides three weeks of collective training for new employees to help them quickly integrate into the organization and develop their job skills, and provide them with various field experiences, including experience at domestic and overseas business sites. The Ulsan Synthetic Rubber Plant provides one year of on-the-job rotation training besides common training (1 week), safety/environmental training (4 weeks), and basic training (4 weeks) in accordance with the revised employee training standards to help new employees adapt to the workplace and improve their job skills. The Ulsan Synthetic Resin Plant conducts common training (3 weeks) and placement training (14 weeks), which focuses on departmental theories and on-the-job training, for new college graduates to provide them with prior knowledge necessary for their work.

Training by Position

Kumho Petrochemical operates training programs for employees in their second and third years of employment to retain talented employees, and during the training period, we listen to their concerns about work and company life and help each employee have a refreshment time. We also conduct collective leadership training for team leaders in their first, third, and fifth years of employment to foster leadership in management positions such as team leader and above. In 2023, depending on the outcome of HR Innovation TFT activities, we plan to reinforce the leadership training for team leader candidates comprised of deputy managers and managers.

In addition, Yeosu Synthetic Rubber Plant, Yeosu Specialty Chemicals Plant, and Yeosu Energy Plants are planning customized training programs to enhance the practical skills of their employees, taking into account the characteristics of their industries. In 2023, we plan to establish our own training roadmap and conduct training accordingly.

Support for Self-directed Learning

Kumho Petrochemical supports employees to take the initiative in terms of their competence development from diagnosing their capabilities to establishing self-development plans to taking training courses. We reimburse employees for education courses, and have been operating a duty qualification system, a program that supports employees in obtaining certificates related to their work, since 2010. With the aim of developing refinement of our employees, we have offered points for purchasing books every year while adopting e-Book service to facilitate a reading culture in 2022. In addition, we are considering to introduce a domestic and international MBA program to strengthen employees’ job expertise.

Female Leadership Courses

Kumho Petrochemical established a female leadership course in 2023 to foster female leaders and expand the talent pool. The female leadership course is consisted of three courses, ‘Female Leadership Mindset’, ‘Successful Leadership Manifestation’, and ‘Capturing the Scent of a Leader’, and 66 employees participated. Through the female leadership course, we plan to indorse excellent leadership candidates and actively support their personal growth, while expanding diversity and inclusion of employees.



Female Leadership Courses

Objective	<ul style="list-style-type: none"> Develop female leaders and expand the talent pool 	<ul style="list-style-type: none"> Support personal growth 	<ul style="list-style-type: none"> Increase employee diversity and inclusion
Trainee	<ul style="list-style-type: none"> 66 female employees in total, including department head/senior managers, deputy managers/responsible managers, and manager/senior assistant 		
Course	Female Leadership Mindset	<ul style="list-style-type: none"> Motivation through leadership style analysis and competency assessment 	
	Successful Leadership Manifestation	<ul style="list-style-type: none"> Self-care for leadership development 	
	Capturing the Scent of a Leader	<ul style="list-style-type: none"> Personal and organizational visioning through calligraphy, scent, and flower therapy 	

Human Rights

Human Rights and Labor Management Policy

We have established a Human Rights and Labor Management Policy that complies with international standards and guidelines related to human rights and labor, including the Universal Declaration of Human Rights, the UN Guiding Principles on Business and Human Rights (UNGPs), and the UN Global Compact Ten Principles. In 2022, the Policy was revised to further reflect the remedy procedures in case of human rights violations and the conditions of recruitment, and labor. In addition, we apply the Policy to our business sites and employees around the world and share it with stakeholders affected by our business activities.



Remedy Process for Victims of Human Rights Violations

In accordance with the provisions of the employment rules, we have set up a process to report and take action on human rights issues, including sexual harassment, bullying, and discrimination in the workplace, and these measures are stipulated in the Code of Ethics, Human Rights and Labor Management Policy, Guideline for Human Rights and Labor Management, and reporting management regulations.

First of all, we have a reporting obligation that anyone can report human rights issues that violate the regulations through the internal reporting procedure. When we receive a report through online or offline channels (online reporting platform, telephone, fax, e-mail, direct visit, etc.) from employees, customers, or suppliers, it is immediately delivered to the head of the human rights department (the person in charge), and an investigation into the matter is conducted at the same time. All investigations are handled within 15 days of receipt, and the Personnel Committee implements disciplinary and recurrence prevention measures based on the results without delay. In addition, we take measures to ensure that no disadvantage or secondary damage is caused to the reporters and informants in accordance with the principle of protecting informants. In particular, the identity of the informant is protected anonymously to ensure strict confidentiality, guarantee of identity, and reduction of responsibility. Furthermore, in order to avoid any inconvenience or disadvantage caused by the report, we accommodate the informant's request to move departments or change positions as much as possible.

Human Rights Impact Assessment

Kumho Petrochemical conducts human rights impact assessments to enhance human rights management and identify major human rights risks in advance. 2022 was the first year of implementation, and the evaluation was conducted to the management departments of the headquarters. We identified potential human rights risks based on 'Guidelines for Human Rights Management of National Human Rights Commission', 'Guidelines on Business and Human Rights of Ministry of Justice', and new issues that corporate management activities could have on human rights in 2022, and we organized 10 areas of human rights impact assessment based on those risks. We conducted the assessment using 110 detailed indicators in 10 areas and figured out improvement tasks such as conducting human rights education beyond the scope of legal obligations, regularizing human rights management assessments, and expanding the scope of fulfilling human rights management obligations in the mid- and long-term. In 2023, in order to fulfill the identified improvement tasks, we are planning to conduct human rights education and second human rights impact assessment.

Human Rights Impact Assessment Areas

Human rights management framework	Nondiscrimination in employment and work
Freedom of association and collective bargaining	Forced labor
Child labor	Employee safety and health
Human rights protection in the workplace	Responsible supply chain management
Environmental protection	Protecting consumer rights

Occupational Safety and Health 2022 Material Issue

Vision and Goals of Occupational Safety and Health

Under the vision, ‘Healthy Company Putting Safety First, Pursuing Shared Happiness’, we have drawn three goals; achieving zero serious accidents, establishing the infrastructure for occupational safety and health, and settling an autonomous culture of safety and health. Major affiliates, including Kumho P&B Chemicals, are also strengthening their safety and health management by making safety and security the top priority of corporate management. Kumho P&B Chemicals declared zero accidents at its plants, establishment of safety and health management system, industrial safety, and settlement of Process Safety Management (PSM) as its safety and health management goal, while Kumho T&L has selected zero accidents and stable management as its management policy.

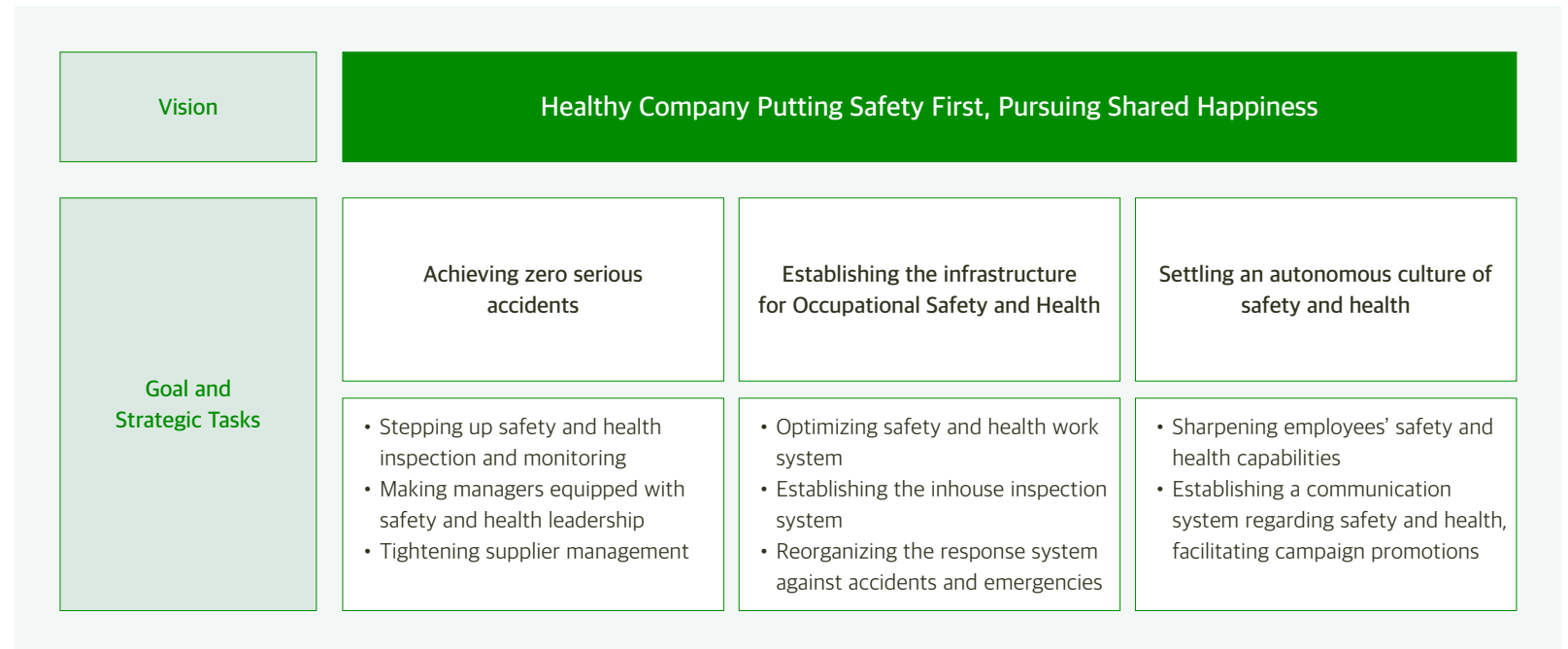
Safety and Health Management System

We have established a global-level of safety, environment and health management system meeting the requirements of ISO 45001, and is constantly establishing and revising our regulations on safety, environment and health to strengthen safety and health management at all business sites, including the headquarters, plants, and R&BD center. In particular, the safety, environment and health manual separately regulates management processes at the practical level. Besides, in order to implement more practical safety and health management, we establish and revise the standards in a way to reflect the characteristics of each business sites, such as plants and Central R&BD Center.

ISO 45001 certified affiliates:

Kumho Petrochemical, Kumho P&B Chemicals, Kumho Mitsui Chemicals, and Kumho Polychem

Kumho Petrochemical’s Vision and Goal for Occupational Safety and Health

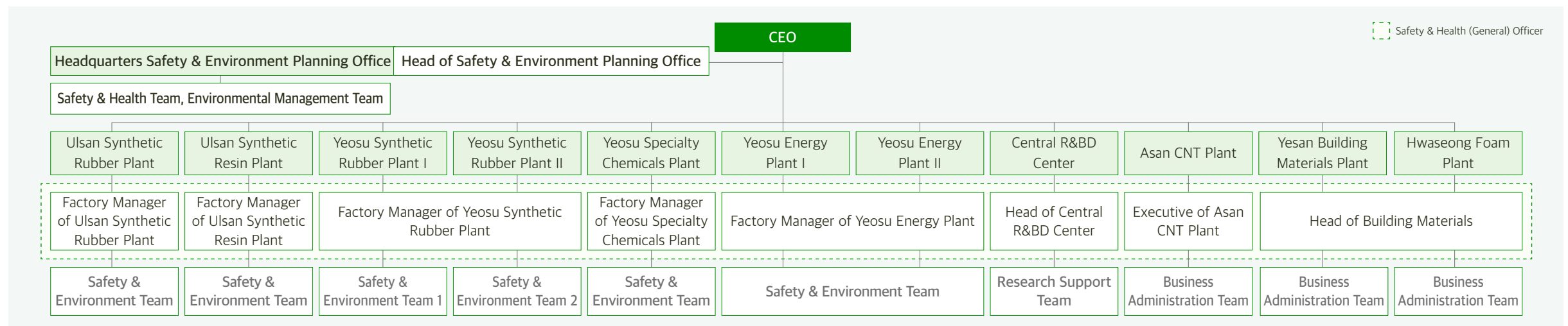


Organization Responsible for Occupational Safety and Health

In February 2022, we upgraded the status of the Safety & Environment Team, previously under the Technology Planning Division of the headquarters, to the Safety & Environment Planning Office, positioned directly under the CEO to strengthen the independence and role of the dedicated safety and environment organization. The Safety & Environment Planning Office acts as a control tower that oversees the safety and environment work in 12 business sites, including the headquarters, and comprehensively manages safety and environmental risks under the leadership of a dedicated executive (Head of Safety & Environment Planning Office). In addition, we have secured uniformity in safety and environmental policies and practices across all business sites by complying with the relevant laws, establishing goals and detailed roadmaps, and inspecting the implementation of relevant tasks at each business site. In addition, we have established Safety & Environment Teams at each business site under the direct supervision of the factory manager to respond quickly to safety and environmental issues that arise at the plant.

Kumho P&B Chemicals has established and operates an integrated safety and health management system organization for plants and research center to proactively respond to the strengthening of obligations to ensure safety and health. The General Factory Manager under the CEO is entrusted with the overall safety and health work of business sites, and a dedicated safety and health organization is formed to establish the safety and health system and evaluate its implementation. The company also conducts quarterly safety, health, and environment meetings and manages safety and health performance and plans. Kumho Mitsui Chemicals is also striving to prevent industrial accidents and strengthening workplace safety management by setting a safety and health management policy, establishing an organization in charge of safety and health affairs, and holding safety and health meetings from time to time under the leadership of the CEO. Kumho Polychem has appointed Safety & Health Management Officers for the headquarters management division, plant division, and research division under the CEO, and practices safety and health management with relevant departments at each business site. In addition, the headquarters Strategy Team monitors the fulfillment of obligations under safety and health related laws and regulations quarterly, presents business reports monthly, and receives the opinions from employees at each business site. In the case of Kumho T&L, the Safety & Health Officer and the Safety & Health Team are in charge of safety and health management, and related departments and contractor safety officers work together to implement workplace safety, health, and environmental management. In particular, it strengthens site management with the goal of achieving an accident-free workplace, improves facilities such as conveyor belts and underground tunnel motion detection systems, and conducts regular safety inspections of silo structures.

EHS Organizational Chart



Industrial Health & Safety Committee

We operate the Industrial Health & Safety Committee which employees participate in to effectively prevent industrial accidents. The role of the Committee is to guarantee the cooperation and communication between the labor and management. The Committee consists of the same number of members each from labor and management, deliberates and resolves issues under the Occupational Safety And Health Act, and shares major safety and health achievements, future plans, and results of implementing recommendations.

Status of Industrial Health & Safety Committee

Business Site	Members (Labor/Management)
Ulsan Synthetic Rubber Plant	10/10
Ulsan Synthetic Resin Plant	8/8
Yeosu Synthetic Rubber Plant	10/10
Yeosu Energy Plant	9/9
Central R&BD Center	8/8

Emergency Response Process

Kumho Petrochemical established a response process to prevent emergencies and minimize damage in the event of an emergency. In 2023, we established unified and company-wide ‘Emergency Plan (E-Plan)’, to supplement the existing contingency system of each business sites, and counteract serious disasters rapidly and effectively.

Emergency Plan (E-Plan)

The E-Plan is a company-wide contingency process that covers from occurrence of accident to executive reporting and response execution.

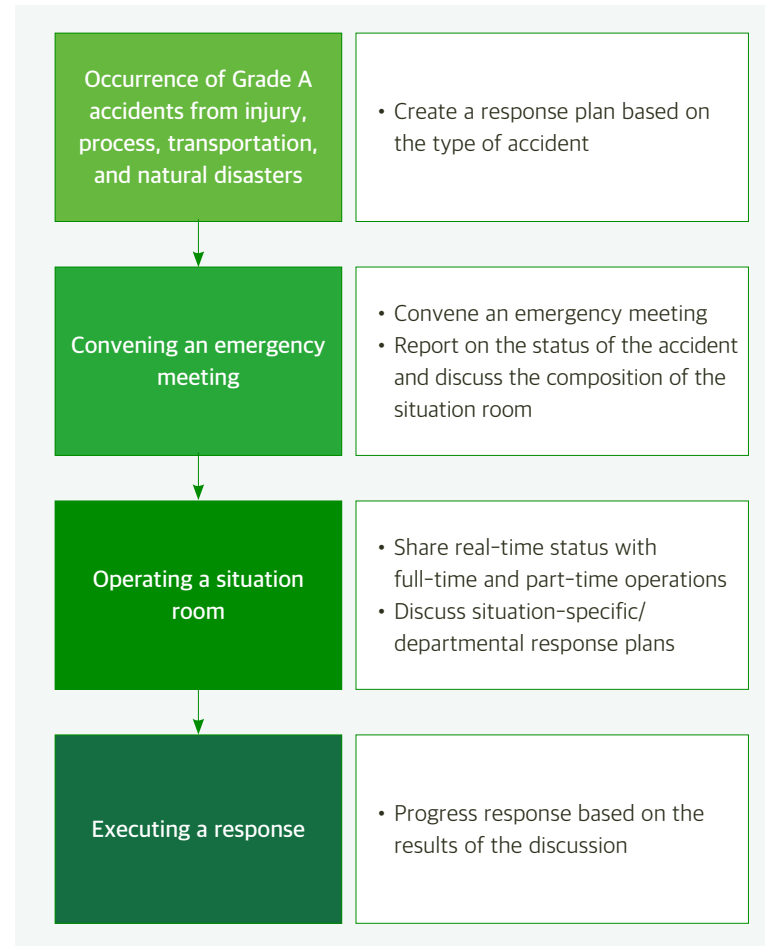
Classification of Accident Types

We have categorized safety and health-related accidents into injury, process, and transportation accidents, and classified each accident into grades A through C according to severity, activating the E-Plan in the event of a grade A accident. In case of overlapping accidents, we apply higher classification standards more strictly.

Classification of Accident Types

Grade	Injury accident	Process accident	Transportation accident
A	Fatalities, industrial accidents	Fire, explosion, chemical accident	External leakage
B	Minor injuries	Power outages, excessive pollutant emission	Internal leakage
C	Medical treatment	-	-

Overview of E-Plan



Convening an Emergency Meeting

In the event of a Grade A accident, we report the accident to the Safety & Environment Planning Office at the headquarters within one hour and activate the E-Plan with the approval of the CEO. When the E-Plan is activated, an emergency executive meeting is urgently convened and an emergency contact network is established to quickly share work contents. In addition, based on the results of the analysis of the severity of the accident, the control room’s composition plan is discussed.

Operating of Situation Room

The situation room, which is organized according to the E-Plan, is headed by the CEO as the general manager of emergency response, and includes the director of the situation room (Head of Safety & Environment Planning Office,) emergency leaders (Safety & Environment Planning Office, Head of Production Technology Team at the business site), and relevant departments for accident response. The External Affairs Team, Legal Team 1, IR Team, ESG Management Team, etc. participate in the situation room and define the goals and roles of accident response by department in detail.

Executing a Response

After the establishment of the situation room, we discuss the response plan and execute the plan through flexible communication between the headquarters and the situation room at the business site. In particular, we have established a matrix of situation-specific response items to specify the duty of each department for specific situation in detail, and the matrix is utilized as a reference for accident response.

Reporting to the ESG Committee

In the event of a safety and health-related situation at each business site, the Safety & Environment Planning Office receives the details of the accident and reports to the CEO and the ESG Committee depending on the severity of the accident. In particular, in the event of a Grade A or higher accident, the Safety & Environment Planning Office reports the details of the accident to the CEO and based on the CEO’s judgement, it can also be reported to ESG Committee. In addition, the ESG Committee is convened at the request of the ESG Management Team to discuss related matters depending on the severity of the accident.

Emergency Preparedness and Response Process by Business Site

In the event of an emergency, such as a safety accident, each business site responds according to the emergency preparedness and response process. All accidents are shared with the headquarters Safety & Environment Planning Office, and an E-Plan is activated according to the grade of the accident.

Strengthening Occupational Safety and Health Management

Embedding Occupational Safety and Health KPI

We conduct evaluations on the performance of safety and health-related duties of employees and managers in charge of safety and health management twice a year. From 2023 onward, the results of such evaluations will be reflected in the PM (Performance Measure) of executives and teams related to occupational safety and health and the KPIs (Key Performance Indicators) of managers in charge of occupational safety and health in order to strengthen safety and health management by rank and position. The PM is composed of specific indicators related to the ‘performance of duties to ensure safety and health’, and the lowest grade will be given in the event of a serious industrial accident, including those involving suppliers.

Safety and Health Compliance Inspection Check

We conduct safety and health inspections at all of our business sites to fulfill the seven items of the management’s duty to secure safety and health imposed under the Serious Accidents Punishment Act. The inspection team consists of 6 to 8 people depending on the size of the business site, and is composed of external agencies and our own inspection organization.

Based on the inspection results, we figure out what improvements are needed, establish improvement plans, share best practices with each business site, and reward outstanding teams and employees.

Safety and Health Risk Assessment

Kumho Petrochemical conducts risk assessment to identify possible serious industrial accidents, serious accidents, and near misses in advance. Depending on the process, we apply the HAZOP (Hazard and Operability Study), the Check List, and the K-PSR (KOSHA Process Safety Review) to identify hazards and risk factors at each business site and establish measures to mitigate them. In addition, each team manager provides training to team members on the assessment results to prevent similar accidents in advance. In the case of Yeosu Energy Plant, we also conduct risk assessments for non-process areas such as labor-supplied work and in-house work within teams to identify risk factors that may occur in risk blind spots.

Establishing standards of handling hazardous substances for transportation

Kumho Petrochemical established safety work standards, safety guidelines, and handling standards to reduce the impact on the local community and society. In particular, our safety guidelines clearly indicates the risk factors that may arise at shipping facilities and automated warehouses, person in charge, and the management and the standards for working plans. Moreover, we periodically check whether the guidelines are up to date.

Best Practice in Inspecting the Fulfillment of the Obligation to Secure Safety and Health by Business Sites

Evaluation Item	Business Site	Best Practice
Evaluations on the performance of safety and health-related duties of employees and managers in charge of safety and health management	Yeosu Specialty Chemicals Plant	Operating a reward program for utilizing the right to work suspension
Fulfillment of obligations under safety and health laws	Yeosu Synthetic Rubber Plant II	Keeping sites organized and well-maintained and pursuing improvement activities
Identification and remediation of harmful/risk factors	Ulsan Synthetic Resin Plant	Conducting a risk assessment based on a detailed inventory of tasks
Listening to the voice of employees	Ulsan Synthetic Rubber Plant	Creating a suggestion box for contractor safety and health feedback and reflecting on improvement activities
Adherence to the manual on emergency action plan	Ulsan Synthetic Rubber Plant	Building actual response capabilities with unannounced nighttime drills
Evaluation on safety and health management of suppliers	Yeosu Synthetic Rubber Plant I, II	Conducting monthly safety and health assessments for resident contractors
Fulfillment of safety and health training obligation	Yeosu Synthetic Rubber Plant I	Conducting a subjective test to determine the effectiveness of safety and health training

Safety and Health Risk Assessment Techniques

HAZOP (Hazard and Operability Study)	Identify and eliminate possible hazards in a work process and factors that reduce process efficiency
Check List	Identify risks by cataloging process and equipment errors, defective conditions, and hazards
K-PSR (KOSHA Process Safety Review)	Analyze the risk of accidents (leaks, fires, etc.) by revisiting process safety in chemical plants
CA (Consequence Analysis)	Assess damage through quantitative assessment of potential fire, explosion, and leakage hazards in the process
Job Safety Analysis	Break down specific tasks into key steps and identify hazards and potential accident factors for each step, and develop countermeasures to eliminate or minimize them

Improving Safety Facilities

Kumho Petrochemical is strengthening the safety of each facility to reduce safety accidents caused by facilities within the plant. The Yeosu Synthetic Rubber Plant I introduced a wireless communication system to prevent accidents caused by suffocation and monitors the number of people entering the plant at all times. Yeosu Synthetic Rubber Plant I also installed emergency rescue equipment in the workplace and conducted a detailed safety diagnosis of the automated warehouse structure to strengthen workplace safety. The Yeosu Energy Plant installed safety railings, toe boards, and protection device to prevent accidents caused by falls, pinching, and plunge.

Responding to Fire Accidents

Kumho Petrochemical has a thorough response system for fire accidents. The Ulsan Synthetic Rubber Plant has installed a fire detection equipment monitoring system and surveillance cameras in vulnerable areas within the plant, and is training its own fire brigade experts by commissioning specialized courses on firefighting and emergency rescue activities. The Ulsan Synthetic Resin Plant improved its automatic fire detection system and expanded the installation of flame detectors integrated with surveillance cameras. Through in-house diagnosis, Yeosu Synthetic Rubber Plant II went through whether it has met the standards obliged by related fire and hazardous laws and figured out what should be supplemented in terms of countering fire accident. The Yeosu Specialty Chemicals Plant and Yeosu Energy Plant also conducted safety diagnosis of fire accident-related documents and facilities with external agencies.

Welfare Programs to Promote Employee Health

Kumho Petrochemical is operating a welfare system for the health care of employees. In order to detect and treat diseases at an early stage, we provide regular medical examinations and support medical and dental expenses within the annual limit. In addition, physical training expenses are supported at business sites, and the Central R&BD Center operates a physical training room for employees.

Empowering Employee Health Management

In 2023, to strengthen the health management capabilities of employees and prevent the occurrence of serious accidents, we conducted training to nurture personnel dedicated to first aid and CPR, and promoted AED training for all employees at the headquarters. Besides, we installed AEDs on all floors where employees are present to ensure rapid lifesaving in case of an emergency.

Preventing Work-Related Illness

To prevent work-related diseases and create a comfortable working environment, Kumho Petrochemical regularly conducts surveys on the tasks putting burden on musculoskeletal system and job stress, and executes improvement plans based on the survey results. In 2023, the survey was expanded to include headquarters employees. Although the work performed by headquarters employees is not included in the 11 musculoskeletal burden works notified by the Ministry of Employment and Labor, the survey was conducted to reduce the likelihood of related diseases by proactively identifying hazardous factors. Referring to the analysis of survey result, we executed our plans to eliminate harmful risk factors and prevent diseases.

Facilitating Safety and Health Communication

Refinery and Petrochemical Industry Safety and Health Leadership Council

The CEO of Kumho Petrochemical attended the ‘Refinery and Petrochemical Industry Safety and Health Leadership Council’ organized by the Ministry of Employment and Labor to discuss policy directions to reduce fatal accidents due to industrial accidents and examples of risk assessment management systems of other companies. During the meeting, participants shared their commitment to creating a safety and health culture by establishing a self-discipline prevention system centered on risk assessment, which is a key element of the roadmap to reduce fatal accidents, and activating pre-work safety inspection meetings to ensure the safety of workers.

Safety and Environment Integration Meetings and Exchanges

Kumho Petrochemical conducts Safety and Environment Integration Meeting and Exchanges twice a year to convey the CEO’s policy and commitment to safety and environment culture and to strengthen company-wide safety and environment collaboration. At the Safety and Environment Integration Meetings, employees share the performance and future plans of each business site, and attend seminars and trainings on safety and environment. In 2022, we invited an external expert to give a special lecture on trends in safety and health policies and the direction of the company.



Refinery Petrochemical Safety and Health Leadership Statement



24th Safety and Environment Integration Meeting

Safety and Health Workshops

Kumho Petrochemical conducts safety and health workshops to share the direction of work among safety and environment managers at the headquarters and business sites. In 2022, two workshops were held in the first and second half of the year to discuss the process of responding to the Serious Accidents Punishment Act and the procedure of rebuilding the safety and health management system.

First Half of 2022	<ul style="list-style-type: none"> • Serious accident prevention safety resolution meeting • Accident reporting and handling process • Risk assessment process • Emergency preparedness and response processes
Second Half of 2022	<ul style="list-style-type: none"> • Revised rules on investment and expense budget • Accident investigation and handling processes • Inspection results of fulfillment of safety and health obligations, etc.

