



**Responsible  
Chemical &  
Energy Leader**



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### Overview

Hanwha TotalEnergies Petrochemical publishes 2024 ESG Report to transparently disclose its sustainability activities and performance in the areas of environment, society and governance to its stakeholders. By publishing this report, we aim to actively gather stakeholder opinions and incorporate them into our management activities through the annual publication of this report.

### Reporting Principles

This report has been prepared in accordance with the Global Reporting Initiative (GRI) Standards 2021, the global sustainability reporting standard. It also incorporates the Sustainability Accounting Standards Board (SASB) standards disclose activities on major industry-specific issues. The financial information presented in this report has been prepared according to Korean International Financial Reporting Standards (K-IFRS).

### Reporting Period

This report covers our financial and non-financial performance from January 1 through December 31, 2023, with certain measures extended through the first quarter of 2024 for timeliness and significance of the information. Quantitative data also includes the three most recent years of data (2021 - 2023) to allow for year-over-year trend analysis.

### Reporting Scope

The financial performance presented in this report is on a consolidated basis, and the non-financial performance is limited to the domestic business sites of Hanwha TotalEnergies Petrochemical as a separate entity.

### Report Verification

Independent assurance has been provided on the financial information in this report. The non-financial data herein has been verified by the British Standards Institution (BSI), an independent third party, against the four principles - inclusivity, materiality, responsiveness and impact - to ensure objectivity and reliability.

### Publisher

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### Publication date

August 2024


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
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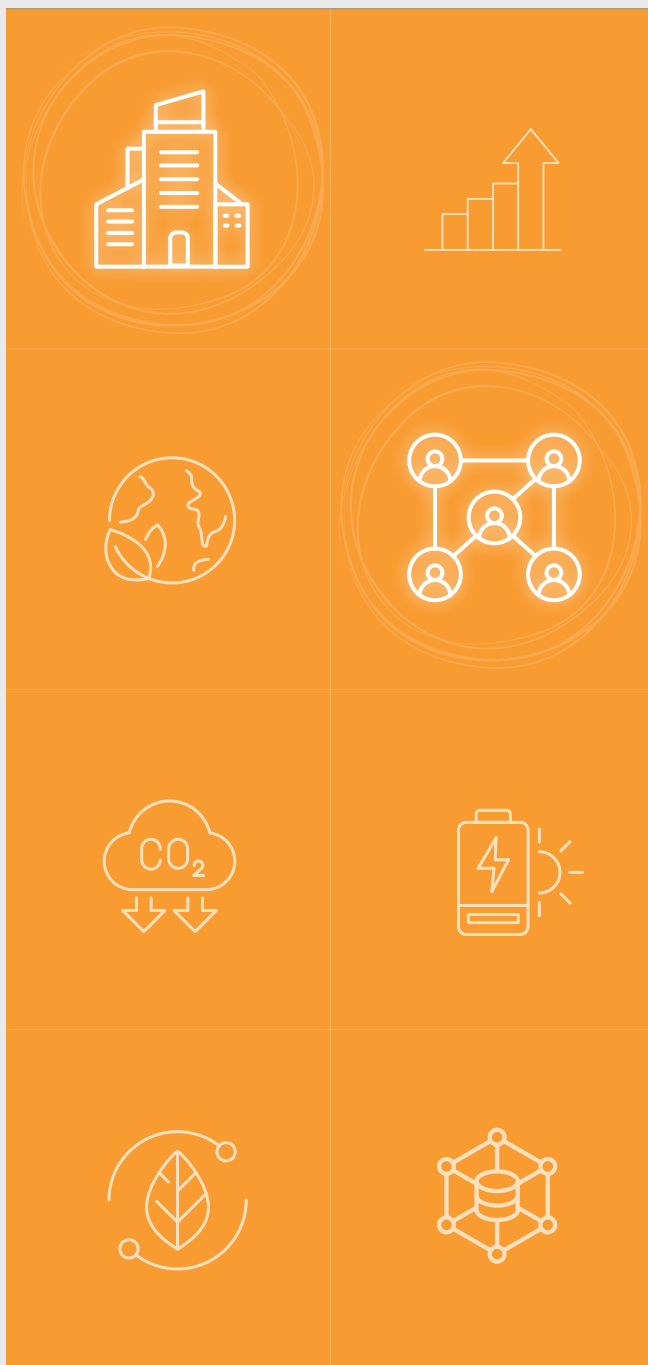
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# Overview



**Hanwha TotalEnergies Petrochemical** enriches human life on the basis of 'passion & challenge', 'efficiency & rationality', and 'love & trust'. To this end, **Hanwha TotalEnergies Petrochemical** has always strived to improve the quality of our lives by placing top priority on the value of life chemistry for human beings, cutting-edge chemistry based on technologies, and environmental chemistry that puts the environment first. Based on infinite passion and challenges, **Hanwha TotalEnergies Petrochemical** is taking strides to become the best-in-class chemical company with the highest competitive edge

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# CEO MESSAGE

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### CEO Message

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### Dear stakeholders, I am Laurentius Na, CEO of Hanwha TotalEnergies Petrochemical.

Despite a continuation of challenging business conditions in 2023 due to persistent inflation, prolonged high interest rates, and intensified geopolitical conflicts including wars, **Hanwha TotalEnergies Petrochemical** has faithfully delivered the promises set out in the 2023 report and solidified ESG management having in mind corporate sustainability as top priority in management activities. As part of this effort, we conducted a company-wide study to enhance energy efficiency from all directions such as the 2023 process optimization, and plan to implement the results on a continued basis. Another important achievement in 2023 has been the improvement of the safety culture, which has enabled the successful completion of the largest-scale turnaround in our history. I would like to take this opportunity to thank all of our employees and partners who, in their respective roles, have done their very best to bring these achievements to fruition. Building on the achievements we have made so far, we will be focusing on the following three points.

- First,** we will strengthen environmental management to meet society's demand for environmental sustainability and use it as a value creation opportunity. In line with the above objective, we have set three medium-term strategic tasks for eco-friendly management: achieving carbon reduction, minimizing environmental impact, and building a circular economy, and will faithfully deliver on them.
- Second,** we will "go further together" by creating sustainable value with all stakeholders, including customers, shareholders, suppliers, employees, and local communities, and achieving win-win management.
- Finally,** our role as a responsible member of society requires us to go beyond compliance with the law and to actively respond to global norms and standards and establish transparent and sound governance.

Under the slogan "Responsible Chemical & Energy Leader," we will continue to strive to become a comprehensive energy and chemical company that fully integrates sustainability into all aspects of its business and creates positive value for society.

We would like to ask for your continued interest in and support of our journey.

August 2024  
CEO of Hanwha Total Energies Petrochemical  
**Laurentius Na**



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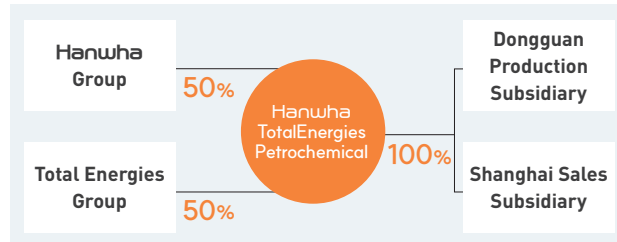
# COMPANY OVERVIEW

## Company Profile

Established in 1988, Hanwha TotalEnergies Petrochemical is a multi-energy chemical company that manufactures products in the fields of base chemicals, polymers and energy, using condensate, naphtha, and LPG as the main feedstocks. We lead the industry with a stable supply of top-quality products that are used as raw materials for a wide range of industries, including electronics, automotive, aviation, and textiles. Building on our industry-leading technology and competitive edge, we aim to become a Petrochemical company that not only builds for a sustainable future, but also delivers new value to people, the environment, business partners and customers.

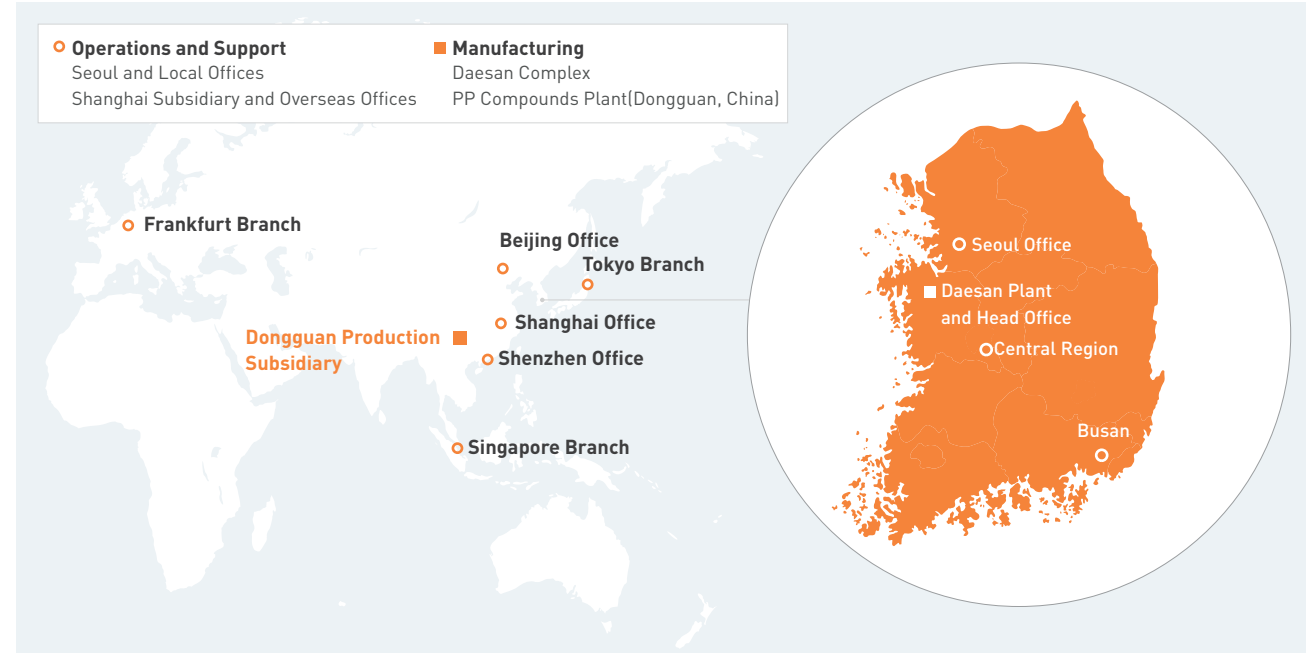
<b>Company Name</b>	Hanwha TotalEnergies Petrochemical
<b>CEO and Representative Director</b>	Laurentius Na
<b>EVP and JRD</b>	1988.05
<b>Founded</b>	Thierry Boulfroy
<b>Head Office</b>	103, Dokgot 2-ro, Daesan-eup, Seosan-si, Chungcheongnam-do, Korea
<b>Employees</b>	1,856
<b>Revenue</b>	Approximately KRW 11 trillion
<b>Business Areas</b>	Base Chemical / Polymer / Energy

## Governance



## Our Locations

We are committed to expanding our global presence based on various networks at home and abroad to produce and market the highest quality products. Our production sites are located in Korea (Daesan) and China (Dongguan), and we have sales sites and offices in five countries: Korea, China, Japan, Singapore, and Europe. Daesan Plant is the first Petrochemical company in Korea to have an NCC (Naphtha Cracking Center), the core facility of a Petrochemical plant, a CFU (Condensate Fractionation Unit), refining facilities, and BTX (Aromatics) production facilities. This vertical integration from Petrochemical feedstock supply to final product manufacturing enables both highly efficient production and diversified business development in the fields of polymers, basic chemicals and energy. Dongguan Plant is a composite resin plant built in 2009 in Southern China to provide more efficient and timely service and product supply to Chinese customers. The products manufactured at this plant are marketed in cooperation with our sales offices in Shanghai, Beijing, Shenzhen, Tokyo and Singapore as part of our overseas market development efforts.



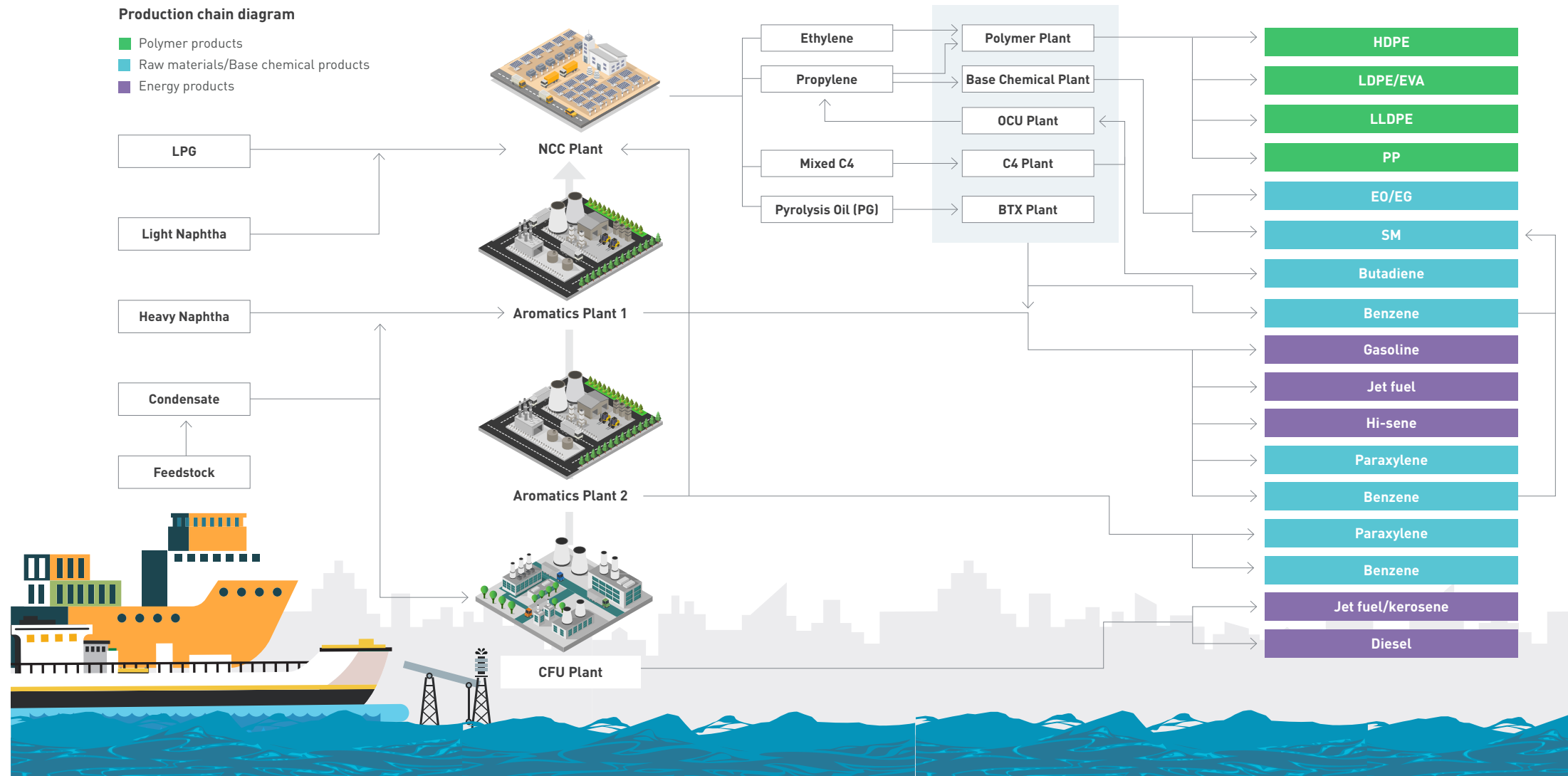


# BUSINESS OVERVIEW

Hanwha TotalEnergies Petrochemical is a comprehensive energy and chemical company headquartered in Korea with two subsidiaries in China (Shanghai Sales Subsidiary and Dongguan Production Subsidiary). We are a stable supplier of high-quality raw materials to electronics, automotive, aviation, textile, and other related industries. Our business is organized into three business segments: Base Chemical, which manufactures ethylene, propylene and styrene monomer using condensate and naphtha as feedstocks; Energy, which manufactures jet fuel, diesel and gasoline; and Polymer, which manufactures LDPE, EVA, HDPE and PP.

## Production chain diagram

- Polymer products
- Raw materials/Base chemical products
- Energy products



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Hanwha TotalEnergies Petrochemical produces the base chemicals for the Petrochemical industry, such as ethylene, propylene, paraxylene (PX) and styrene monomer (SM), and supplies them to customers. In particular, we are continuously strengthening our competitiveness in terms of scale by having the largest annual production capacity of PX and SM in Korea at 2 million tons and 1.04 million tons respectively.

**SM**  
Styrene Monomer

SM is a liquid product with a distinctive odor, produced by the reaction of ethylbenzene, a compound of benzene and ethylene. It is mainly used as a raw material for PS and ABS, plastics used in home appliances such as televisions and refrigerators. It is also used to produce synthetic rubber (ABS) by polymerizing it with butadiene.

**EO/EG**  
Ethylene Oxide,  
Ethylene Glycol

EO is a colorless, highly reactive gas at room temperature. Its powerful bactericidal and insecticidal properties make it suitable for use as a gas sterilizer for medical devices and packaging, and as a synthetic detergent.

**BD**  
Butadiene

BD is a gaseous material with a characteristic odor at room temperature and is extracted from mixed C4 resin, a by-product of naphtha cracking. It is used as a raw material for synthetic rubbers such as SBR and BR, which are used in tires and other applications.

**PX**  
Para-Xylene

PX is a clear, transparent liquid produced by the distillation or reforming of xylenes from the aromatics plant. It is primarily used as a feedstock for purified terephthalic acid (PTA), an intermediate for synthetic fibers and plastic bottles.

**BZ**  
Benzene

BZ is a liquid, odorous, aromatic product derived from the aromatics plant along with toluene and xylene, and is used as a feedstock for the production of styrene monomer (SM).

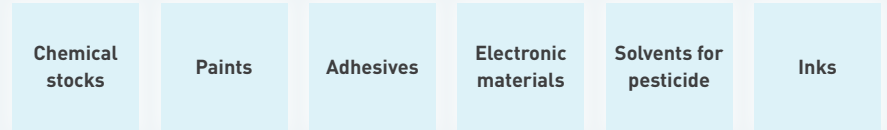
**Circular  
Base Chemicals**

Hanwha TotalEnergies Petrochemical manufactures sustainable products from pyrolysis oil derived from post-consumer plastic waste that are physically difficult to recycle. We have obtained ISCC PLUS certification for these products, which can be provided upon customer request.  
Applicable products: Circular SM, Circular BD, Circular BZ, etc.

**BASE CHEMICAL**

There is growing interest in a stable supply of green products and alternative feedstocks as measures against unpredictable situations as in rising oil prices and reluctance to produce fossil fuels.  
To keep pace with changing trends, we are expanding the supply of green materials and products, such as bio-naphtha, and pursuing R&D projects tailored to each customer.

In addition, we implement internal programs for plant operation, raw material traceability and logistics management to ensure efficient production and stable supply. In the future, we will continue to strive for business growth through proactive responses to market risks and the development of a stable supply of green products.





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We use our own crude oil refining facilities - the Condensate Fractionation Unit (CFU) and two aromatics plants - to produce a broad range of high-quality energy products, including gasoline, diesel, jet fuel, by-product fuel oil, LPG and solvents. Our strong portfolio of value-added products and stable domestic supply position us to accelerate our expansion into the domestic and international energy markets.

**Gasoline** We produce and sell high quality gasoline using oil produced from petrochemical processes. Since the completion of the gasoline production plant in 2010, we have been exporting high-grade gasoline to Japan, and since 2012 we have been supplying gasoline to discount gas stations through Korea National Oil Corporation. Our gasoline is a high-quality product that maximizes fuel efficiency and engine performance, enhances driving performance, and meets environmental standards.

**Jet Oil** We have been producing and selling jet oil for jet turbines since 2010. In particular, our products are recognized for highest quality, having successfully passed rigorous quality inspection by BP, the world's largest jet oil trader.

**Diesel** Our 10 ppm ULSD diesel fuel for vehicles is produced in a state-of-the-art desulfurization plant and meets the world's most stringent specification standards. Exported primarily to Australia and Japan, it is an environmentally friendly fuel that maximizes fuel economy and power output while drastically reducing emissions.

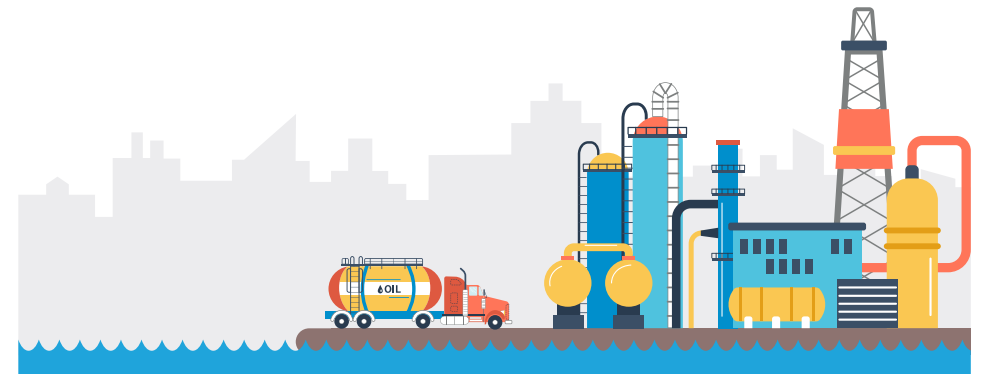
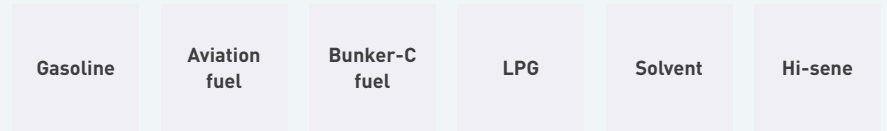
**LPG** Our LPG offers excellent combustion characteristics due to easy ignition and flame control, and is injected with an odorant to improve safety. We have been importing and selling LPG since we installed our own storage tank in 2010. From automobile fuel to propane and butane gas burners, LPG has a wide range of applications.

**Solvent** We manufacture and supply hydrocarbon solvents to meet the specifications for large domestic and global customers. Our solvents serve a wide range of industrial applications, such as paints, adhesives, pesticides, wood coatings, oil extraction, rolling/cutting oils, as well as in the petrochemical and pharmaceutical industries. In 2018, we successfully commercialized high-purity heptane and environmentally friendly de-aromatized solvents.

**Hi-sene** The by-product fuel oil is produced in the process of manufacturing petrochemical products and is registered as By-product Fuel #1 (kerosene type) and By-product Fuel #2. Our byproduct fuel #1, 'Hi-sene', is an environmentally friendly light oil product with a low sulfur content, allowing its use without dust collection equipment and regardless of the time of year, as its low pour point eliminates fear of freezing. Hi-sene can be used in both kerosene and light oil plants without any modification.

## ENERGY

It is inevitable to face changing business landscape in the oil and energy industry, as we are directly exposed to various risks, including the introduction of the EU's Carbon Border-Adjustment Tax, the establishment and implementation of the Korean government's carbon reduction roadmap, and the resulting extensive regulatory changes. In response to these internal and external changes, we are actively exploring the transition to a green business model to enhance social and environmental values and ensure the sustainability of our business.



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# BUSINESS OVERVIEW

Polymer is an indispensable product in our daily lives that is used as raw and intermediate materials for various industries. We are a leader in the synthetic resin market with an annual production of 1.53 million tons of ethylene and 1.12 million tons of propylene from the Naphtha Cracking Center (NCC). Our products are high value-added products with many applications such as EVA for solar panels and HDPE for bottle caps.

**LDPE**  
Low Density  
Polyethylene

Low density polyethylene (LDPE) is one of the most widely used synthetic resin products used in everyday life. It has excellent processability, flexibility and transparency and is used for transparent packaging film, cable coating, and disposable product. We also manufacture linear low density polyethylene (LLDPE), which exhibits similar properties to LDPE, but is more specialized in manufacturing film with good intensity.

**EVA**  
Ethylene Vinyl Acetate

EVA is a typical synthetic resin obtained by copolymerization of ethylene and vinyl acetate. Depending on the vinyl acetate content, its density and flexibility increase. It is used for various applications such as foam molding products and film adhesives. EVA for solar cells, one of our flagship products, was selected as a world-class product in 2015 and recognized for its technological competence.

**HDPE**  
High Density Polyethylene

High Density Polyethylene (HDPE) is a synthetic resin made by polymerization of ethylene and is a typical synthetic resin product in daily use. Due to its resistance to impact and cold, it is widely used in a variety of containers and plastic boxes. Our HDPE products are produced using the most advanced low-pressure polymerization process and are known worldwide for their excellent processability and quality.

**PP**  
Polypropylene

Polypropylene (PP) is a thermoplastic resin product produced by polymerizing propylene. It is characterized by its low density, making it the lightest among commodity plastics, and exhibits high mechanical strength, good heat resistance, and relatively transparent properties. Its ease of molding and processing makes it a material for household appliances such as blenders, irons and coffee pots, as well as a textile material.

**Circular  
Polymer**

Hanwha TotalEnergies Petrochemical manufactures sustainable products from pyrolysis oil derived from post-consumer plastic waste that are physically difficult to recycle. We have obtained ISCC PLUS certification for these products, which can be provided upon customer request.  
Applicable products: Circular HDPE, Circular LDPE, Circular LLDPE, Circular EVA, Circular PP

**POLYMER**

Recent years have seen an increased emphasis on corporate responses to climate change and efforts to ensure environmental and social sustainability. This shift has led to changes in the demand for chemical products. There is an increasing demand for green materials to produce environmentally friendly products and a growing need to reuse chemical substances in production.

In order to respond to these external environmental changes, we intend to expand our line of environmentally friendly polymer products (Circular naphtha). Our plan is to provide our customers with environmentally sound, high quality products, which in turn will be used by our customers for the production of environmentally sound products, thus creating both environmental and social value.





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### Environmental



#### Environmental investment (Bond issuance)

**+ KRW 65.5 billion**

Including facility investments to reduce air pollutant emissions

\* Installation of 29 Tele-monitoring system (TMS) and replacement of 9 ultra-low NOx burners, etc.

#### Launching new low-carbon businesses

Creation of a circular production system through adopting the raw materials made from recycled waste plastic, commercial sales of the products and obtainment of the relevant certifications

#### 0 Cases of environmental non-compliance

Placing SHE at the forefront of our management activities and responding proactively to increasingly stringent environmental laws and regulations

### Social



#### Social contribution volunteer service

**+ 7,164 hours**

Engaging in various activities to contribute to society as a responsible corporate citizen in order to live up to the expectations of the community and to create a happier world together

#### Creating a sustainable supply chain policy

Creating a sustainable supply chain policy and supplier code of conduct to ensure shared growth by minimizing ESG risks in the supply chain

#### 0 Cases of data leak

Strict management of information on R&D, technology, and clients by the InformationSecurity Committee

### Governance



#### Developing company-wide ESG strategy

Restructuring ESG management framework to align efforts from corporate vision to execution and build consistent governance

#### Compliance training

**+1,720 employees**

Ongoing efforts to establish and promote a compliance culture based on commitment and competence, with legal/ethical compliance as a core value of corporate management

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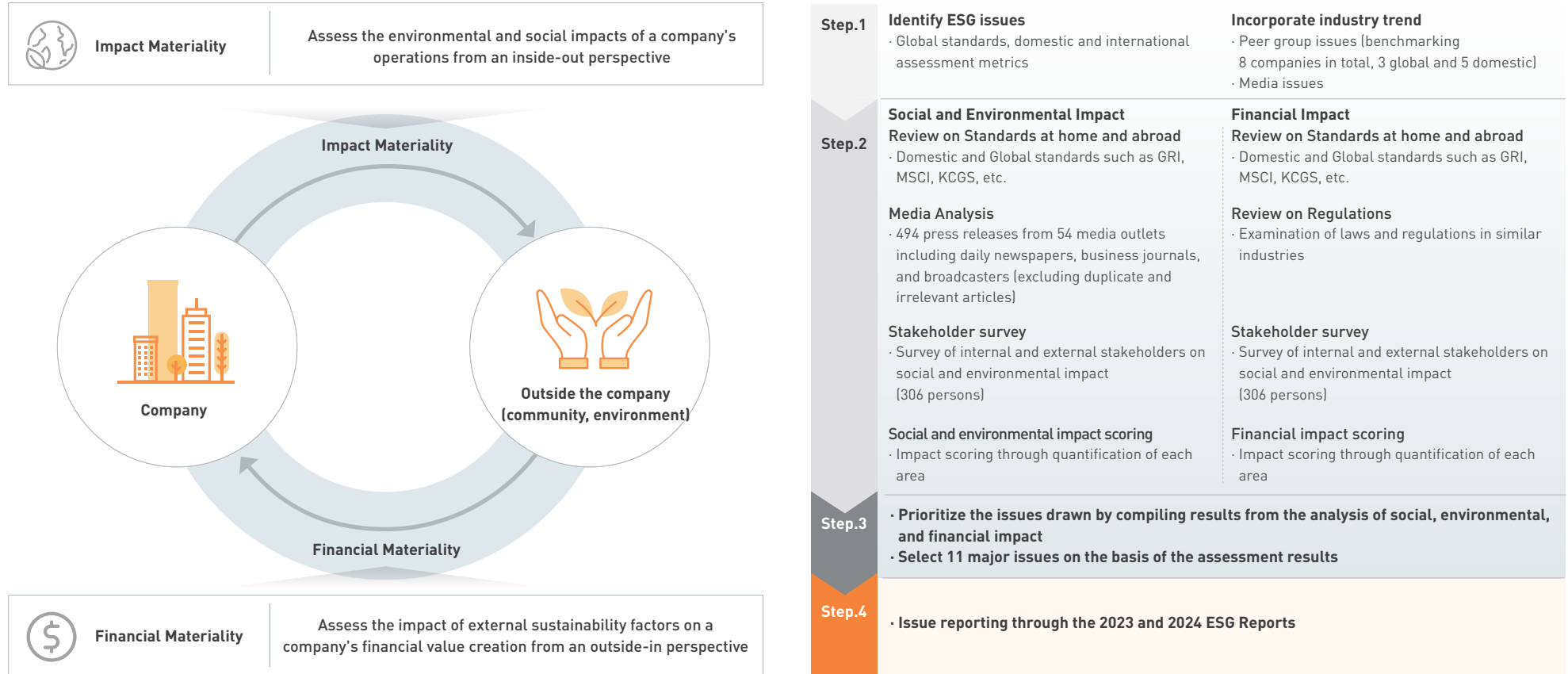
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# Double Materiality Assessment

Double materiality is a concept where both internal and external aspects need to be taken into account: the impact of environmental and social factors from the outside on corporate financial status ('outside-in') and that of corporate activities on the environment and society ('inside-out'). This is part of a global trend to move beyond the traditional concept of assessing only the impact on shareholder value to understand the impact of business activities on people, the environment and society. **Hanwha TotalEnergies Petrochemical** intends to nimbly respond to global movements, allowing use of the double materiality assessment to arrive at sustainable topics with high reliability and incorporate them into business strategies. Our assessment methodology is based on international standards such as the Global Reporting Initiative (GRI) guidelines, and involves a comprehensive analysis of international standards, media coverage, benchmarking analysis and stakeholder survey results. The assessment enabled us to select 11 major issues by gathering the top ESG issues from Environment, Social, and Governance sectors, respectively.



# Double Materiality Assessment

## Materiality Assessment Results

Hanwha TotalEnergies Petrochemical has identified a total of 11 key ESG issues through double materiality assessment exercise. We selected material issues including the following: 'Climate Action and Carbon Neutrality' in the environmental field; 'Safety-first Management and Robust Industrial Safety and Health System' in the social field; and 'Compliance and Response Systems Regarding Environmental, Social, and Economic Regulation' in the governance field. We aim to disclose the selected key ESG issues in detail in this report and to integrate them into our sustainability management strategy in the medium term.



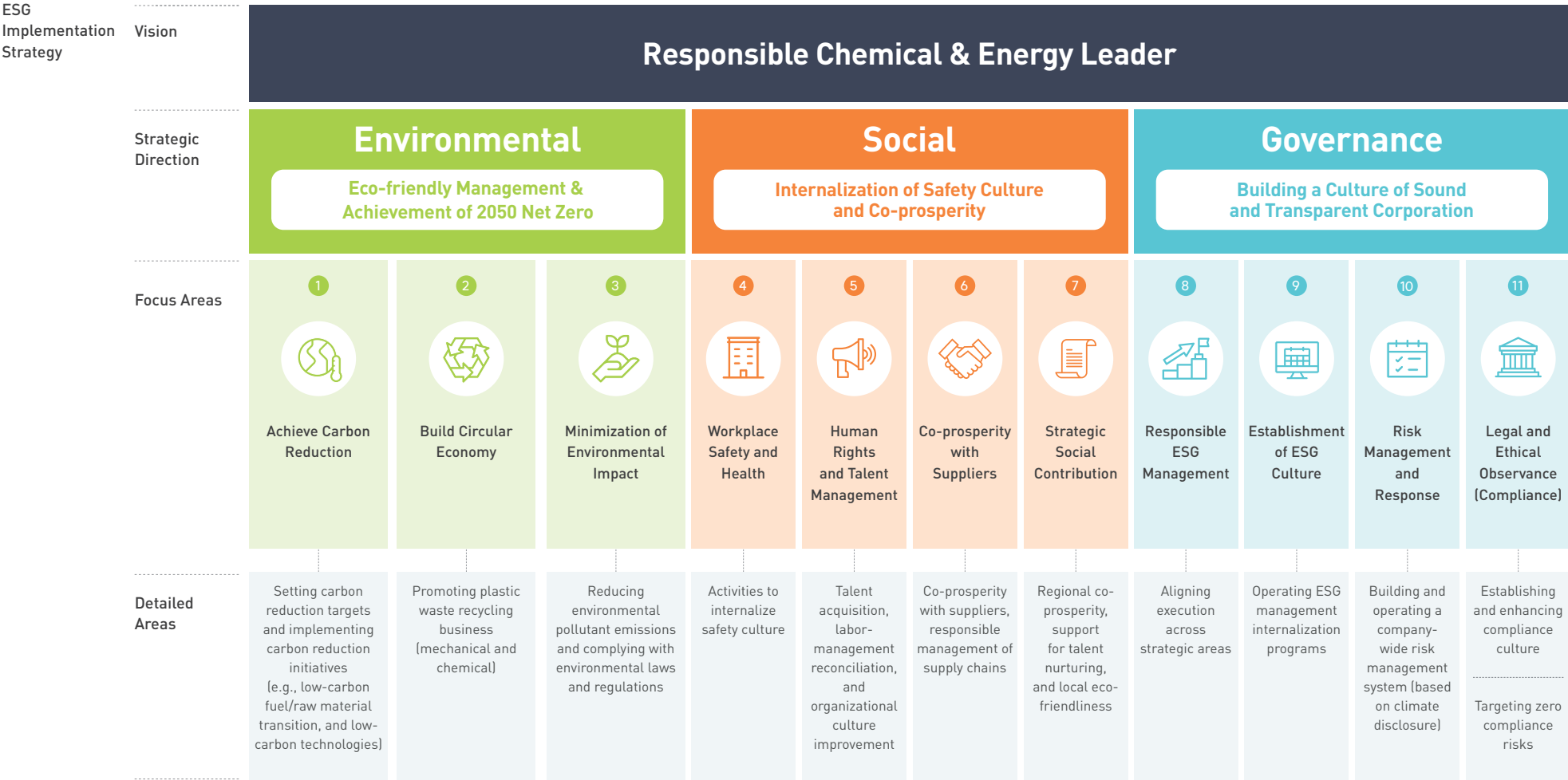
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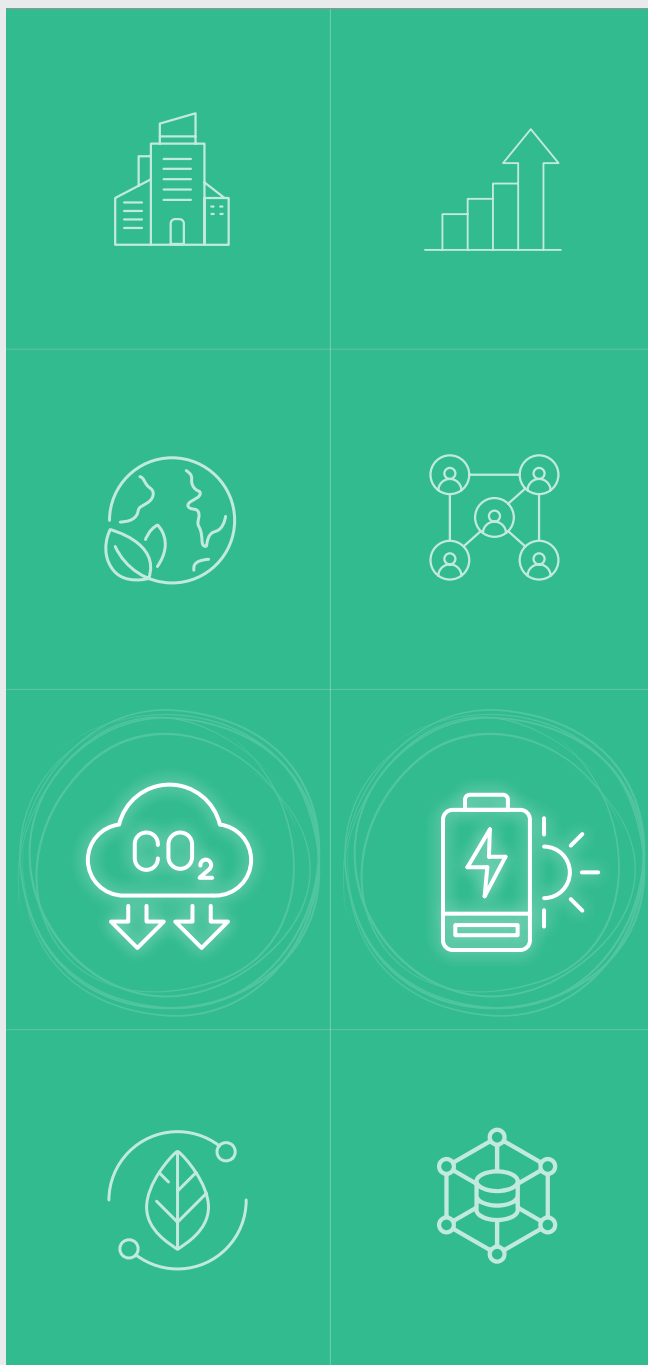
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# ESG Management Implementation Strategy

Hanwha TotalEnergies Petrochemical has established an ESG management framework and implementation strategy to promote sustainable growth by realigning ESG activities across the board, from vision to execution, and establishing consistent governance.