Safety Keeping Dialogue

Kumho Petrochemical conducts the Safety Keeping Dialogue under the leadership of the headquarters Safety & Health Team. It is a program that selects safety and health issues every month, creates posts, and disseminates the contents to all employees at the headquarters and business sites. In 2022, we shared information on the Serious Accidents Punishment Act, the right of work suspension, electric shock accidents, spring fever safety accidents, fall accidents, and rainy season safety accidents.

Enhancing Safety and Health Capabilities

Safety and Health Training

Kumho Petrochemical provides various training programs to raise the safety and health awareness of employees. In January 2022, we provided training on ‘Legal Responsibilities in the Event of a Serious Accident and Countermeasures under the Serious Accidents Punishment Act’ to safety managers and representatives of suppliers at 11 business sites. In addition, we provided training on ‘Trends in Safety and Health Policy and Corporate Direction’ for CEOs and plant safety managers, and offered junior-level engineers the opportunity to participate in the ‘Junior Engineer Training for Accident Prevention in Petrochemical Plants’ organized by the Korea Gas Safety Corporation. In order to thoroughly investigate the root cause in the event of accidents, we select accident investigation personnel from the headquarters and each business site, and provide training for accident investigation experts from professional agencies.

Each business site also provides training programs that consider the situation of the business site. The Ulsan Synthetic Resin Plant provides outsourced training on process safety report preparation, accident investigation process, risk assessment, and electrical safety management techniques to improve the job skills of employees in charge of safety and health management. The Yeosu Specialty Chemicals Plant and Yeosu Energy Plant separately provides safety and health training to all employees and resident suppliers, as well as to all personnel with construction experience. In particular, we enhance the effectiveness of training by conducting performance evaluations and rewarding employees who perform well based on the evaluation results. In addition, small-scale worksites such as the Central R&BD Center, Yesan Building Materials Plant, Hwaseong Foam Plant, and Asan CNT Plant also conduct special safety training to strengthen safety management.

Consulting to Strengthen Safety Management

Kumho Petrochemical conducted consulting on strengthening safety management to build an optimized safety management system, considering the characteristics of small-scale business sites such as the Central R&BD Center, Yesan Building Materials Plant, Hwaseong Foam Plant, and Asan CNT Plant, which do not have enough management personnel. After consultation on risk assessment, safety work permit, and supplier safety management, we identified the need for strengthening supplier safety and health management capabilities. In response, we plan to conduct consultations to improve the level of supplier safety management as well as workshops for health management personnel and the preparation of standard guidelines.

Training on the Right of Work Suspension

Kumho Petrochemical provides detailed information on the right of work suspension for workers at its business sites. The right of work suspension refers to the right to stop work and take necessary measures in the event of an industrial accident or a serious accident and can be exercised by workers to protect their own safety. Each business site of Kumho Petrochemical explains the right of work suspension in detail during safety trainings for all employees and workers of suppliers, and also specifies related contents in the pledge. We also train managers at each business site to ensure that workers do not suffer any personnel disadvantages for exercising the right of work suspension.

Supplier Safety and Health Management

Supplier Safety Risk Management

Kumho Petrochemical aims to prevent safety accidents by thoroughly managing the safety risks of our suppliers. In particular, the safety and health department at the headquarters manages ‘improving safety management of suppliers’ as a team goal, and as part of this, we identify the safety risks of our suppliers, derive and implement improvement measures. In addition, in the case of companies with excellent safety management, we share their safety management systems with other companies to level up the safety management capabilities of suppliers.

Contractor Safety and Health Assessment

Kumho Petrochemical regularly conducts safety and health assessments for contractors. When selecting contractors, all business sites, including the Central R&BD Center, evaluate the safety and health capabilities of contractors using the new contractor evaluation form and the e-procurement system. In addition, safety assessments for resident contractors are conducted once a year or as often as monthly, depending on the situation at each business site, to monitor the safety and health management status of suppliers.

Safety and Health Cooperation Program

Kumho Petrochemical operates a safety and health cooperation program with suppliers at each business site to prevent industrial accidents and strengthen the safety and health capabilities of suppliers. The Safety and Health Cooperation Group, consisting of people in charge of safety and health management both from Kumho Petrochemical and our suppliers, monitors the implementation of the cooperation program through regular meetings (once a month) and ad hoc meetings (as needed), and assesses risk factors at business sites through frequent assessments and joint inspections.

In addition, we establish and implement detailed improvement plans such as educational support, facility improvement, and safety protective equipment support for companies with high risks based on the results of the risk assessment.

Cooperation Program

Technical support	Quarterly joint inspections, monthly safety inspections of hazardous machinery and equipment, and inspections of supplier workplaces
Educational support	Safe work guides for each hazardous task, basic workplace safety practices, etc.
Resource support	Risk assessment materials, emergency action response management processes, chemical safe handling standards, etc.

Operating Supplier Safety and Health Grievance Channel

Kumho Petrochemical operates a grievance channel to hear suggestions and opinions related to safety and health from contractors. For example, we collect opinions through the contractor council and reflect them in the actual improvement of business site operations. In the case of Yeosu Specialty Chemicals Plant, a total of 6 opinions were collected and reflected through the council in 2022, including the purchase of rubber cones and connecting rods for heavy-duty work and the purchase of signalmen’s clothing and equipment. The Yeosu Energy Plant also collected a total of 103 opinions as of the end of 2022 and reflected 20 of them, actively reflecting the opinions of suppliers through continuous improvement activities.

In addition, other business sites collect opinions from suppliers through contractor suggestion boxes. The Ulsan Synthetic Rubber Plant received a total of 47 proposals and implemented 38 of them, while the Yeosu Specialty Chemicals Plant implemented all 3 proposals, including remodeling the aging rest facilities.

The Yeosu Specialty Chemicals Plant and Yeosu Energy Plant collected opinions from suppliers who have performed the previous month’s and current month’s construction including resident supplier. Besides, Hwaseong Foam Plant operates a supplier suggestion system for process improvement and production efficiency in addition to safety and health. We also encourage active participation of employees and workers of suppliers by awarding rewards to those who provide opinions that are helpful to the operation of business sites.

Supply Chain Management

Supply Chain Management System

Kumho Petrochemical aims to secure business stability by building a sustainable supply chain and strengthen industry competitiveness through shared growth with the supply chain. To achieve this, we systematically manage the supply chain centered on the purchasing department and established the 'Sustainable Procurement Policy' and 'Supplier Code of Conduct' as the basis for supply chain management.

The Sustainable Procurement Policy contains guidelines for all procurement activities, including supply chain evaluation and management, and purchasing ethics to establish fair trade. The Supplier Code of Conduct outlines what Kumho Petrochemical and its suppliers must do in terms of environment/safety, labor/human rights, and ethics/anti-corruption, and since 2021, we have been asking all major suppliers, including new suppliers, to agree to the Supplier Code of Conduct.

 Sustainable Procurement Policy

 Supplier Code of Conduct

Management of New Suppliers

When selecting a new supplier, Kumho Petrochemical conducts sustainability monitoring for financial stability as well as environmental and social violations and sanctions. In particular, from 2021, we expanded the scope of supplier evaluation by adding items such as environment, labor/human rights, safety and health, and fair trade.

Fair Trade

In order to foster transparent and fair-trade practices, Kumho Petrochemical has defined 'Fair Trade 4 Principle' in accordance with the guidelines set forth by the Korea Fair Trade Commission.

Fair Trade 4 Principle

Appropriate Contract-Signing

Kumho Petrochemical strictly indicates requirements for contracting methods, prohibiting the signing of contracts that arbitrarily restrict competition. We also specify in detail what must be included in contracts, such as reasonable unit prices, compliance with payment deadlines, and objective quality inspection standards, and what must be avoided, such as unfair subcontracting treatment and management interference.

Fair Selection of Suppliers

We specify in detail the criteria for selecting suppliers, the disclosure of procedures and results, and the specificity, clarity, and fairness of the selection criteria. We also stipulate that when selecting suppliers, all suppliers shall be given the opportunity to do business, and no supplier shall be deprived of the opportunity to do business based on arbitrary interpretation.

Operation of the Internal Deliberation Committee

Kumho Petrochemical operates an Internal Deliberation Committee centered on the Strategic Planning Executive (chairperson) and the team leader of the contracting department (member). The Internal Deliberation Committee deliberates on the fairness and legality of subcontracting transactions in advance to ensure that desirable contracts are signed and suppliers are selected fairly.

Issuance and Preservation of the Written Document

Kumho Petrochemical clearly specifies the contractual rights and obligations in writing and stipulates in detail the timing and method of issuance of the document.

Fair Trade Training

Kumho Petrochemical conducts fair trade training through the compliance training program. In 2022, we established a system for operating a regular compliance training program, and in the first half of 2023, we conducted compliance training for new employees, and in the second half of 2023, we will conduct compliance training in the leadership course for team leaders. We also conduct legal seminars twice a year and distribute contract guidelines and compliance handbooks to promote the importance of fair trade.

Supplier ESG Risk Assessment

Kumho Petrochemical enforces our own ESG risk assessment to identify potential ESG risks in the supply chain in advance. In particular, we divide our entire supply chain into tiers 1-3, taking into account the characteristics of suppliers in the supply chain, and assesses the ESG risks of suppliers through a self-diagnostic questionnaire tailored to the characteristics of each tier. In 2023, we plan to improve our supply chain assessment, due diligence process, and implement conflict minerals and responsible minerals surveys to enhance supply chain management. We will also expand ESG risk assessments to newly registered suppliers to minimize supply chain ESG risks and actively respond to international regulations.

Supplier ESG Risk Assessment

	Tier 1	Tier 2	Tier 3
Supply chain classification	• Major suppliers of key raw materials	• Suppliers of subsidiary raw materials	• Suppliers of facility equipment, construction, goods, etc.
Suppliers subject to management	• 11 companies	• 360 companies	• 677 companies
Evaluated companies in 2022	• 11 companies (Including 2 new suppliers)	• 60 companies (Transaction amount of KRW 1 billion or more)	• 53 companies (Resident suppliers and average transaction value of KRW 500 million or more over the last three years)
Future plans	<ul style="list-style-type: none"> Incentivize or penalize next year's contract based on evaluation results Consider expanding evaluations to international suppliers 	<ul style="list-style-type: none"> Conduct due diligence on companies with low assessment results Advance supply chain assessment processes Investigate conflict and responsible minerals 	<ul style="list-style-type: none"> Conduct due diligence on resident suppliers Advance supply chain assessment process

CASE STUDY

Supply Chain Management of Affiliate

To ensure the sustainability of its supply chain, Kumho P&B Chemicals prioritizes the implementation of the Serious Accidents Punishment Act and the establishment of a transparent and fair procurement process. Every year, it conducts regular assessments on financial status, safety, environment, social, and quality for major suppliers, and regular safety assessments for major construction companies. In 2022, it reviewed ESG risks in the supply chain to renew its Authorized Economic Operator (AEO) certification, reflected the requirements of the Serious Accidents Punishment Act in construction contracts, and improved procurement business processing regulations. Going forward, Kumho P&B Chemicals plans to strengthen business competitiveness by securing the stability and reliability of the supply chain by establishing a code of conduct for suppliers and a supply chain ESG risk assessment system.

Shared Growth with Suppliers

Kumho Petrochemical is building a long-term and stable trust relationships with our suppliers through multi-faceted support which spans finance, technology, management, employment, and training while identifying the needs of our suppliers through regular communication. We also operate a shared growth program to ensure a virtuous cycle of growth for our suppliers.

Kumho Petrochemical's Shared Growth Program

Financial support

- KRW 20 billion in the mutual growth fund,
- Approximately KRW 11.2 billion in supporting interest of loans (for 33 suppliers)

Online training support

- Support for online self-development for workers of suppliers (registration of Win-Win Nuri, development of online training programs for SMEs which we do not trade)

Meetings for opinion hearing

- Monthly meeting to gather opinions from suppliers (attended by 15 companies per session on average)

Win-Win Growth Mall

- Expansion of sales channels for SMEs

Provision of items to encourage suppliers to overcome the COVID-19 pandemic



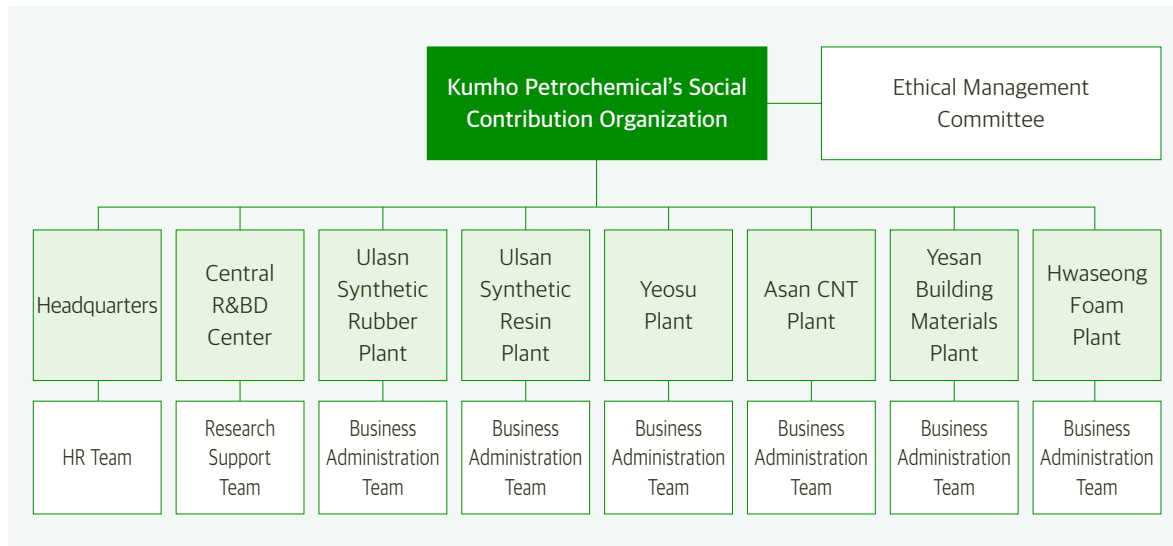
Yeosu Synthetic Rubber Plant Supplier Meeting

Local Community

Social Contribution Implementing System

Kumho Petrochemical is establishing social contribution strategy and promoting related activities with the purpose of creating the value of ‘social responsibilities and trust, coexistence, and growth of local communities’. Moving beyond from simple product support of donations, we are expanding our activities to participation, sharing, and running a social contribution program related to our business characteristics such as donating HUGREEN windows, supporting assisting devices for the disabled. Moreover, we are operating a system for rewards for volunteers in order to encourage employees to join volunteer efforts. In 2022, despite the difficulties in conducting direct activities due to COVID-19 pandemic, we continued various activities based on our steadfast interest in the local community.

Organizational Chart Responsible for Social Contribution



Social Contribution Activities

Residential Environment Support

Replacing Old Window Facilities

Every year, Kumho Petrochemical replaces old windows of welfare facilities for the disabled that are in urgent need of replacement of windows in collaboration with HUGREEN, a building material brand. By replacing the windows with HUGREEN windows, which have excellent insulation effect and are designated as low-carbon certified products, we hope to contribute the heating efficiency of the welfare facilities. In 2022, we provided HUGREEN windows worth KRW 86 million to Hyojeong Vision Town, a welfare facility for the disabled located in Yongin, Gyeonggi-do, together with the Seoul Association of Welfare Facilities for the Disabled.

Improving Housing Conditions for Vulnerable People

The Ulsan Synthetic Rubber Plant and Ulsan Synthetic Resin Plant actively support the improvement of the living environment of the vulnerable. The Ulsan Synthetic Rubber Plant donated heating oil to low-income marginalized groups and helped improve the environment of the welfare center’s senior cafeteria. The Ulsan Synthetic Resin Plant implemented the ‘Love House Repair Support Project’ by replacing paintings and wallboards for vulnerable residents, inspecting electrical facilities at risk of accidents, and replacing deteriorated lights.

Support for Improving Mobility for the Disabled

Kumho Petrochemical have been donating assisting devices customized for the severely disabled and white canes for the visually impaired for 15 years, since 2008, to help people with disabilities go outside and move around more easily.

The assisting devices for the severely disabled is a special wheelchair equipped with a customized posture maintenance device according to each individual’s body and requires periodic replacement according to changes in the user’s body. In 2022, together with the Seoul Association of Welfare Facilities for the Disabled, we visited 18 residential facilities for the disabled in the Seoul metropolitan area and donated 51 customized canes (worth KRW 64.3 million), and to date, we have provided customized assisting devices to 407 people. White canes for the visually impaired are tools that inform the visually impaired of the location of obstacles and changes in terrain when walking, and require periodic replacement due to damage caused by use. In 2022, together with the Korea Welfare Center for the Blind, we provided durable white canes made of aluminum to 1,540 severely visually impaired people nationwide (worth approximately KRW 54 million).

Donation of Odd Money Fund

Since 1991, Kumho Petrochemical have been raising money to help the underprivileged by encouraging individual donations and collecting donations from employees. Employees contribute the odd money under KRW 1,000 from their monthly salary and Kumho Petrochemical contributes an additional amount equal to the employee's donation (matching grant) and delivers it to local welfare fundraising organizations, including the Eastern Social Welfare Society. In 2022, we donated a total of KRW 150 million through the fund and matching grants.

Blood Donation

Kumho Petrochemical have been participating in blood donations by Korean Red Cross since 2012. In 2022, we expanded the blood donation event to three times to ease the blood shortage due to the prolonged COVID-19, and a total of 209 employees participated in the blood donation event. The Ulsan Synthetic Resin Plant donated 362 blood donor cards and items worth KRW 3.68 million to the Korean Association for Children with Leukemia & Cancer. In addition, Kumho Resorts participated in group blood donations with 220 employees on 10 occasions.

Supporting Vulnerable Communities at Business Sites

The Yeosu Synthetic Rubber Plant continues to provide financial support to vulnerable people in the local community. We have supported the living expenses of 13 families of elderly people living alone and 3 households of abandoned children, as well as health insurance premiums for low-income people. In addition, we provided scholarships to 11 elementary school students and 4 middle school students through the Yeodo Foundation to support the growth of local youth. Furthermore, we supported the cost of denture treatment for 20 low-income people under the age of 65, for a total of 111 denture treatments from 2016 to the present.

The Ulsan Synthetic Rubber Plant and Ulsan Synthetic Resin Plant support daily necessities for the elderly living alone through a joint program with social contribution partners. In 2022, the Ulsan Synthetic Resin Plant delivered gift packages and lunch boxes, including Seosaeng seaweed and Ulsan honey, to 1,240 elderly people living alone. The Ulsan Synthetic Resin Plant also provided holiday gift sets, including electric fans, to 100 low-income elderly people living alone through the Jung-gu Community Care Center for the Elderly. Moreover, the Ulsan Synthetic Rubber Plant donated kimchi to a welfare center for the visually impaired, and the Ulsan Synthetic Resin Plant distributed rice to low-income families.

CASE STUDY

Affiliates' Social Contribution Activities

Kumho Petrochemical Group systematically conducts group-wide social contribution activities. Each affiliate also spreads positive influence to stakeholders through active social contribution activities in the local community. Kumho P&B Chemicals continues its sponsorship activities for the vulnerable and disabled in Yeosu. It supports the livelihoods of children of the disabled and crime victims in the area, and provides donations for low-income families with hearing disabilities and vulnerable hearing-impaired seniors. It also sponsors educational boats for survival swimming for elementary school students through the Korea Association Safety Service. Kumho P&B Chemicals also practices social contribution through the active participation of its employees. As an internal campaign, it runs the 'Step Donation Challenge' to collect funds based on the number of steps taken and donate them to international humanitarian NGOs for medical support for children. It also contributes to improving the local environment through environmental cleanup activities in the area around its Gimpo R&BD center. Kumho Polychem supports the underprivileged and the elderly living alone through the Hope Rice Car program, and Kumho Resort actively promotes environmental cleanup activities near its sites, including the waterfront around the Tongyeong site, the public parking lot at the Hwasun site, and the access road to the Seorak site, to expand its positive impact on the local community.

Data Security and Personal Data Protection

Data Security and Personal Data Protection System

Kumho Petrochemical is committed to protecting corporate and personal data from malicious programs such as viruses and ransomware and external hacking, and thoroughly implements data security related to product and technology development. In particular, we have appointed an expert in the field of data protection as the Chief Information Security Officer (CISO) to strengthen data security and personal data protection. In addition, we have divided data security and personal data protection into three areas: administrative security (human security and privacy), physical security, and technical security (IT service security), and dedicated organizations with expertise in each area manage them in accordance with relevant regulations. Each dedicated organization reports to the CEO and the BOD when issues related to data security and privacy arise, and the issues are also shared among the dedicated organizations to quickly respond to issues.

Strengthening Administrative Security

Administrative security refers to human security and personal data protection, and the HR Team is responsible for administrative security. Kumho Petrochemical requires data security agreement from new employees and investigates whether former careers are confidential and whether there are restrictions on employment with other companies. In addition, we provide regular security training to all employees at least once a year on regular security training, security management status, work confidentiality status, external companies personnel security, access control for outsiders, security personnel training and we require employees to sign up pledge related to data security annually.

Privacy Policy

Kumho Petrochemical established privacy policy that reflects the laws on personal information (Personal Information Protection Act, Act On Promotion Of Information And Communications Network Utilization And Information Protection, etc.) and discloses it on our website, and based on this, we follow the procedures for collection, use, provision, consignment, and destruction of personal data accordingly.



Establishment of DRM and DLP System

Kumho Petrochemical established DRM (Digital Rights Management) and DLP (Data Loss Prevention) systems to protect personal data. Through the DRM system, all internal documents of Kumho Petrochemical are encrypted to prevent personal data from being leaked, and the DLP system is utilized to control internal documents containing personal information from being leaked to the outside. In addition, we prevent the printing of documents containing personal data, and in 2023, we plan to introduce PC screen watermarks to strengthen personal data protection.

Strengthening Physical Security

Physical security refers to the protection of company secrets, special materials, facilities, etc. The headquarters Management Support Team and Business Administration Teams at each business site, which are dedicated to physical security, set up and operate restricted and controlled areas at business sites. They also establish their own security plans for protected areas and execute security guards according to approved procedures.

Establishing Access Control System

In 2022, we introduced a face-recognition-based access control system to all of our business sites. The introduction of the access control system enhanced physical security by thoroughly managing the entry and exit records of employees and workers of suppliers.

Strengthening Technical Security

Technical security refers to the protection of IT infrastructure and systems. Kumho Petrochemical strengthens technical security by establishing IT security policies, monitoring cybersecurity threats around the clock, and implementing and operating security solutions, centered on the IT Infrastructure Team.

Data Security Training

Kumho Petrochemical conducted data security training twice in the first and second half of the year to raise awareness of technology security among new employees. We also provided online data security to employees and suppliers.

Emergency Response Drill

Kumho Petrochemical conducted simulation training to respond to malicious code infection based on virtual scenarios. In 2022, a fictitious event assumed the infection and spread of malware through phishing emails to enhance the response capabilities of employees and suppliers, and to spread the importance of periodically blocking malicious emails.

Data Security System Check

Kumho Petrochemical diagnosed security vulnerabilities in 21 servers, including blueprints, HR, and groupware, and conducted service security vulnerability diagnosis for company-operated websites such as Kumho Resort, Asiana CC, and Asan Sparvis homepage.

Operation of Data Security Council

Kumho Petrochemical operates a data security council by selecting a security officer for each group company. The council shares quarterly internal and external security issues and security system operation performance by affiliates.

Customer Management

ISO 9001 Certification

Kumho Petrochemical aims to ultimately realize customer satisfaction through thorough management and continuous improvement of product quality. To this end, we have obtained ISO 9001 certification, the international standard for quality management systems. In addition, we have organized our own checklists to respond to certification audits and distributed them to relevant departments to continuously improve the quality of products and services.

ISO 9001 certified affiliates	Kumho Petrochemical, Kumho P&B Chemicals, Kumho Mitsui Chemicals, Kumho Polychem
IATF 16949 certified affiliates	Kumho Petrochemical, Kumho Polychem

Product Quality Management

Kumho Petrochemical thoroughly manages indicators such as the defect rate of products sold to each customer, delivery compliance rate, incidence of additional freight charges, and customer production changes/defects. Each indicator is linked to product quality as well as the reliability of the business relationship and is used as a measure of customer satisfaction management. In this regard, Kumho Petrochemical is improving the performance of each indicator to build sustainable relationships with customers.

Building a CRM System

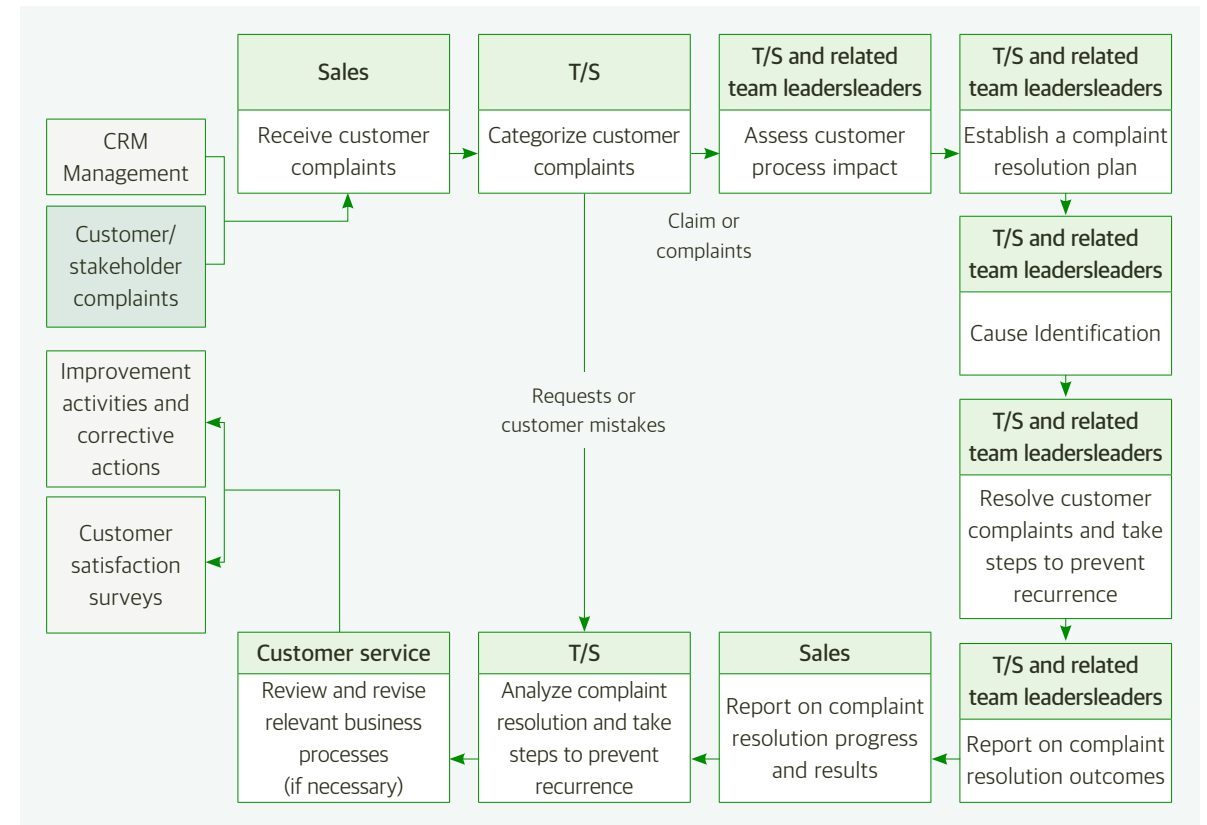
Kumho Petrochemical is building a Customer Relationship Management (CRM) system for systematic customer management. In the first half of 2023, we plan to implement a system to aggregate data such as customer management cards containing customer information and sample sending lists as the first step in building the system. After that, we will continue to build and upgrade the CRM system to standardize data on scattered customer information and realize efficient customer management based on it.