- #1 Process efficiency improvement
- #2 Utilization of low-carbon fuels&raw materials
- #3 Development of Carbon Capture & Utilization and Eco-friendly Material Technologies
- #4 Circular economy
- #5 Identifying and Examining of New Sustainable Businesses



# Special Focus

## Special Comment Executives Vice President

No business can sustain itself by ignoring climate change. Our goal to become carbon neutral by 2050 is both an opportunity to reflect on our approach and a watershed moment to change the way our business grows. Our future will be different from our past 20 years.

**Hanwha TotalEnergies Petrochemical** strives to improve energy efficiency and build a circular economy, producing cleaner products by reducing pollutant emissions and water consumption, and developing low-carbon products. As daunting as our commitment may be, it is also what drives us to go the extra mile - together with our suppliers and our customers. And we are working to ensure that this commitment does not stop at our own operations, but rather that it flows through our entire supply chain to create a virtuous circle.

**Hanwha TotalEnergies Petrochemical** will continue to strive to be a 'good neighbor' to our society and environment.

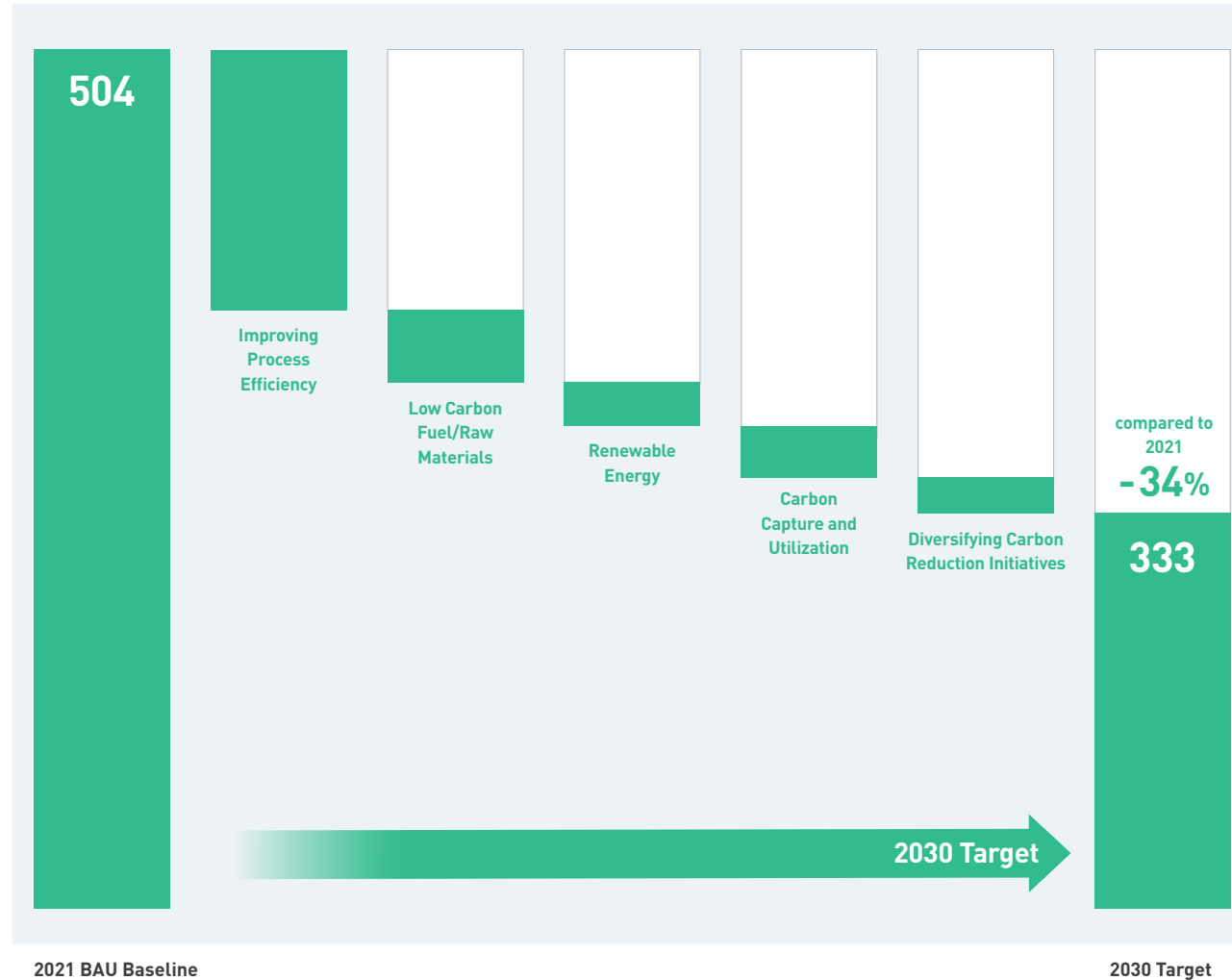
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# Carbon Neutrality Roadmap of Hanwha TotalEnergies Petrochemical

## Carbon Neutrality Action Plan



### Special Comment

#### Head of Planning BU

Climate action has become a critical factor for business survival and growth in the face of the global climate crisis. Recognizing the importance of sustainability management in the current business environment, Hanwha TotalEnergies Petrochemical focuses on creating social and environmental value along with economic value, and aims to become a leader in sustainability management. To respond to climate change, we have set a 2030 carbon reduction target (34% reduction in emissions from 2021 BAU) and a 2050 net-zero target, and we are actively working to achieve these targets by improving process efficiency, using less carbon-intensive fuels, adopting renewable energy, and implementing carbon capture and utilization. In 2023, our emissions decreased 6% from the previous year to 4.57 million metric tons due to energy-saving initiatives such as increasing process efficiency at existing facilities and reducing utilization rates.

In 2024, we plan to identify additional medium- to long-term initiatives that can be practically applied in production by identifying and validating potential energy-saving ideas based on the analysis of process simulation models. We are also in the process of adopting renewable energy as a way to reduce indirect carbon emissions from electricity use.

In the medium to long term, we will accelerate our transition to a green business and join the global carbon neutrality movement through various initiatives, including the introduction of green raw materials through raw material diversification, investment in low-carbon fuel technologies, and the development of carbon capture and utilization technologies.



#1 Process efficiency improvement

#2 Utilization of low-carbon fuels & raw materials

#3 Development of Carbon Capture & Utilization and Eco-friendly Material Technologies

#4 Circular economy

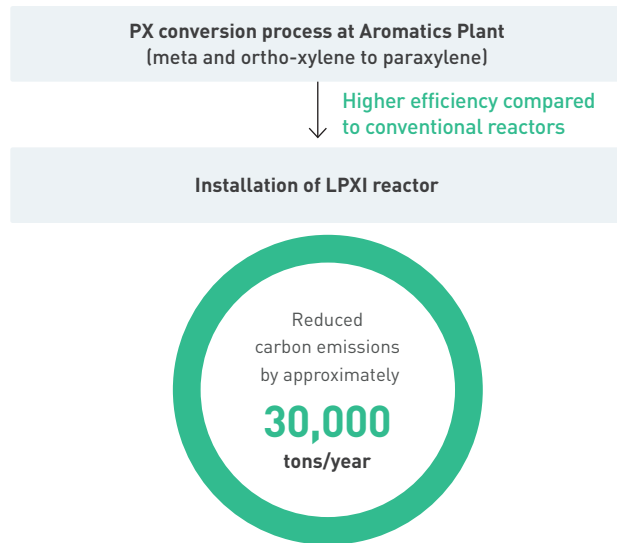
#5 Identifying and Examining of New Sustainable Businesses

# Process efficiency improvement

Energy saving activities through process efficiency improvement is the only reduction measure securing better economics to date, as they assure the effect of carbon reduction and bring down carbon credit purchasing and energy costs. As part of our efforts to achieve the 2030 emissions target of 3.33 million tons, **Hanwha TotalEnergies Petrochemical** has established a mid- to long-term energy savings roadmap to reduce carbon emissions by 500,000 tons by 2030. Energy optimization studies based on process simulation models enabled us to review and push ahead with waste heat recovery and high-efficiency equipment replacement. Unlike as-is projects limited to respective plants, we plan and gradually implement process retrofitting projects involving aggressive investment and groundbreaking energy reductions where new technologies are applied, with an aim of achieving localized optimization through integrated studies between processes. **Hanwha TotalEnergies Petrochemical** encourages all employees to take an active interest in and action to reduce carbon emissions by incorporating climate action indicators into management and divisional KPIs. We encourage the exploration of ideas to reduce carbon emissions and operate in a more carbon efficient manner by comparing carbon emission intensity based on the actual amount of carbon emitted per unit.

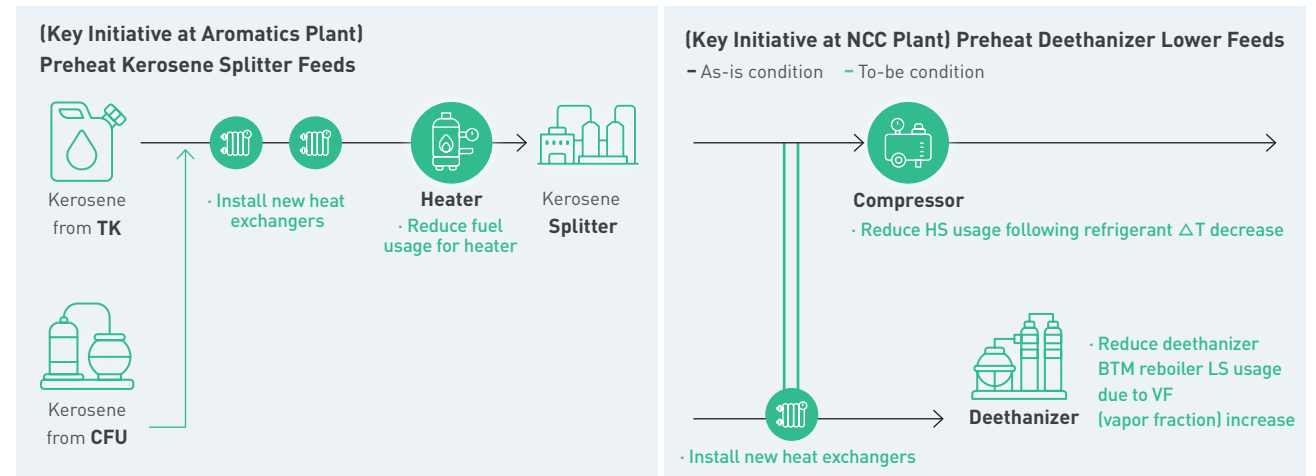
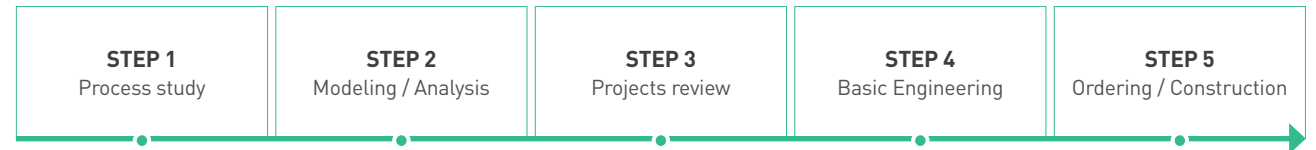
## LPXI Project

A CAPEX project is underway to install a liquid phase xylene isomerization (LPXI) reactor with higher efficiency than the existing reactor in the PX conversion process (conversion of meta- and ortho-xylene to paraxylene) at our aromatics plant. The high-efficiency reactor is expected to reduce energy consumption and contribute to a reduction in carbon emissions of approximately 30,000 tons per year.



## Mid- to Long-term Energy Roadmap

The NCC and Aromatics plants identified a variety of projects through the 2023 energy optimization activities, and the Basic engineering phase has been in progress to apply them into real-world processes. Starting in 2024, we plan to expand the scope of the optimization study.

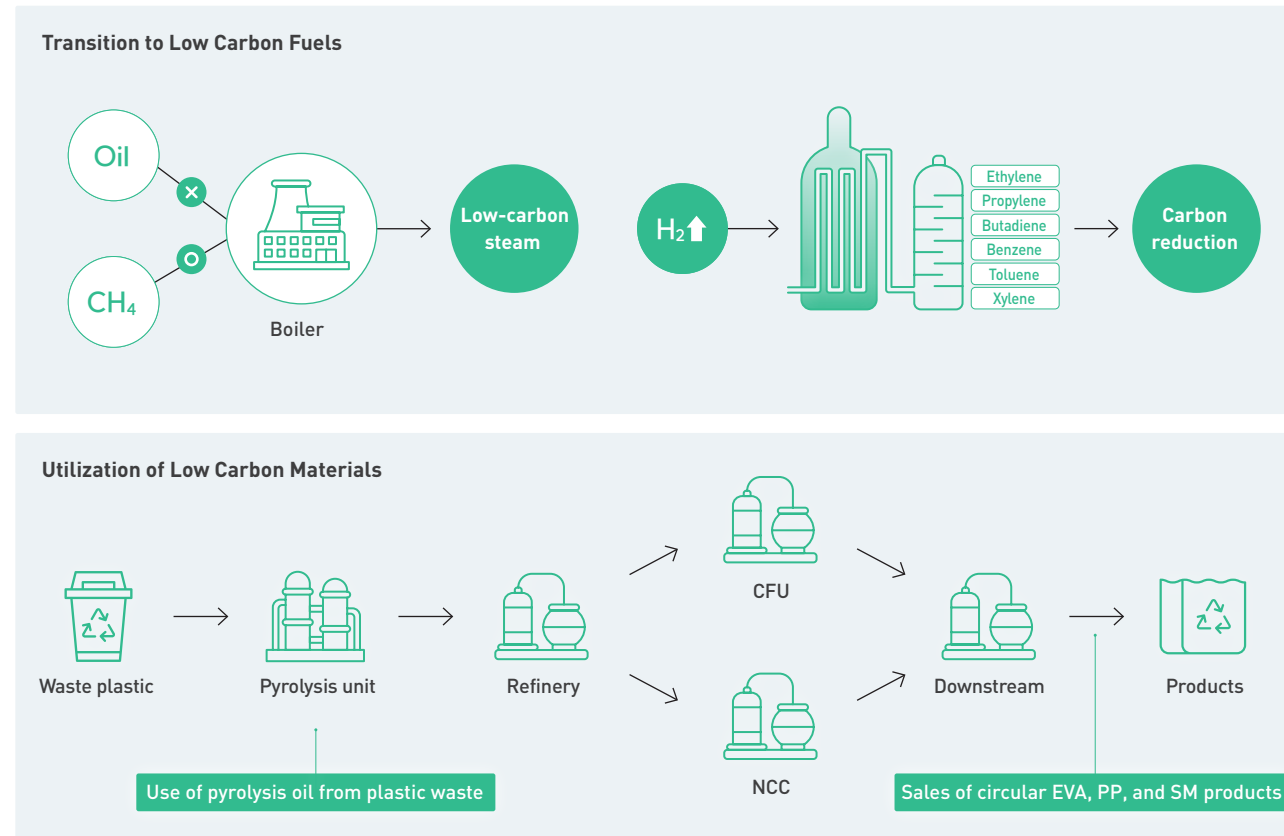


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- #4 Circular economy
- #5 Identifying and Examining of New Sustainable Businesses

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# Utilization of Low-Carbon Fuels & Raw Materials

Hanwha TotalEnergies Petrochemical strives to firsthand reduce carbon emissions within its complex using low carbon-intensive fuels or feedstocks. Also, we are actively reviewing measures to input low carbon fuels such as by-product hydrogen and methane in major heaters and boilers at the moment. We are also identifying and incorporating sustainable, low-carbon raw materials into our production process. To understand the impact of using lower-carbon feedstocks, we have completed Life Cycle Assessment (LCA) of all fossil fuel products and all fossil fuel products and are evaluating sustainable products. In the future, we plan to gradually increase the use of pyrolysis oil from plastic waste to expand our sustainable products business and contribute to the development of a circular economy.



### Special Comment

#### Director of Technology

As Hanwha TotalEnergies Petrochemical, as one of the major emitters, is highly accountable, we have reviewed and implemented various mitigation means for the reduction of GHG emissions. We strive to identify carbon reduction ideas through ongoing energy optimization studies and make sustained investments in process optimization, acquisition of high-efficiency equipment and use of low-carbon fuels and materials to achieve direct emission reductions.

In addition to reducing carbon emissions, we aim to strengthen the sustainability and competitiveness of the company by continuously evaluating the technical and economic feasibility of mitigation technologies. In addition, our sustainability certifications and life cycle assessments will demonstrate the low carbon footprint of our products and ensure transparent and accurate information is provided to our customers and stakeholders.



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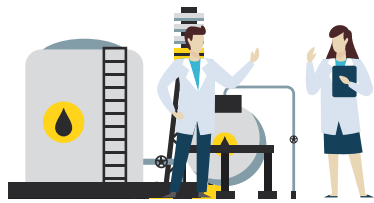
## Development of Carbon Capture & Utilization and Eco-friendly Material Technologies

South Korean industries contributes 51% of the total GHG emissions, with the chemical industry alone accounting for 20% out of these industrial emissions. This translates that our industry is considered a largest emitter following the steel industry. To prepare for the incoming era of carbon neutrality, we are actively engaged in research on carbon capture/usage/storage (CCUS) technologies that capture unavoidable CO<sub>2</sub> emissions and convert them into raw materials and fuels. To this end, we focus on securing proprietary CCUS technology through collaboration on national projects with leading domestic research institutions.

### Special Comment

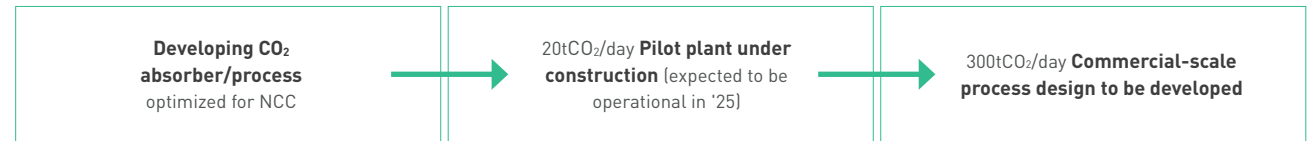
#### Head of R&D Center

Hanwha TotalEnergies Petrochemical is engaged in a wide range of research activities with the aim of developing next-generation green products and new materials, and preparing for the energy transition. We focus on securing original mitigation technologies that we can license out in the future while using open innovation to alleviate development risks and accelerate research. We will do our best in Hanwha TotalEnergies Petrochemical's journey to become a sustainable petrochemicals company in the coming decarbonization era.



### Carbon Capture

Research is in progress to directly capture CO<sub>2</sub> from the flue gas of NCC, the largest CO<sub>2</sub> emitter in the petrochemical complex.



### Carbon Utilization & Storage

Today, only a few direct carbon capture technologies exist on a global scale, so we do not know which technologies will emerge in the future. To address this uncertainty, we actively research and develop different technologies.

#### Green feedstock

To make the petrochemical industry more sustainable, there is a need for technologies that capture and recycle carbon emissions as feedstocks. In this context, we are exploring technologies that convert CO<sub>2</sub> directly into catalysts or reform it with methane and use it as a feedstock for petrochemical processes.

#### Green Fuel

Increasingly stringent fuel regulations are driving demand for cleaner fuels in the airline and marine industries. To meet this demand, we are investigating technologies that convert CO<sub>2</sub> to fuels as a way to gain a foothold in new clean energy businesses.

### Biodegradable Plastics

We are involved in the development of new biodegradable plastics that have superior properties compared to conventional biodegradable plastics while still responding to the regulations on single-use plastics. Our products are distinguished by our proprietary polymerization technology which results in a biodegradable polymer blend without loss of biodegradability. At present, we are in the process of verifying its productivity through scale-up tests. The new biodegradable plastics are expected to be used in various applications such as films, garbage bags and agricultural mulch films.