Customer Communication Channels

Kumho Petrochemical collects customer opinions through various channels. Demands for product quality and sustainable products raised through the website, customer inquiry center, etc. are reviewed by relevant departments and reflected in production activities. Each business sites also receive customer opinions and complaints individually and reflects them in the production process to improve the quality of products and services.

Customer Complaint Receipt and Resolution Process

Kumho Petrochemical operates the Customer Complaint Receipt and Resolution Process to handle customer complaints and opinions on products and services and to prevent recurrence of problems caused by the same cause. Relevant departments such as sales, research, quality assurance, and T/S departments receive comments or complaints from customers and resolve them according to the process.



- Claim: The purchaser of a product is dissatisfied in the course of using the product and requires replacement of the product or reimbursement for loss.
- Complaint: A formal notification, at the level of a caution or warning, by the purchaser of a product about a defect related to the product.
- Requests: When a buyer or prospective buyer of a product inquires or requests a change in the specifications of the product or the method of transportation, packaging, etc. as required.
- Customer error: When caused by the customer's transportation, storage, and unauthorized use of the product.

Governance

Transparent and stable governance and a culture of practical ethical management are the foundation of corporate management and the basis for stable growth. Kumho Petrochemical enhances the stability of governance by securing the independence and expertise of the BOD and operates committees based on the expertise of the BOD members. In addition, through practical ethical management activities, we create a corporate culture based on honesty and trust and enhance stakeholder trust by preventing ethical risks in advance.

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Board of Directors

- Securing independence and expertise of the BOD
- Operating 6 BOD Committees
- Conducting BOD evaluation

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Ethical Management

- Operating an ethics whistleblower channel
- Advancing ESG compliance
- Managing internal transaction risk

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Tax and Accounting

- Implementing internal control over financial reporting on a consolidated basis
- Managing tax risks

Board of Directors

Kumho Petrochemical aims to lay the foundation for a sustainable company by establishing a sound governance structure. The main role of the BOD is to represent the interests of stakeholders, supervise management, and make long-term decisions. All matters pertaining to the BOD, such as appointment of directors, quorum for resolutions, and composition of committees, are operated in accordance with the Articles of Incorporation and the Board of Directors Regulations. Kumho Petrochemical discloses the Articles of Incorporation, Board of Directors Regulations, and Committee Regulations within the BOD on our website, and transparently publicizes compliance with the core principles of corporate governance through the Corporate Governance Report.

BOD Composition

Kumho Petrochemical's BOD consists of a total of 10 directors, including 3 executive directors and 7 independent directors. We maintain the ratio of independent directors higher than the legal requirement to ensure that the board maintains its independence and oversees and checks the management decision-making process. In order to appoint directors with diverse competencies and expertise, we apply the Board Skill Matrix (BSM), which led to the appointment of Park Sang-soo and Park Young-woo at the March 2022 Annual General Meeting of Shareholders, and the appointment of Kwon Tae-kyun, Lee Jee-yoon, and Park Jun-kyung at the July 2022 Extraordinary General Meeting of Shareholders.

BOD Composition

(As of March 31, 2023)

Position	Name	Role	Career Profile	Expertise	Date of Appointment and Tenure
Independent director (Chairperson)	Choi Do-soung	<ul style="list-style-type: none"> Chair of the BOD Chair of the Independent Director Nomination Committee Member of the Audit Committee Member of the ESG Committee 	(Former) Professor at Seoul National University Business School (Current) President of Handong Global University	Finance, Accounting, Risk Management, ESG	2021.03.26 ~ 2024.03.25
Executive director (CEO)	Baek Jong-hoon	<ul style="list-style-type: none"> CEO Chair of the Management Committee Member of the ESG Committee 	(Current) CEO & President of Kumho Petrochemical	Business Management, Industry, Sales, Procurement, R&D	2021.03.26 ~ 2024.03.25
Executive director	Park Jun-kyung	<ul style="list-style-type: none"> Member of the Management Committee Member of the ESG Committee 	(Former) Senior Executive Vice President & Managing Director of Sales Division of Kumho Petrochemical (Current) President of Kumho Petrochemical	Business Management, Industry, Sales	2022.07.21 ~ 2025.07.20
Executive director	Ko Young-do	<ul style="list-style-type: none"> Member of the Management Committee 	(Former) Executive Director of Purchasing & Finance of Kumho Petrochemical (Current) Director of Management Division of Kumho Petrochemical	Business Management, Finance, Accounting, Risk Management	2021.06.15 ~ 2024.06.14
Independent director	Lee Jung-mi	<ul style="list-style-type: none"> Chair of the Related Party Transaction Committee Member of the Independent Director Nomination Committee Member of the ESG Committee 	(Former) Judge of the Constitutional Court (Current) Executive Advisor Attorney at LOGOS Law LLC	Legal, ESG, Risk Management	2021.03.26 ~ 2024.03.25
Independent director	Hwang Lee-seok	<ul style="list-style-type: none"> Chair of the Audit Committee Member of the Related Party Transaction Committee 	(Former) Professor at Seoul National University Business School (Current) Independent Director of CJ CGV	Finance, Accounting, ESG, Risk Management	2021.03.26 ~ 2024.03.25
Independent director	Park Sang-soo	<ul style="list-style-type: none"> Chair of the Compensation Committee Member of the Audit Committee 	(Former) Chair of the Trustee Responsibility Committee of the National Pension Service (Current) Honorary Professor of Kyung Hee University Business School	Finance, Treasury, Risk Management, Policy	2022.03.25 ~ 2025.03.24
Independent director	Park Young-woo	<ul style="list-style-type: none"> Member of the Related Party Transaction Committee Member of the ESG Committee 	(Former) Head of UNEP Asia Pacific Office (Current) Director of EcoMom Korea	ESG, Policy	2022.03.25 ~ 2025.03.24
Independent director	Kwon Tae-kyun	<ul style="list-style-type: none"> Member of the Compensation Committee Member of the Independent Director Nomination Committee 	(Former) Director of Public Procurement Service (Current) Independent Director of POSCO Holdings Inc.	Finance, Trade, Procurement, Policy	2022.07.21 ~ 2025.07.20
Independent director	Lee Jee-yoon	<ul style="list-style-type: none"> Chair of the ESG Committee Member of the Compensation Committee 	(Former) Head of Environmental Health Policy Division, Ministry of Environment (Deputy Director) (Former) Vice President of the Korea Chemicals Management Association	Environment, Climate Change, Safety, Health	2022.07.21 ~ 2025.07.20

Independence and Diversity of the BOD

Kumho Petrochemical enhances the independence and diversity of the BOD so that the right decisions are made by overseeing the management and presenting various opinions.

To enhance the independence of the BOD, on December 14, 2022, Choi Do-sung, an independent director, was appointed as the BOD chairperson, separating the BOD chairperson from the CEO. In addition, when appointing independent directors, we do not impose restrictions on gender or age, and consider expertise such as experience to enhance the diversity of the BOD composition. Also, we maintain a majority of independent directors, and ensure the independence of the BOD by appointing 100% independent directors to the Audit Committee, Independent Director Nomination Committee, Compensation Committee, and Related Party Transaction Committee, and 2/3 of the members of the ESG Committee as independent directors.

Expertise of the BOD

Kumho Petrochemical applies the Board Skill Matrix (BSM) to appoint directors with diverse capabilities and expertise. In particular, we thoroughly review candidates' careers and expertise to ensure that they are not biased toward a particular field in order to form a BOD that can contribute substantially to corporate management. Currently, the BOD is composed of directors with expertise in business management, industry, sales, finance/treasury trade/procurement, risk management, governance, legal, ESG, etc., and the Audit Committee members are composed of at least two professionals with experience in finance, accounting, and treasury, which is stronger than the legal requirement.

In 2023, we plan to enact the Independent Director Nomination Policy to establish the principles and procedures for nominating independent director candidates, which will be approved by the BOD. We also plan to strengthen the independence, diversity, and expertise of the BOD by securing a pool of independent director candidates with diverse expertise.

Strengthening BOD Competency

In order to strengthen the expertise of independent directors, we regularly conduct trainings for independent directors and on-site management to strengthen BOD-centered management. In the first half of 2022, newly appointed independent directors were trained on the petrochemical industry in general and Kumho Petrochemical's business status. In the second half of the year, all directors visited the Yeosu National Industrial Complex as part of the on-site management of the BOD, where they were trained on the petrochemical industry and the business status of Kumho Petrochemical's plants and affiliates in Yeosu and were reported on ESG issues. In addition, we actively utilized programs provided by external professional institutions such as accounting firms to provide training for auditors to perform their duties.

BSM, Board Skill Matrix

Position	Name	Business Management	Industry	Finance/Treasury	Risk Management	Legal/Policy	ESG	Gender
Independent director (Chairperson)	Choi Do-sung			●	●		●	M
Executive director (CEO)	Baek Jong-hoon	●	●					M
Executive director	Park Jun-kyung	●	●					M
Executive director	Ko Young-do	●		●	●			M
Independent director	Lee Jung-mi				●	●	●	F
Independent director	Hwang Lee-seok			●	●		●	M
Independent director	Park Sang-soo			●	●	●		M
Independent director	Park Young-woo					●	●	M
Independent director	Kwon Tae-kyun			●		●		M
Independent director	Lee Jee-yoon					●	●	F

BOD Operation

Kumho Petrochemical's BOD consists of 10 experts and management in each field, sharing opinions on pending issues and making decisions from a mid- to long-term point of view. The BOD holds a regular meeting once every quarter and convenes an extraordinary meeting when necessary. In 2022, a total of 10 meetings were held, and the BOD deliberated and decided on agendas related to the general shareholders' meeting, business management, finance, and directors under the Articles of Incorporation and Board of Directors Regulations. The information and resources required for the work and decision-making of directors are sufficiently provided prior to the BOD meeting.

BOD Committees

Kumho Petrochemical is operating six committees within the BOD, including the Audit Committee, Independent Director Nomination Committee, ESG Committee, Related Party Transaction Committee, Compensation Committee, and Management Committee, in accordance with the Articles of Incorporation and Board of Directors Regulations. We have established Committee Regulations that set out the details of the authority, composition, and operation of the committees within the BOD and disclose them on our website. The committees are composed of members with specialized expertise in accordance with the scope of authority set in each Committee Regulations, deliberate and resolve the issues submitted. Resolved issues are notified and reported to the BOD.

BOD Committees

Committee	Role
Audit Committee	<ul style="list-style-type: none"> Supervising the work of directors and the management Approving the selected external auditors Other matters stipulated in the articles of incorporation or internal regulations concerning the audit
Independent Director Nomination Committee	<ul style="list-style-type: none"> Establishing, inspecting, and improving the director appointment principles Recommending director candidates to be appointed by the general shareholders' meeting Managing and verifying director candidates
ESG Committee	<ul style="list-style-type: none"> Establishing corporate ESG strategies and policies Forming the corporate strategy and policy related to sustainable management and social value creation Other ESG matters delegated by the BOD
Related Party Transaction Committee	<ul style="list-style-type: none"> Deliberating and deciding on internal transactions to promote fairness and transparency of transactions Deliberating and deciding on internal transactions in accordance with the Commercial Act, Monopoly Regulation And Fair Trade Act, etc
Compensation Committee	<ul style="list-style-type: none"> Deliberating and deciding on the limit of remuneration for directors and the remuneration system
Management Committee	<ul style="list-style-type: none"> Establishing key management strategies or management policies Deliberating and deciding on significant management status

BOD Evaluation

Kumho Petrochemical plans to enact director evaluation regulations and report them to the BOD in 2023 and conduct evaluation of directors for the first time in 2024. The evaluation will be conducted by the directors themselves, other directors, and employees of the Board Secretariat, and will cover items such as integrity, fairness, management consciousness, ethics, shareholder orientation, external competence and information management, sense of ownership, and leadership. The results of the evaluation will be reported to the BOD and utilized by the BOD, the Compensation Committee, and the Independent Director Nomination Committee, as well as the Annual General Meeting of Shareholders in determining director remuneration and deciding whether to re-appoint directors.

Strengthening Shareholder Rights

Kumho Petrochemical discloses information regarding the date, place, and agenda of the general shareholders' meeting on DART (Data Analysis, Retrieval and Transfer System) and the company website at least two weeks before the meeting. In order to facilitate the exercise of voting rights by shareholders, we recommend voting by proxy. We are also reviewing the introduction of a shareholder convenience system. We keep the one vote per share policy while continuously paying dividends to raise shareholder value. English version of the performance, major financial statements, and sustainability reports are provided for foreign shareholders.

We are also continuing our efforts to return to shareholders. First, we are establishing a mid- to long-term dividend policy and have announced that we will utilize 25-35% of our net income on a stand-alone basis to return to shareholders over the next two to three years. As part of the shareholder return policy, we also decided to acquire our own stocks (for the purpose of retirement of stocks). In 2022, the amount of shareholder return (dividend, acquisition of our own stock / retirement of stock) was KRW 246.4 billion in total (42.9% on a separate basis). Going forward, we will strive to raise the value of our shareholders.

Ethical Management

Ethical Management Policy

Code of Ethics

Kumho Petrochemical established a Code of Ethics to create a corporate culture based on honesty and trust and presents standards for value judgment. The Code of Ethics contains policies for various stakeholders, including customers, suppliers, shareholders, employees, country and society, and details the organization in charge and ethical management. The Guideline for Ethical Management contains detailed information on ethical management, including bribery, anti-money laundering, and whistleblower protection.



Ethical Management Organization

Kumho Petrochemical's ethical management activities are centered on the Management Audit Team. The Management Audit Team oversees internal audit work, including regular audits, occasional audits, and monitoring, and investigates reports, including whistleblowing. The Team also establishes and supplements guidelines for report management regulations, including the internal reporting system. In addition, the Management Audit Team lays the foundation for securing the credibility of management activities by revising and amending the Code of Ethics of Kumho Petrochemical, planning ethical management campaigns, and operating the Online Reporting Room (Online Friends).

The Internal Control Team, the main department in charge of internal accounting management, and the BOD Secretariat, a support organization for the Audit Committee, are responsible for internal control functions such as direct and indirect ethical management activities and compliance monitoring. In particular, since 2020, we designated legal officers as compliance officers and the Legal Team as a support organization for compliance officers to ensure the implementation and compliance with the compliance control standards (5 items, 19 clauses).

The HR Team is in charge of implementing ethical management. It operates ethical management education programs, creates ethical management compliance pledges, and runs ethical management campaigns to raise employees' awareness of ethical management and create a practical ethical management culture.

Ethical Management Activities

Internal Audit

Kumho Petrochemical conducts regular audits, occasional audits, and constant monitoring as internal audit activities. The audit covers all areas of the group, including Kumho Petrochemicals, all affiliates, and domestic and overseas business sites.

Regular audits are conducted on a three-year cycle for each business site and include checks on business processes and violations of laws and regulations. An annual audit plan is established for the audit targets in consideration of changes in the business environment and the risk level of each affiliate and business site, and the audit targets are finalized through a report to the Audit Committee.

Occasional audits are conducted when specific issues arise internally or externally, or when there are significant reports. The audit results are communicated to the receiving organization and the results of follow-up actions are verified.

In addition, Kumho Petrochemical monitors transactions by sector, including purchasing, accounting, funds, and sales, as well as the normal use of employee corporate cards, and monitors risk signs of fraud to prevent related accidents in advance. Moreover, when serious violations of corporate regulations are found during internal audits, we eradicate corruption through an in-depth investigation.

Ethical Management Education

Kumho Petrochemical operates ethical management education programs such as prevention of sexual harassment, prevention of bullying in the workplace, education on raising awareness of the disabled, and ethics education for new employees. Besides, by distributing the 'Kumho Manners White Paper', we are striving to create a culture of ethical management that promotes mutually respectable manners and collaboration.

Pledge to Comply with Ethical Management

Kumho Petrochemical requires new employees to sign and submit the Pledge to Comply with Ethical Management. Furthermore, we also ask current employees to hand in the pledges when they sign their annual salary contract so that we can raise the awareness of ethical management throughout the company.

Operating Whistleblower Channel

Kumho Petrochemical operates a reporting channel for all internal and external stakeholders, including employees, competitors, customers, suppliers, partners, shareholders, and investors, who are directly or indirectly related to the company, to report issues related to ethical management. In 2023, we enacted the ‘Reporting Policy’, which contains operational guidelines for the entire process of reporting, from receiving reports to concluding investigations, to enhance the reliability and transparency of the reporting process.

Kumho Petrochemical does not limit the scope of reporting and accepts reports on all acts that violate ethical management, such as acceptance of money or entertainment by employees, embezzlement of public funds, theft, and self-interest. All stakeholders who recognize an issue to be reported can report it through various channels, including the Online Friends (online reporting center) email, phone, fax, and in-person visits. The Online Friends is also available on mobile and uses a secret comment feature to communicate with whistleblowers when reporting anonymously.

When we receive a report that requires investigation, the Management Audit Team conducts a transparent and fair investigation and handling of the report. Investigations are conducted through the process of ‘report receipt, briefing received issue, investigation, reporting results, and closure of investigation’ and are centered on ethical management and violation of various company regulations and customary laws.

In addition, Kumho Petrochemical established an informant protection system to protect the identity of the informant and investigation cooperator as well as the contents of the report. We strictly observe the protection of the informant, investigation cooperator, and the contents of the report by ensuring that no disadvantage is caused by the report under any circumstances and clearly stipulating the standards for disciplinary action in case of violation.

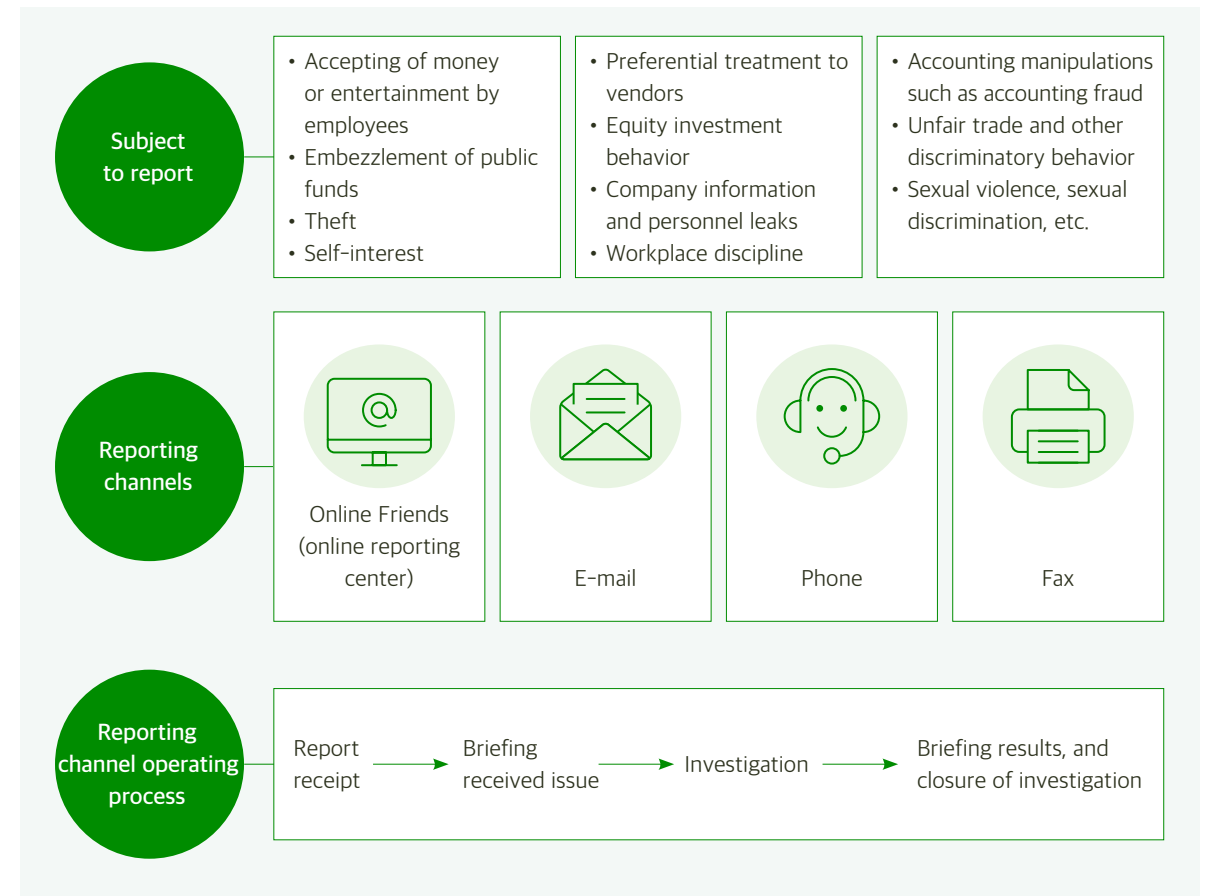
The whistleblowing procedure is also conducted through the same targets and processes, and the regulations reflect the protection of whistleblowers and retaliatory measures. Besides, all the contents and processing results of the whistleblower channel is reported to the Audit Committee every year.

 [Reporting Policy](#)

Clean Holidays Campaign

Twice a year, Kumho Petrochemical sends a letter from the CEO on ethical management to suppliers through the ‘Clean Holidays Campaign’ for the purpose of preventing unfair transactions with stakeholders, such as bribery and solicitation. If an employee receives a gift, it has to be reported and returned to the Gift-taking Report Center at each business site and the Management Audit Team disposes of items that could not be returned. In 2022, we implemented the Clean Holidays Campaign for domestic business sites, and in 2023, we plan to expand the campaign to overseas purchasing sites.

Ethical Management Reporting Channel



Compliance

Compliance Management System

Kumho Petrochemical's Legal Team conducts compliance work and provides legal advice for the Group. We operate an in-house Legal Update bulletin board to share information on the enactment and revision of major laws, and conduct compliance training and seminars to help employees cultivate a spirit of compliance and acquire compliance knowledge. In 2022, in order to establish an ESG compliance system, we implemented two separate projects, ESG compliance inspection and response to the Serious Accidents Punishment Act. We also executed a system for operating regular and occasional compliance education programs, and completed compliance education for new employees in the first half of 2023. In the second half of the year, we plan to conduct compliance education through leadership courses subjected to team leaders. We also produced and distributed a compliance handbook.

Establishment of ESG Compliance System

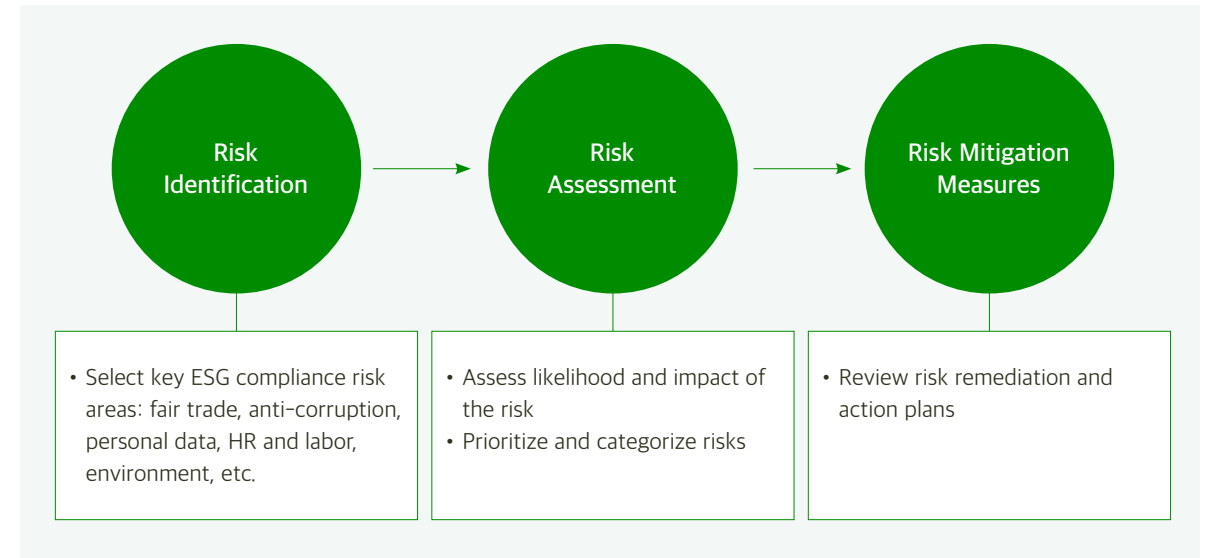
Kumho Petrochemical carried out a core ESG compliance system establishment project, selected core ESG compliance risks through the project and conducted a risk assessment.

As a result, fair trade, anti-corruption, personal data, HR and labor, and environment were selected as core ESG risk areas. To identify risks and behaviors that may violate laws and regulations in the business process, we reviewed data such as internal regulations, conducted on-site surveys, and interviewed people in charge. We then assessed the likelihood of occurrence and impact of the risks identified through the risk assessment and classified the priority and risk level of each risk in stages according to the assessment results. In addition, we derived improvement measures for each area and reviewed the action plan to establish a detailed plan to mitigate compliance risks and shared the contents with relevant departments.

Compliance Training

Kumho Petrochemical operates regular and occasional compliance education programs. For regular compliance education, we provide compliance education programs for new employees and new team leaders. In the case of occasional compliance education, lawyers were invited to deliver lectures on issues related to the company twice a year in the first and second halves of 2022 under the supervision of the Legal Team, and differentiated education such as 'Importance of Bidding Guide in Petrochemical Industry' and 'Guide to EPC Construction and General Contractor's Role' were provided to employees whose duties are related to specific topics.

ESG Compliance Risk Assessment Process



Risk Remediation

Risk	Remediation
Fair trade	<ul style="list-style-type: none"> Establishing guidelines and instructions on insider trading and improper joint behavior Guidelines and guidebook for work related to the status of shareholdings of registered executives in the same family/affiliated companies
Anti-corruption	<ul style="list-style-type: none"> Self-assessment checklist and anti-corruption training materials regarding anti-corruption in business activities
Personal data	<ul style="list-style-type: none"> Reviewing privacy policy and self-assessment checklist, agreement on the consignment of personal data processing and consent to personal data processing
HR and labor	<ul style="list-style-type: none"> Self-inspection checklists for labor standard act, etc., sexual and workplace harassment prevention and response manuals, etc.
Environment	<ul style="list-style-type: none"> Creation of Safety & Environment Planning Office and review of related regulations, and review of integrated change management work standards and accident investigation and handling

Compliance Handbook

As part of our ongoing compliance education program, we distributed a handbook on key compliance issues to all employees of Kumho Petrochemical and its affiliates. The handbook covers unfair collaborative behavior (collusion), anti-corruption, and personal data protection, and we used it to conduct compliance training for new employees. In the future, we plan to publish handbooks on other areas of compliance and conduct compliance training using their contents.

Main contents of the handbook include types of unfair collaborative behavior, precautions when contacting competitors, bribery and financial transactions, collection/use/transfer/destruction of personal data, and protective measures.



Related Party Transaction Risk Management

With regard to related party transactions, Kumho Petrochemical established related party transaction procedure standards that take into account BOD's disclosure obligations under the Commercial Act, the Monopoly Regulation And Fair Trade Act and the self-dealing regulation. This procedure standard is made to prevent related legal risks and raise employees' awareness.

In particular, for basic control of related party transactions, each department provides a separate checklist to review the appropriateness of related party transactions and conducts additional reviews through relevant departments. In addition, the compliance bulletin board provides information on related party transactions, and separate meetings are held for the BOD and disclosure officers of each affiliate to inform them of the importance of related party transaction risk management.



Tax and Accounting

Tax and Accounting Management System

Kumho Petrochemical has established a separate Tax Team in 2022 to actively manage tax-related strategies and risks. In addition, we established a consolidated standard internal accounting management system for tax management, and reviewed and upgraded control items and flow charts.

Tax-related Risk Management

Kumho Petrochemical strives to identify and review tax-related issues in an early stage that may arise in the course of business. We identify new and revised domestic and international tax laws in a timely manner and actively communicate with external experts and tax authorities to prevent the occurrence of tax risks due to differences in interpretation of tax laws. We also conduct periodic monitoring of major risk factors to mitigate tax risks and transparently disclose tax information for shareholders and society in accordance with reporting standards.

Compliance with Tax Laws

Fulfilling Tax Obligations

Kumho Petrochemical complies with the laws of each country where its domestic and overseas business sites are located, faithfully fulfills its tax reporting and payment obligations, and does not engage in transactions aimed at avoiding tax obligations or without commercial substance. We cooperate with tax authorities by submitting and storing necessary forms and data in a timely manner upon request from tax authorities, and reach to an agreement through sufficient consultation when there is a conflict of interest.

Compliance of Global Consensus

Kumho Petrochemical does not engage in transactions or contracts that take advantage of differences in tax treaties to transfer income between countries, and does not utilize tax havens. We are aware of the appropriate tax amount of the tax jurisdiction at each business site within the legal tax system. In the transaction between parties with special relations, the taxation is adjusted based on the regular price calculated by a reasonable method that is typically applied or assumed to be applied to ordinary transactions.



ESG DATA PACK

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Kumho Petrochemical

For the data contained in Kumho Petrochemical's ESG Data, indicator definitions, calculation criteria, and restatements of information, please refer to page 83 of this report.

Economic

Revenue		Unit	2020	2021	2022
Consolidated basis		KRW 1 million	4,809,536	8,461,842	7,975,626
Separated basis	Total	KRW 1 million	3,489,720	5,501,282	5,086,856
	Synthetic Rubbers	KRW 1 million	1,837,554	3,053,233	2,580,177
	Synthetic Resins	KRW 1 million	1,153,971	1,829,740	1,594,459
	Specialty Chemicals	KRW 1 million	104,664	164,252	205,993
	Others	KRW 1 million	393,531	454,056	706,227

Distribution of economic performance (separated)		Unit	2020	2021	2022
Shareholder/ investor	Total	KRW 1 million	135,202	294,093	160,546
	Dividends	KRW 1 million	115,812	280,856	146,432
	Interest rate cost	KRW 1 million	19,390	13,237	14,114
Employee	Total	KRW 1 million	182,731	231,166	206,745
	Pay	KRW 1 million	153,559	199,537	170,960
	Welfare benefits	KRW 1 million	29,172	31,629	35,785
Government	Corporate tax	KRW 1 million	153,968	369,234	172,180
Local community	Donations	KRW 1 million	394	1,584	503

R&D		Unit	2020	2021	2022
No. of R&D employees		Person	165	169	174
Amount of R&D investment		KRW 1 million	42,950	49,327	48,121

Intellectual property rights		Unit	2020	2021	2022
Intellectual property rights	(accumulated)	EA	598	601	599
	No. of patent registration				
	(for the year)	EA	43	42	32
	No. of patent registration				
(for the year)	No. of patent application	EA	31	42	102

Retirement pension reserve		Unit	2020	2021	2022
No. of subscribers to defined benefit		Person	1,208	1,213	1,268

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Environmental

Greenhouse gas		Unit	2020	2021	2022
Greenhouse gas quota·emission allowance	Greenhouse gas emission allowances	tCO ₂ -eq	3,083,438	3,083,438	3,327,241
Greenhouse gas emissions	Total greenhouse gas emissions ¹⁾	tCO ₂ -eq	3,499,732	3,409,409	3,473,210
	Scope 1 emissions	tCO ₂ -eq	3,108,304	3,036,989	3,128,818
	Scope 2 emissions	tCO ₂ -eq	391,427	372,428	344,400
	Total GHG reduced	tCO ₂ -eq	-21,249	90,323	-63,801
	Year-over-year reduction rate	%	-0.6	2.6	-1.9
Greenhouse gas intensity	Greenhouse gas emissions per unit intensity	tCO ₂ -eq/ KRW 1 billion	1,002.9	619.8	682.8

1) Differences in the totals due to unit truncation

Energy		Unit	2020	2021	2022	
Energy use	Total energy consumed ¹⁾	TJ	43,216	42,727	42,338	
	Total general energy consumed	TJ	42,644	41,718	41,453	
	Direct energy	Total consumed	TJ	35,221	33,905	34,550
		LNG	TJ	510	551	500
		LPG	TJ	0.1	0.1	0.4
		Gasoline	TJ	0.3	0.2	0.2
		Diesel	TJ	25	27	26
		Coal	TJ	25,699	24,249	25,149
		Others	TJ	8,988	9,078	8,874
	Indirect energy	Total consumed	TJ	7,423	7,813	6,903
		Electricity	TJ	5,040	5,329	4,832
		Steam	TJ	2,383	2,484	2,071
		Others	TJ	0	0	0
	Renewable energy	Total consumed (Biomass-Woodchip)	TJ	572	1,008	885
		Rate of renewable energy used	%	1.3	2.4	2.1
	Total energy reduced	TJ	584	493	388	
	Year-over-year reduction rate	%	0.02	1.1	0.9	
Energy intensity	Energy use per unit intensity	TJ/ KRW 1 billion	12.4	7.8	8.3	
Energy generation	Total energy production	TJ	20,332	20,964	20,377	
	General energy generated	Total	TJ	20,193	20,734	20,144
		Electricity	TJ	7,900	6,780	7,347
		Steam	TJ	12,294	13,954	12,798
	Total renewable energy generated	TJ	139	230	232	
Energy sales ²⁾	Total	TJ	12,982	12,539	12,313	
	Electricity	TJ	6,460	5,328	5,918	
	Steam	TJ	6,522	7,210	6,395	

1) Differences in the totals due to unit truncation

2) Including affiliate sales

Kumho Petrochemical

Water		Unit	2020	2021	2022	
Water management	Water withdrawn	Total	m'	13,017,978	14,450,991	13,827,307
		Water supply	m'	25,722	25,827	41,372
		Groundwater	m'	4,972	6,488	7,140
		Industrial water	m'	12,987,284	14,418,676	13,778,795
		Others	m'	0	0	0
	Water consumed	m'	5,981,974	6,548,271	6,139,120	
	Water recycled	m'	730,751	795,381	505,001	
	Rate of water recycled	%	12.2	12.2	8.2	
	Water withdrawn in regions with high or extremely high baseline water stress	m'	9,782	9,532	10,281	
	Water consumed in regions with high or extremely high baseline water stress	m'	9,782	9,532	10,281	
Rate of business sites in regions with high or extremely high baseline water stress	%	8.3	8.3	8.3		
Water intensity	Water per unit intensity	m'/KRW 1 billion	1,714.2	1,190.3	1,206.9	
Wastewater	Wastewater discharged	m'	7,036,004	7,902,720	7,688,187	
	Wastewater discharged per unit intensity	m'/KRW 1 billion	2,016.2	1,436.5	1,511.4	

Air pollutants		Unit	2020	2021	2022
Air pollutants emissions	NOx	ton	981.0	934.3	854.2
	SOx	ton	530.9	470.8	494.3
	VOCs	ton	30.3	20.8	16.4
	HAPs	ton	52.7	44.2	29.6
	PM	ton	68.4	76.3	81.7

Water pollutants		Unit	2020	2021	2022
Water pollutants discharged	COD	ton	364.9	312.4	-
	BOD	ton	267.5	233.4	179.4
	SS	ton	151.0	181.1	153.8
	TOC	ton	-	-	271.6
	T-N	ton	195.3	229.9	164.5
	T-P	ton	21.4	16.2	14.2

Hazardous chemicals		Unit	2020	2021	2022	
Hazardous chemicals discharged	Hazardous chemicals discharged	ton	68.6	64.3	51.2	
	Hazardous chemicals discharged per unit intensity	ton/ KRW 1 billion	0.02	0.01	0.01	
Hazardous chemicals used	Hazardous chemicals used	ton	1,730,128.5	1,831,535.7	1,593,631.9	
	Hazardous chemicals used per unit intensity	ton/ KRW 1 billion	495.8	332.9	313.3	
Hazardous chemical management and inspection	No. of hazardous chemical inspection	Total	Case	17	21	24
		Regular inspection	Case	11	7	8
		Irregular Inspection	Case	6	14	16

Kumho Petrochemical

Waste		Unit	2020	2021	2022	
Total waste	Total waste generated	ton	138,413	136,622	124,342	
	Total waste recycled	ton	123,686	120,577	110,285	
	Rate of total waste recycled	%	89.4	88.3	88.7	
	Total waste treated	ton	14,727	16,045	14,056	
General waste	Total general waste generated	ton	125,842	123,562	113,122	
	Total general waste recycled	ton	120,378	117,367	108,204	
	Rate of general waste recycled	%	95.7	95.0	95.7	
	Total general waste treated	Total	ton	5,464	6,195	4,918
		Incineration	ton	1,382	1,587	1,635
		Landfill	ton	4,021	4,608	3,282
		Others	ton	61	0	0
Hazardous waste	Total hazardous waste generated	ton	12,571	13,060	11,220	
	Total hazardous waste recycled	ton	3,308	3,209	2,081	
	Rate of hazardous waste recycled	%	26.3	24.6	18.5	
	Total hazardous waste treated	Total	ton	9,263	9,851	9,139
		Incineration	ton	9,261	9,659	8,899
		Landfill	ton	0.1	0.0	0.2
Others		ton	2	192	240	

Raw materials		Unit	2020	2021	2022
Raw materials used		ton	3,678,708	3,333,370	3,541,176
Recycled raw materials used		ton	53,408	77,097	76,307
Rate of recycled raw materials used		%	1.5	2.3	2.2

Environment management		Unit	2020	2021	2022
Environment investment		KRW 1 million	18,776	19,723	18,709
Violations of environmental laws and regulations	No. of breaches	Case	0	3	2
	Fines/penalties	KRW 1 million	0	2.9	4.8

Eco-friendly revenue		Unit	2020	2021	2022
Eco-friendly product revenue		KRW 1 million	41,673	40,606	61,244

Kumho Petrochemical

Social

Employee		Unit	2020	2021	2022	
Total no. of employees		Person	1,345	1,401	1,453	
By age	Under 30	Person	153	188	203	
	30~49	Person	848	859	888	
	50 and older	Person	344	354	362	
By employment type	Full time employees	Person	1,251	1,327	1,385	
	Temporary employees	Person	94	74	68	
	Non-affiliated workers(field support positions)	Person	817	818	817	
Workforce diversity	Employees	Female	Person	194	214	225
		Male	Person	1,151	1,187	1,228
	Executives (registered directors included)	Female	Person	1	4	4
		Male	Person	45	42	43
	Executives (registered directors excluded)	Female	Person	1	2	2
		Male	Person	35	34	35
	Manager position	Female	Person	53	61	62
		Male	Person	406	427	452
	Non-manager position	Female	Person	140	151	161
		Male	Person	710	726	741
	Manager position in revenue generation departments	Female	Person	9	11	12
		Male	Person	85	95	97
STEM-related departments	Female	Person	38	43	46	
	Male	Person	194	197	206	
National veterans	Person	57	54	47		
Employees with disabilities	Person	22	22	23		
Foreign national employees	Person	2	2	2		

HR management		Unit	2020	2021	2022	
Recruitment	Total no. of employees newly hired		Person	91	125	129
	Entry-level employees	Total	Person	70	91	77
		Female	Person	19	26	16
		Male	Person	51	65	61
		Under 30	Person	51	88	77
		30~49	Person	18	2	0
		50 and older	Person	1	1	0
	Experienced employees	Total	Person	21	34	52
		Female	Person	0	5	4
		Male	Person	21	29	48
		Under 30	Person	1	1	3
		30~49	Person	14	23	41
50 and older		Person	6	10	8	
Cost of hiring new employees		KRW 1 million	233	756	454	
Internal hiring (transfer to other department)		Person	93	79	75	
Turnover·resignation	Rate of turnover·resignation		%	6.0	4.5	5.7
	No. of turnover·resignation		Person	80	60	80
	Rate of voluntary turnover·resignation		%	3.7	2.1	3.1
	No. of voluntary turnover·resignation		Person	49	28	44
Performance evaluation	Ratio of employees receiving regular performance evaluation		%	90.7	90.0	93.7
	Ratio of employees subject to competency development evaluation		%	90.7	90.0	93.7
	Ratio of employees subject to multi-faceted performance evaluation		%	59.3	59.3	60.3
	Ratio of relative evaluations within the same position		%	90.7	90.0	93.7
	Employee engagement	Employee engagement score (out of 5)	Point	-	3.4	3.3

Kumho Petrochemical

Employee training	Unit	2020	2021	2022
Employee training hours	Hour	146,858	140,326	97,846 ¹⁾
Employee training cost	KRW 1 million	1,314	1,804	2,099

1) Due to the encouragement of voluntary reading by employees through subscription to Millie's study and the abolition of reading communication, the corresponding performance decreased, reducing employee training hours in 2022

Labor-management relations	Unit	2020	2021	2022
Rate of union membership	%	32.3	31.0	30.1
Rate of collective bargaining agreement coverage	%	100	100	100
No. of labor-management council meetings	Case	4	4	4

Pay and benefits		Unit	2020	2021	2022	
Basic salary	Average basic salary for all employees	KRW 1 million	62	60	67	
	Average basic salary for male employees	Total	KRW 1 million	65	63	71
		Executive	KRW 1 million	161	239	247
		Manager Position	KRW 1 million	72	75	77
	Non-manager position	KRW 1 million	58	50	61	
	Average basic salary for female employees	Total	KRW 1 million	45	44	48
		Manager position	KRW 1 million	67	68	76
		Non-manager position	KRW 1 million	48	43	50
	Total annual salary (basic salary + bonus)	Average annual salary for all employees	KRW 1 million	100	112	138
Average annual salary for male employees		Total	KRW 1 million	106	120	147
		Executive	KRW 1 million	301	477	541
		Manager Position	KRW 1 million	108	121	155
		Non-manager position	KRW 1 million	99	108	130
Average annual salary for female employees		Total	KRW 1 million	65	71	93
		Manager position	KRW 1 million	98	110	143
		Non-manager position	KRW 1 million	69	65	89
Gender pay gap		Ratio of average basic salary for male and female employees	Total	%	69.3	64.9
	Manager position		%	92.2	91.2	98.3
	Non-manager position		%	82.8	85.7	82.3
	Ratio of average annual salary (basic salary + bonus) for male and female employees	Total	%	61.4	59.1	63.3
		Manager position	%	91.1	91.1	92.3
		Non-manager position	%	69.9	60.3	68.7

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Pay and benefits		Unit	2020	2021	2022	
Welfare benefits	Ratio of welfare cost to separate revenues	%	0.8	0.6	0.7	
	Employee welfare costs	KRW 1 million	29,172	31,629	35,785	
Other welfare benefits	Participation rate of flexible working system	%	100	100	100	
Parental leave	Parental leave	Total	Person	13	14	15
		Male	Person	6	0	2
		Female	Person	7	14	13
	No. of employees returning to work after parental leave	Total	Person	8	12	15
		Male	Person	3	3	1
		Female	Person	5	9	14
	No. of employees working more than 12 months after returning to work	Total	Person	5	11	9
		Male	Person	1	4	0
		Female	Person	4	7	9
	No. of employees leaving, working less than 12 months after returning to work	Total	Person	0	1	0
		Male	Person	0	1	0
		Female	Person	0	0	0

Occupational safety & health		Unit	2020	2021	2022	
Employee health support	Health checkups	Person	1,116	1,145	1,237	
	Comprehensive checkups	Person	747	736	818	
	General checkups	Person	369	409	419	
Violation of health and safety laws and regulations	No. of breaches	Case	0	0	4	
	Fines/penalties	KRW 1 million	0	0	13.6	
Occupational accident rate	Employees	LTIFR	-	0	0	0
		OIFR	-	0	0	0
		TRIFR	-	0	0	0
		Process Safety Event _ Tier 1	-	0	0	0.7
		Fatality rate	%	0	0	0
		Occupational accident rate	%	0	0	0
	Suppliers	LTIFR	-	1.27	0.63	1.84
		OIFR	-	0	0	0
		TRIFR	-	1.27	0.63	1.84

Certification		Unit	2020	2021	2022
ISO 14001	Rate of business sites certified	%	70	70	70
	Business sites subject to certification	EA	10	10	10
	Certified business sites	EA	7	7	7
ISO 45001	Rate of business sites certified	%	70	70	70
	Business sites subject to certification	EA	10	10	10
	Certified business sites	EA	7	7	7
Eco-friendly certification	Green product certification	EA	1	1	1
	Low carbon product certification	EA	1	1	1
	ISCC Plus	EA	0	0	2

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Human rights		Unit	2020	2021	2022
Human rights risks	No. of human rights reports	Case	0	0	1
	No. of human rights cases handled	Case	0	0	1
Violation of human rights laws and regulations	No. of breaches	Case	0	0	0
	Fines/penalties	KRW 1 million	0	0	0
Human rights assessments ¹⁾	No. of business sites conducting human rights assessments	EA	-	-	1
	Business sites where human rights risks are identified	EA	-	-	0
	No. of risk-related actions	Case	-	-	0

1) Inclusion of corruption risk assessment in human rights assessment

Supply chain		Unit	2020	2021	2022
Suppliers	Total no. of suppliers	EA	1,022	1,041	1,048
	No. of suppliers newly registered	EA	148	154	146
	Rate of suppliers signed for Suppliers Code of Conduct	%	67.2	66.0	65.6
	Risk assessment of suppliers	EA	142	240	327
	Supplier ESG Risk Assessment	All suppliers New suppliers	EA EA	- -	12 -
Supply chain support	Amount of mutual growth fund	KRW 1 million	20,000	20,000	20,000
	Loan interest support	KRW 1 million	6,190	5,410	11,200
	Loan support	EA	21	20	36
	Training support	EA	121	141	107
Participation in supplier consultation channel	Time		4	4	4

Social contribution		Unit	2020	2021	2022
Social contribution activities	No. of employees participating in social contribution activities	Person	1,025	283	295
	Hours spent in social contribution activities	Hour	24,161	4,702	5,830
Donation	Charitable donations	KRW 1 million	394	1,584	503
	Community donations	KRW 1 million	233	396	335
	Political donations ¹⁾	KRW 1 million	0	0	0
	Other donations	KRW 1 million	161	1,188	169

1) We strictly prohibit political fund donations and lobbying, in accordance with the laws

Data security		Unit	2020	2021	2022
Data security risk	Information leakage	Case	0	0	0
	Leakage related to customer information	Case	0	0	0
Violation of data security laws and regulations	No. of breaches	Case	0	0	0
	Fines/penalties	KRW 1 million	0	0	0
Data security training	Employees subject to data security training	Person	50	62	93
	Employees completed data security training	Person	50	62	93
	Rate of data security training completed	%	100	100	100

Kumho Petrochemical

Governance

BOD		Unit	2020	2021	2022
BOD composition	Total no. of directors	Person	10	10	10
	Executive directors	Person	3	3	3
	Independent directors	Person	7	7	7
	Rate of independent directors in the BOD	%	70	70	70
BOD diversity	No. of female directors	Person	0	2	2
	Ratio of female directors	%	0	20	20
BOD efficiency	Tenure of directors	Year	4.2	1.8	1.1
	Tenure of executive directors	Year	5.1	0.6	1.2
	Tenure of independent directors	Year	3.9	1.8	1.1
BOD meeting-attendance	BOD meeting	Time	10	11	10
	Attendance rate of BOD	%	97.0	100	100
	Attendance rate of executive director to BOD	%	96.7	100	100
BOD resolution-reporting	Attendance rate of independent director to BOD	%	97.1	100	100
	BOD resolution	Case	28	29	22
BOD training	BOD reporting	Case	8	13	14
		Time	2	3	3
BOD compensation		KRW 1 million	423	564	499

CEO to employee compensation ratio	Unit	2020	2021	2022
CEO compensation	KRW 1 million	843	536	656
Ratio of CEO compensation to median employee salary	%	926.6	521.5	513.2
Ratio of CEO compensation to average employee salary	%	844.3	476.9	474.5

Shareholder rights	Unit	2020	2021	2022
Agenda notification date before the shareholder meeting (regular general meeting of shareholders)	Day	23	17	17

Share		Unit	2020	2021	2022
Total no. of shares	Shares	Stock	30,467,691	30,295,844	29,314,312
	Issued shares	Stock	30,467,691	30,295,844	29,314,312
	Outstanding shares	Stock	24,875,163	25,047,010	24,065,478
Shareholding ratio	Shareholding ratio of CEO	%	6.7	0.02	0.02
	Shareholding ratio of registered directors	%	6.7	0.03	7.5
	Shareholding ratio of the National Pension Service	%	8.3	6.9	6.6
	Shareholding ratio of the government and public institutions excluding National Pension Service	%	0.0	0.0	0.0
	Shareholding ratio of the founding family	%	24.8	25.1	26.0

Kumho Petrochemical

Ethical management		Unit	2020	2021	2022
Ethics education	Rate of employees who completed ethics education	%	100	100	100
	No. of employees who completed ethics education	Person	1,359	1,366	1,454
	Hours of ethics education completed by employees	Hour	2,718	4,098	2,908
	Rate of pledge to comply with Code of Ethics for employees signed	%	100	100	100
	Rate of Code of Ethics applied	%	100	100	100
Reporting and discipline	Reports received	Case	5	0	4
	Reports handled	Case	5	0	4
	Disciplinary actions taken after reporting	Case	1	0	1
Conduct of audits	Conduct of audit ¹⁾	Case	0	0	1
	Disciplinary actions taken after auditing	Case	0	0	0
Violation of ethical management laws and regulations	No. of breaches	Case	0	0	0
	Fines/penalties	KRW 1 million	0	0	0

1) In 2020~2021, Kumho Petrochemical's internal audit was not conducted due to the schedule of reporting and internal audit of affiliates

Tax		Unit	2020	2021	2022
Tax paid	Total tax due	KRW 1 million	105,580	244,842	746,882
	Net income before corporate tax	KRW 1 million	797,721	2,618,120	1,251,576
	Nominal tax rate	%	25.24	26.48	25.06
	Nominal tax amount	KRW 1 million	201,355	693,238	313,637
	Effective tax rate	%	26.92	24.92	18.05
	Effective tax amount	KRW 1 million	214,740	652,543	225,871

Appendix

On this page, you can find detailed definitions and calculation criteria for Kumho Petrochemical’s quantitative ESG performance indicators, as well as information on changes compared to the previous year’s report. The calculation criteria or special features of the data by affiliate are annotated on the page where the data is located.

Metric definitions and data calculation criteria

Category	Metrics	Description	
Environmental	Scope 1, Scope 2 GHG emissions	<ul style="list-style-type: none"> Based on ‘Greenhouse Gas Emissions and Energy Usage Statement’ Completed third-party verification (Reasonable Assurance) of the statement 	
	Scope 3 GHG emissions	<ul style="list-style-type: none"> Applied relevant emission factors (based on national LCI DB) to activity data by category using ERP system Conforms to the categories of ‘purchased products and services’, ‘fuel and energy related activities (not included in Scope 1 or Scope 2)’, and ‘upstream transportation and distribution’ under the GHG Protocol 	
	Energy consumed	<ul style="list-style-type: none"> Based on ‘Greenhouse Gas Emissions and Energy Usage Statement’ Completed third-party verification (Reasonable Assurance) of the statement 	
	Water consumed	<ul style="list-style-type: none"> ‘Water withdrawn’ minus ‘Wastewater discharge’ 	
	Water stress areas	<ul style="list-style-type: none"> Areas with high or extremely high baseline water stress based on the World Resource Institute’s (WRI) Aqueduct tool 	
	Rate of business sites in regions with high or extremely high baseline water stress	<ul style="list-style-type: none"> Ratio of ‘number of business sites located in areas with high or extremely high baseline water stress’ to ‘total number of business sites’ 	
	Wastewater discharged	<ul style="list-style-type: none"> Based on the cost of wastewater treatment at the wastewater treatment plant per business site 	
	COD and TOC discharged	<ul style="list-style-type: none"> Replaced COD with TOC for reporting starting in 2022 	
	Waste treated	<ul style="list-style-type: none"> Fully consigned 	
	Violations of environmental laws and regulations	<ul style="list-style-type: none"> Limited to sanctions against the company that are disclosed in the business report 	
	Eco-friendly product revenue	<ul style="list-style-type: none"> Total sales of eco-friendly certified products, and sales of RECs, etc. 	
	Environmental data per unit	<ul style="list-style-type: none"> Based on Kumho Petrochemical’s sales on a separate basis in the current year 	
	Social	Manager position	<ul style="list-style-type: none"> Manager or above, department head or below by job title
		Non-manager position	<ul style="list-style-type: none"> Assistant manager or below by job title
Revenue generation departments		<ul style="list-style-type: none"> Departments in Sales Division (excluding technical, support, and operations roles) 	
STEM-related departments		<ul style="list-style-type: none"> Departments in Research, Technology Planning, and IT Division (excluding technical, support, and operations roles) 	
Rate of turnover-resignation		<ul style="list-style-type: none"> Ratio of ‘total number of employees in the reporting year’ to the ‘number of turnover and resignation in the reporting year’ 	
Rate of union membership		<ul style="list-style-type: none"> Ratio of ‘unionized employees’ to ‘total employees’ 	
Parental leave		<ul style="list-style-type: none"> Employees eligible for parental leave in the reporting year 	
No. of employees returning to work after parental leave		<ul style="list-style-type: none"> Employees who were on parental leave in the prior and current year who returned to work in the reporting year 	
No. of employees working more/less than 12 months after returning to work		<ul style="list-style-type: none"> Employees who were on parental leave in the prior year and have been back to work for more/less than 12 months. 	
Rate of ISO Certification		<ul style="list-style-type: none"> Ratio of ‘business sites certified’ to ‘business sites subject to the certification’ 	
LTIFR, OIFR, TRIFR, and Process Safety Event _ Tier 1		<ul style="list-style-type: none"> Annual working hours are calculated as ‘annualized working days * 8 hours * number of employees’. 	
Violations of human rights and information security laws and regulations		<ul style="list-style-type: none"> Limited to sanctions against the company that are disclosed in the business report 	
Governance		Ratio of CEO compensation to average employee salary	<ul style="list-style-type: none"> Exclude highest paid employees when calculating median/average employee salaries

Restatement of information

The following information on Kumho Petrochemical’s quantitative ESG performance in this report is different from the previous year’s report due to changes in data calculation criteria or error correction.