### Post-consumer Plastic Extraction/Refining Technology

We are developing technology to extract and refine post-consumer plastics to produce high-purity resins. This technology can be used to complement mechanical recycling, which has been widely used for its simplicity, but degrades with repeated recycling and has a limited ability to remove impurities. We are working on a technology that selectively extracts specific plastics from post-consumer plastics mixed with different resins and impurities to produce reclaimed resins of comparable quality to virgin products.



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# Circular Economy

Hanwha TotalEnergies Petrochemical is at the forefront of circular economy development and ESG management by promoting mechanical and chemical recycling of waste plastics.

## Special Comment

### Head of Polymer BU

As human civilization evolved, plastics have brought many benefits to the materials industry, including lightness, thinness, and convenience. At the same time, their manufacturing process and dependence on fossil fuels make them highly energy-intensive. Consequently, in the current situation where we are not free from the issues of environmental pollution, building a circular economy presents an opportunity to rethink the meaning of this business and to find an exit from it. And the business of recycling virgin plastics or recovering waste plastics for reuse is an area of sustainability to address and will become an essential element in the future supply of plastic raw materials. In this context, we will examine all factors related to the circular economy and actively reduce carbon emissions by physically recycling or reusing waste plastics through pyrolysis and re-introduction into the process, thereby reducing the amount of new materials we use and contributing to sustainable management.



## [Mechanical Recycling (MR) Business]



- Heated floor (Ondol) installation project (Deungchon & Mapo Self-sufficiency Promotion Centers)
- GRS\* certification to be obtained
- Developing materials for automotive parts
- Intensifying development of home appliance materials
- In-house multi-use cup collection project

We plan to obtain GRS certification for our mechanically recycled products in 2024. GRS is an international certification that verifies not only the transparency of raw materials & those used up to manufacturing phase but also recycled contents of final products.

We are also working with major domestic automakers to develop eco-friendly materials for auto parts, and since 2023, we have been actively participating in our customers' efforts to reduce carbon emissions by supplying sustainable recycled materials (flame-retardant PP composites) to home appliance manufacturers.

## [Chemical Recycling (CR) Business]



- Production of chemically recycled products using pyrolysis oil from plastic waste
- Acquisition of ISCC PLUS\*\*, international sustainability certification

Hanwha TotalEnergies Petrochemical is expanding the production of ISCC PLUS-certified products using waste plastic-based pyrolysis oil and circular naphtha produced from the oil as feedstock instead of the existing fossil fuel-based naphtha. Starting with the first commercial sale of chemically recycled plastic in 2023, the company plans to expand its business in line with the growing demand for sustainable products and take a lead in building a circular economy.

\* GRS : Global Recycle Standard

\*\* ISCC : International Sustainability & Carbon Certification PLUS

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# Identification & Examination of New Sustainable Businesses

## Biofuel Business

### Joining Eco-friendly Biofuel Revitalization Alliance

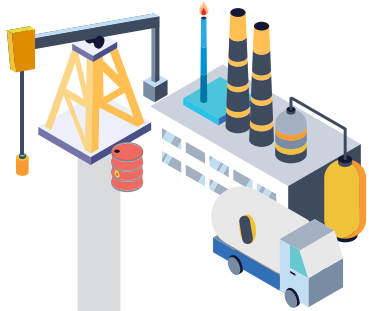
Hanwha TotalEnergies Petrochemical is stepping up its active response to the climate crisis as regulations requiring biofuel blends for transportation vehicles such as cars, planes and ships gain global traction, with the EU taking the lead. To contribute to the goal of reducing greenhouse gas emissions by shifting to cleaner fuels, we joined the Eco-friendly Biofuel Revitalization Alliance, a government-led public-private partnership launched in 2022, and continued to work to strengthen the infrastructure for biofuel adoption and use in Korea.

### Sustainable Aviation Fuel (SAF) Business

Sustainable aviation fuels (SAFs) are alternative aviation fuels derived from non-petroleum renewable resources including used cooking oil, vegetable oils and animal fat. With the potential to reduce carbon emissions by up to 80% compared to conventional jet fuel, SAF is an effective way to reduce carbon emissions while using existing aviation infrastructure. Today, standards and legislation for the mandatory use of SAF are emerging in the US and Europe, and infrastructure is being developed to support it. Korea is no exception to this trend, and the revision of the Petroleum Business Act and its Enforcement Decree are widely expected to provide the basis for SAF use and result in specific mandatory blending guidelines.

1

### Biofuel blending mandates



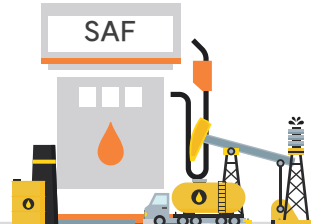
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### Eco-friendly Biofuel Revitalization Alliance

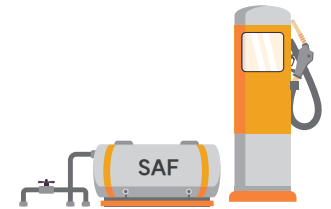


3

### Sustainable jet fuel infrastructure



80%  
less carbon emissions  
than conventional jet fuel

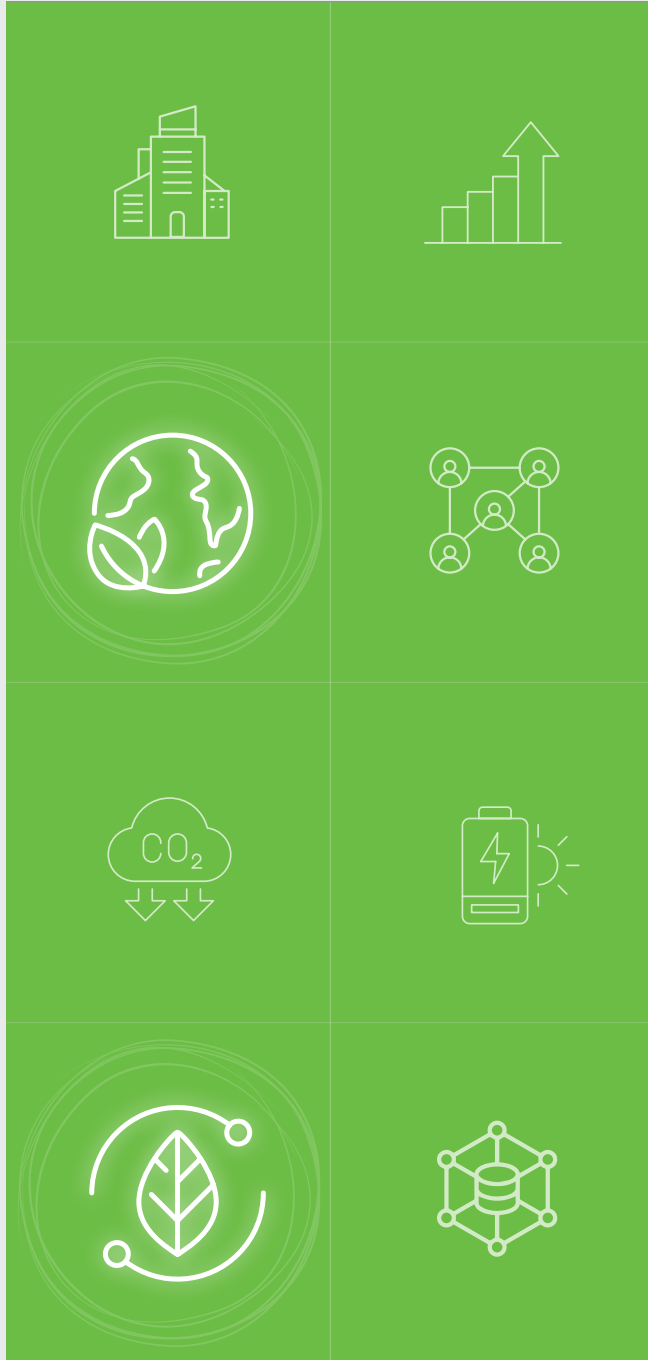


## Special Comment

### Director of Strategy & Planning

Hanwha TotalEnergies Petrochemical has been making continuous efforts to create environmentally friendly value in the course of the energy transition to tackle the global climate crisis. Accordingly, we are committed to biofuel business which can create sustainable social values. Specifically, sustainable aviation fuels are attracting significant attention as a viable means of reducing carbon emissions and as a pioneering next-generation fuel for the aviation industry. Our goal in this business is to strengthen our mid- to long-term portfolio of green business structures and secure future growth engines through proactive market leadership.

Our interest in the green paradigm shift in the energy industry has led us to explore the automotive and marine biofuels business beyond the aviation industry. In doing so, we aim to optimize our ESG management to become an environmentally responsible energy company that offers practical solutions to the challenge of climate change.



# ESG Performance

Hanwha TotalEnergies Petrochemical is committed to a sustainable future. We strive to fulfill our corporate social responsibilities and roles and create a better world for our neighbors and society. We place SHE as a top priority in our management activities and endeavor to build a world-class safety culture.

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# Minimization of Environmental Impact

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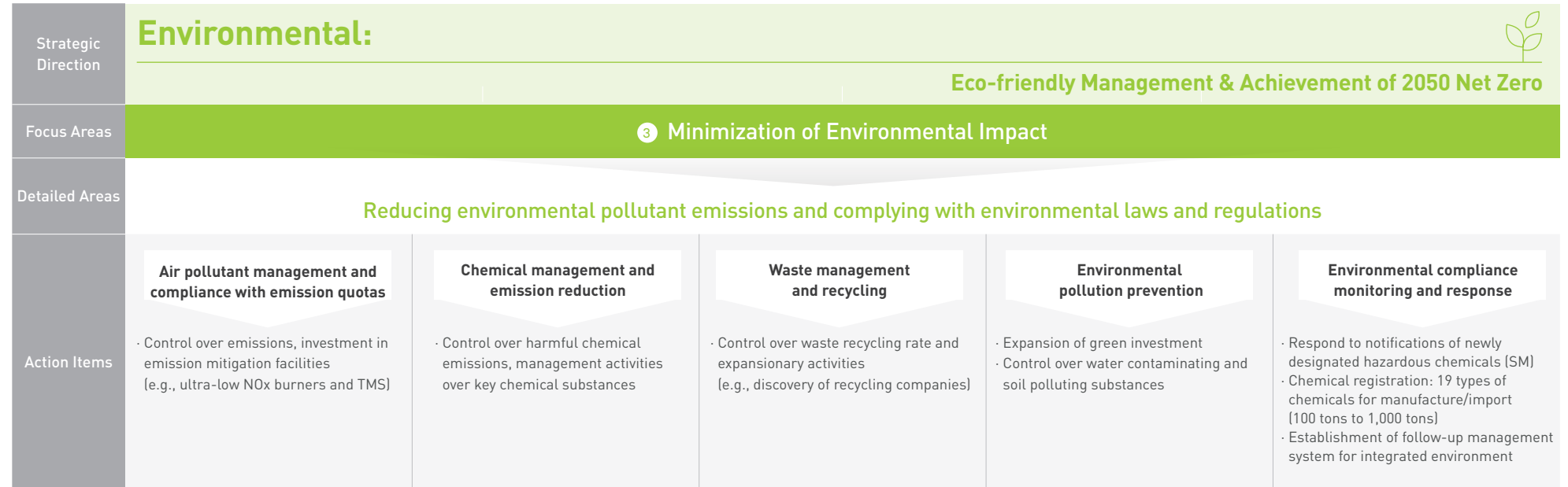
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## Our Strategy



## Environmental Management System

To minimize our environmental footprint, we gradually implement measures to reduce carbon emissions and recycle waste from the production process. We also manage emissions of air and water contaminants by applying internal standards more stringent than those required by law and by continuously monitoring the concentration of air-borne pollutants through regular measurement and analysis as required by law. Given the nature of our Petrochemical business, we are committed to building a sustainable environmental management system by performing various strategic tasks and eliminating potential environmental risks in advance.

### Environmental Management System (ISO14001) Certification

We have established an environmental management system that meets international standards by obtaining ISO 14001:2015 certification, and have maintained it through annual follow-up audits and three-year renewal audits. We strive for sustainable environmental performance by establishing, implementing and improving detailed action plans. We will continue to improve the company-wide environmental management system to identify potential environmental risks and minimize environmental impacts.

### 3 Minimization of Environmental Impact

Key activities in 2023 | Reducing environmental pollutant emissions and complying with environmental laws and regulations

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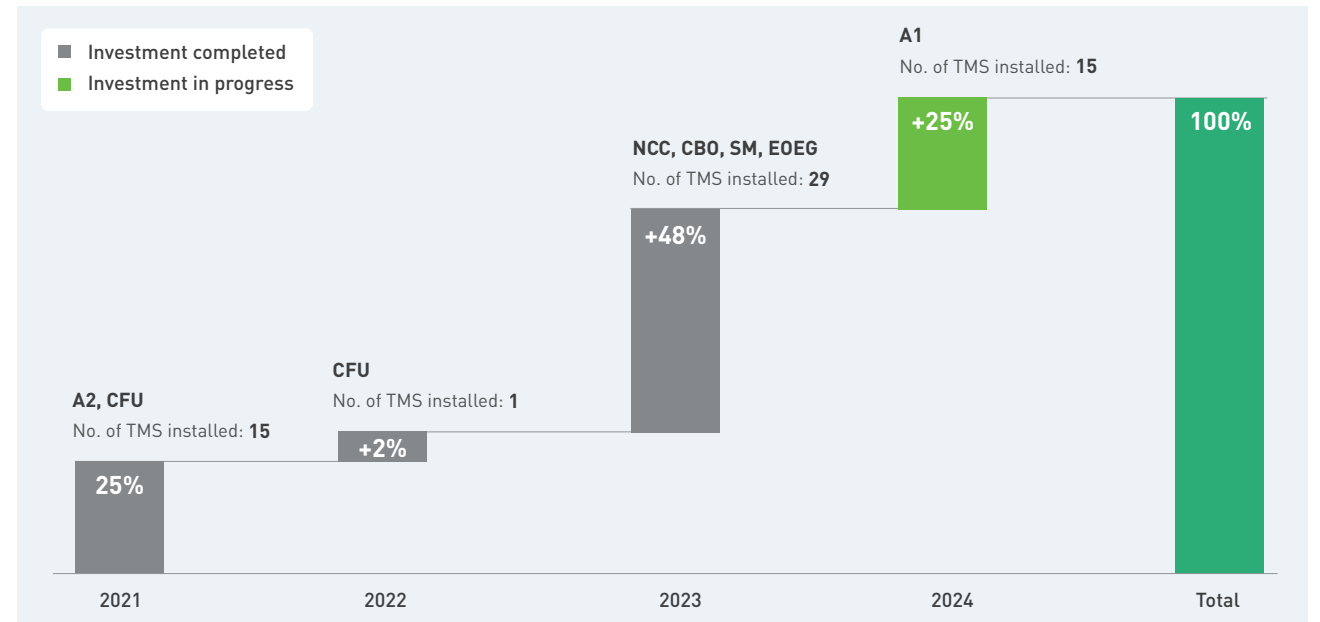
## Air Pollutant Management and Emissions Compliance

Recognizing the serious impact of air pollutants from our manufacturing processes on human health and the environment, we strictly manage them by adhering to internal management standards that are well below legally permissible standards. The Tele-Monitoring System (TMS)\* is used to monitor air pollutants in real time, and regular air pollutant measurements are conducted at some facilities. In addition, we have installed NOx abatement equipment (Selective Catalytic Reduction (SCR) and Fuel Gas Recirculation (FGR)) and VOC abatement equipment (Regenerative Thermal Oxidizer (RTO)), and implemented the Leak Detection and Repair (LDAR) system at all plants to manage fugitive leaks. Other measures include continued investment in facilities reducing air pollutants as in electrical dust collectors and burner replacement, etc. in an effort to emit the least likely amount into the atmosphere, such as electrical dust collectors and the replacement of burners, in an effort to minimize the amount of pollutants released into the atmosphere.

### Total Air Pollutant (NOx, SOx & dust) Emissions \*\*

	2021	2022	2023
Emissions (NOx, SOx & dust)	9.8 K tons (below legal limit)	8.6 K tons (below legal limit)	6.8 K tons (below legal limit)

### Investments in Air Pollution Abatement Facilities



Installation of atmospheric TMS: to reduce total emissions and monitor pollution concentrations through the installation of heating TMS at all plants (target of 64 units in total).

\* TMS: a telemonitoring system installed at an air pollutant emitting workplace that transmits the status of air pollutant emissions (i.e., NOx, SOx, and dust) in real time.

\*\* Calculated in accordance with the criteria of the Special Act on Air Quality Improvement in Air Control Zones



### 3 Minimization of Environmental Impact

Key activities in 2023 | Reducing environmental pollutant emissions and complying with environmental laws and regulations

## Chemical Management and Emission Reduction

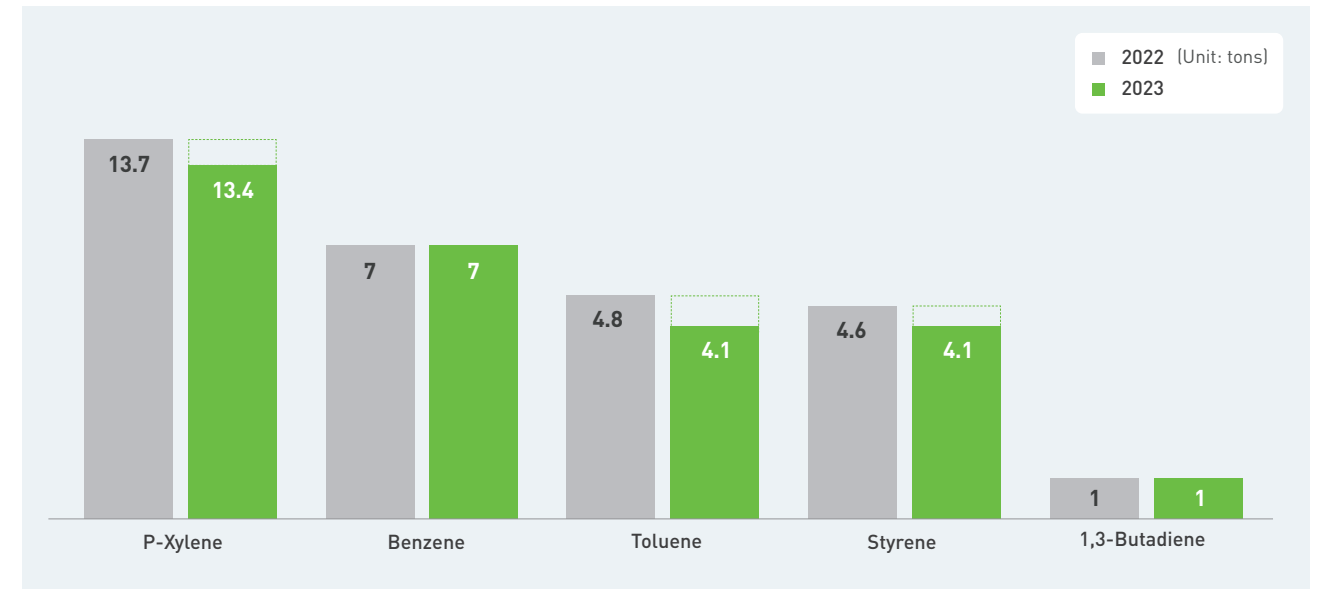
We have implemented Chemical Management including REACH (CheMiR), an integrated system to ensure the safe management of chemicals used in our business. We have established a domestic and international regulatory database for each chemical substance. For hazardous chemicals to which employees may be exposed at work, we manage risks and prevent accidents through job mapping.

In addition, we carry out exercises based on chemical exposure scenarios by creating manuals for prompt reporting procedures and first response to prevent damage from escalating. In addition, to effectively prevent chemical accidents and major civil disasters, we keep our chemical monitoring and management procedures up-to-date with newly designated toxic substances.

After changes were made to the legal form of the hazardous chemical management log according to Article 50 of the Chemical Substances Control Act in 2023, we improved the hazardous chemical management log system and introduced a visitor access control log. Moreover, the recent amendments made to the 'Types of Hazardous Substances Subject to Management under the Occupational Safety and Health Standards' made the Guide to Control over Hazardous Materials to be updated in order to secure safety in terms of relevant jobs.

Initiatives	Description
Improving work environment management	· Risk management by mapping chemicals and jobs
Establishing an integrated chemical management system	· System implementation to comply with relevant laws and regulations on chemical substances and increase business efficiency
Developing guidelines for preparing chemical exposure scenarios	· Establishment of guidelines for preparing scenarios to be submitted under the Act On Registration And Evaluation Of Chemical Substances: · Outline/content of scenarios, R&R for each item, etc.
Responding to newly designated toxic substances	· Check for newly listed toxic substances in the materials we produce, import, or store · Hazardous chemical permit in progress (~December 2024)

### Emissions of Hazardous Chemicals Subject to Management (top 5 types)



**3 Minimization of Environmental Impact**

Key activities in 2023 | Reducing environmental pollutant emissions and complying with environmental laws and regulations

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### Waste Management and Recycling

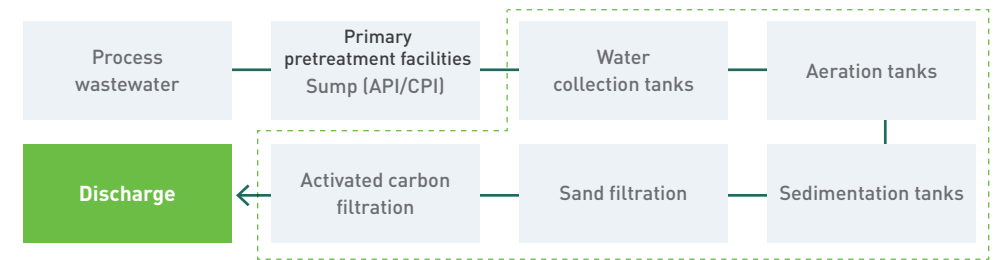
We endeavor to establish a resource circulation system across our production and sales activities, including the purchase of raw materials, transportation, and product sales. To minimize waste generation, we focus on managing waste sources and building a circular economy through thorough waste separation and improved resource recovery rates. We periodically analyze the waste generated in our production process to determine the environmental impact on the surrounding areas, including the local community, and maintain a waste storage facility to prevent the environmental impact of waste. The stored waste is disposed of by specialized contractors licensed by law, and the entire waste disposal process is recorded and monitored in the government's system. The contractors are subject to regular due diligence audits for verification of the legality of the waste disposal process.

In 2023, we implemented activities to improve the wastewater treatment process, including operating preliminary pretreatment facilities for wastewater at each plant, operating a real-time raw wastewater/process monitoring system, operating a pretreatment process for toxic wastewater, operating advanced treatment facilities full time, and regularly cleaning the main water collection tanks to remove suspended solids. Additionally, key performance indicators are established each year for reducing waste discharge and increasing recycling, as well as for reducing wastewater discharge and total organic carbon (TOC) emissions. For 2024, we have set a waste recycling rate target of 80% or more, and we continue to make investments in facility improvements to reduce the amount of waste we generate.

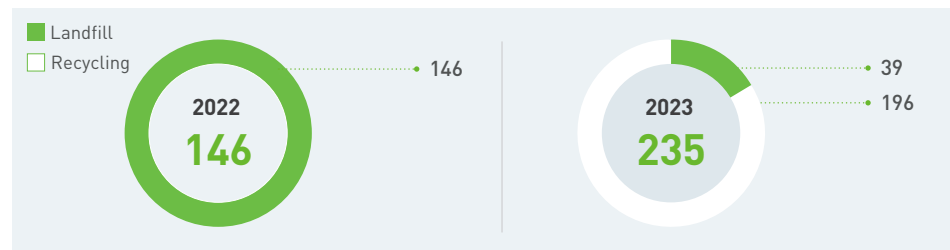
#### Continuous Waste Reduction through Source Management



#### Wastewater Treatment Process



#### Major Improvements in Waste Treatment [Changes to Insulation Disposal Methods] (Unit: tons)



Activated carbon filtration facilities



Sand filtration facilities

### 3 Minimization of Environmental Impact

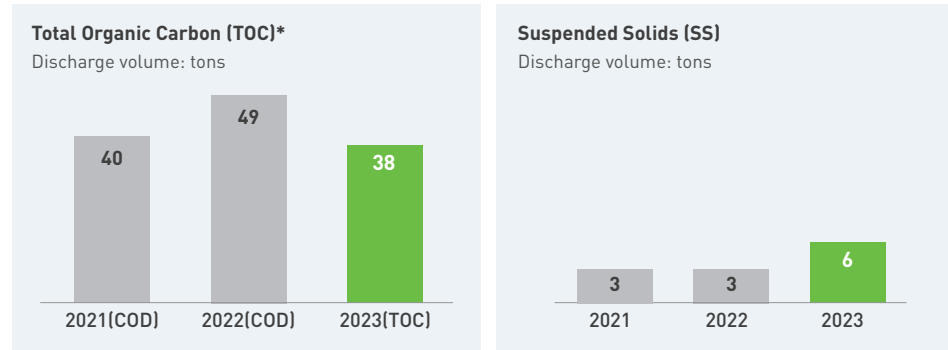
Key activities in 2023 | Reducing environmental pollutant emissions and complying with environmental laws and regulations

## Environmental Pollution Prevention

### Water Pollutant Control

We operate wastewater treatment plants to systematically treat water pollutants. The wastewater generated at each plant is transported through the oil-water separator to the catch basin at the wastewater treatment plant. After primary treatment with the activated sludge method, which uses microorganisms to treat organic pollutants, the wastewater undergoes advanced treatment with sand filtration and activated carbon filtration before being discharged. The discharged water is monitored through the water quality tele-monitoring system (TMS), which transmits the concentration of pollutants such as total organic content (TOC) and suspended solids (SS) in real time to the administrative agency. Every quarter, we measure and monitor 63 pollutants, including specific water pollutants such as benzene and phenol, and manage them by applying internal standards that are stricter than legal limits. This allows us to continuously invest in facility improvements to minimize the discharge of water pollutants.

### Water Pollutant Discharges



Discharge concentration (mg/L)	Legal standards	2022	2023
Total Organic Carbon (TOC)	90	14	14
Suspended Solids (SS)	80	1	2

\* Change of standards for the control of discharges of water pollutants from 2023 (from COD to TOC).

### Soil Pollutant Control

According to relevant laws and regulations, we carry out soil pollution investigations and remediation, conducting periodic measurements and tracking pollution sources at our business sites. Every two years, specialized organizations conduct soil contamination inspections to determine whether soil is contaminated, and if contamination is found, specialized remediation companies are hired to clean up the contaminated soil and have the remediation verified by the appropriate regulatory agency. In November 2023, 96 tanks underwent regular soil contamination inspections and were found to be in compliance.

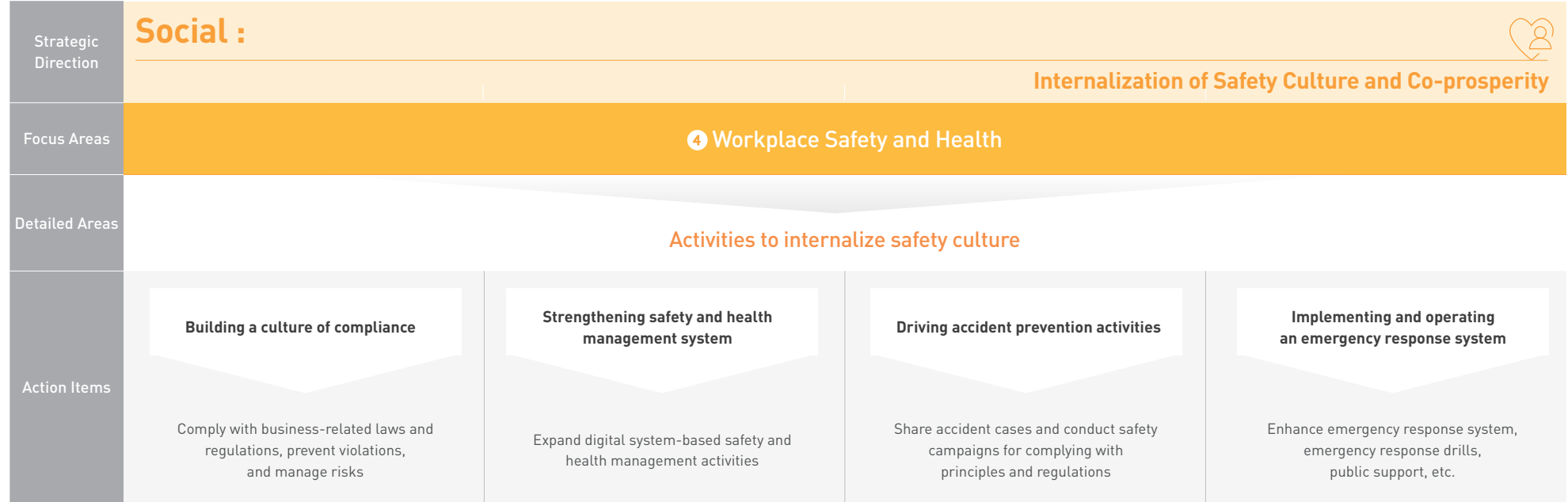
### Expanding Green Investments

In February 2022, we issued KRW 50 billion worth of Environmental, Social, and Governance (ESG) bonds for the green projects and invested in the construction of air pollution prevention facilities in the workplace. We have executed investments totaling KRW 65.5 billion by 2023, and plan to utilize green funds for activities such as reducing heat, noise, CO2 emissions, and odors from Petrochemical processes to below permissible levels. Through the effective reduction of air pollutants and CO2 emissions and the recycling of resources, we will protect the health of people living in the vicinity of our plants and actively contribute to the environmental improvement of local communities.

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# Workplace Safety and Health

## Our Strategy



### Special Comment

## Plant Manager



Recognizing the safety and health of all employees, suppliers, and residents of nearby communities as a key factor in prosperity, we strive to build a world-class safety and health system in terms of culture, competence, system, and technology with the goal of zero safety and health incidents. As for systems, we have established a mature system among the world's best, as demonstrated by ISRS Level 8 and PSM Level P. Under the Korean government's roadmap to reduce major accidents, we are actively working to strengthen the autonomous prevention system, with risk assessment at its core, by improving existing risk assessment, introducing advanced video-based risk assessment techniques, and standardizing pre-job safety briefings (toolbox meetings). In terms of culture and competency, we have defined safety leadership as the main driver for establishing a safety-first culture and have been operating the Safety Leadership Program since 2020. In 2023, we extended the program to our suppliers to promote win-win development. Since 2023, we have also organized and implemented 'Safety Core Time' under the slogan "One hour a day dedicated to safety, with leaders leading by example," where site management, managers, team members and suppliers meet every morning to communicate and build consensus on safety. On the technology side, we are working hard to implement state-of-the-art safety management at our workplaces to overcome human limitations and increase the reliability of safety management through man-machine interfaces. We aim to innovate our approach to safety management by proactively combining safety with the latest technologies such as VR training, AI-based facility monitoring and video analysis, and wireless gas monitoring systems.

# Workplace Safety and Health

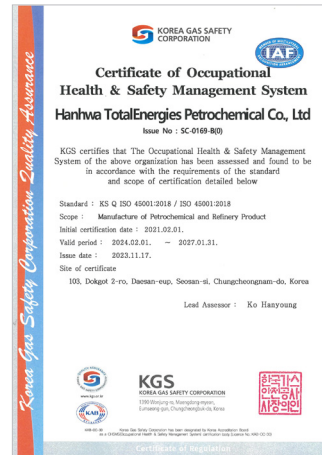
## Implementation System

### Safety and Health Management System

**Global SHE Management System** Through the integrated certification of ISO 45001 and ISO 9001 by the International Organization for Standardization, we have been recognized for our comprehensive safety, health, quality and environmental management activities. In 2021, we maintained level 8 in the International Safety Rating System (ISRS) evaluation, which demonstrates the continuous maintenance and development of our safety and health system. This level means that our safety and health system is in the top 8% worldwide, and only nine companies in the world have achieved Level 9. Given that no other company in the refining and Petrochemical industry has achieved levels 9 or 10, our rating is considered the highest in the industry today.

**Organizational Chart** We have a line-staff-type safety and environment organization with the Plant Manager and the Head of the R&D Center as the accountable executive in charge of safety and health. Under this structure, each business unit and department has its own safety and environmental organization and personnel.

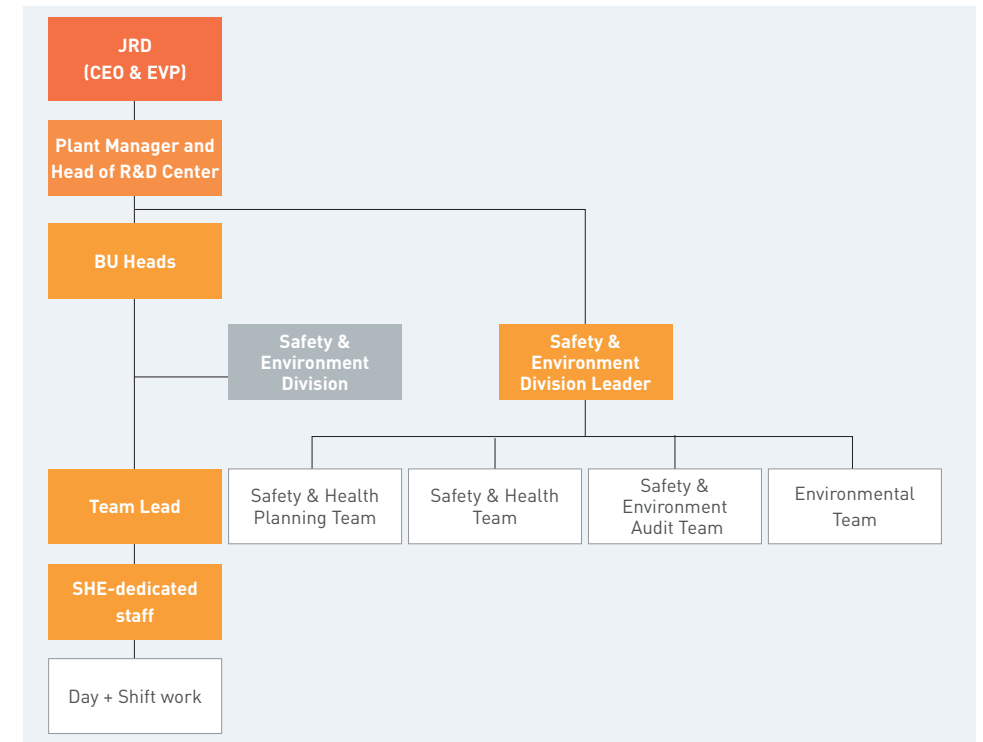
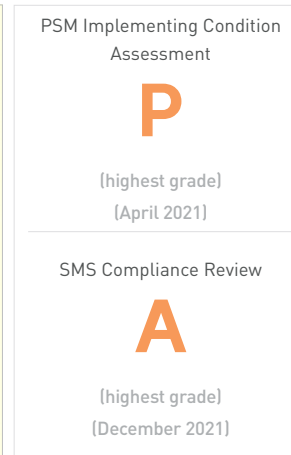
### Health and Safety Management System (ISO 45001)



### International Safety Rating System (ISRS)



### Process Safety Management (PSM/SMS)



\* ISO 45001: International standard for management systems of occupational safety and health set by the International Organization for Standardization (ISO), PSM: Evaluation of a systematic process safety management system based on 12 elements, SMS: Evaluation of comprehensive safety management regulations and system operation system, International Safety Rating System (ISRS): Internationally-recognized safety rating assessment by DNV GL, an international standards certification organization

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## Activities to internalize safety culture

### Establish Culture of Compliance Based on Rules

Hanwha TotalEnergies Petrochemical has declared that the highest priority of its SHEQ policy is to comply with relevant domestic and international laws and regulations. We have further revised the policy in 2023 to adopt domestic and international best practices, as well as laws and regulations. Compliance management is emphasized in all aspects of our operations. In addition, to ensure the continuous compliance with laws and regulations and best practices, we encourage the establishment of a culture of compliance through quarterly on-site inspections by top management and constant compliance monitoring/feedback by the Management Assessment Team/Safety & Environment Audit Team. In addition to the inspections/audits required by law, in 2023 an external specialist (Korea Gas Safety Corporation (KGS)) was engaged to objectively assess our compliance with safety and health laws and international standards with a view to voluntary improvements. In order to apply changes in safety and health-related laws and regulations and notices in a systematic and timely manner, we monitor the enactment and revision trends every month and establish response plans to supplement the company policies (internal business procedures) and technical standards (detailed facilities/equipment guidelines) in accordance with the internal management system. Moreover, we have well-thought-out training programs to establish a culture of compliance management and improve safety and health competencies, and periodic surveys are conducted to identify the training needs of employees to continuously improve the programs.



On-site inspection by top management



Presentation of third-party inspection results

Course Name	Target Audience	Frequency	Hour	Training Type	Responsible Department	
Safety leadership training	Executives	Annual	2hr	In person	Safety & Health Planning Team	
	Department heads	Annual	2hr	In person		
	F/M	Half-yearly	2hr/time	In person/Online		
	All employees	Half-yearly	2hr/time	In person	Safety & Health Planning Team	
Safety skill-up training	SHE-dedicated staff	Annual	16hr	In person	Safety & Environment Audit Team	
	SEC	Phased operations		In person/Online	Safety & Health Planning Team	
	PE, Operator	Upon occurrence	16hr	In person	Labor-Management Team	
	Safety staff	Twice per person		In person	Safety & Health Team	
	Member of Industrial health committee (working level)	Yearly		In person		
VR safety experience training	Production/maintenance	Periodic/as occurred	2hr	In person	Safety & Health Team	
Emergency response drills	Comprehensive fire drill	All employees	Half-yearly	2hr	In person	Safety & Health Planning Team
	Mobile fire brigade training	Mobile fire brigade	Monthly	1hr	In person (drill)	Safety & Health Team
	Emergency measures training	Production departments	Monthly	1hr	Lecture/practice	Each department
	Fire suppression training	Employees under three years	Half-yearly	4hr	In person (drill)	Safety & Health Team



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## System Management

In order to achieve zero safety and environmental accidents and efficient utilization of safety, health, and environmental resources, **Hanuha TotalEnergies Petrochemical** has been modernizing its safety and health management system through the use of digital technology, and implementing various activities to expand the application of smart plant. As part of the effort, in 2023, VR training was organized as a regular training course and we also introduced an equipment failure prediction algorithm, which has been verified and is under review for further expansion. Other improvements are the improvement of training integration conditions for the safety training system used by all employees, and the improvement of user friendliness so that safety and health information can be used in a variety of ways in related systems for greater efficiency.