Changes in data calculation criteria

Category	Metrics	Description
Economic	No. of R&D employees	<ul style="list-style-type: none"> Change in calculation criteria (includes research support roles → excludes research support roles)
Environmental	Environmental metrics intensity	<ul style="list-style-type: none"> Changed the basis for calculating the per unit (consolidated revenue → separate revenue of Kumho Petrochemical)
	Rate of business sites in regions with high or extremely high baseline water stress	<ul style="list-style-type: none"> Include Seoul (headquarters) in the scope of the survey
Social	Violations of environmental laws and regulations	<ul style="list-style-type: none"> Change in calculation criteria (includes sanctions against employees → only counts sanctions against the company, excluding sanctions against employees)
	Manager position	<ul style="list-style-type: none"> Change in calculation criteria (headcount at manager level including executives → headcount at manager level excluding executives)
	STEM-related departments	<ul style="list-style-type: none"> Change in calculation criteria (includes technical, support, and operations roles → excludes technical, support, and operations roles)
	No. employees newly hired (entry-level employees, experienced employees)	<ul style="list-style-type: none"> The number of employees reentering the workforce after retirement is excluded from the number of new hires and included in the number of experienced hires.
	Rate of (voluntary) turnover-resignation	<ul style="list-style-type: none"> Change in denominator criteria (number of employees in the previous year → number of employees in the current year)
	Ratio of employees receiving regular performance evaluations and employees subject to competency development Evaluation	<ul style="list-style-type: none"> Reflect changes to evaluation rules (including post-2021 unlimited contract workers)
	Rate of union membership	<ul style="list-style-type: none"> Change in denominator criteria (number of unionized employees → total employees)
	No. of employees returning to work after parental leave	<ul style="list-style-type: none"> Change in calculation criteria (Number of employees who returned from a leave of absence in the previous year → number of employees who returned from a leave of absence in the previous and current year)
	Certification rate of ISO 14001, ISO 45001	<ul style="list-style-type: none"> Change in denominator criteria (increase the number of business sites subject to certification)
	No. of employees receiving comprehensive and general checkups	<ul style="list-style-type: none"> Change in calculation criteria (employees subject to medical checkup → employees who received medical checkup)
Suppliers LTIFR and TRIFR	<ul style="list-style-type: none"> Redefine incidents 	
Total no. of suppliers and no. of suppliers newly resgistered	<ul style="list-style-type: none"> Expand the scope of suppliers 	

Error correction

Category	Metrics	Description
Environmental	Indirect energy consumed	<ul style="list-style-type: none"> Corrected 2020 data errors
	General energy generated	<ul style="list-style-type: none"> Corrected errors in data unit conversions for 2020 and 2021
	Water consumed	<ul style="list-style-type: none"> Corrected 2020 and 2021 data errors
	Air pollutants emissions, water pollutants discharged, raw materials used, waste generated/recycled/treated	<ul style="list-style-type: none"> Corrected 2020 and 2021 data to the public data in the environmental information disclosure system
	No. of regular hazardous chemical inspection	<ul style="list-style-type: none"> Corrected 2020 and 2021 data errors
Governance	No. of female directors	<ul style="list-style-type: none"> Corrected 2020 data errors
	Attendance rate of BOD	<ul style="list-style-type: none"> Corrected 2020 data errors

Integrated ESG Performance

This page reports the integrated ESG performance of three petrochemical companies (Kumho Petrochemical, Kumho P&B Chemicals, and Kumho Polychem) from consolidated subsidiaries, and the intensity of environmental data intensity is calculated based on consolidated sales.

Environmental

Greenhouse gas		Unit	2020	2021	2022
Greenhouse gas emissions	Total greenhouse gas emissions ¹⁾	tCO ₂ -eq	4,737,985	4,690,820	4,650,347
	Scope 1 emissions	tCO ₂ -eq	3,273,527	3,223,370	3,313,871
	Scope 2 emissions	tCO ₂ -eq	1,464,457	1,467,459	1,336,486
Greenhouse gas intensity	Greenhouse gas emissions per unit intensity	tCO ₂ -eq/KRW 1 billion	985.1	554.3	583.1

1) Differences in total due to unit truncation

Energy		Unit	2020	2021	2022
Energy use	Total energy consumed	TJ	58,083	59,815	58,219
	Total direct energy consumed	TJ	37,623	36,519	37,141
	Total indirect energy consumed	TJ	20,459	23,296	21,078
	Energy use per unit intensity	TJ/KRW 1 billion	12.1	7.1	7.3

Water		Unit	2020	2021	2022
Water management	Water withdrawn	m ³	18,519,742	20,966,117	20,116,127
Wastewater	Wastewater discharged	m ³	9,643,373	11,245,922	11,069,779
	Wastewater discharged per unit intensity	m ³ /KRW 1 billion	2,005.1	1,329.0	1,388.0

Air pollutants		Unit	2020	2021	2022
Air pollutants emissions	NOx	ton	1,030.1	967.4	874.3
	SOx	ton	538.7	484.3	507.1
	VOCs ¹⁾	ton	30.3	20.8	16.4
	HAPs ¹⁾	ton	52.7	44.2	29.6
	PM	ton	82.1	88.9	90.9

1) Kumho Petrochemical only (Kumho P&B Chemicals, Kumho Polychem are not applicable)

Water pollutants		Unit	2020	2021	2022
Water pollutants discharged	COD ¹⁾	ton	543.0	526.1	-
	BOD	ton	361.7	298.4	310.8
	SS	ton	286.4	297.9	268.4
	TOC ¹⁾	ton	-	-	427.0
	T-N	ton	221.8	261.5	203.2
	T-P	ton	42.9	35.6	32.4

1) Replacing COD with TOC for reporting starting in 2022

Hazardous chemicals		Unit	2020	2021	2022
Hazardous chemicals discharged	Hazardous chemical discharged	ton	114	106	86
	Hazardous chemicals discharged per unit intensity ¹⁾	ton/ KRW 1 billion	0.02	0.01	0.01
Hazardous chemicals used	Hazardous chemical used	ton	2,540,040	2,710,786	2,329,164
	Hazardous chemicals used per unit intensity	ton/ KRW 1 billion	528.1	320.4	292.0

1) Kumho Petrochemical and Kumho P&B Chemicals only (Kumho Polychem will measure from 2023)

Integrated ESG Performance

Waste		Unit	2020	2021	2022
Total waste	Total waste generated	ton	146,653	147,539	135,727
	Total waste recycled	ton	127,724	128,478	117,680
	Rate of total waste recycled	%	87.1	87.1	86.7
	Total waste treated	ton	18,929	19,061	18,048
General waste	Total general waste generated	ton	132,797	133,028	122,832
	Total general waste recycled	ton	123,704	124,379	114,642
	Rate of general waste recycled	%	93.2	93.5	93.3
	Total general waste treated	ton	9,093	8,649	8,190
Hazardous waste	Total hazardous waste generated	ton	13,856	14,512	12,896
	Total hazardous waste recycled	ton	4,020	4,099	3,038
	Rate of hazardous waste recycled	%	29.0	28.2	23.6
	Total hazardous waste treated	ton	9,836	10,412	9,858

Social

Employee		Unit	2020	2021	2022
Total no. of employees		Person	1,898	1,971	2,062
By gender	Female	Person	254	284	304
	Male	Person	1,644	1,687	1,758
By age	Under 30	Person	221	276	315
	30 ~ 49	Person	1,164	1,189	1,232
	50 and older	Person	513	506	515
By employment type	Full time employees	Person	1,764	1,850	1,938
	Temporary employees	Person	134	121	124

HR management		Unit	2020	2021	2022
Recruitment	Total no. of employees newly hired	Person	139	181	204
	Entry-level employees	Person	107	135	127
	Experienced employees	Person	32	46	77
Turnover-resignation	Rate of turnover-resignation	%	5.6	4.6	6.3
	Rate of voluntary turnover-resignation	%	2.9	2.4	3.5

Benefits		Unit	2020	2021	2022	
Parental leave	Parental leave	Total	Person	16	19	20
		Male	Person	6	0	2
		Female	Person	10	19	18
No. of employees returning to work after parental leave		Total	Person	10	16	15
		Male	Person	3	3	1
		Female	Person	7	13	14
No. of employees working more than 12 months after returning to work		Total	Person	7	14	9
		Male	Person	1	4	0
		Female	Person	6	10	9

Occupational safety & health		Unit	2020	2021	2022
Occupational accident rate	LTIFR	-	0.49	0.00	0.00
	OIFR	-	0.00	0.00	0.00
	TRIFR	-	0.49	0.00	0.00
	Process Safety Event_Tier 1	-	0.00	0.00	0.45

Kumho P&B Chemicals

Financial Performance

	Unit	2020	2021	2022
Assets	KRW 1 million	1,110,586	2,109,416	1,966,762
Liabilities	KRW 1 million	351,530	616,422	284,628
Equity	KRW 1 million	759,056	1,492,994	1,682,134
Revenue	KRW 1 million	1,412,043	2,688,715	2,202,484
Operating profit	KRW 1 million	210,435	1,008,670	306,209

Environmental

Greenhouse gas		Unit	2020	2021	2022
Greenhouse gas emissions	Total greenhouse gas emissions	tCO ₂ -eq	999,732	956,117	862,006
	Scope 1 emissions	tCO ₂ -eq	164,862	183,372	182,657
	Scope 2 emissions	tCO ₂ -eq	834,870	772,745	679,349
Greenhouse gas intensity	Greenhouse gas emissions per unit intensity	tCO ₂ -eq/ KRW 1 billion	708.0	355.6	391.4

Energy		Unit	2020	2021	2022
Energy use	Total energy consumed	TJ	11,789	12,595	11,475
	Total direct energy consumed	TJ	2,398	2,610	2,585
	Total indirect energy consumed	TJ	9,391	9,985	8,889
Energy intensity	Energy used per intensity	TJ/KRW 1 billion	8.3	4.7	5.2

Water		Unit	2020	2021	2022
Water management	Water withdrawn	m ³	3,655,643	3,805,506	3,488,831
Wastewater	Wastewater discharged	m ³	1,141,129	1,230,372	1,207,137
	Wastewater discharged per unit intensity	m ³ / KRW 1 billion	808.1	457.6	548.1

Air pollutants		Unit	2020	2021	2022
Air pollutants emissions	NOx	ton	48.4	31.1	14.8
	SOx	ton	7.7	12.6	11.4
	PM	ton	8.6	7.2	4.6

Water pollutants		Unit	2020	2021	2022
Water pollutants discharged	COD ¹⁾	ton	142.9	149.1	-
	BOD	ton	40.8	60.4	64.3
	SS	ton	120.8	99.6	104.6
	TOC ¹⁾	ton	-	-	155.3
	T-N	ton	23.8	28.2	37.4
	T-P	ton	21.4	19.3	18.0

1) Replacing COD with TOC for reporting starting in 2022

Hazardous chemicals		Unit	2020	2021	2022
Hazardous chemicals discharged	Hazardous chemicals discharged	ton	46	42	35
	Hazardous chemical discharged per unit intensity	ton/KRW 1 billion	0.03	0.02	0.02
Hazardous chemicals used	Hazardous chemicals used	ton	808,778	877,347	733,842

Raw materials		Unit	2020	2021	2022
Raw materials used		ton	1,627,581	1,752,350	1,504,538

Kumho P&B Chemicals

Waste		Unit	2020	2021	2022	
Total waste	Total waste generated	ton	4,260	5,087	5,989	
	Total waste recycled	ton	453	2,568	2,546	
	Rate of waste recycled	%	10.6	50.5	42.5	
	Total amount of waste treated	ton	3,807	2,519	3,443	
General waste	Total general waste generated	ton	3,479	4,356	5,049	
	Total general waste recycled ¹⁾	ton	232	2,382	2,313	
	Rate of general waste recycled	%	6.7	54.7	45.8	
	Total general waste treated	Total	ton	3,247	1,974	2,736
		Incineration	ton	3,138	1,868	2,284
		Landfill	ton	109	100	368
		Others	ton	0	6	85
Hazardous waste	Total hazardous waste generated	ton	781	731	940	
	Total hazardous waste recycled	ton	221	187	233	
	Rate of hazardous waste recycled	%	28.3	25.5	24.8	
	Total hazardous waste treated	Total	ton	561	545	706
		Incineration	ton	558	539	661
		Landfill	ton	3	6	36
Others		ton	0	0	10	

1) Increase in 2021 recycling rate due to identification of new recycling companies dealing with waste ion exchange resin, and waste water treatment

Human Resources

Employee		Unit	2020	2021	2022	
Total no. of employees		Person	346	358	386	
By age	Under 30	Person	58	68	80	
	30 ~ 49	Person	174	186	200	
	50 and older	Person	114	104	106	
By employment type	Full time employees	Person	312	319	339	
	Temporary employees	Person	34	39	47	
Workforce diversity	Employees	Female	Person	41	46	50
		Male	Person	305	312	336
	Executives (registered directors included)	Female	Person	2	2	2
		Male	Person	9	8	10
	Manager position ¹⁾	Female	Person	6	6	7
		Male	Person	65	69	70
	Manager position ¹⁾ in revenue generation departments ²⁾	Female	Person	2	2	2
		Male	Person	14	15	15
	STEM-related departments ³⁾	Female	Person	7	9	7
		Male	Person	17	19	23
National veterans	Person	13	12	12		
Employees with disabilities	Person	4	3	3		
Foreign national employees	Person	1	1	1		

1) Above senior manager level, below director level

2) Departments belonging to the sales division

3) Departments belonging to the research sector (excluding support departments), Technology Planning Team, and New Business Team

HR management		Unit	2020	2021	2022	
Recruitment	No. of employees newly hired	Total	Person	37	37	58
		Entry-level employees	Person	27	29	35
		Experienced employees	Person	10	8	23
Turnover-resignation	Rate of turnover-resignation	%	7.0	4.0	10.6	
	Rate of turnover-resignation	%	1.0	1.4	5.0	

Kumho P&B Chemicals

Employee training		Unit	2020	2021	2022
Employee training hours		Hour	7,529	9,122	9,318
Employee training cost		KRW 1 million	125	206	278

Labor-management relations		Unit	2020	2021	2022
Rate of union membership (compared to total no. of employees) ¹⁾		%	44.5	39.9	38.6
No. of labor-management council meetings		Case	4	4	4

1) Decreased rate of union membership in 2021 following the dissolution of the 2nd union

Pay and benefits			Unit	2020	2021	2022
Gender pay gap	Average basic salary ratio for male and female employees	Total ¹⁾	%	77	78	81
		Executives ¹⁾	%	77	67	96
		Manager position	%	87	92	100
		Non-manager position	%	105	99	95
Parental leave	Parental leave	Total	Person	3	5	3
		Male	Person	0	0	0
		Female	Person	3	5	3
	No. of employees returning to work after parental leave	Total	Person	2	4	0
		Male	Person	0	0	0
		Female	Person	2	4	0
No. of employees working more than 12 months after returning to work	Total	Person	2	3	0	
	Male	Person	0	0	0	
	Female	Person	2	3	0	

1) Registered directors excluded

Occupational Safety & Health

Occupational safety & health		Unit	2020	2021	2022	
Employee health support	Health checkups	Person	195	121	208	
	Special health checkups ¹⁾	Person	228	235	265	
	General checkups	Person	222	235	265	
Violation of health and safety laws and regulations	No. of breaches	Case	47	3	3	
	Fines/penalties	KRW 1 million	88	1	3	
Occupational accident rate	Employee	LTIFR ²⁾	-	2.9	0.0	0.0
		OIFR ²⁾	-	0.0	0.0	0.0
		TRIFR ²⁾	-	2.9	0.0	0.0
		Process Safety Event _ Tier 1 ²⁾	-	0.0	0.0	0.0
		Fatality rate	%	0.0	0.0	0.0
		Occupational accident rate	%	0.32	0.30	0.0
	Suppliers	LTIFR ²⁾	-	4.6	0.0	0.0
	OIFR ²⁾	-	0.0	0.0	0.0	
	TRIFR ²⁾	-	4.6	4.2	0.0	
	Fatality rate	%	0.68	0.0	0.0	
	Occupational accident rate	%	0.0	0.0	0.0	

1) Calculated base on the number of people inspected, excluding duplicates

2) Calculated annual working hours assuming 8 hours per day and 250 days per year

Kumho Polychem

Financial Performance

	Unit	2020	2021	2022
Assets	KRW 1 million	405,905	517,090	629,830
Liabilities	KRW 1 million	101,217	143,309	135,579
Equity	KRW 1 million	304,688	373,781	494,251
Revenue	KRW 1 million	328,029	631,523	781,598
Operating profit	KRW 1 million	-2,993	87,123	160,300

Environmental

Greenhouse gas		Unit	2020	2021	2022
Greenhouse gas emissions ¹⁾	Total greenhouse gas emissions	tCO ₂ -eq	238,521	325,294	315,131
	Scope 1 emissions	tCO ₂ -eq	361	3,009	2,396
	Scope 2 emissions	tCO ₂ -eq	238,160	322,286	312,736
Greenhouse gas intensity	Greenhouse gas emissions per unit intensity	tCO ₂ -eq/KRW 1 billion	727.1	515.1	403.2

1) Total differs from the sum of Scope 1, 2 emission since emissions are calculated by business sites and unit truncation

Energy		Unit	2020	2021	2022
Energy use	Total energy consumed	TJ	3,650	5,503	5,292
	Total general energy consumed	TJ	4	5	6
	Total indirect energy consumed	TJ	3,645	5,497	5,286
Energy intensity	Energy used per unit intensity	TJ /KRW 1 billion	11.1	8.7	6.8

Water		Unit	2020	2021	2022
Water management	Water withdrawn ¹⁾	m ³	1,846,121	2,709,620	2,799,989
Wastewater	Wastewater discharged ¹⁾	m ³	1,466,240	2,112,830	2,174,455
	Wastewater discharged per unit intensity	m ³ /KRW 1 billion	4,469.8	3,345.6	2,782.1

1) Data increase in 2021 due to an increase in factory utilization after economic recovery from the outbreak our COVID-19

Air pollutants		Unit	2020	2021	2022
Air pollutants emission	NOx	ton	0.7	2.0	5.3
	SOx	ton	0.1	0.9	1.4
	PM	ton	5.1	5.4	4.6

Water pollutants		Unit	2020	2021	2022
Water pollutants discharged	COD ¹⁾	ton	35.3	64.6	-
	BOD	ton	53.3	4.7	67.0
	SS	ton	14.6	17.2	10.0
	TOC ¹⁾	ton	-	-	0.1
	T-N	ton	2.7	3.4	1.3
T-P	ton	0.02	0.06	0.18	

1) Replacing COD with TOC for reporting starting in 2022

Hazardous chemicals		Unit	2020	2021	2022
Amount of hazardous chemicals used		ton	1,133	1,902	1,690

Raw materials		Unit	2020	2021	2022
Raw materials used		ton	135,201	220,791	199,016

Kumho Polychem

Waste		Unit	2020	2021	2022	
Total waste	Total waste generated	ton	3,980	5,831	5,397	
	Total waste recycled	ton	3,584	5,333	4,848	
	Rate of total waste recycled	%	90.1	91.5	89.8	
	Total waste treated	ton	395	497	549	
General waste	Total general waste generated	ton	3,476	5,110	4,661	
	Total general waste recycled	ton	3,093	4,630	4,124	
	Rate of general waste recycled	%	89.0	90.6	88.5	
	Total general waste treated	Total	ton	383	480	536
		Incineration	ton	352	444	416
		Landfill	ton	31	36	120
		Others	ton	0	0	0
Hazardous waste	Total hazardous waste generated	ton	504	720	736	
	Total hazardous waste recycled	ton	491	704	724	
	Rate of hazardous waste recycled	%	97.5	97.7	98.3	
	Total hazardous waste treated	Total	ton	13	17	12
		Incineration	ton	13	17	12
		Landfill	ton	0	0	0
Others		ton	0	0	0	

Human Resources

Employee		Unit	2020	2021	2022	
Total no. of employees		Person	208	215	226	
By age	Under 30	Person	10	20	32	
	30~49	Person	143	147	147	
	50 and older	Person	55	48	47	
By employment type	Full time employees	Person	202	207	217	
	Temporary employees	Person	6	8	9	
Workforce diversity	Employees	Female	Person	20	26	31
		Male	Person	188	189	195
	Executives (registered directors included)	Female	Person	0	1	1
		Male	Person	12	9	10
	Manager position ¹⁾	Female	Person	1	1	2
		Male	Person	54	54	58
	Manager position ¹⁾ in revenue generation departments ²⁾	Female	Person	0	0	0
		Male	Person	12	12	13
STEM-related departments ³⁾	Female	Person	2	2	3	
	Male	Person	22	20	16	

1) Above senior manager level, below director level

2) Department belonging to the Sales Division

3) Department belonging to the R&D Division

HR management		Unit	2020	2021	2022	
Recruitment	No. of employees newly hired	Total	Person	11	19	17
		Entry-level employees	Person	10	15	15
		Experienced employees	Person	1	4	2
Turnover-resignation	Rate of turnover-resignation		%	1.0	6.3	2.8
	Rate of voluntary turnover-resignation		%	1.0	6.3	2.8

Kumho Polychem

Employee training		Unit	2020	2021	2022
Employee training hours		Hour	12,301	13,374	16,984
Employee training cost		KRW 1 million	59	92	118

Labor-management relations		Unit	2020	2021	2022
Rate of union membership (compared to total no. of employees)		%	41.3	40.0	38.5
No. of labor-management council meetings		Case	4	4	4

Pay and benefits			Unit	2020	2021	2022
Gender pay gap	Average basic salary ratio for male and female employees	Total ¹⁾	%	49	42	46
		Executives ¹⁾	%	-	-	-
		Manager position	%	42	45	49
		Non-manager position	%	66	56	61
Parental leave	Parental leave	Total	Person	0	0	2
		Male	Person	0	0	0
		Female	Person	0	0	2
	No. of employees returning to work after parental leave	Total	Person	0	0	0
		Male	Person	0	0	0
		Female	Person	0	0	0
	No. of employees working more than 12 months after returning to work	Total	Person	0	0	0
		Male	Person	0	0	0
		Female	Person	0	0	0

Occupational Safety & Health

Occupational safety & health		Unit	2020	2021	2022	
Employee health support	Health checkups	Person	191	198	210	
	General checkups	Person	139	142	158	
Violation of health and safety laws and regulations	No. of breaches	Case	0	1	1	
	Fines/penalties	KRW 1 million	0	40	3	
Occupational accident rate	Employees	LTIFR ¹⁾	-	0.0	0.0	0.0
		OIFR ¹⁾	-	0.0	0.0	0.0
		TRIFR ¹⁾	-	0.0	0.0	0.0
		Process Safety Event _ Tier 1 ¹⁾	-	0.0	0.0	0.0
		Fatality rate	%	0.0	0.0	0.0
	Occupational accident rate	%	0.0	0.0	0.0	
	Suppliers	LTIFR ¹⁾	-	0.0	0.0	0.0
		OIFR ¹⁾	-	0.0	0.0	0.0
		TRIFR ¹⁾	-	0.0	0.0	0.0
		Fatality rate	%	0.0	0.0	0.0
Occupational accident rate		%	0.0	0.0	0.0	

1) Calculated annual working hours assuming 8 hours per day and 250 days per year

Kumho Resort

Financial Performance

	Unit	2020	2021	2022
Assets	KRW 1 million	699,534	737,856	739,920
Liabilities	KRW 1 million	471,044	470,991	469,272
Equity	KRW 1 million	228,490	266,865	270,648
Revenue	KRW 1 million	56,545	70,225	97,663
Operating profit	KRW 1 million	-6,885	508	8,799

Environmental

Energy		Unit	2020	2021	2022
Energy use ¹⁾	Total energy consumed	TJ	153	149	206
	Total direct energy consumed	TJ	102	101	142
	Total indirect energy consumed	TJ	51	48	64
Energy intensity	Energy use used unit intensity	TJ/KRW 1 billion	2.7	2.1	2.1

1) In accordance with the energy conversion standard of the Enforcement Rules of the Energy Act

Human Resources

Employee		Unit	2020	2021	2022	
Total no. of employees		Person	417	402	408	
By age	Under 30	Person	112	103	119	
	30~49	Person	256	247	236	
	50 and older	Person	49	52	53	
By employment type	Full time employees	Person	400	380	387	
	Temporary employees	Person	17	22	21	
Workforce Diversity	Employees	Female	Person	125	124	127
		Male	Person	292	278	281
	Executives (registered directors included)	Female	Person	1	0	0
		Male	Person	7	6	6
	Manager position ¹⁾	Female	Person	0	0	1
		Male	Person	12	13	14
	Manager position ¹⁾ in revenue generation departments ²⁾	Female	Person	0	0	0
		Male	Person	7	7	8
National veterans	Person	4	3	3		
Employees with disabilities	Person	1	1	1		

1) Above senior manager level, below director level

2) All business sites excluding the headquarters (Kumho Tongyeong Marina Resort, Kumho Seorak Resort, Kumho Hwasun Spa Resort, Kumho Jeju Resort, Asiana CC, Asan Spavis)

HR management		Unit	2020	2021	2022	
Recruitment	Total no. of employees newly hired	Total	Person	47	90	111
		Entry-level employees	Person	29	43	50
		Experienced employees	Person	18	47	61
Turnover-resignation	Rate of turnover-resignation	%	15.1	25.2	26.1	
	Rate of voluntary turnover-resignation	%	14.9	24.5	25.4	

Kumho Resort

Employee training		Unit	2020	2021	2022
Employee training hours	Hour		14,978	10,001 ¹⁾	30,511
Employee training cost	KRW 1 million		28	89	231

1) Reduced employee training hours in 2021 due to the suspension of face-to-face training in 2020 and the first half of 2021 due to COVID-19

Labor-management relations		Unit	2020	2021	2022
No. of union membership	Person		72	74	74
No. of labor-management council meetings	Case		4	4	4

Pay and benefits			Unit	2020	2021	2022
Gender pay gap	Average basic salary ratio for male and female employees	Total ¹⁾	%	82	74	71
		Executive ¹⁾	%	101	-	-
		Manager Position	%	96	94	91
		Non-manager position	%	87	82	78
Parental leave	Parental leave	Total	Person	15	9	9
		Male	Person	11	5	3
		Female	Person	4	4	6
	No. of employees returning to work after parental leave	Total	Person	14	5	8
		Male	Person	10	3	3
		Female	Person	4	2	5
No. of employees working more than 12 months after returning to work	Total	Person	13	4	0	
	Male	Person	9	2	0	
	Female	Person	4	2	0 ²⁾	

1) Registered directors excluded

2) There are no female parental leave workers who have reached 12 months since returning as of the counting date

Occupational Safety & Health

Occupational safety & health		Unit	2020	2021	2022	
Employee health support	Health checkups	Person	0 ¹⁾	244	251	
	General checkups	Person	375	134	108	
Violation of health and safety laws and regulations	No. of breaches	Case	0	0	1	
	Fines/penalties	KRW 1 million	0	0	1	
Occupational accident rate	Employee	LTIFR ²⁾	-	2.4	2.5	6.1
		OIFR ²⁾	-	0.0	0.0	0.0
		TRIFR ²⁾	-	2.4	2.5	6.1
		Fatality rate	%	0.0	0.0	0.0
		Occupational accident rate	%	0.40	0.31	0.54

1) Health checkups implemented from 2021

2) Calculated annual working hours assuming 8 hours per day and 250 days per year

Kumho T&L

Financial Performance

	Unit	2020	2021	2022
Assets	KRW 1 million	214,815	203,292	177,228
Liabilities	KRW 1 million	124,003	114,022	61,301
Equity	KRW 1 million	90,812	89,270	115,927
Revenue	KRW 1 million	75,929	80,264	78,793
Operating profit	KRW 1 million	12,409	10,434	10,131

Environmental

Water		Unit	2020	2021	2022
Water management	Water withdrawn	m ³	105,015	105,479	86,920
Wastewater	Wastewater discharged	m ³	12,972	12,828	14,213
	Wastewater discharged per unit intensity	m ³ /KRW 1 billion	170.8	159.8	180.4

Air pollutants		Unit	2020	2021	2022
Air pollutants emissions	NOx ¹⁾	ton	-	0.073	0.297
	VOCs ¹⁾	ton	-	0.089	0.023
	HAPs ¹⁾	ton	-	0.102	0.201
	PM	ton	3.619	4.884	2.795

¹⁾ Pollutants registered and measured since 2021

Water pollutants		Unit	2020	2021	2022
Water pollutants discharged	COD ¹⁾	ton	0.088	0.102	-
	BOD	ton	0.043	0.028	0.013
	SS	ton	0.127	0.162	0.115
	TOC ¹⁾	ton	-	-	0.039
	T-N	ton	0.047	0.021	0.026
	T-P	ton	0.003	0.001	0.001

¹⁾ Replacing COD with TOC for reporting starting in 2022

Waste		Unit	2020	2021	2022	
Total waste	Total waste generated	ton	651	872	716	
	Total waste recycled	ton	651	872	716	
General waste	Total general waste generated	ton	647	866	713	
	Total general waste treated	Total	ton	647	866	713
		Incineration	ton	59	115	57
		Landfill	ton	26	57	76
		Others	ton	562	694	580
Hazardous waste	Total hazardous waste generated	ton	4	5	5	
	Total hazardous waste treated	Total	ton	4	5	3
		Incineration	ton	4	5	3
		Landfill	ton	0	0	0
		Others	ton	0	0	0

Raw materials		Unit	2020	2021	2022
Raw materials used		ton	186,707	178,526	177,132

Kumho T&L

Human Resources

Employee		Unit	2020	2021	2022	
Total no. of employees		Person	63	68	68	
By age	Under 30	Person	11	8	10	
	30~49	Person	46	53	51	
	50 and older	Person	6	7	7	
By employment type	Full time employees	Person	57	61	62	
	Temporary employees	Person	6	7	6	
Workforce diversity	Employees	Female	Person	7	9	11
		Male	Person	56	59	57
	Executives (registered directors included)	Female	Person	0	0	0
		Male	Person	3	3	3
	Manager position ¹⁾	Female	Person	0	0	0
		Male	Person	14	14	13
Manager position ¹⁾ in revenue generation departments ²⁾	Female	Person	0	0	0	
	Male	Person	3	3	3	

1) Above senior manager level, below director level

2) Logistics Sales Team, TDF Operation Team

HR management		Unit	2020	2021	2022	
Recruitment	Total no. of employees newly hired	Total	Person	6	9	8
		Entry-level employees	Person	3	5	4
		Experienced employees	Person	3	4	4
Turnover·resignation	Rate of turnover·resignation	%	9.7	6.3	11.8	
	Rate of voluntary turnover·resignation	%	6.5	3.2	8.8	

Employee training		Unit	2020	2021	2022
Employee training hours		Hour	1,115	393	677
Employee training cost		KRW 1 million	12	1	6

Labor-management relations		Unit	2020	2021	2022
Rate of union membership (compared to the total number of employees)		%	33.3	30.9	33.8
No. of labor-management council meetings		Case	4	4	4

Pay		Unit	2020	2021	2022
Gender pay gap	Average basic salary ratio for male and female employees ¹⁾	%	50	55	63

1) Registered directors excluded

Kumho T&L

Occupational Safety & Health

Occupational safety & health		Unit	2020	2021	2022	
Employee health support	Health checkups	Person	64	64	62	
	Comprehensive checkups	Person	40	48	48	
	General checkups	Person	64	64	62	
Violation of health and safety laws and regulations	No. of breaches	Case	0	1	0	
	Fines/penalties	KRW 1 million	0	22	20	
Occupational accident rate	Employee	LTIFR ¹⁾	-	7.94	0.00	0.00
		OIFR ¹⁾	-	0.00	0.00	0.00
		TRIFR ¹⁾	-	7.94	0.00	0.00
		Fatality rate	%	0.0	0.0	0.0
		Occupational accident rate	%	0.0	0.0	0.0
	Supplier	LTIFR ¹⁾	-	8.52	5.35	8.29
		OIFR ¹⁾	-	0.00	0.00	0.00
		TRIFR ¹⁾	-	8.52	5.35	8.29
		Fatality rate	%	0.00	0.48	0.00
		Occupational accident rate	%	1.48	0.48	1.51

1) Calculated annual working hours assuming 8 hours per day and 250 days per year

Kumho Trading

Financial Performance

	Unit	2020	2021	2022
Assets	KRW 1 million	46,799	33,855	35,267
Liabilities	KRW 1 million	8,054	6,900	5,425
Equity	KRW 1 million	38,745	26,955	29,842
Revenue	KRW 1 million	55,227	53,918	71,385
Operating profit	KRW 1 million	1,458	3,113	4,793

Human Resources

Employee	Unit	2020	2021	2022	
Total no. of employees	Person	241	116	17 ¹⁾	
By age	Under 30	Person	3	7	
	30~49	Person	94	57	
	50 and older	Person	144	52	
By employment type	Full time employees	Person	61	79	
	Temporary employees	Person	180	37	
Workforce diversity	Employees	Female	Person	185	61
		Male	Person	56	55
	Executives (registered directors included)	Female	Person	0	0
		Male	Person	4	3
	Manager position ²⁾	Female	Person	5	4
		Male	Person	21	22
	Manager position ²⁾ in revenue generation departments ³⁾	Female	Person	3	3
		Male	Person	5	5
Employees with disabilities	Person	4	2	1	

1) Employee reduction in 2022 due to the dispose of the road management business 2) Above senior manager level, below director level 3) Trade Team and Infrastructure Business Team (2021)

Employee training	Unit	2020	2021	2022
Employee training hours	Hour	492	741	269
Employee training cost	KRW 1 million	14	6	5

HR management	Unit	2020	2021	2022		
Recruitment	Total No. of employees newly hired	Total	Person	26	50	8
		Entry-level employees	Person	0	0	1
		Experienced employees	Person	26	50	7
Turnover-resignation	Rate of turnover-resignation ¹⁾		%	12.2	72.6	93.1
		Rate of voluntary turnover-resignation	%	11.0	6.6	4.3

1) Employee reduction in 2022 due to the dispose of the road management business

Labor-management relations	Unit	2020	2021	2022
No. of union membership ¹⁾	Person	6	6	-
No. of labor-management council meetings	Case	4	4	-

1) In 2022 there were less than 30 full-time workers so no labor-management council was established

Pay and benefits	Unit	2020	2021	2022		
Gender pay gap	Average basic salary ratio for male and female employees	Total ¹⁾	%	59.3	66.5	70.0
		Executive ¹⁾	%	-	-	-
		Manager Position	%	106.4	111.5	83.9
		Non-manager position	%	86.7	87.4	70.8
Parental leave	Parental leave	Total	Person	4	3	2
		Male	Person	2	2	0
		Female	Person	2	1	2
	No. of employees returning to work after parental leave	Total	Person	3	2	0
		Male	Person	1	1	0
		Female	Person	2	1	0
No. of employees working more than 12 months after returning to work	Total	Person	1	0	0	
	Male	Person	0	0	0	
	Female	Person	1	0	0	

1) Registered directors excluded

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Climate Change Response Highlight

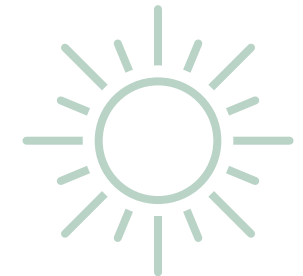
- Appointed a dedicated climate change officer and created a dedicated organization
- Established 5 main strategies to reduce carbon emissions by 29% from BAU levels by 2030, begin carbon neutral growth by 2035, and ultimately reach carbon neutrality by 2050



Improving governance and establishing strategies to advance climate change response

- Identified climate risks and opportunities that are most pertinent to Kumho Petrochemical's business activities, based on the categorization of climate-related risk and opportunities recommended by the TCFD framework
- Established a systematic climate risk identification process based on peer benchmarking, industry trends analyses, interviews, etc.

Establishing a process for identifying climate risks and opportunities for Kumho Petrochemical's business



Measuring physical risk with Jupiter Intelligence tools



- Utilized Jupiter Intelligence, which is a climate risk tool, to measure the risk of eight hazards (flood, wind, precipitation, heat, hail, drought, fire, and cold) across Kumho Petrochemical's business sites
- Analyzed changes in vulnerability of each hazard through the application of SSP scenarios

Measuring the financial impact of physical risk through financial modeling

- Calculated financial impact to business sites due to major hazards
- Analyzed changes in financial impact by scenario through financial modeling



Governance

Kumho Petrochemical established a governance structure to effectively respond to climate change issues. The BOD and the ESG Committee resolves, supervises, and manages climate change issues, and the management and working organizations promote practical climate change response activities.

BOD and ESG Committee

The BOD and ESG Committee manages and oversees functions on various environmental issues, including climate change, and approve and review related agendas.

The ESG Committee is composed of four independent directors and two executive directors with expertise in the fields of climate change and environment, finance, and risk, and is chaired by an environmental policy expert to respond to climate change.

In 2022, the ESG Committee approved joining the K-EV100 and reviewed climate change-related issues, such as climate change strategies, response to plastics regulations, detailed roadmap for 2030 GHG reduction, and CCUS investment and commercialization. In addition, the Committee discussed the results of climate risk and its financial impact analysis in 2023.

Executive and working organizations

Kumho Petrochemical is actively responding to climate change issues through a working organization directly under the CEO.

The ESG Management Team under the Strategic Planning Executives (which is under direct control of the CEO) and the Environmental Management Team, under the Head of Safety & Environment Planning Office are working on tackling climate change.

In March 2022, we elevated the Safety & Environment Team, previously under the Technology Planning Division, to the Safety & Environment Planning Office which is directly under the CEO and formed the Environmental Management Team. The Environmental Management Team is an organization that carries forward climate action plans. The Climate Part of the Team is in charge of realizing and promoting carbon-neutral growth, while the Environment Part manages general environmental affairs such as pollutant reduction, waste reduction, and environmental compliance. The Production Technology Teams at each business sites implement climate change response activities tailored to the characteristics of the business site based on the climate change strategy of the Environmental Management Team. The ESG Management Team oversees ESG issues company-wide, establishes environmental goals, including carbon neutrality target, in cooperation with the Environmental Management Team, and monitors the progress. To respond to climate and environmental issues, we have formed a company-wide Council for Climate and Environment. The Council includes the Environmental Management Team, ESG Management Team, Technology Planning Team, and New Business Team as regular members, and the Renewable Energy Team, related departments at business sites and Central R&BD Center as non-regular members. The Council holds meetings whenever environmental issues such as climate change arise. In 2022, the Council held meetings to elaborate on carbon reduction implementation plans for each business site and respond to emission calculations for each product.

Strategy

Climate Risks and Opportunities

In order to understand the impact of climate change on Kumho Petrochemical’s business, it is essential to identify risks and opportunities that the company faces in relation to climate change. Therefore, based on the TCFD recommendations, we analyzed peer companies, industry trends, and climate-related disclosure requirements to form a pool of climate-related risks and opportunities. Then, we assessed material risks and opportunities that could affect our business by interviewing internal departments. Furthermore, we analyzed the potential financial impact of each risk and opportunity factor to identify the impact of climate change on the company more specifically.

Climate-Related Risks

Category	Risk Factors	Potential Financial Impact
Transition risk	Policy and Legal <ul style="list-style-type: none"> • Stricter regulations on carbon emissions and reduced allocation due to 2030 Nationally Determined Contributions (NDC) • Stronger pressure to reduce carbon emissions from customers due to carbon regulations in supply chains • Increasing need to enhance reliability and transparency of information due to the stricter obligations to disclose greenhouse gas emissions 	<ul style="list-style-type: none"> • Rising operating costs as GHG emissions regulations tighten and purchase prices rise • Increasing cost of purchasing carbon credit in the event of unavailability of carbon credit and exceeding emission allowance • Higher purchase cost of PPA and REC that is related to the renewable energy shortage, lacking the sufficient supply compared to the growing demand • Falling competitiveness from trade barriers due to the expanded Carbon Border Tax • Rising operating costs when fulfilling customer requirements and decreasing operating profits due to contract termination in case of non-fulfillment
	Technology <ul style="list-style-type: none"> • Rising investor and customer demand for new technologies (especially the introduction of eco-friendly product management technology) • Adopting eco-friendly technologies requires changes in operational processes, including changes in production processes and product inventory management 	<ul style="list-style-type: none"> • Incurring costs to develop new technologies/facilities and transition to low-carbon energy sources • Decreasing revenue due to failure to attract investment in new technologies and loss of customers • Incurring costs associated with changes in operational processes, such as changes in production processes
	Market <ul style="list-style-type: none"> • Increased demand for eco-friendly products due to changing consumer preferences • Deterioration of business stability due to uncertain demand for eco-friendly products • Increasing demand for carbon emissions per product from customers 	<ul style="list-style-type: none"> • Decreasing sales due to reduced demand for existing products • Increasing costs for eco-friendly product certifications • Reducing product competitiveness compared to competitors if product-specific carbon emissions are not submitted
	Reputation <ul style="list-style-type: none"> • Increasing investor demand for coal divestment (divestment or exclusion of facilities due to stranded asset concerns) • Reputational damage from not achieving 2050 carbon neutrality or dropping targets • Responding to negative perceptions of the petrochemical industry 	<ul style="list-style-type: none"> • Investor withdrawal due to failure to respond to investor demands, loss of trust, etc. • Negative publicity about the petrochemical industry can damage the brand image and reduce sales

Category		Risk Factors	Potential Financial Impact
Physical risk	Acute	<ul style="list-style-type: none"> Increasing frequency of extreme weather events, resulting in direct damage to critical plant equipment and adverse plant operations Unstable energy supply due to extreme weather events, which can adversely affect plant operations and increase worker safety and health risks Adjustment of plant utilization rates to prevent damage to equipment during extreme weather events and resulting adverse impacts on plants Deteriorating supply chain operational processes and unstable supply of raw materials due to extreme weather events 	<ul style="list-style-type: none"> Reducing revenue due to lower plant utilization Costs incurred to repair damaged facilities or build new ones Incurring costs to find and purchase alternative sources of energy and raw materials Reducing revenue due to reduced worker productivity or business interruptions Incurring costs due to deteriorating logistics processes (e.g., ship delays, etc.)
	Chronic	<ul style="list-style-type: none"> Deteriorating water availability due to rising ground temperatures, increased surface evaporation, and reduced precipitation Damage to business site utilities as average temperatures rise Reduced labor productivity as average temperatures rise 	<ul style="list-style-type: none"> Reduced plant utilization and revenue as water availability deteriorates Reduced plant utilization and revenue due to utility damage Costs incurred to secure new utilities or repair damaged utilities Reduced revenue due to reduced worker productivity

Climate-Related Opportunities

Category		Opportunity Factors	Potential Financial Impact
Opportunity	Resource Efficiency	<ul style="list-style-type: none"> Reducing the use of raw materials through resource recycling and developing new products using byproducts Reducing wastewater generation by optimizing manufacturing processes and recycling water 	<ul style="list-style-type: none"> Reducing costs by using fewer raw materials and generate revenue by selling byproducts Reducing costs by reducing water withdrawals
	Energy Source	<ul style="list-style-type: none"> Maximizing energy efficiency through the use of low-carbon energy sources Improving operational efficiency by converting processes to lower energy consumption Expanding the use of renewable and low-carbon energy sources by utilizing energy-related policy support 	<ul style="list-style-type: none"> Reducing the cost of carbon credits and monetize the sale of reduction credits Saving costs from reduced energy use
	Products and Services	<ul style="list-style-type: none"> Growing consumer demand for eco-friendly products and services 	<ul style="list-style-type: none"> Increasing revenue from eco-friendly products and services by meeting changing consumer demand
	Markets	<ul style="list-style-type: none"> New markets following the transition to an eco-friendly portfolio Increasing demand for medical protective products due to increased diseases caused by climate change 	<ul style="list-style-type: none"> Generating new revenue by diversifying revenue sources and securing high-value revenue sources Increasing revenue from increased demand for existing product

Physical Risk Assessment

The frequency and severity of extreme weather events are increasing due to climate change, and the socio-economic damage is also increasing rapidly. Kumho Petrochemical conducted a scenario analysis through the following three-step process to assess the risk of climate hazards occurring at our business sites and their financial impact. To conduct a more accurate scenario analysis, we utilized the Jupiter Intelligence tool, a climate risk analysis tool. Jupiter Intelligence is a tool that quantitatively analyzes the risk of hazards such as flood, wind, and heat based on models that predict future weather caused by climate change. We utilized the tool to predict and assess the scale of potential impact of hazards on our business sites based on climate scenarios.

Physical Risk Assessment Process

Selecting business sites and hazards to analyze

Business sites subject to analysis

We have conducted an analysis on the headquarters, Central R&BD Center, 10 plants (Ulsan Synthetic Rubber Plant, Ulsan Synthetic Resin Plant, Yeosu Synthetic Rubber Plant I, Yeosu Synthetic Rubber Plant II, Yeosu Specialty Chemicals Plant, Yeosu Energy Plant I, Yeosu Energy Plant II Asan CNT Plant, Yesan Building Materials Plant, Hwaseong Foam Plant).

Hazards subject to analysis

We analyzed the impact of eight hazards on our business sites: flood, wind, precipitation, heat, hail, drought, fire, and cold.

Hazards	Measurement metrics
Flood	• Maximum depth of water and inundation area at the 10-, 20-, 50-, 100-, 200-, and 500-year return period
Wind	• Maximum wind speeds experienced at the 10-, 20-, 50-, 100-, 200-, and 500-year return period
Precipitation	• Maximum daily precipitation experienced at the 10-, 20-, 50-, 100-, 200-, and 500-year return period
Heat	• Average annual temperature • Number of days per year with temperature above 35°C or 38°C, etc.
Hail	• Number of days per year where large hail (greater than 2-5 cm in diameter) is possible • Number of days per year where environmental conditions are conducive to severe thunderstorm formation
Drought	• Annual local water stress, etc.
Fire	• Annual number of wildfires that are expected in a 1km ² grid cell
Cold	• Number of days per year with minimum temperature below 0°C

Selecting a scenario

Selected scenarios

We selected three SSP scenarios used in the IPCC's Sixth Assessment Report: SSP1-2.6, in which global average temperature rise is limited to 2°C or less; SSP5-8.5, in which carbon emissions at current trends lead to a global average temperature increase of 4°C or more; and SSP2-4.5, which assumes a global average temperature increase of 2-3°C as an intermediate step. This report presents the results of our analysis under SSP 1-2.6 and SSP5-8.5 scenarios.

Scenario	Description
SSP1-2.6	• Low-carbon scenario with global average temperature rise limited to 2°C or less • Assumes meeting the requirements of the Paris Climate Change Agreement
SSP2-4.5	• A scenario where global average temperature increase is limited to 2-3°C • Assumes greenhouse gas emissions remain at current levels through 2050
SSP5-8.5	• High-carbon scenario with a global average temperature increase of 4°C or more • Assumes greenhouse gas emissions at current trends

Applying scenarios and evaluating

Hazard Level Assessment

Using the Jupiter Intelligence tool, we conducted scenario analysis to determine the likelihood of eight hazards per site every five years from the present to 2100.

Financial Impact Assessment

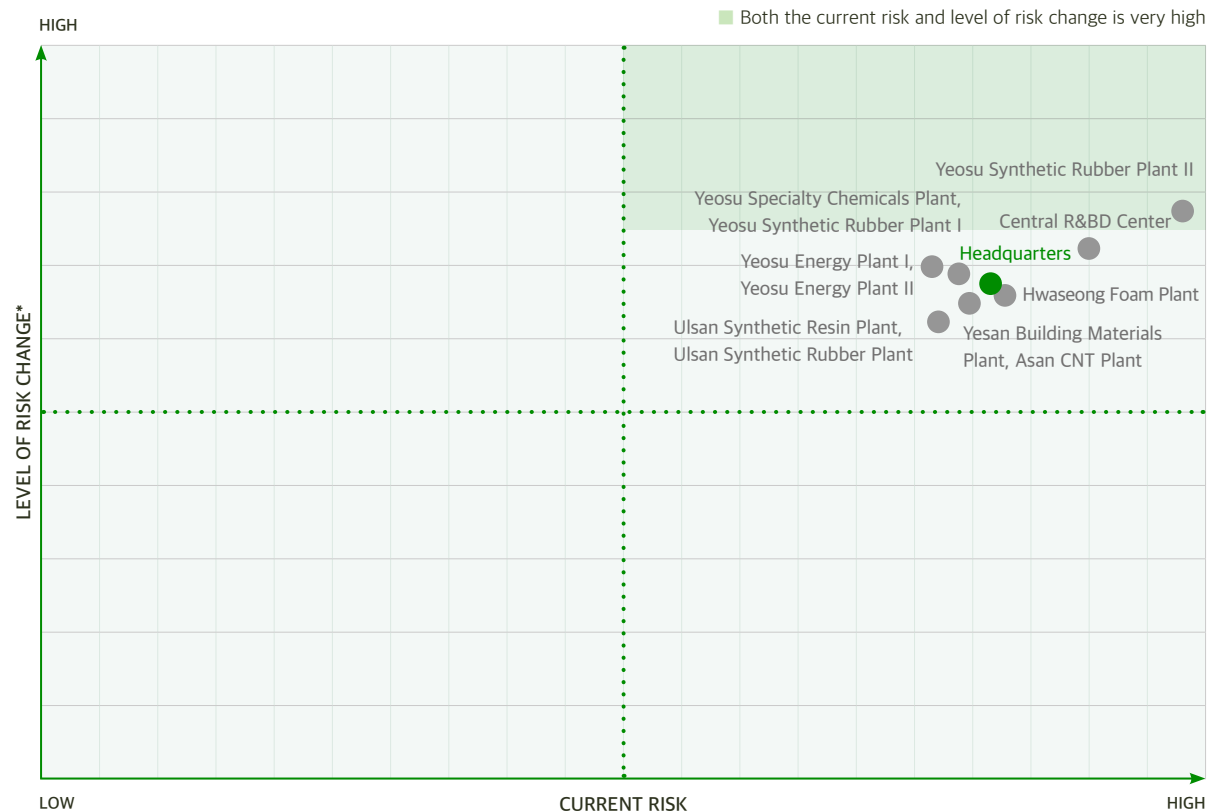
For major hazards that are likely to occur at Kumho Petrochemical, we measured the financial impact of each scenario. The financial impact was calculated in a broad range, considering direct damage to business sites due to hazards and indirect damage due to business interruption during the recovery period.

Physical Risk Assessment Results

For each of the 12 business sites, we assessed their current (2023) level of hazard and the level of change in risk over time. To assess the level of change, we applied the SSP5-8.5 scenario, which assumes that greenhouse gases will be emitted at current levels. The analysis showed that all 12 business sites are exposed to physical risks due to climate change and that the level of risk will increase over time. Among them, Yeosu Synthetic Rubber Plant II has the highest risk exposure, and the amount of increase by 2050 will be the largest.

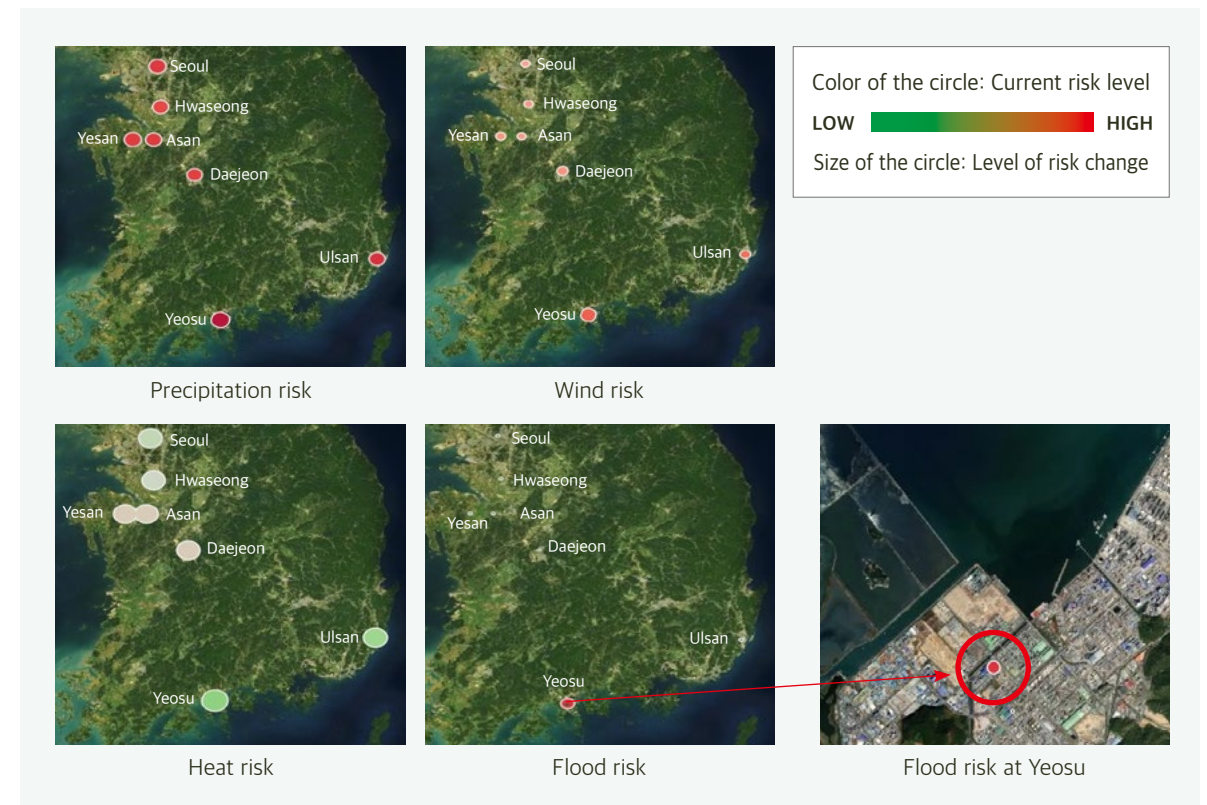
When analyzing the impact of each hazard, we found that of the eight hazards analyzed, flood, wind, precipitation, and heat are material to Kumho Petrochemical. All 12 business sites are exposed to the risk of heavy precipitation, and the level is expected to increase over time. Although wind currently has high level of risk, the level of change is low, and the impact is expected to be similar in the future as it is today. For heat, the current level of risk is not high, but the analysis shows that the level of risk will increase over time. In particular, ‘average number of days per year exceeding 35°C’, criterion used to estimate the risk of heat, is expected to increase in Ulsan about 30% compared to today, which implies high level of change in heat risk for business sites located in Ulsan. Flood risk was found to exist only at the Yeosu Synthetic Rubber Plant II, which is adjacent to the coastline and waterways, where ‘the depth of the water at the 10-year return period’ was analyzed to be 14% deeper in 2050 compared to today. For hail, drought, fire, and cold, the current risk level is relatively low and is not expected to have a significant impact in the future.

Risk Exposure Level and Level of Change by Business Site (SSP5-8.5 Scenario)



* Level of change in physical risk between 2023 and 2050 under the SSP5-8.5 scenario

Risk Exposure and Level of Change by Hazard (SSP5-8.5 Scenarios)



Results of the Financial Impact Assessment of Physical Risk

The financial loss of companies due to extreme climate events is an important factor to consider for sustainable management. Kumho Petrochemical calculated the financial impact of three hazards (flood, wind, and heat) that are predicted to have a major impact on the company, in order to effectively respond to climate change and prevent losses and damages that may occur as a result. Three SSP scenarios were applied to assess changes in financial losses, similar to the hazard level analysis in the previous step. In the case of flood and wind, the financial impact was measured by assessing not only direct damages such as damage to business sites due to hazards, but also indirect damages such as lost sales due to business site downtime. In the case of heat, the financial impact was calculated based on lost sales due to reduced labor productivity of employees.