### Virtual Reality (VR) Training

We have carried out a virtual reality (VR)-based safety education project to improve the safety of all workers at our sites, respond to the Fatal Accident Punishment Act, and develop a safety culture by raising awareness of risks. The project reflected actual accident cases, and VR contents for hands-on experience were selected for three accidents that are most likely to occur at actual work sites, including seat belt falls, falls through openings, and falls from scaffolds. In 2023, a total of 900 employees and subcontractor workers participated in the program, and the training will be offered sequentially to subcontractor workers and employees who participate in turnarounds or TAs



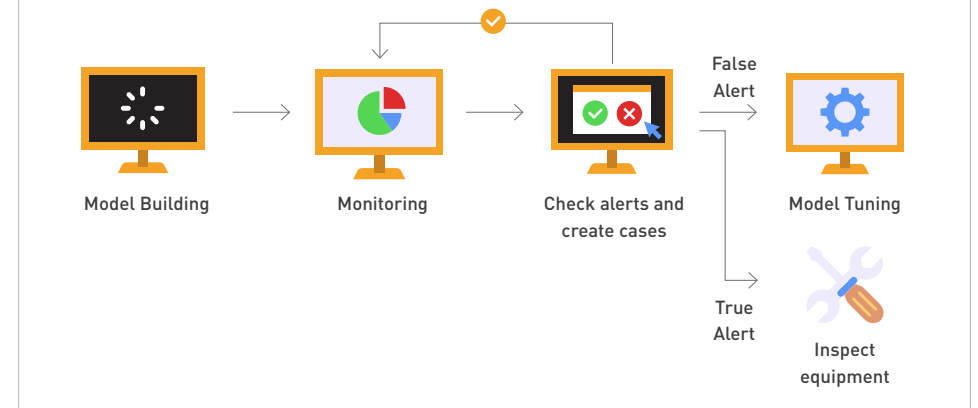
VR Simulator Room

### Safety and Health Management System Development



### Equipment Failure Prediction

Petrochemical processes run around the clock, and unexpected failures in critical equipment can lead to unplanned shutdowns, potentially undermining safe and stable operations and causing production losses. To prevent such events, we attach sensors to critical equipment that can collect operating data such as pressure, temperature, corrosion, vibration, and speed, which are aggregated and monitored in real time, and we use the information to perform preventive maintenance. In 2023, we introduced an algorithm for predicting failure signs by analyzing failure cases of rotating equipment to validate the reliability of the algorithm's analysis, and we plan to increase the number of facilities to which the prediction algorithm is applied in the future.



## 4 Workplace Safety and Health

Key activities in 2023 | Activities to internalize safety culture

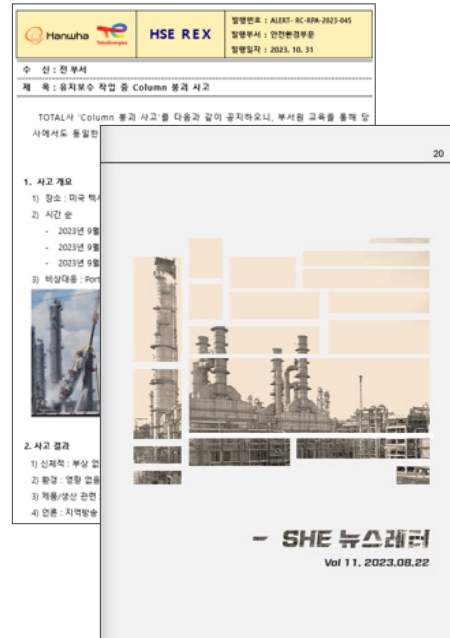
### Accident Prevention

#### Raising Safety Awareness

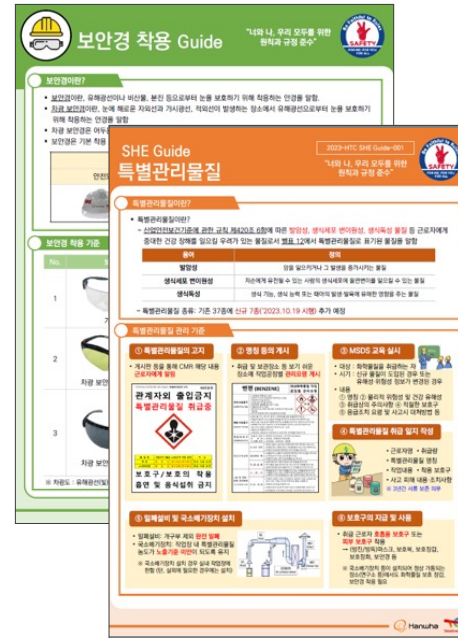
We run the Safety Contact Program, which shares safety management highlights and major issues at home and abroad, and various safety campaigns aimed at promoting and facilitating safety culture activities to raise the safety awareness of employees and suppliers' workers. In 2023, 17 safety guides and 26 overseas accident cases were published through the Safety Contact Program, contributing to the improvement of safety culture by presenting and sharing relevant laws and regulations, guidelines, and accident cases. Also, to remind employees of the importance of safety and form a safety-first culture, we conduct safety campaigns such as the

World Day for Safety (a day designated by the UN's International Labor Organization to raise awareness of the seriousness of occupational accidents). In April 2023, the World Day for Safety event was held on the theme of technical risks and Wave-1 principles, attended by 11 of our divisions and 21 suppliers (over 3,000 participants). As a new initiative, the HSE staff organize safety inspection days once a month for the purpose of accident prevention and promotion of a safer atmosphere at workplaces. (In 2023, inspections were conducted on the theme of proper use of personal protective equipment.)

#### Safety Contact Program



Overseas accident cases and SHE Newsletter



Safety Guide

Safety Campaigns	Target	Frequency
Adhering to Wave-1 Principles and Rules	· All personnel in the plant, suppliers, etc.	Yearly
World Day for Safety	· All personnel in the plant, suppliers, etc.	Yearly
Campaign for Occupational Safety Awareness Period	· Ministry of Labor, related departments, suppliers, on-premise companies, etc.	Yearly
Safety Inspection Day	· SHE staff and Safety & Environment Division	Monthly
Special campaigns (turnarounds, etc.)	· Relevant BUs, suppliers, etc.	As needed



Wave-1 Principles



World Day for Safety

Overview

Special Focus

ESG Performance

Environmental

Social

**Workplace  
Safety and Health**

Human Rights and  
Talent Management

Co-prosperity with  
Suppliers

Strategic Social  
Contribution Activities

Governance

APPENDIX

## Accident Prevention

### Employee Health Promotion

Our health management systems provide a safe and pleasant working environment for our employees, and also help to improve the health of employees' family members. This goes beyond simply meeting basic legal standards by expanding our voluntary health initiatives. We conduct work environment measurements, health examinations (general/comprehensive/specialized), musculoskeletal disease risk surveys, and brain/cardiovascular system and work stress assessments as required by law and regulation. In 2023, we carried out work environment measurements for each of our 35 teams and 20 suppliers in both the first and second halves of the year to regularly measure harmful factors such as chemicals and noise in the work environment, and there were no cases of exceeding the legal exposure standards (based on the period from the start of measurements in 2018 to 2023). Non-statutory health promotion programs include wellness clinic and physical/mental health counseling, flu vaccination, aroma healing, weight loss programs, smoking cessation programs, vaccinations, and CPR training, and employee participation in these programs is steadily increasing. In 2023, given the impact of mental health on work safety and quality, we have expanded the scope of mental health care (from employees only to employees and their spouses and children).



Work environment measurement in 1H & 2H 2023



Wellness Clinic and physical/mental well-being counseling

Key Activities	Description	Frequency	Remarks
Statutory	Work environment measurement	· Measuring/evaluating worker exposure to harmful factors such as noise/dust/hazardous chemicals	Half-yearly Specialized organizations
	Health checkup	· General check-up (employees) · Comprehensive health examination (employees and spouses) · Specialized medical examination (employees) · Health check-up before placement (employees)	Yearly 4 years/biannual/ yearly Half-yearly Upon occurrence Hospitals / Clinics
	Musculoskeletal risk assessment	· Eliminate/reduce hazards to prevent musculoskeletal disorders	3 years Specialized organizations
	Brain, cardiovascular, and work-related stress assessment	· Assess brain and cardiovascular disease risk and job stress factors/levels	2 years Hospitals
Non-statutory	Physical wellness · Wellness Clinic and health consultation · Flu vaccinations	· Personalized exercise regimens, health counseling (for individuals with conditions) · Flu vaccination subsidies	3 years, as needed External specialists
	Mental wellness · mental health care counseling · Aroma healing	· Therapy sessions (for those wishing) · Job stress management	As needed External specialists
	Events & Campaigns · Body fat loss program · Smoking cessation program	· Health promotion through exercise · Support for those willing to quit smoking	As needed Health administrators
	CPR training	· CPR training	Monthly Health administrators, first responders

4 Workplace Safety and Health

Key activities in 2023 | Activities to internalize safety culture

## Emergency Response

### Establishing and Operating 24/7 Emergency Response System

Our company creates and manages emergency response scenarios by identifying accident scenarios through quantitative and qualitative risk assessment of sites to respond quickly and accurately to contingencies. We have identified more than 700 emergency response scenarios that may occur at our sites, which are reviewed and updated annually. Moreover, we have implemented a 24/7 emergency response system by establishing our own location-based map that integrates CCTV (fixed/mobile) and mobile gas monitoring systems to quickly identify locations and take countermeasures in the event of an emergency within our 3.3 million square meter site.

Companywide emergency response drills are held half-yearly where employees and suppliers participate to check and strengthen our organizational preparedness, along with other exercises such as emergency communications drills for executives, mobile fire brigade training, scenario-based emergency response drills for injuries, and fire suppression exercises. Two company-wide emergency response exercises were held in 2023, involving a total of 1,000 employees and suppliers, to strengthen our readiness to respond to real-life situations in the event of major safety and environmental incidents such as fires, explosions and leaks, as well as major industrial accidents.

<p>Emergency Response Systems</p> 	<p>Emergency Response Drills</p> 	<p>Public Support</p> 
<ul style="list-style-type: none"> <li>· Enhanced emergency response systems</li> <li>· Leak/fire early detection</li> <li>· Intensive surveillance of hazardous/blind spots</li> <li>· Emergency response scenario/liaison network</li> <li>· Disaster prevention equipment</li> <li>· Emergency response cooperation with neighboring companies</li> </ul>	<ul style="list-style-type: none"> <li>· Company-wide exercise</li> <li>· Emergency communications drills for executives</li> <li>· Mobile fire brigade training</li> <li>· Marine oil spill response drills</li> <li>· Emergency response drills for injuries</li> </ul>	<ul style="list-style-type: none"> <li>· Community emergency support activities</li> </ul>



On-site inspection by top management

Presentation of third-party inspection results



- Overview
- Special Focus
- ESG Performance
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# Human Rights and Talent Management

## Our Strategy

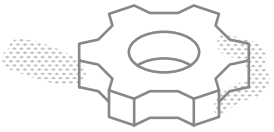


**Special Comment**

**Head of HR & Admin BU**



Recognizing early on that ESG is essential to our survival, we established a dedicated ESG organization and built an internal infrastructure. Building on this, we are advancing ESG management by forming an ESG Council, reporting its activities to the Board of Directors, shifting to a green business portfolio at the corporate level, and supporting research into carbon reduction technologies at R&D Center. These efforts are helping to lay the foundation for green business, identifying future markets for each of our business segments. We also strive to realize ESG from a talent management perspective by attracting and retaining outstanding talent, valuing diversity, pursuing stability through mutual respect and cooperation between labor and management, and building an organizational culture that empowers employee involvement and commitment. We will continue to maintain our current talent management promotion strategy so that all employees can understand, communicate, and actively participate in the company's vision and ESG management.

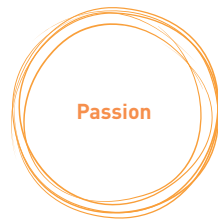


## Consistent HR operations

### Talent Acquisition and Compensation System

We believe that the key to our growth is the happiness of our employees, and we strive to create an environment where they can reach their full potential and feel empowered and satisfied. To create value for both the environment and people, we have declared our Talent Image and actively recruit individuals who challenge, lead change, and collaborate through communication. We hire without regard to gender, age, race, religion or educational background, focusing on an individual's skills, performance and potential for growth. We also aim to progressively increase the proportion of female employees, recognizing that a culture that embraces diversity and inclusion is essential to drive innovation and growth. With the vision of becoming a 'Responsible Chemical & Energy Leader', we will do our best to create a positive virtuous cycle in which employees create sustainable value and growth together with the company. In 2023, we transitioned to a role-oriented HR system centered around Career Levels (CLs), which enables high performers to advance fast by basing decisions for promotion on their continued excellence in their current CL and their potential in the next CL. We strictly prohibit discrimination on the basis of gender, age, and educational background in promotions, evaluations, and compensation, and we continue to improve the fairness and transparency of the human resources system by introducing a promotion point system and KPI-based performance evaluation.

### Who we want



Passion

Constantly challenging for the best capabilities and expertise



Creativity

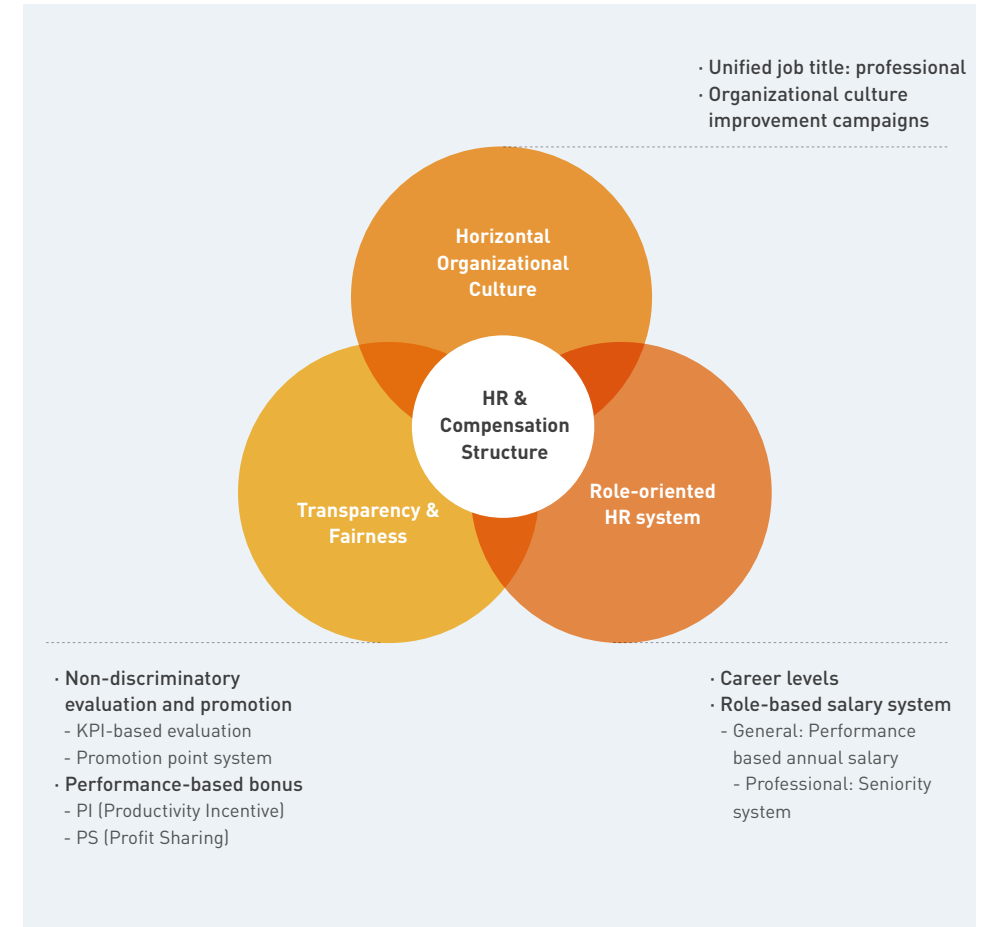
Leading change with flexible and positive mindset



Communication

Communicating and harmonizing with others, respecting diversity

### HR & Compensation Structure





## 5 Human Rights and Talent Management






Key activities in 2023 | Talent acquisition, labor-management reconciliation, and organizational culture improvement

### Employee growth support

#### Talent Development Program

We provide a variety of training opportunities to foster talent through pursuing personal development and strengthening professional capabilities. We help employees strengthen their competencies through a job transfer system, academic degree training support, language intensive, and the Global Talent Program as well as mandatory training like safety, health, and ethics. Especially for engineers, we provide personalized training courses for each stage of growth, from basic knowledge of processes to training at external institutions and overseas companies with licensed technologies.

Achieve together through unique curriculum of HTC

<b>Introductory Courses</b> 	<b>Mandatory Training (company-wide)</b> 	<b>Job Training</b> 	<b>Self-Learning</b> 	<b>Education for fostering talent</b> 
<ul style="list-style-type: none"> <li>• <b>Introductory courses</b> Understanding of the company, establishing challenging and creative mindset for new hires</li> <li>• <b>Beginner's course for processes</b> Early deployment through systematic acquisition of basic processes knowledge required in the field</li> <li>• <b>HPMP (Hanuha Pre Manager Program)</b> Reinforcing business skills and global capabilities of new hires</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Sexual harassment prevention</b></li> <li>• <b>Disability awareness</b></li> <li>• <b>Workplace harassment prevention</b></li> <li>• <b>Reemployment support</b></li> <li>• <b>Pension payment</b></li> <li>• <b>Personal information privacy</b></li> <li>• <b>Information Security</b></li> <li>• <b>Industrial safety and health</b></li> <li>• <b>Hazardous chemical safety</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Intermediate course for processes</b> Intermediate theories and practice for fixed/rotating machines, electrical/instrument devices</li> <li>• <b>Internal training courses</b> Enhancing job capabilities, such as designing facilities, job communication, stable processes, process/office automation, Biz Process, OA, data analysis, and strengthening capabilities at various levels, such as interviewer skill-up, coaching &amp; feedback, female middle manager</li> <li>• <b>Online training</b> Online training from Cyber Institute, EDRC, and others</li> <li>• <b>External training</b> Courses from professional educational institutions in Korea and abroad by autonomously selecting the necessary courses that fit the job descriptions</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Support for professional engineer certification</b> Develop self-learning culture and support for certification to contribute to the company</li> <li>• <b>DT education</b> Guarantee expertise in comprehensive digital and data analysis / motivate self-learning through rewards</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Researcher</b> Academic training (research) / overseas collaborative research training</li> <li>• <b>Engineer</b> Academic training (technology)/ overseas technology research</li> <li>• <b>General</b> Courses for regional expert, intensive language (English, Chinese, and Japanese) courses</li> </ul>

## 5 Human Rights and Talent Management

Key activities in 2023 | Talent acquisition, labor-management reconciliation, and organizational culture improvement

### Healthy labor-management culture

#### Healthy Labor Relations

We comply with the constitution and applicable laws and regulations to ensure the fundamental rights of workers, such as the right to organize, the right to collective bargaining and the right to collective action. We have pledged to maintain healthy labor relations through the Labor Harmony and Peace Declaration. As such, we conduct collective bargaining on wages, a labor-management council, workshops, and networking events in accordance with applicable labor relations laws. In 2023, the labor-management council held four regular meetings and a total of 17 proposals were discussed between management and labor, of which 16 have been implemented (e.g., hourly annual leave and improved company housing conditions) and one is in progress. We also formed a grievance committee to hear and address workers' complaints and operate an online grievance forum for open communication.