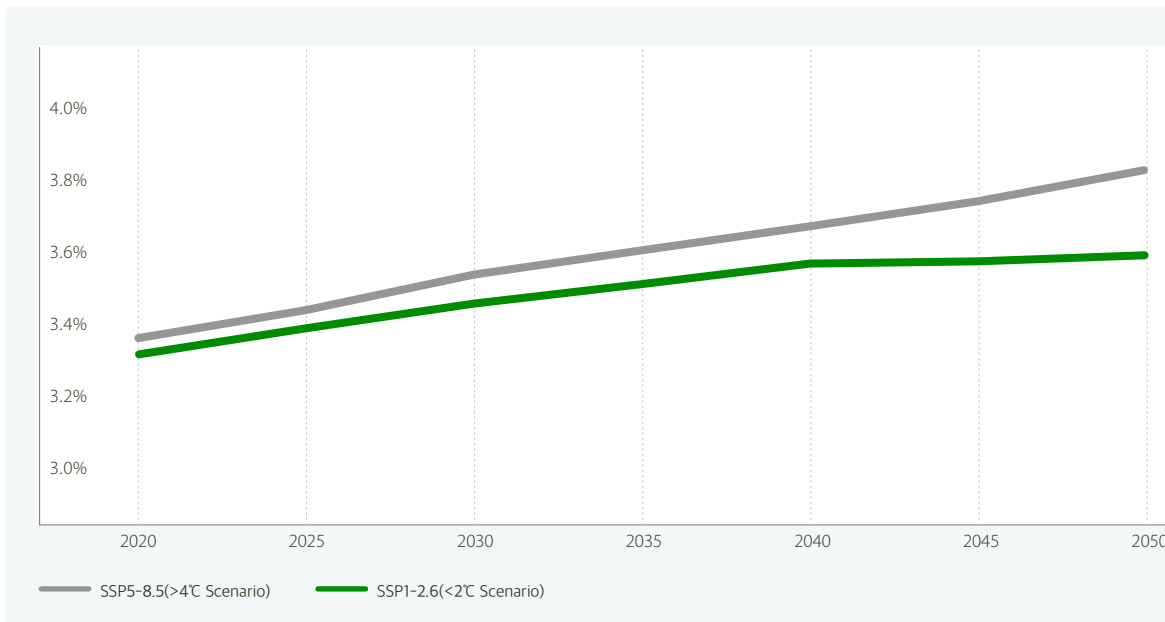
The analysis shows that under the high-emission scenario, SSP5-8.5, the share of financial losses due to hazards to total business value increases from 3.3% today to about 3.7% in 2050. Under the low-emission scenario, SSP1-2.6, the share of losses in 2050 is limited to 3.5%. Among the three hazards, wind accounts for the largest share of losses, accounting for about 62% of total losses in 2050, under the SSP5-8.5 scenario. On the other hand, the share of financial loss from heat increases from 16% today to 19% in 2050, showing the largest change in the share of losses among the three hazards.

Securing Resilient Strategy

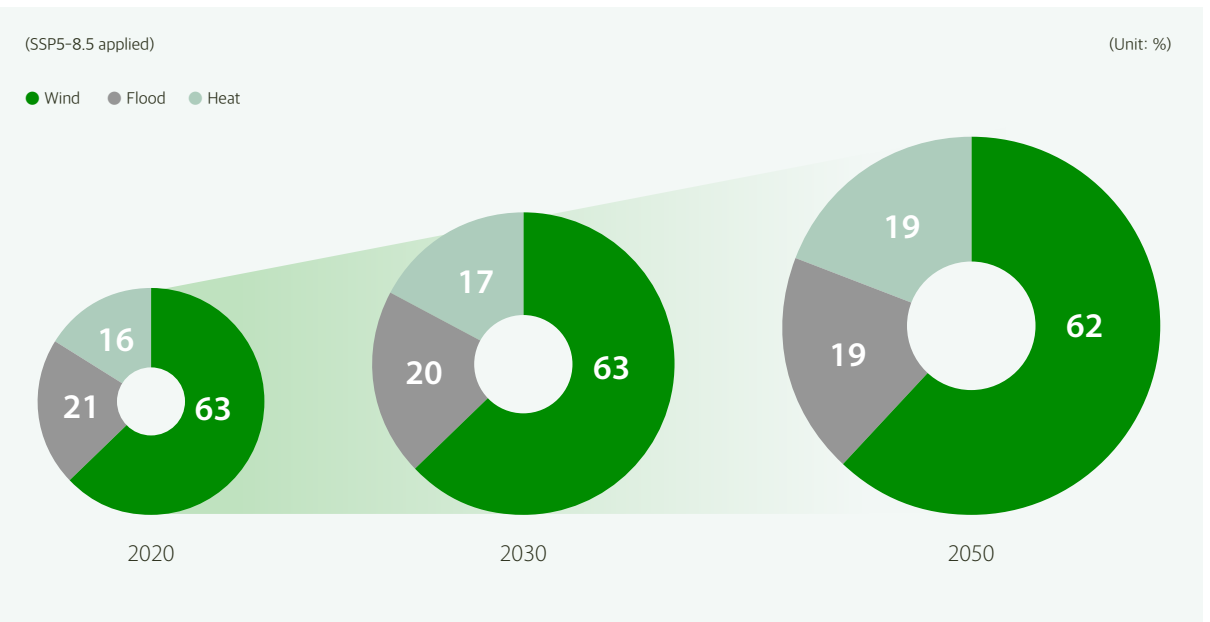
Scenario analysis was conducted to further understand the impact of physical risks on Kumho Petrochemical and to examine whether our climate strategy is resilient under various scenarios. By 2050, financial losses from climate change are not expected to increase significantly compared to today, and we plan to minimize climate change impacts by achieving our 2050 carbon neutrality goal. Furthermore, we aim to strengthen our resilience to climate change by considering the financial impact analysis results on the value of our business sites in our long-term management plans and strategies.

We will also proactively reflect the results of physical risk analysis in the management of business sites facilities to prevent damage due to climate change. In particular, we will continuously monitor the current level of risk for hazards and the level of change in future risks to check the level of preparedness for hazards by business site and supplement facilities against increasing risks. To this end, we have shared the results of physical risk analysis with each business sites and plan to reflect the analysis results in the facility management plan.

Share of Hazard Loss to Total Business Value



Change in Share of Losses by Hazard (SSP5-8.5 Scenario)



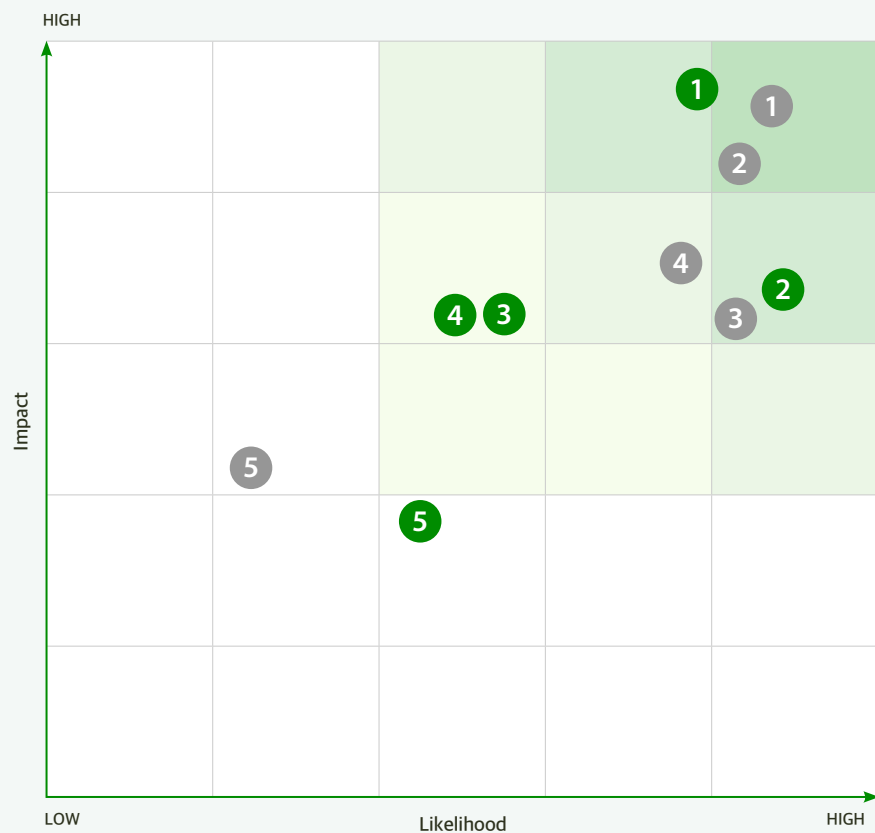
Transition Risk and Opportunity Assessment

We assessed the materiality of each factor based on the likelihood of occurrence and business impact of the transition risks and opportunities.

As a result, transition risks arising policy and legal were identified as top risk factors. Following the establishment of 2030 NDC (Nationally Determined Contribution), climate-related regulations are gradually being strengthened, including those related to carbon regulations in the supply chain, and regulations related to disclosure of greenhouse gas emission information, which may be newly applied to various aspects of Kumho Petrochemical's business. In addition, technology-related risks, which require overall changes to existing processes when adopting eco-friendly technologies, were also rated as a top risk since stakeholders' interest in eco-friendly technologies and products is increasing, such as investors' expansion of eco-friendly investment portfolios and customers' demand for low-carbon products.

On the other hand, securing new markets through portfolio transformation was identified as a major opportunity factor. The demand for eco-friendly products is growing rapidly and developing products that fulfill this demand is expected to provide a competitive advantage in the market. Maximizing operational efficiency by transitioning to low-energy consumption processes and using low-carbon energy sources was also assessed as a major opportunity. Based on the results of this assessment, we will lay the foundation for sustainable management by establishing countermeasures for major risks and strategies to maximize opportunities.

Transition Risk and Opportunity Assessment Results



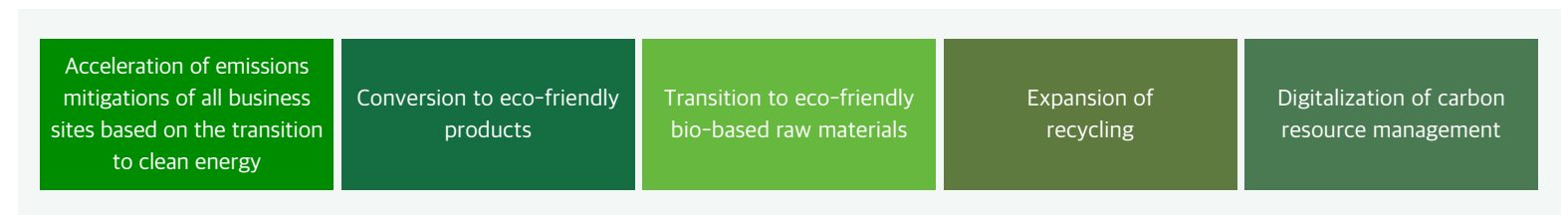
Category	Rank	Factor description
Transition risks	1	Policy and Legal • Increased customer demand for carbon reduction due to carbon regulations in supply chains
	2	Policy and Legal • Stricter regulations on carbon emissions and reduced allocation due to 2030 NDC
	3	Policy and Legal • Need to enhance reliability and transparency of information due to the expanded obligations to disclose greenhouse gas emissions
	4	Technology • Adopting eco-friendly technologies requires changes in operational processes, including changes in production processes and product inventory management
	5	Technology • Increased investor and customer demand for new technologies (especially the introduction of eco-friendly product management technology)
Opportunities	1	Market • New markets following the transition to an eco-friendly portfolio
	2	Market • Increased demand for medical protective products due to increased diseases caused by climate change
	3	Energy Source • Improve operational efficiency by converting processes to lower energy consumption
	4	Energy Source • Maximize energy efficiency through the use of low-carbon energy sources
	5	Energy Source • Expanding the use of renewable and low-carbon energy sources by utilizing energy-related policy support

Establishment of Climate Change Strategies

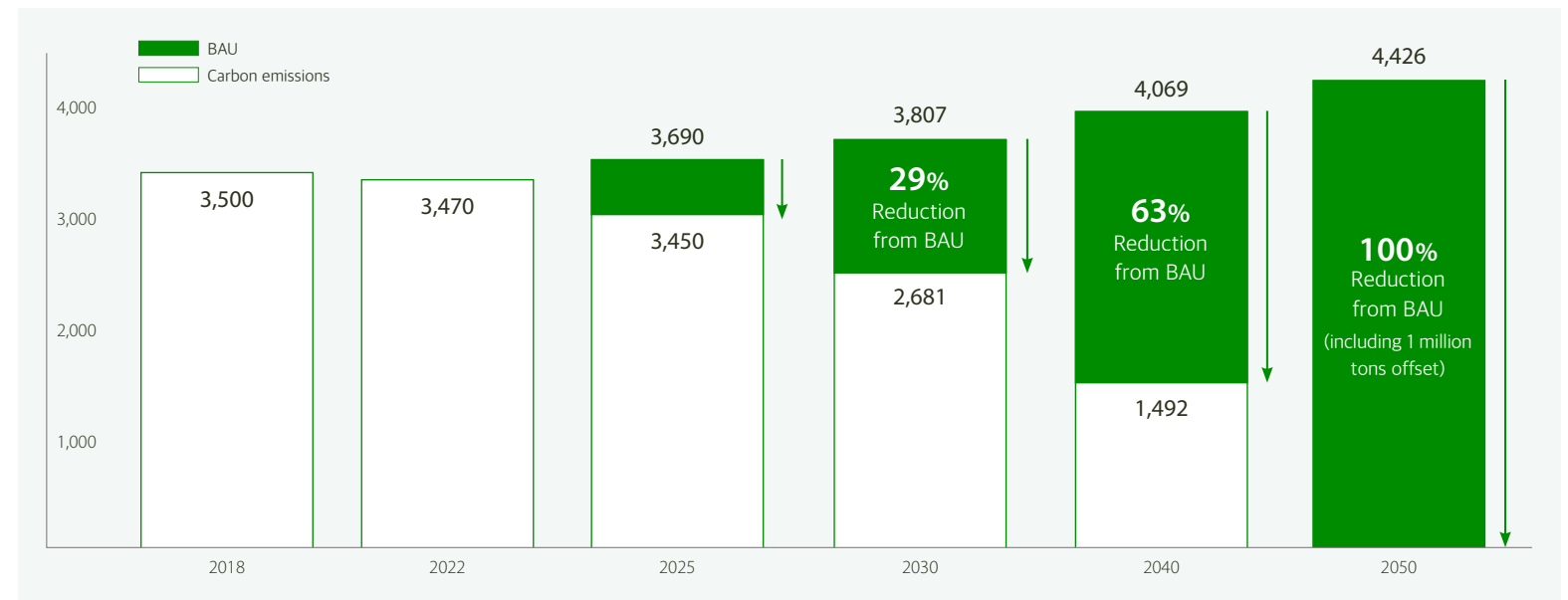
Kumho Petrochemical has established and implemented action plans for each business site to achieve the goals of our five main climate change response strategies: (1) Acceleration of emissions mitigations of all business sites based on the transition to clean energy, (2) Conversion to eco-friendly products, (3) Transition to eco-friendly bio-based raw materials, (4) Expansion of recycling, and (5) Digitalization of carbon resource management. We have also established a detailed roadmap to reduce GHG emissions (Scope 1 and 2) by year through activities based on each strategy. Based on the detailed GHG reduction implementation roadmap, we have established company-wide GHG emission targets for each year and for each business site, and are actively implementing activities to achieve them.

5 Main Strategies	Activities
Acceleration of emissions mitigations of all business sites based on the transition to clean energy	<ul style="list-style-type: none"> Increase the biomass co-firing rate Review fuel transition of energy business division Generate and sell renewable energy
Conversion to eco-friendly products	<ul style="list-style-type: none"> Expand recycled styrene (RSM) business Develop eco-friendly automotive solutions Obtain more eco-friendly certifications such as environmental labeling certification, environmental labeling certification, etc.
Transition to eco-friendly bio-based raw materials	<ul style="list-style-type: none"> Develop bio-based NB-Latex Sign an MOU to purchase bio raw materials
Expansion of recycling	<ul style="list-style-type: none"> Identify and drive waste recycling activities by business site Promote the recovery and reuse of packaging materials Achieve business site ZWTL certification
Digitalization of carbon resource management	<ul style="list-style-type: none"> Computerized recordkeeping of all data using ESG data management system

5 Main Strategies to respond to climate change




Detailed GHG Reduction Implementation Roadmap




Greenhouse Gas Emissions Reduction Efforts

Kumho Petrochemical strives to reduce GHG emissions at each business site according to the detailed GHG reduction implementation roadmap. Existing emissions by business site were analyzed and target emissions were allocated for each year reflecting the characteristics of each business site. In addition, we are establishing and implementing detailed reduction plans to achieve the target.




Carbon footprint analysis

- Analyze emissions by business site as of 2021
- Yeosu Energy Plant, Yeosu Synthetic Rubber Plant, and Ulsan Synthetic Rubber Plant have the highest emissions



Setting carbon emissions reduction goals for each business site

- Establish carbon emission allowance and reduction targets for each business site, taking into account estimated emissions per site, company-wide target calculation conditions, sales plans, etc.



Establishment of carbon emission reduction plan

- Establish a reduction plan that reflects site-specific emissions and reduction targets

Yeosu Energy Plant carbon emission reduction plan

 - Increased biomass co-firing rate: completed facility improvements to increase biomass co-firing rate from 6% in 2023 to 14% in 2030
 - Introduction of CCUS technology: 2023 business plan reported and approved by the Investment Review Committee
 - Review fuel transition to LNG, hydrogen, and fuel cells
- Establish a plan to reduce Scope 3 emissions

- Transition to eco-friendly products and expand low-carbon product portfolio: 16% of eco-friendly business by 2026 and 30% by 2030
 - Promote the establishment of an LCA system: Establishment of LCA system for 22 product groups at Ulsan and Yeosu plants in 2025 after evaluation of 4 major products at Ulsan Synthetic Resin Plant in 2023
- Join the K-EV100

- An initiative to publicly declare and phase in the conversion of a company's owned and leased vehicle fleet to zero-emission vehicles by 2030
 - Set goals of converting 32% of the company's 59 corporate vehicles (32% by 2025, 88% by 2028, 100% by 2030)

CASE STUDY

GHG Emissions Reduction Efforts of Major Affiliates

Kumho Petrochemical's major affiliates are also working to reduce greenhouse gases.

Kumho Mitsui Chemicals is continuing its efforts to reduce carbon emissions by utilizing hydrochloric acid oxidation technology (FOX, Fixed Bed Oxidation). Hydrochloric acid oxidation technology regenerates hydrochloric acid, a byproduct of the production process of MDI (Methylene Diphenyl Diisocyanate) which is a key raw material for polyurethane, into chlorine. Kumho Mitsui Chemicals has secured related technologies through joint technology development for about 4 years since the introduction of pilot facilities with Mitsui Chemicals in Japan in 2018, and is currently in the process of getting the technology recognized as a Clean Development Mechanism (CDM)*.

In the first quarter of 2023, Kumho Polychem established a carbon neutrality roadmap applying the Nationally Determined Contributions (NDC). To this end, it estimated BAU emissions for 2030 and is continuously identifying items for internal reduction projects. It also plans to change internal combustion engine vehicles to hybrid vehicles and electric-hydrogen vehicles, taking into account the availability of eco-friendly vehicle models and charging infrastructure for each corporate vehicle. Some vehicles have already been converted to hybrid vehicles, or orders have been placed.

Kumho Resorts** and Kumho T&L set a goal to convert their corporate-owned and leased vehicles to zero-emission vehicles such as electric and hydrogen vehicles by 2030. In the case of Kumho T&L, it is considering installing electric vehicle charging facilities at the Nakpo business site.

* Clean Development Mechanism (CDM): A greenhouse gas reduction project jointly promoted by developed and developing countries, and a system that recognizes reductions generated by developed countries' investments in developing countries as reductions.

** Kumho Resort plans to switch to zero-emission vehicles except for specialty vehicles.

Risk Management

Climate Risk Management Process

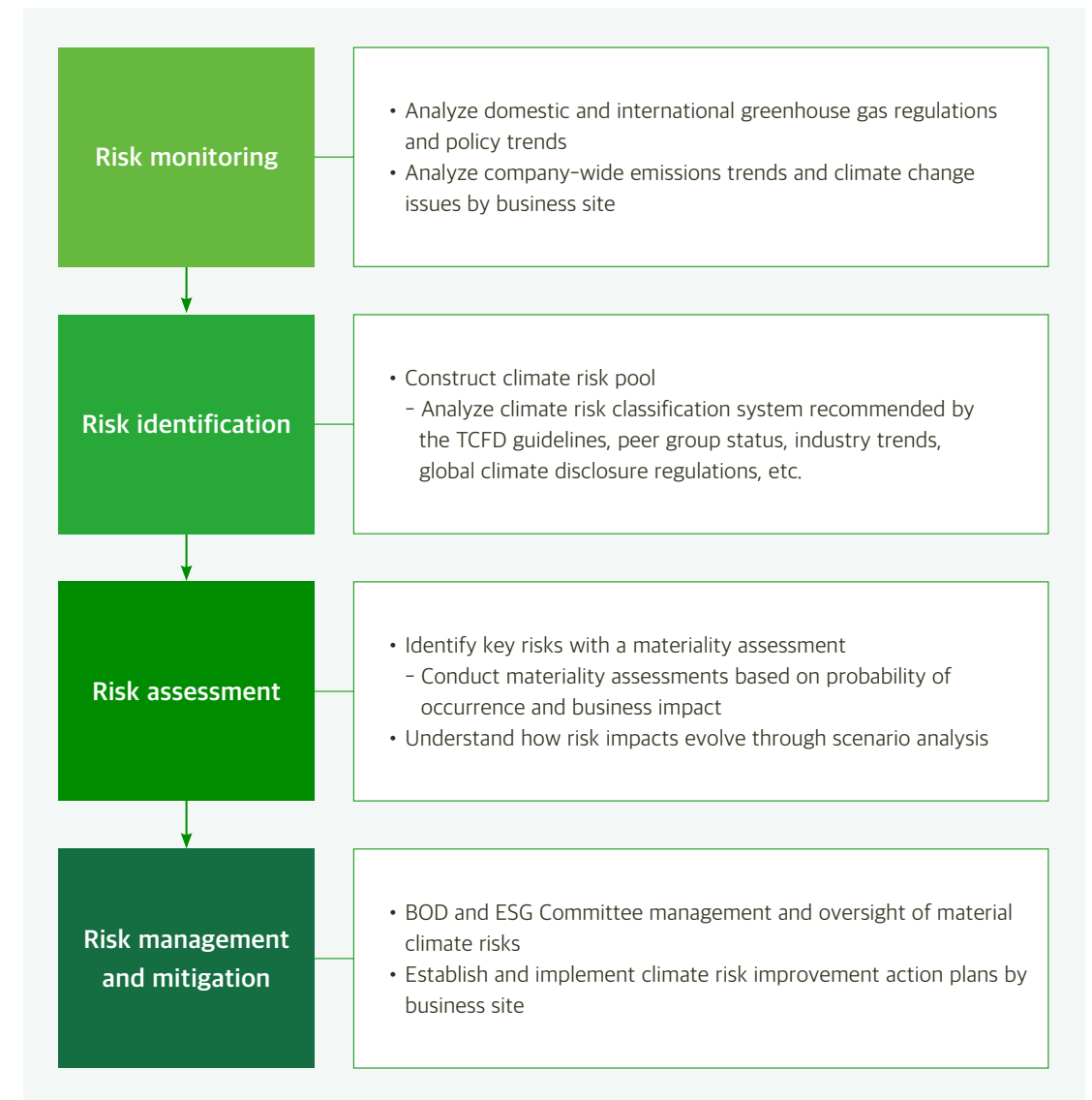
Climate risk affects companies in different ways depending on the nature of the industry in which they operate and the location of their business sites. We recognize climate risk as a material risk and integrally manages climate risk within the company-wide risk management process. In particular, we aim to minimize the negative impacts of climate change by managing climate risk more systematically through a four-step process of climate risk monitoring, identification, assessment, management, and mitigation.

Risk Monitoring | Kumho Petrochemical, centered on the Environmental Management Team conducts risk monitoring by analyzing domestic and international greenhouse gas regulations and policy trends related to climate risk and analyzing company-wide emission trends. The dedicated departments at each business site analyze local climate change issues and regularly propose agendas to the ESG Council, and conduct risk identification procedures for major issues.

Risk Identification | We construct a pool of climate risk factors that may affect the company by analyzing the climate risk classification system recommended by the TCFD Guidelines, the status of peer companies, industry trends, and global climate disclosure regulations. As the level of impact of each factor depends on the nature of the business and the geographic location of the business site, we finalize the risk factors closely related to Kumho Petrochemical through interviews with internal departments.

Risk Assessment | We define risks with high probability of occurrence and high business impact as major risks, and periodically conduct materiality assessments to select major risks among various risk factors. In particular, we analyze potential future impacts through scenario analysis and identify changing trends in the impact of risks on Kumho Petrochemical.

Risk Management and Mitigation | Major risks are classified as key risks and managed and supervised by the BOD and ESG Committee. When a climate risk occurs or the likelihood of occurrence increases, the head of the relevant department reports to the management, and in the case of material risks, the ESG Committee approves the agenda as a resolution to control the risks that climate risks may have on the company. In addition, we establish and deliberate on improvement action plans for each climate risk and implement them in the departments in charge of each business site. For climate risks for which we have implemented mitigation measures, we minimize related risks through periodic monitoring. In addition, we establish the ESG Investment Principles in 2023 to ensure that environmental and social risks are taken into account when making investment decisions. Even after risk management and mitigation measures, we monitor the possibility of further occurrence of related risks at all times to strengthen the sustainability of our business activities.



Metrics and Targets

Kumho Petrochemical selects and manages relevant metrics to measure the performance of climate change response activities. We periodically analyze yearly trends of related metrics such as greenhouse gas emissions and energy usage, and check the progress of achieving climate change response goals by comparing performance against targets. We also use the measurement results of key metrics as a basis for implementing climate change response strategies and reflect them in decision-making to set the direction of management activities. In particular, for greenhouse gas emissions, we set a goal to reduce carbon emissions by 29% compared to BAU by 2030 and start 'carbon-neutral growth' in 2035, when the amount of reduction is greater than the increase in carbon emissions, and ultimately to achieve carbon-neutral growth on a Scope 1 and 2 in 2050.

Metrics

Kumho Petrochemical manages greenhouse gas emissions and energy consumption as key metrics.

Metrics		Unit	2020	2021	2022
Greenhouse gas emissions	Total (Scope 1, 2)*	tCO ₂ eq	3,499,732	3,409,409	3,473,210
	Scope 1		3,108,304	3,036,989	3,128,818
	Scope 2		391,427	372,428	344,400
	Scope 3		3,311,681	3,684,896	3,518,491
	Intensity (Scope 1, 2)	tCO ₂ eq/KRW 1 billion	1,002.9	619.8	682.8
Energy use	Total consumed	TJ	43,216	42,727	42,338
	Intensity	TJ/KRW 1 billion	12.4	7.8	8.3

*Based on Greenhouse Gas Emissions Statement, and difference in total due to unit truncation

Targets

Kumho Petrochemical has set a phased target to achieve carbon neutrality in 2050. We aim to reduce the combined Scope 1 and 2 emissions by 29% compared to BAU in 2030, and plan to start carbon neutral growth in 2035. Ultimately, we will achieve carbon neutrality through a 100% reduction (including offsets) of Scope 1 and 2 emissions compared to BAU in 2050.

2030
29% reduction
compared to BAU
(Scope 1, 2)



2035
Start carbon
neutral growth
(Scope 1, 2, 3)



2050
Achieve carbon
neutrality
(Scope 1, 2)



Managing Greenhouse Gas Emissions Metrics

Measurement and Disclosure

Kumho Petrochemical manages GHG emissions through the National GHG Comprehensive Management System based on the GHG Emission Statement submitted to the Ministry of Environment, and discloses them transparently. In particular, we disclose GHG emissions per unit divided by economic activity indicators to enhance comparability when analyzing emission trends.

Aligning with Executive KPIs

Kumho Petrochemical designated an executive in charge of quarterly data collection and reporting in 2022 to enhance the effectiveness of climate change response activities based on GHG emissions. From 2023, to strengthen management's responsibility for climate change, GHG emission-related targets were assigned to management KPIs, including the CEO, Strategic Planning Executives, Technology and Energy Business Executives, Head of Safety & Environment Planning Office, and Purchasing Executives.

Scope 3 Emissions Calculation and Verification

Kumho Petrochemical aims to upgrade GHG emissions management by expanding the scope to Scope 3. Previously, we calculated Scope 3 by utilizing ERP system-based activity data and emission factors from the national LCI DB, but in 2023, we completed the selection of categories and confirmation of methodology to calculate emissions in compliance with the WBCSD Chemical and GHG Protocol. We plan to obtain third-party verification from an external expert organization once the emission calculation and inventory construction of the category is completed.

Establishment of Product Carbon Information Calculation System

Kumho Petrochemical is promoting product carbon LCA to measure carbon emissions on a per-product basis. Carbon LCA is a technique to evaluate the carbon emissions generated throughout the entire product life cycle, which enables us to respond to customer requirements and carbon trade tariff policies. We have established an LCA measurement plan from 2023 to 2025 and are considering expanding the number of products to be measured.



APPENDIX

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GRI Index

Statement of Use	Report on economic, environmental and social performance from January 2022 to December 2022 in accordance with the Global Reporting Initiative (GRI) standards, the international sustainability reporting guidelines
GRI 1 Used	GRI 1: Foundation 2021
Application of GRI Industry Standards	Not Applicable

Universal Standards: GRI 2			
Topic	Disclosures		Page
GRI 2: General Disclosures 2021 1. The organization and its reporting practices	2-1	Organizational details	7~11, 13~18
	2-2	Entities included in the organization's sustainability reporting	2
	2-3	Reporting period, frequency and contact point	2
	2-4	Restatements of information	83
	2-5	External assurance	120~121
GRI 2: General Disclosures 2021 2. Activities and workers	2-6	Activities, value chain and other business relationships	7~11, 57~58
	2-7	Employees	77
	2-8	Workers who are not employees	77, Annual Report p.292
GRI 2: General Disclosures 2021 3. Governance	2-9	Governance structure and composition	64~65
	2-10	Nomination and selection of the highest governance body	64~66
	2-11	Chair of the highest governance body	64
	2-12	Role of the highest governance body in overseeing the management of impacts	24, 64~66
	2-13	Delegation of responsibility for managing impacts	21, 64~66
	2-14	Role of the highest governance body in sustainability reporting	21, 64~66
	2-15	Conflicts of interest	64~66
	2-16	Communication of critical concerns	24, 64~66
	2-17	Collective knowledge of the highest governance body	65
	2-18	Evaluation of the performance of the highest governance body	66
	2-19	Remuneration policies	66 Annual Report p.292~299 Corporate Governance Report p.27~28
2-20	Process to determine remuneration	66 Annual Report p.292~299 Corporate Governance Report p.27~28	
2-21	Annual total compensation ratio	81	

Universal Standards: GRI 2			
Topic	Disclosures		Page
GRI 2: General Disclosure 2021 4. Strategy, policies and practices	2-22	Statement on sustainable development strategy	22~23
	2-23	Policy commitments	ESG Policy and Guideline
	2-24	Embedding policy commitments	ESG Policy and Guideline
	2-25	Processes to remediate negative impacts	24
	2-26	Mechanisms for seeking advice and raising concerns	49, 68
	2-27	Compliance with laws and regulations	82 Annual Report p.306~313
	GRI 2: General Disclosure 2021 5. Stakeholder engagement	2-28	Membership associations
2-29		Approach to stakeholder engagement	117
2-30		Collective bargaining agreements	78

Universal Standards: GRI 3			
Topic	Disclosures		Page
GRI 3: Material Topics 2021	3-1	Process to determine material topics	27~28
	3-2	List of material topics	27~28

Hazardous chemicals management			
Topic	Metric		Page
GRI 3: Material Topics 2021	3-3	Management of material topics	28
GRI 416: Customer Health and Safety 2016	416-1	Assessment of the health and safety impacts of product and service categories	36, 75

Climate change response			
Topic	Metric		Page
GRI 3: Material Topics 2021	3-3	Management of material topics	28
GRI 201: Economic Performance 2016	201-2	Financial implications and other risks and opportunities due to climate change	98~110
GRI 305: Emissions 2016	305-1	Direct (Scope 1) GHG emissions	74
	305-2	Energy indirect (Scope 2) GHG emissions	74
	305-3	Other indirect (Scope 3) GHG emissions	74
	305-4	GHG emissions intensity	74
	305-5	Reduction of GHG emissions	74, 108

Air pollutants emissions management			
Topic	Metric		Page
GRI 3: Material Topics 2021	3-3	Management of material topics	28
GRI 305: Emissions 2016	305-7	Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	75

Energy efficiency			
Topic	Metric		Page
GRI 3: Material Topics 2021	3-3	Management of material topics	28
GRI 302: Energy 2016	302-1	Energy consumption within the organization	74
	302-3	Energy intensity	74
	302-4	Reduction of energy consumption	33, 74

Safety and health risk management			
Topic	Metric		Page
Material Topics 2021	3-3	Management of material topics	28
GRI 403: Occupational Health and Safety 2018	403-1	Occupational health and safety management system	50
	403-2	Hazard identification, risk assessment, and incident investigation	53
	403-3	Occupational health services	54
	403-4	Worker participation, consultation, and communication on occupational health and safety	51, 54~55
	403-5	Worker training on occupational health and safety	55
	403-6	Promotion of worker health	54
	403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	55~56
	403-8	Workers covered by an occupational health and safety management system	50, 79
	403-9	Work-related injuries	54, 79
	403-10	Work-related ill health	54, 79

ESG governance			
Topic	Metric		Page
GRI 3: Material Topics 2021	3-3	Management of material topics	28

SASB Index

Sustainability Disclosure Topics and Accounting Metrics

Topic	Metric	Unit of Measure	Code	Report Page or Performance
Greenhouse Gas Emissions	Gross global Scope 1 emissions	tCO ₂ -eq	RT-CH-110a.1	p.74
	Percentage covered under emissions-limiting regulations	%		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	-	RT-CH-110a.2	p.31, p.98~110
Air Quality	(1) NOx Emissions (excluding N ₂ O)	ton	RT-CH-120a.1	p.75
	(2) SOx Emissions	ton		p.75
	(3) VOCs Emissions	ton		p.75
	(4) HAPs Emissions	ton		p.75
Energy Management	(1) Total energy consumed	GJ	RT-CH-130a.1	p.74
	(2) Percentage grid electricity	%		p.74
	(3) Percentage renewable	%		p.74
	(4) Total self-generated energy	GJ		p.74
Water Management	(1) Total water withdrawn	m ³	RT-CH-140a.1	p.75
	2) Total water consumed	m ³		p.75
	(3) Percentage of water withdrawn in regions with High or Extremely High Baseline Water Stress	%		p.75
	(4) Percentage of water consumed in regions with High or Extremely High Baseline Water Stress	%		p.75
	Number of incidents of non-compliance associated with water quality permits, standards, and regulations	No.	RT-CH-140a.2	p.75
	Description of water management risks and discussion of strategies and practices to mitigate those risks	-	RT-CH-140a.3	p.33
Hazardous Waste Management	Amount of hazardous waste generated	ton	RT-CH-150a.1	p.76
	Percentage recycled	%		p.76
Community Relations	Discussion of engagement processes to manage risks and opportunities associated with community interests	-	RT-CH-210a.1	p.32~38, p.59~60

Topic	Metric	Unit of Measure	Code	Report Page or Performance
Workforce Health & Safety	(a-1) Total recordable incident rate (TRIR) for direct employees	%	RT-CH-320a.1	p.79
	(a-2) Fatality rate for direct employees	%		p.79
	(b-1) Total recordable incident rate (TRIR) for contract employees	%		p.79
	(b-2) Fatality rate for contract employees	%		0%
	Description of efforts to assess, monitor, and reduce exposure of employees and contract workers to long-term (chronic) health risks	-	RT-CH-320a.2	p.50~56
Product Design for Use-phase Efficiency	Revenue from products designed for use phase resource efficiency	KRW 1 million	RT-CH-410a.1	N/A
Safety & Environmental Stewardship of Chemicals	(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	%	RT-CH-410b.1	p.36
	(2) Percentage of such products that have undergone a hazard assessment	%		p.36
	(1) Discussion of strategy to manage chemicals of concern	-	RT-CH-410b.2	p.36
	(2) Discussion of strategy to develop alternatives with reduced human and/or environmental impact	-		p.36
Genetically Modified Organisms Management of the Legal & Regulatory Environment	Percentage of products by revenue that contain genetically modified organisms (GMOs)	%	RT-CH-410c.1	N/A
	Discussion of corporate positions related to government regulations and/or policy proposals that address environmental and social factors affecting the industry	-	RT-CH-530a.1	ESG Policy and Guideline
Operational Safety, Emergency Preparedness & Response	(1) Process Safety Incidents Count (PSIC)	No.	RT-CH-540a.1	0 Incidents
	(2) Process Safety Total Incident Rate (PSTIR)	%		0%
	(3) Process Safety Incident Severity Rate (PSISR)	%		0%
	Number of transport incidents	No.	RT-CH-540a.2	0 Incidents

Activity Metrics

Topic	Unit of Measure	Code	Report Page or Performance
Production by reportable segment¹⁾	m ³ or tons	RT-CH-000.A	p.73

1) Due to different units of the figures by business (energy business), it is replaced to the revenues by business

Sustainability Initiatives

Kumho Petrochemical is participating in various initiatives such as the UNGC, UN SDGs, KBCSD, and K-EV100 to achieve sustainable growth of the environment and society. In addition, we plan to build partnerships with public and private partners, local communities, and experts in the field to actively implement the initiatives and seek ways to create tangible results. We will fulfill our corporate environmental and social responsibilities by expanding our participation in sustainable development initiatives within the petrochemical industry.

UN Global Compact

The United Nations Global Compact (UNGC) is a global initiative internalizing 10 principles in the four areas of human rights, labor, environment, and anti-corruption into corporate management, enhancing corporate citizenship, and providing action plans for sustainable development. Kumho Petrochemical joined the UN Global Compact in 2021.



UNGC	10 Principles	Page
Human Rights	1. Business should support and respect the protection of internationally proclaimed human rights; and	49
	2. Make sure that they are not complicit in human rights abuses	49
Labour	3. Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;	46
	4. the elimination of all forms of forced and compulsory labour;	49
	5. the effective abolition of child labour; and	49
	6. the elimination of discrimination in respect of employment and occupation	45~49
Environment	7. Businesses should support a precautionary approach to environmental challenges;	31~38, 98~110
	8. undertake initiatives to promote greater environmental responsibility; and	31~38, 98~110
	9. encourage the development and diffusion of environmentally friendly technologies	39~43
Anti-Corruption	10. Businesses should work against corruption in all its forms, including extortion and bribery	67~70

UN SDGs



The United Nations Sustainable Development Goals (UN SDGs) is an international agreement signed in September 2015 between the member states of the United Nations that promises sustainable development. They consist of 17 goals that the international community should strive to achieve in order to solve universal human problems, climate change issues, and economic and social issues, and Kumho Petrochemical is also making efforts to achieve them.

UNSDGs	Our Activities	Page
No Poverty	• Supporting vulnerable communities of business sites	59~60
Zero Hunger	• Supporting vulnerable communities of business sites	59~60
Good Health and Well-being	• Improving safety facilities and managing employee health • Donation of assisting devices for the disabled • Supply of white canes for the visually impaired • Employees' blood donations	50~56, 59~60
Quality Education	• Development of employee competency • Assistance in re-employment of retirees	45~48
Gender Equality	• Ensuring employee diversity	45~48
Clean Water and Sanitation	• Increase water efficiency and recycling rate • River clean-up activities by employees	33, 35, 37~38
Affordable and Clean Energy	• Managing energy use • Generating and using renewable energy • Transitioning to green energy	33, 42
Decent Work and Economic Growth	• Fair recruitment • Enhanced win-win growth programs with suppliers • Operation of fair-trade compliance programs	45~48, 57~58
Reduced Inequality	• Specifying nondiscrimination such as human rights, codes of conduct, etc. • Commitment to diversity and expertise of the BOD	49, 65
Sustainable Cities and Communities	• Replace old windows of welfare facilities	59~60
Responsible Consumption and Production	• Stricter management of chemicals and wastes • More usage of eco-friendly raw materials	36~37, 39~41
Climate Action	• Establishment of carbon-neutral strategies • Reducing greenhouse gas emissions and the implementation of energy transition • Disclosure of TCFD recommendations	31, 98~110
Life Below Water	• Preserving biodiversity	37~38
Life on Land	• Preserving biodiversity	37~38

Korea Business Council for Sustainable Development (KBCSD)

KBCSD is the Korean partner organization of the World Business Council for Sustainable Development (WBCSD), which facilitates organic communication between CEOs of domestic and overseas companies and serves as a communication channel for domestic companies on key ESG policies. By joining the WBCSD, Kumho Petrochemical aims to actively respond to domestic and international ESG-related laws and regulations and join global efforts for sustainable development.

K-EV100

K-EV100 is an initiative for the transition to zero-emission vehicles in the Republic of Korea, organized by the Ministry of Environment. Companies participating in K-EV100 publicly declare that they will convert all vehicles owned or leased by the company to zero-emission vehicles, such as electric or hydrogen vehicles, by 2030 and submit a specific roadmap to achieve this. By joining the K-EV100, Kumho Petrochemical aims to realize GHG reductions in Scope 1 and 2 as well as Scope 3.

TCFD Supporter

Kumho Petrochemical aims to transparently disclose climate change-related information by publicly declaring our support for the TCFD and its recommendations. As such, in June 2022, Kumho Petrochemical joined the TCFD Supporters and discloses information in accordance with the TCFD recommendations through its Sustainability Report. In 2023, we established a process to identify climate change risks and opportunities and measured the financial impact of physical risks through financial modeling. We will continue to enhance the analysis of the financial impact of climate change and transparently disclose related information.

ESG Rating Status







한국ESG기준원
 Korea Institute of Corporate Governance and Sustainability

Rated A in overall ESG rating by KCGS
 Environment: B+
 Social: A
 Governance: A

Member of
Dow Jones Sustainability Indices
 Powered by the S&P Global CSA

Listed in the Dow Jones Sustainability Korea Indices

ecovadis
 KUMHO PETROCHEMICAL CO LTD (GROUP)
 has been awarded a Gold medal
 as a recognition of their EcoVadis Rating
 SEPTEMBER 2022

EcoVadis Gold ratings

MSCI

MSCI ESG RATINGS
BB
 CCC | B | BB | BBB | A | AA | AAA
 RATING ACTION DATE: January 20, 2023
 LAST REPORT UPDATE: June 20, 2023

Rated BB in MSCI ESG ratings

CDP
 DRIVING SUSTAINABLE ECONOMIES

B

Rated B in CDP Climate Change ratings

Stakeholder Engagement and Communication

Kumho Petrochemical defines major stakeholder groups and operate communication channels to actively reflect the opinions of each stakeholder in management activities. We categorize stakeholders (customers, shareholders, investors, government, media, suppliers, employees, etc.) that have a significant impact on our management activities and reflect their various opinions and expectations in our management activities according to their characteristics. Kumho Petrochemical plans to enhance the transparency of its management activities through continuous communication with stakeholders and share various news related to corporate activities widely.

Stakeholder Group	Channels for Engagement and Communication	Frequency	Expectations
 Customers	Homepage	Always	<ul style="list-style-type: none"> • Demanding sustainable products • Sharpening quality management capabilities • Raising the ratio of the investments in R&D to sales • Responding to ESG management evaluation
	Call center	Always	
	News release	Always	
 Shareholders and investors	Information disclosure	Yearly	<ul style="list-style-type: none"> • Elevating corporate value • Building a sound governance • Integrated risk management • Strengthening ESG-related data disclosure
	General shareholders' meeting	Quarterly	
	Key regular report	Yearly	
	Sustainability report	Always	
 Government and media	Homepage	Always	<ul style="list-style-type: none"> • Transitioning to carbon neutrality in the petrochemical industry • Supporting for the creation of a safe work environment • Assisting suppliers for shared growth • Disclosing business activities • Disclosing ESG data
	News release	Always	
	Meetings and councils	Always	
	Annual report and audit report	Always	
	Sustainability report	Yearly	
 Suppliers	Council for the safety and health of contractors	Monthly	<ul style="list-style-type: none"> • Reinforcing safety management for suppliers • Stepping up social contribution activities
	Meeting of the representatives of suppliers	Frequently	
 Employees	In-house portal website (magazine, in-house webtoon)	Always	<ul style="list-style-type: none"> • Improving occupational safety and health • Building capacity
	Labor-management council	Quarterly	
	Industrial Health & Safety Committee	Quarterly	

Awards and Association Memberships

Awards

Classification	Host organization	Date	Awards	Type
Sustainable management	The Korea Economic Daily	Dec. 2022	Korea ESG Management Award for Excellence in Materials	Group
	TV Chosun	Nov. 2021	TV Chosun Management Awards 2021 in the sustainable management (social contribution) area	Individual
	Forbes	Jan. 2021	World's Best Employers	Group
	Maeil Business News	Sep. 2021	The Great CEO & Management of Korea in the social contribution management area	Individual
Safety and environment	Ulsan South Fire Department	Nov. 2022	60th Anniversary Fire Day Citation – Ulsan South Fire Chief	Individual
	Yeosu-si	Mar. 2022	Yeosu Mayor's Prize at Yeosu Industrial Complex's Prevention of Safety Accident Merit Awards	Individual
	Yeosu-si	Feb. 2021	Yeosu Mayor's Prize at Yeosu Industrial Complex's Prevention of Safety Accident Merit Awards	Individual
	Korea Gas Safety Corporation	Dec. 2021	Trade, Industry, Energy, SMES, and Startups Committee Chair's Citation in the prevention of gas safety accident area	Individual
	National Fire Agency	Nov. 2021	Presidential Prize at the 20th Korea Safety Award	Group
	Korea Gas Safety Corporation	Nov. 2021	Mayor's Citation for the contribution in gas industry	Group
	Ulsan-si	Nov. 2021	Citation for the excellence of in-house fire department	Group
	Technology	Ministry of Trade, Industry and Energy	Jan. 2022	Ministerial Citation in commemoration of the 14th Chemical Industry Day
Ministry of Trade, Industry and Energy		Nov. 2021	Ministerial Citation for the contribution in globally top products	Group
Ministry of Trade, Industry and Energy		Oct. 2021	Ministerial Citation in commemoration of the 13th Chemical Industry Day	Individual
Korea Industrial Technology Association		Jul. 2021	Korea Engineer Award	Individual
Others	Korea Internet Professional Association	Dec. 2021	Hugreen website receiving the excellence prize at the Web Award Korea	Group

Association Memberships

IISRP	Korea Enterprises Federation
KBCSD	Korea Rubber Association
UNGC	Polymer Society of Korea
Korean Society of Industrial and Engineering Chemistry	Korea Management Association
Korea Industrial Safety Association	Korea International Trade Association
Korea Tire Manufacturers Association	Korea Vinyl Environmental Council
Korean Chemical Society	Korea Petrochemical Industry Association
Korean Society of Analytical Sciences	Korea Extruded Polystyrene Council
Chamber of Commerce and Industry (Seoul, Ulsan, Yeosu)	South Korea Combined Heat and Power Association
Korea Listed Companies Association	Korea Specialty Chemical Industry Association
Yeosu Industrial Complex Defense Council	Federation of Middle Market Enterprises of Korea
Yeosu Industrial Complex Factory Manager Council	Korean Institute of Chemical Engineers
Ulsan Petrochemical Complex Council	Korea Chemicals Management Association
Korea Investor Relations Service	Korean Chemical Industry Council
Korea Exchange	Environmental Preservation Association
Korea Construction Engineers Association	

GHG Verification Opinion

Kumho Petrochemical Co., Ltd.

Verification Scope

Korean Standards Association has conducted verification for GHG emissions based on GHG report provided by Kumho Petrochemical Co., Ltd. which includes Scope1 and Scope2 emissions.

Verification Standards and Guidelines

To conduct verification activities, verification team applied verification standards and guidelines. The standards and guidelines are as follows.

- Guidance for reporting and verification of GHG emissions trading scheme (No. 2022-279 provided by Ministry of Environment, Republic of Korea)
- ISO 14064-1, 3 : 2006
- 2006 IPCC Guidelines for National Greenhouse Gas Inventories

Level of Assurance

KKPC's GHG emissions satisfies the under Reasonable Assurance (less than ±2.5% of total emissions).

Verification Conclusion

As a result of verification activities, verification team has found no significant errors, omissions, and misstatements. Therefore, Korean Standards Association confirms that following emissions data are adequately quantified.

2022 Emissions(Scope1, Scope2)

- Year: 2022
- Scope 1: 3,128,817.704tCO₂eq
- Scope 2: 344,400.098tCO₂eq
- Total: 3,473,210tCO₂eq

※ Decimal place is not considered when calculating the emission of each workplace.

※ The emissions verified by KSA are the amount of emissions against the cost for settlement submitting the emission credits.

June 9, 2023
 KOREAN STANDARDS ASSOCIATION



**KUMHO
 PETROCHEMICAL**

GHG Verification Opinion

Kumho Petrochemical Co., Ltd.

✔ **Verification Scope**
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✔ **Verification Standards and Guidelines**
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 · 2006 IPCC Guidelines for National Greenhouse Gas Inventories

✔ **Level of Assurance**
 KKPC's GHG emissions satisfies the under Reasonable Assurance (less than ±2.5% of total emissions).

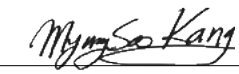
✔ **Verification Conclusion**
 As a result of verification activities, verification team has found no significant errors, omissions, and misstatements. Therefore, Korean Standards Association confirms that following emissions data are adequately quantified.

● **2022 Emissions(Scope1, Scope2)**

(Unit : tCO ₂ eq)			
Year	Scope 1	Scope 2	Total
2022	3,128,817.704	344,400.098	3,473,210

※ Decimal place is not considered when calculating the emission of each workplace.
 ※ The emissions verified by KSA are the amount of emissions against the cost for settlement submitting the emission credits.

June 9, 2023


KOREAN STANDARDS ASSOCIATION

Independent Assurance Statement

To: The Stakeholders of Kumho Petrochemical

Introduction and Objectives of Work

BSI Group Korea (hereinafter “the Assurer”) was requested to verify Kumho Petrochemical 2022 Kumho Petrochemical [Corporate Social Responsibility Report] (hereinafter “the Report”). This assurance statement applies only to the related information included in the scope of the assurance described below.

Responsibilities

Kumho Petrochemical is solely responsible for all information and assertion contained in the Report. The responsibility of the Assurer is to provide Kumho Petrochemical Management with independent assurance statement based on its expert opinions by applying the verification methodology for the specified assurance scope. It is also to provide the information to all stakeholders of Kumho Petrochemical.

Standards and Levels

This assurance was based on the International Standard on Assurance Engagements 3000 (ISAE 3000) (Revised), Assurance Engagements other than Audits or Reviews of Historical Financial Information and confirmed that the Report was prepared in accordance with the Global Reporting Initiative (GRI) Reporting Framework as defined in the GRI Sustainability Reporting Standards 2021. In accordance with the ISAE3000 (Revised), the assurance engagement was a limited level of assurance, and conducted to confirm compliance with the Suitability and Availability of Criteria.

Scope of assurance

The scope of our assurance was limited to assurance over the following information included within the Report for the period of January 1, 2022 through December 31, 2022:

- Major assertion included in the Report, such as sustainability management policies and strategies, goals, projects, and performance, and the Report contents related to material issues determined as a result of materiality assessment.
- Appropriateness and consistency of processes and systems for data collection, analysis and review
- The evaluation of the nature and extent of the Kumho Petrochemical’s adherence to all ISAE3000 (Revised) and the characteristics of suitable criteria of Relevance, Completeness, Reliability, Neutrality and Understandability
- The evaluation of the nature and extent of the Kumho Petrochemical’s adherence to all the principles of the Global Reporting Initiative (GRI) Reporting Framework as defined in the GRI Sustainability Reporting Standards 2021

The following contents were not included in the scope of assurance.

- Financial information presented in the report.
- Disclosures in the international standards and initiatives index excluding GRI presented in the report. Other related additional information such as the website, business annual report.

Methodology

As part of its independent assurance, the assurer has used the methodology developed to collect relevant evidence to comply with the verification criteria and to reduce errors in the reporting, and has performed the following activities;

- Determining the Suitability and Availability of Criteria, reviewing the five characteristics of suitable criteria: Relevance, Completeness, Reliability, Neutral, Understandability
- Review of the system for sustainability management strategy process and implementation
- Review of materiality issue analysis process and verification of the result to determine verification priorities,
- Review of the evidence to support the material issues through interviews with senior managers with responsibility for them
- Verification of data generation, collection and reporting for each performance index

Limitations and Exclusions

The Assurer performed limited verification for a limited period based on the data provided by the reporting organization. This limited assurance engagement relies on a risk based selected sample of data and the associated limitations that this entails. This independent statement should not be relied upon to detect all errors, omissions or misstatements that may exist. The Assurer does not provide assurance for possible future impacts that cannot be predicted or verified during the verification process and any additional aspects related thereto.

Assurance Opinion & Conclusion

On the basis of our methodology and the activities described above, it is our opinion that

- The Report is appropriately prepared in compliance with the GRI Standards (Reporting in accordance with the GRI standards)
- Based on the procedures performed and evidence obtained, nothing has come to our attention that causes us to believe that Kumho Petrochemical has not complied in all material respects with ISAE3000 (Revised)

- Based on the procedures performed and evidence obtained, we are not aware of any material amendments that need to be made to the assessment of key performance indicators for them to be in accordance with [whatever] criteria
- Based on the procedures performed and evidence obtained, nothing has come to our attention that causes us to believe that the [appropriate party's] statement that Kumho Petrochemical has complied with [whatever] law, is not, in all materials respects, fairly stated

Key areas for ongoing development

- The report describes Kumho Petrochemical's key sustainability performance in 2022 and expresses its efforts to advance its activities. At the same time, deriving underperforming sustainability issues and specifying related mid- to long-term strategies and goals can help ensure a balanced reporting.
- Kumho Petrochemical has established a strategy to achieve its company-wide goal of transitioning to a sustainable growth company. Establishing and operating continuously an ESG leading business system can help to identify and operate sustainability issues.

Statement of Independence, Integrity, Competence, and Quality Control

The Assurer is an independent professional institution that specializes in quality, health, safety, social and environmental management with over 120 years history in providing independent assurance services and complied with the other ethical requirements of BSI. No member of the assurance team has a business relationship with Kumho Petrochemical. The Assurer has conducted this verification independently, and there has been no conflict of interest. The Assurer applies Quality Control of BSI scheme and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards, and applicable legal and regulatory requirements. All assurers who participated in the assurance have qualifications as an ISAE3000 assurer, have wide assurance experience and in-depth understanding of the BSI Group's assurance standard methodology.

Evaluation against GRI 'In Accordance' Criteria

The Assurer confirmed that the Report was prepared in accordance with the GRI Standards and the disclosures related to the following Universal Standards, Sector Standards and Topic Standards Indicators based on the data provided by Kumho Petrochemical the sector standard was not applied.

[Universal Standards]

2-1 to 2-5 (The organization and its reporting practices), 2-6 to 2-8 (Activities and workers), 2-9 to 2-21 (Governance), 2-22 to 2-28 (Strategy, policies and practices), 2-29 to 2-30 (Stakeholder engagement), 3-1 to 3- 3 (Material Topics Disclosures)

[Topic Standards]

201-2, 302-1, 302-3~4, 305-1~5, 305-7, 403-1~10, 416-1

8 June 2023

S. H. Lim / BSI Group Korea, Managing Director



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