#### Labor-Management Council and Activities



Leadership workshop for executives & department heads

Major Activities	Contents
<b>Labor-Management Council</b>	Consultation on recruitment, placement, education and training of workers, improvement of systems such as wage payment methods, systems, and structures, improvement of safety & health and other working conditions, and promotion of workers' health · <b>Regular council:</b> four times a year with all members from labor and management · <b>Regular roundtable:</b> monthly (except for the months when regular council meetings are held) with HR executives and workers' representatives
<b>Monthly Meetings of Division Heads</b>	Discussions on labor policy and issues, working hours, and collective bargaining on wage for division heads and leaders of production team
<b>Other training</b>	Health care for managers, retirement seminar, new hire camp, and company-wide special training on communication culture
<b>Networking Activities</b>	Lunch with CEO for junior employees, labor-management workshop
<b>Grievance Committee</b>	Listening to and handling employee grievances
<b>Grievance Forum</b>	Online reporting channel

## Improved employee convenience and job satisfaction

### Employee Benefits

We offer a variety of benefits programs to improve the quality of life for our employees so that they can be more stable, motivated, and focused on their work. To promote work-life balance, we implemented regular working hours and flexible work systems, while also encouraging the use of sabbatical leave and refreshment vacations to provide employees with time to recharge away from work. We take families of employees into account with children's tuition reimbursement, company daycare centers, etc.

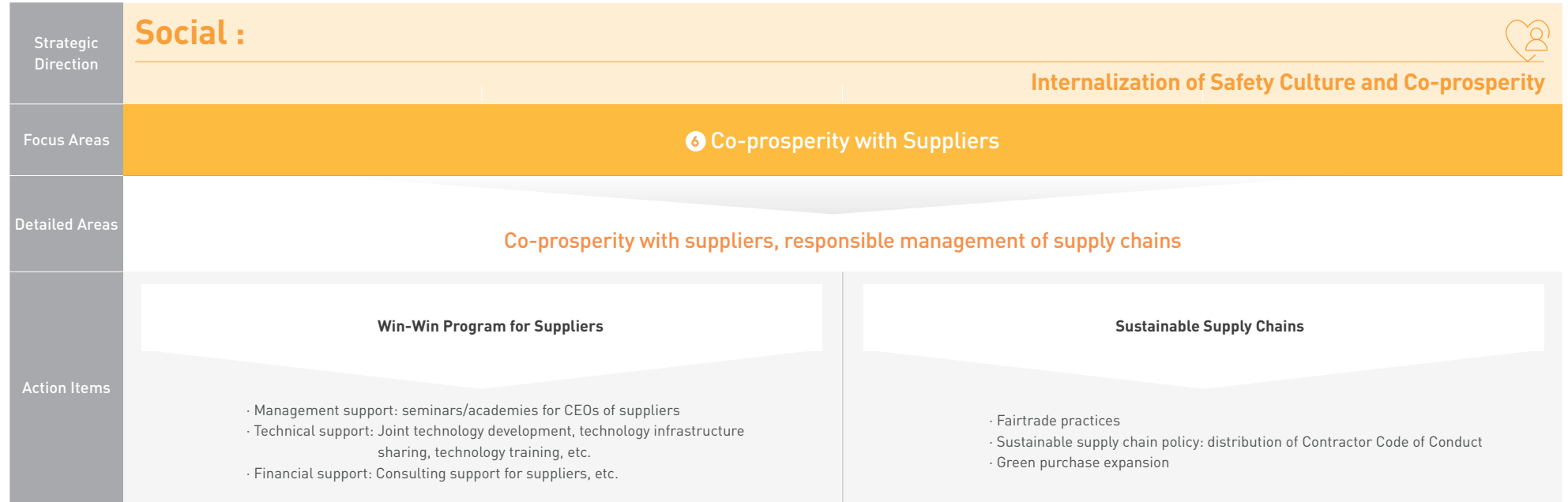
Temporary employees are entitled to the same level of benefits provided to regular employees, except for benefits given on the grounds of continued repayment during long service and working periods. We actively listen to our members' voices and follow the trends provide a better work-life balance and more diverse benefits over the long term. We will grow together with employees through multiple programs. We have improved employee benefits in 2023, such as increasing the number of shared offices and expanding shuttle routes. And we will continue to roll out various programs to ensure that the company and our employees can grow together.

 <p><b>Annual leave</b> 15+4 4 days of refresher days in addition to statutory annual leave</p>	 <p><b>Sabbatical leave</b> A paid summer vacation redundant 1 month of paid leave for every 7 years of service</p>	 <p><b>Family events &amp; holiday support</b> Best memories linger on Marriage, parent's anniversary, birth, child's enrollment, etc.</p>	 <p><b>Longevity leave</b> Rewards for long service Vacation for every 10 years of service</p>
 <p><b>Family &amp; maternity benefits</b> For working parents Paternity leave: one month off for a child's birth Assistance with fertility treatment and leave Childcare leave before and after children start school</p>	 <p><b>Tuition support</b> From daycare to school fees Tuition assistance from preschool to college</p>	 <p><b>Medical expenses</b> For the health of employees and their families Medical expenses for employees, spouses, children, and survivors Medical checkup for employee's spouse Dental expenses for employees</p>	 <p><b>Flexitime work system</b> Flexible workhours Employees may choose to work 7-4, 8-5, 9-6, etc.</p>
 <p><b>Job rotation system</b> Empowering employees to create their own career path Personalized growth support through job rotation system based on career development planning</p>	 <p><b>Cyber training center</b> For global talent Employees can enroll up to three courses per month Language test (OPIC) fee support</p>	 <p><b>Flexible work arrangements</b> Compressed work schedules with overtime hours Overtime hours accrued can be compressed into a shortened workday</p>	 <p><b>Training programs</b> Upgrading with degrees and technical training Support for graduate (master's and doctoral) studies for selected employees Technical training support at an overseas licenser</p>
 <p><b>Housing financing assistance</b> Homeownership with supportive program Help with interest on home or rental loans for employees who are non-homeowners</p>	 <p><b>Benefits points</b> Flexible use for everyday living Leisure, shopping, health, personal growth and more.</p>	 <p><b>Shared office</b> Working in a coworking space Coworking spaces in Seoul, Seosan, and Daejeon</p>	<ul style="list-style-type: none"> <li><span style="color: #8B4513;">■</span> Vacation support</li> <li><span style="color: #FFA500;">■</span> Flexible working hours</li> <li><span style="color: #FF8C00;">■</span> Work &amp; Life Balance</li> <li><span style="color: #A9A9A9;">■</span> Housing support</li> </ul>

# Co-prosperity with Suppliers

- Overview
- Special Focus
- ESG Performance
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    - Workplace Safety and Health
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    - Co-prosperity with Suppliers**
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## Our Strategy



### Special Comment

## Head of Purchasing & Materials

Hanwha TotalEnergies Petrochemical believes that shared growth with its suppliers is of paramount importance to the company's sustainable growth, and engages in activities to establish a win-win relationship with suppliers and build a sustainable supply chain. We operate win-win programs for our suppliers, such as technical cooperation and training support, to provide them with more practical management support. At the same time, we have established internal guidelines for contracting with suppliers and formed an internal review committee to ensure fair business practices. Relevant policies and a Contractor Code of Conduct have also been put in place to build a sustainable supply chain. In 2024, with growing global public concern about environmental and human rights issues in corporate supply chains and tightening regulations, we plan to revise our supply chain risk management system. In this way, we aim to build a supply chain that not only ensures the sustainability of the business, but also promotes shared growth with our suppliers.



## 6 Shared Growth with Suppliers



Key activities in 2023 | Co-prosperity with suppliers, responsible management of supply chains

### Win-Win Program for Suppliers

#### Management Support

Hanwha TotalEnergies Petrochemical operates various win-win cooperation support programs to encourage suppliers to proactively improve their safety management capabilities. In 2023, we newly established and operated VR training and safety leadership programs to raise suppliers' safety awareness. In addition, four joint safety inspections were carried out in 2023 to build win-win management and fair cooperative relationships through enhanced communication, as well as monthly meetings for industrial accident prevention, and regular CEO meetings for stronger communication and cooperation.

#### Support for Safety Management Improvement

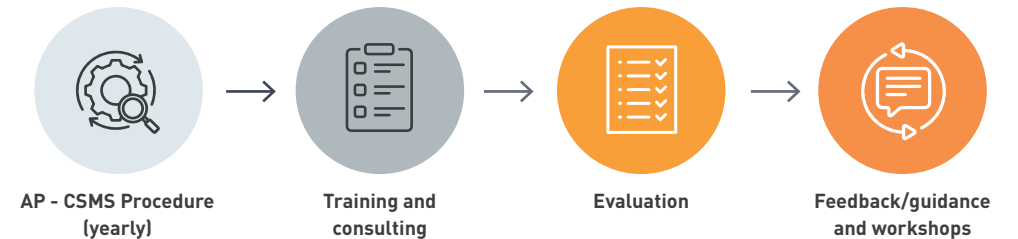
Key Activities	Description
<b>System</b> 	<ul style="list-style-type: none"> <li>Safety and health assessment and consulting support, Building a dedicated system for suppliers (HTC Partner Platform), etc.</li> </ul>
<b>Competency/Safety awareness</b> 	<ul style="list-style-type: none"> <li>VR training, safety leadership programs, safety and health events and campaigns, Awards for outstanding suppliers and workers, etc.</li> </ul>
<b>Work environment improvement</b> 	<ul style="list-style-type: none"> <li>Support for work environment measurement, installation of break rooms for workers, etc.</li> </ul>
<b>On-site safety management support</b> 	<ul style="list-style-type: none"> <li>Support for safety and health management costs of contracted construction, operation of a safety support group for construction supervision,</li> <li>Support for safety inspection/instruction/education guide, support for facilities and protective equipment necessary for accident prevention, support for safety inspection and assessment for construction equipment work, allowance for supplier safety manager certification, etc.</li> </ul>

#### Safety and Health of the Suppliers

In order to select new suppliers with excellent safety management capabilities, we have structured over half of the total evaluation ratio to be based on safety management criteria. Additionally, when entering into contracts, we take into account the safety and health evaluations of qualified subcontractors, with safety assessments comprising approximately 70% of the overall supplier performance evaluation.

##### Contractor Evaluation System (AP-CSMS)

Since 2017, we have been applying the Audit Protocol - Contractor Safety Management System (AP-CSMS), a safety management system evaluation system for suppliers, to continuously guide suppliers to improve their safety management systems. In 2023, we carried out assessments for 19 suppliers in the areas of maintenance, heavy equipment, equipment inspection, packaging, and shipping.



##### AP-CSMS Components

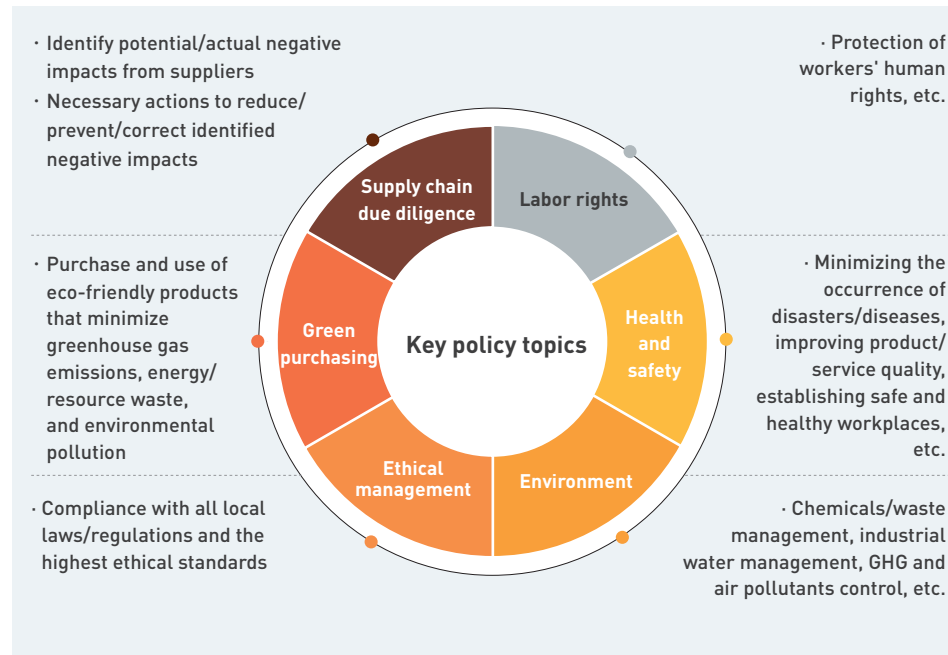
1 Leadership	2 Planning and operations	3 Risk assessment	4 Legal and regulatory compliance
5 Training and competencies	6 Communication and public relations	7 Risk management	8 Emergency response and action
9 Incident investigation	10 Risk monitoring	11 Performance review	

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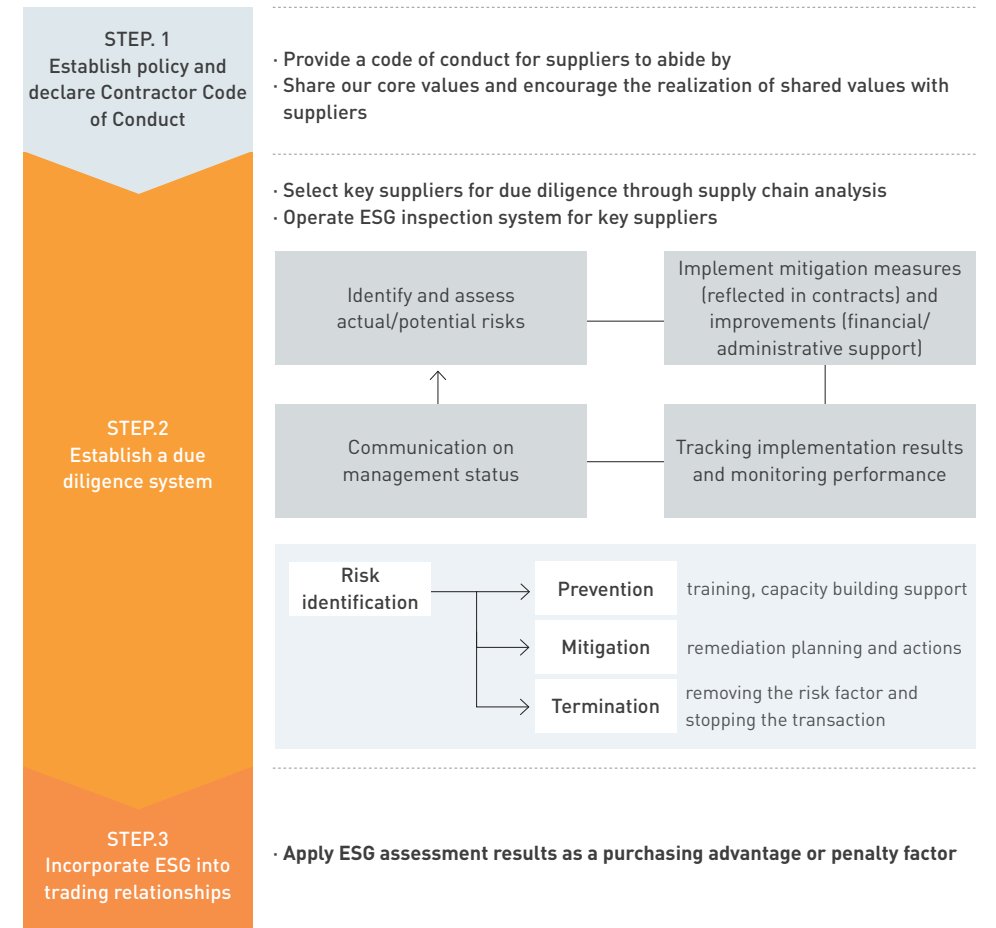
## Sustainable Supply Chain

### Policy Setup

We are laying down a sustainable supply chain management system to minimize ESG risks in our supply chain in our pursuit of shared growth. The 2023 sustainable supply chain policy set down urges contracting parties to join in the ESG management from the aspects of labor human rights, safety & health, the environment, and ethical management. Starting with formulating the Sustainable Procurement Policy and Contractor Code of Conduct, we plan to gradually advance to the stage of monitoring through evaluation and due diligence, and finally incorporating ESG into actual procurement policies.




### Establishing Supply Chain ESG Management System





# Strategic Social Contribution Activities

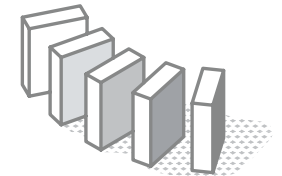
## Our Strategy

Strategic Direction	<b>Social :</b>			
	<b>Internalization of Safety Culture and Co-prosperity</b>			
Focus Areas	<b>7 Strategic Social Contribution Activities</b>			
Detailed Areas	<b>Regional co-prosperity, support for talent nurturing, and local eco-friendliness</b>			
Action Items	<b>Community Outreach &amp; Engagement</b>	<b>Talent Development Support &amp; Funding</b>	<b>Low Carbon &amp; Green Environmental Activities</b>	
	<ul style="list-style-type: none"> <li>· Sponsoring youth in need</li> <li>· Further development of practical support projects to help disadvantaged youths deprived of parental care to plan for their future and prepare a basis for independence</li> <li>· Donation of a multi-purpose van to a local workshop for the disabled</li> </ul>	<ul style="list-style-type: none"> <li>· School development funds</li> <li>· Contributing to school development funds to help schools invest in improving educational conditions and expanding infrastructure to nurture the healthy growth and academic achievement of local students</li> <li>· Supporting experiential programs for elementary and middle school students from low-income and at-risk backgrounds to restore their self-esteem</li> </ul>	<ul style="list-style-type: none"> <li>· Promoting local environmental campaign projects</li> <li>· Supported corporate-linked PBL activities that reflect the characteristics of local communities and allow residents and students to plan and participate in addressing local environmental issues (first such program in Korea launched in 2023)</li> <li>· Sponsoring projects to prevent desertification (planting trees) in conjunction with employee flogging activities</li> </ul>	

### Special Comment Head of Communications



We strive to make the world a happier place with our neighbors and fulfill our corporate social responsibility as a member of the local community based on Hanwha Group's ethos of "Go Further Together." Our contribution ranges from supporting local society and fostering talent to protecting the environment and promoting culture and arts in our society. We also encourage employees to participate in community service programs to instill a sense of pride and fulfillment through volunteer activities. In the future, we plan to go beyond conventional social contributions to more systematically and effectively plan and implement community outreach and win-win cooperation in line with our core values, business characteristics, and social contribution objectives.



## 7 Strategic Social Contribution Activities

Key activities in 2023 | Regional co-prosperity, support for talent nurturing, and local eco-friendliness

### Coprosperity with Local Communities



#### School infrastructure improvements

The running track donation for a local school brings up the fitness level of students. Also, this expansion helps contribute to revitalize community sports.



#### Hearty meal & care services

We serve weekly warm meals during lunch to the local elderly, including those living alone, while also providing personalized care services such as health checks, haircuts, and recreational activities.



#### Sea stewardship (fish release)

Every year, we release hundreds of thousands of juvenile fish into nearby waters, revitalizing local communities through fish stock conservation and increased revenue for those working in the fisheries.



#### Improving housing for the underserved

By renovating old homes and enhancing convenience, we improve the quality of life for low-income and underprivileged neighbors, including people with disabilities, seniors living alone, and multicultural and single-parent families.

### Talent Cultivation



#### Scholarships for low-income high school students

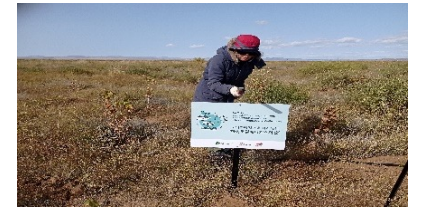
We fulfill our social responsibility by providing grants to students from disadvantaged backgrounds who have demonstrated a commitment to their studies despite economic hardship, encouraging them to grow into productive members of society.



#### Sponsoring clubs and experiential activities

We support various hobbies and experiential activities for elementary and middle school students from low-income families, encouraging them to discover their aptitudes and talents and raise their self-esteem.

### Green Management



#### Planting trees in desertified areas

We donate funds earned through virtual walkathons with employees and their families and flogging around the Seoul office to greening projects (tree planting) in desertified areas.



#### Companion beach cleanup

Taking the lead on ESG management by actively protecting the marine environment, the company designates a beach near the company as a companion beach and conducts environmental clean-up activities with employees.

# ESG Implementation System

Overview

Special Focus

ESG Performance

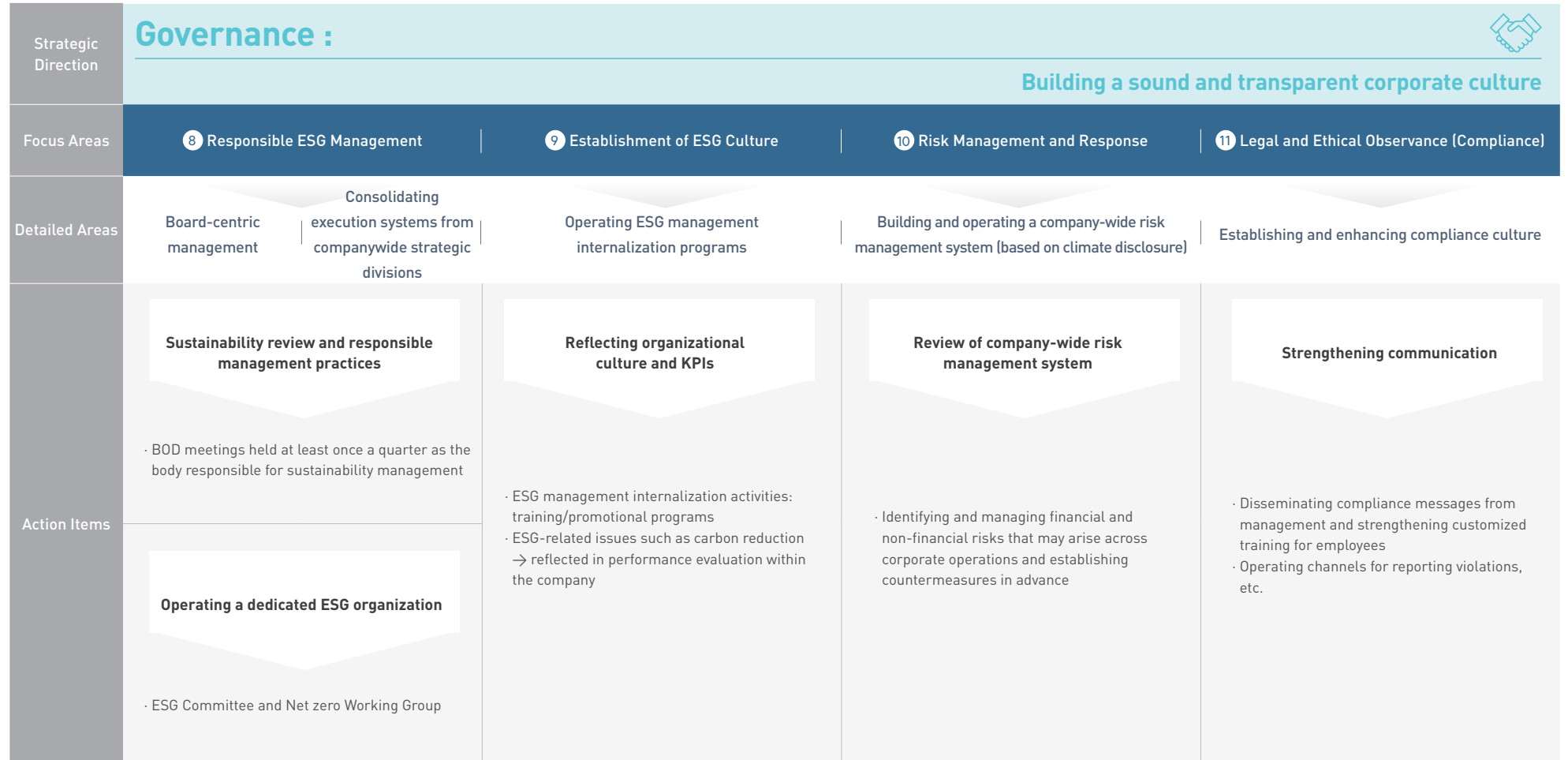
Environmental  
 Social

**Governance**

Responsible  
 ESG Management  
 Establishment of  
 ESG Culture  
 Risk Management and  
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 Legal and  
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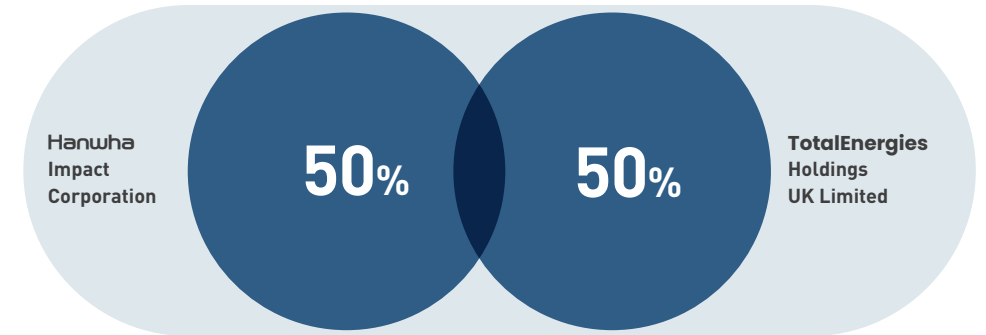
## Our Strategy



## Board of Directors

Hanwha TotalEnergies Petrochemical upholds transparency and sound governance as core drivers of sustainable management. The Board of Directors (BOD) consists of three inside directors and three non-executive directors, as prescribed by law and the Articles of Incorporation, who are appointed by the General Meeting of Shareholders in consideration of professionalism, responsibility, and diverse backgrounds. The two Joint Representative Directors (JRDs) concurrently hold the position of Chair to elevate work efficiency. Also, the two major shareholders with equal stakes manage and supervise the BOD's activities and performances on the basis of mutual checks and cooperation.

### Shareholders' Holdings



### BOD Composition

Position	Name	Appointment	Professionalism	Career Highlights	Nationality	Date of Birth	Gender
Joint Representative Director (JRD)	Laurentius Na	2023.03.24	Chemical engineering, R&D	Hanwha TotalEnergies Petrochemical Plant Manager; Director of Technology, Strategy, and Energy Optimization	Republic of Korea	1965.10	Male
	Thierry Boulfroy	2020.07.20	Chemical engineering, Management	Manager of TotalEnergies Feluy Plant, Belgium; Director of Business Development, Belgium	France	1963.10	Male
Inside Director	Kyongwon Moon	2023.03.24	Business planning	Hanwha Solutions, Director of Strategy and Planning	Republic of Korea	1967.11	Male
Non-executive directors	Heecheul Kim	2021.09.23	Management	CEO of Hanwha Energy Corporation, Hanwha Impact Corporation, and Q Cells	Republic of Korea	1964.10	Male
	François Good	2018.06.22	Management	Director of TotalEnergies Holdings UK Limited, TotalEnergies Refining & Petrochemicals Orient & Growth SVP, TotalEnergies S&OP Europe VP	France	1972.10	Male
	Yves Houilliez	2023.03.24	Safety & environment	TotalEnergies Africa/Middle east/Asia Manufacturing VP; Industrial Asset/Joint Venture VP	France	1963.06	Male
Statutory Auditor	Jaegyoo Lee	2023.09.13	Management	Director of Hanwha Energy Corporation Planning; Manager of Hanwha Solutions Q Cells, US GES Business	Republic of Korea	1971.04	Male
	Jungwon Shin	2020.01.31	Management	TotalEnergies Country Chair Korea	Republic of Korea	1966.07	Male

## 8 Responsible ESG Management

Key activities in 2023 | Aligning execution across strategic areas

### BOD Committee

The Board of Directors has established one committee (compensation committee) to delegate professional authority by Article 29 (2) of the Articles of Incorporation Regulations to enhance operational efficiency and ensure objectivity and transparency in the remuneration decision process. The Compensation Committee, established in 2006, is composed of four registered directors responsible. It is responsible for determining the upper limit of director compensation, reporting, reviewing, and deciding on significant changes in employee compensation, as well as other matters related to remuneration. The Compensation Committee was held once in 2022, and the details of the compensation committee's activities are disclosed in the business report. **Hanwha TotalEnergies Petrochemical** guarantees independence for the committee to carry out management activities responsibly and transparently by the authority and function given.

#### Compensation Committee

- Review of executive compensation and other related matters
- 4 registered directors (2 inside directors, 2 other non-executive directors)

### Diversity and Professionalism of BOD

We have focused on raising the professionalism and diversity of respective directors in order to promote continued development amid the rapidly changing business landscape. We do not discriminate or limit on the basis of gender, race, ethnicity, country, or geography in the appointment. The incumbent Board is a multinational group of directors with a wide range of expertise and experiences in management, economics, accounting, technology, and other fields. They review, advise, and make decisions on business issues and strategic matters based on objective and professional perspectives.

#### Diversity

- No discrimination based on gender, race, ethnicity, country, or geography in the appointment of directors

#### Professionalism

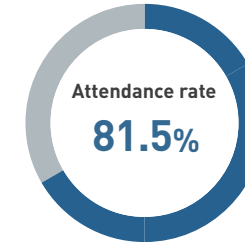
- Extensive expertise and experience in management, economics, accounting, technology, and other relevant fields

### BOD Operation

The Board meets at least quarterly, with additional meetings held in a timely manner depending on the urgency and importance of the agenda. The Board provides approval by a 2/3 majority of the votes according to Article 30 of the Articles of Association. In 2023, the Board of Directors held a total of six meetings. Key issues resolved during these meetings included approval of financial statements, safety and environment reporting, internal audit reporting, and approval of management plans and so on.

#### 2023 BOD's Performances

Number of meetings	Number of agenda items
6	37 (24 items resolved, 13 to be reported)



Inside directors **86.7%**,  
Non-executive directors **75%**

\* Non-executive members have not voted on matters relating to the company in which they hold directorship.

### Compensation

**Hanwha TotalEnergies Petrochemical** pays remuneration to the extent reviewed by the Compensation Committee and approved at shareholders' general meeting. Remuneration for registered directors is paid being broken into base salary and position salary, etc. according to the Executive Compensation Regulations. Also, a differential pay structure is applied to incentives through checking whether to achieve corporate management results and looking into metrics that can show the attainment rate of their own goals. In addition, we provide welfare benefits such as pensions, tuition, holiday bonuses, and welfare points according to internal regulations. Retirement benefits are provided by applying the payment rate of directors' severance pay to the average wage and years of service according to the Executives Severance Pay Regulations.

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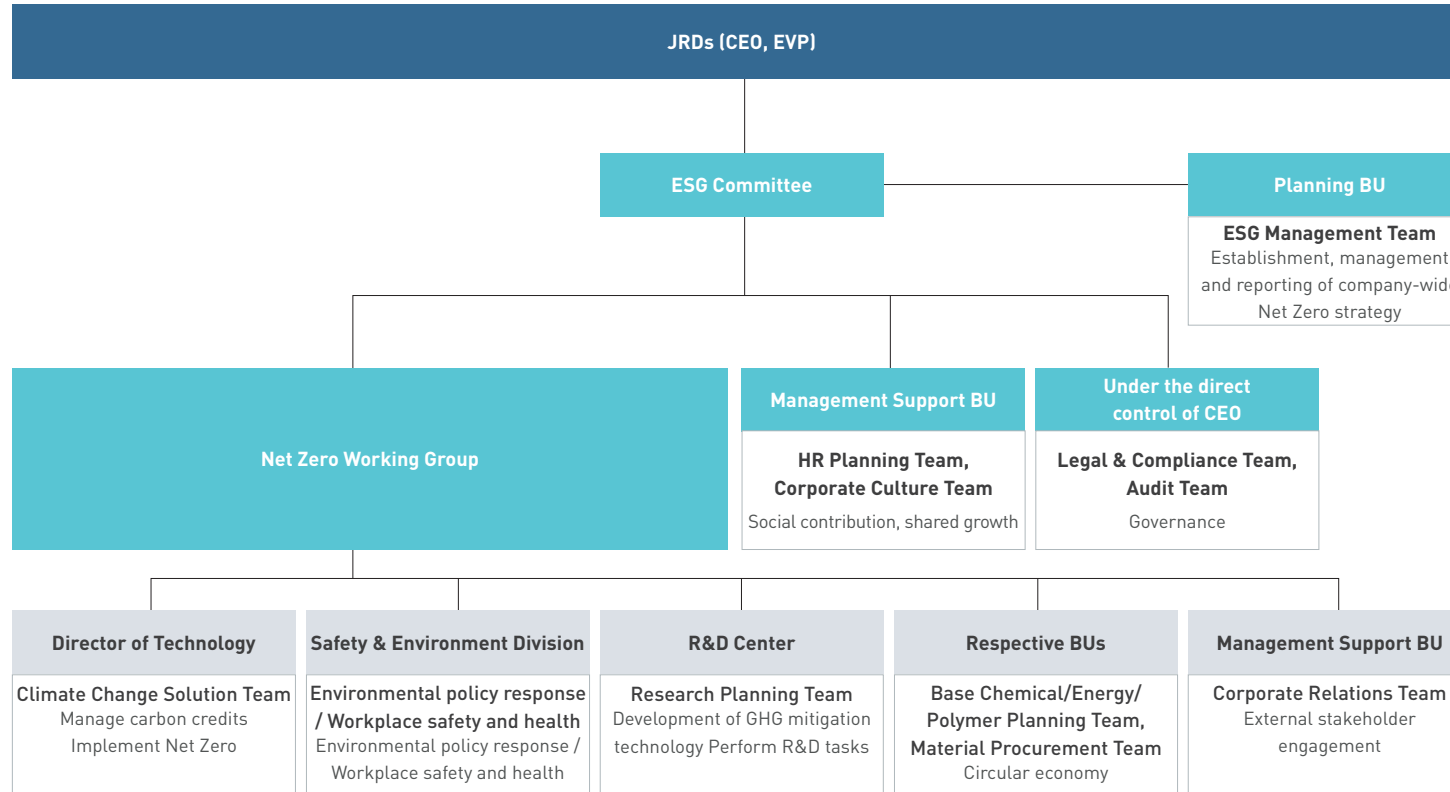
## 8 Responsible ESG Management

Key activities in 2023 | Aligning execution across strategic areas

### ESG Management Organization

**ESG Committee** In December 2021, we established an ESG Committee to ensure that we respond quickly and systematically to environmental, social, and governance issues. The committee is chaired by the JRDs and operated by working team, with the participation of vice presidents of each relevant division. The committee meets annually to support the overall management decision-making process by discussing key ESG issues, including relevant policies and guidelines, carbon neutrality strategy, greenhouse gas emissions monitoring and carbon reduction technology initiatives.

**Net Zero Working Group** The Net Zero Working Group, organized under the ESG Committee and chaired by the Head of Planning, consists of representatives from the Technology, Safety & Environment, Research, relevant business units and Management Support. The group meets semi-annually to discuss the company's carbon neutrality strategy and direction, review progress against the plan and monitor any issues arising from the implementation process.



#### Our commitments to organize ESG management system

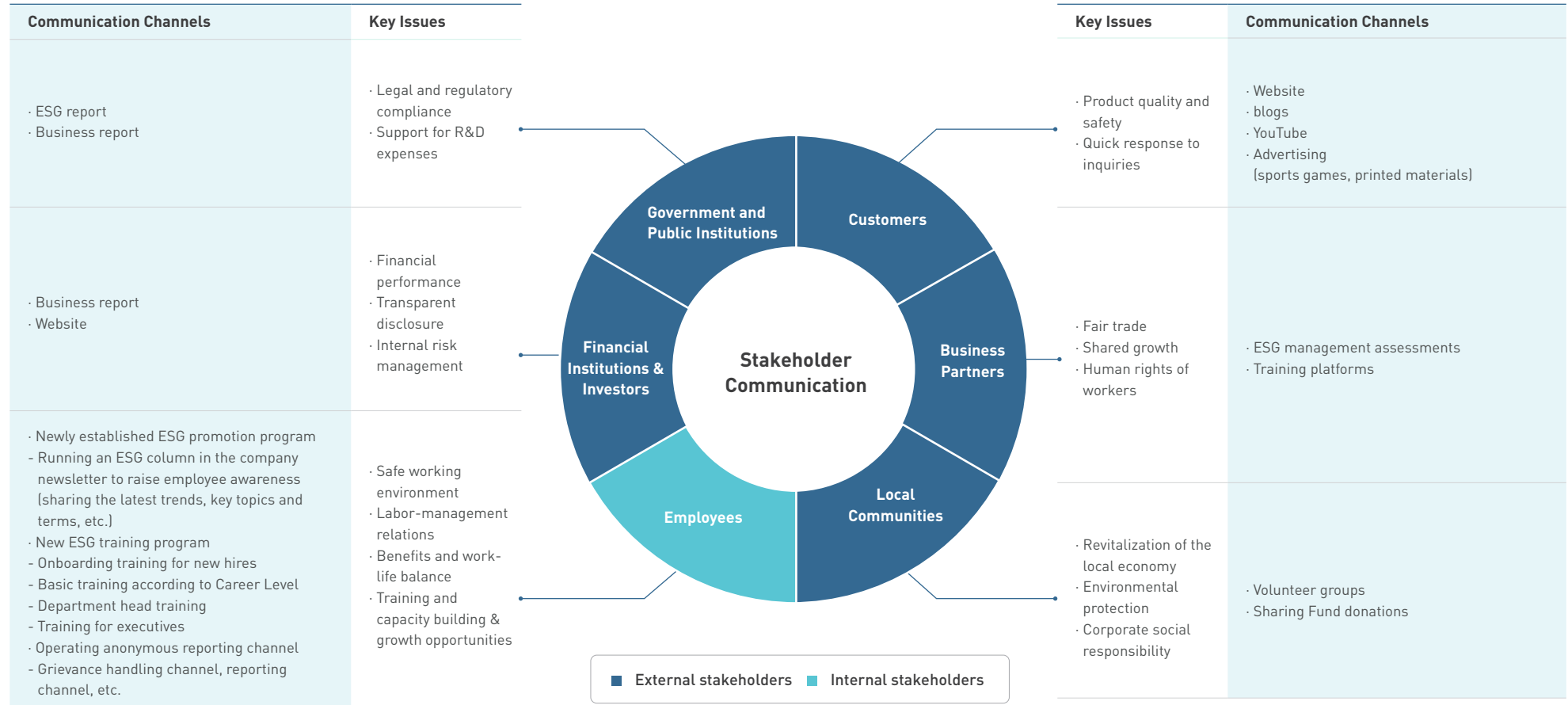
- 1 Setting annual ESG goals and action tasks
- 2 Establishing a dedicated ESG management team
- 3 Operating Net Zero Working Group
- 4 Internalizing ESG management
- 5 Publishing ESG Report



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### Strengthening Stakeholder Communication

Stakeholder engagement is the main driver in the sustainable management and growth of a company. We maintain open communication through various stakeholder engagement channels and strive to listen to their opinions and actively incorporate them into our management activities. We communicate with external stakeholders through our ESG Management Report on our sustainable activities and performance in the areas of environment, society and governance, while at the same time continuing to promote activities to embed ESG values and form internal consensus among employees.

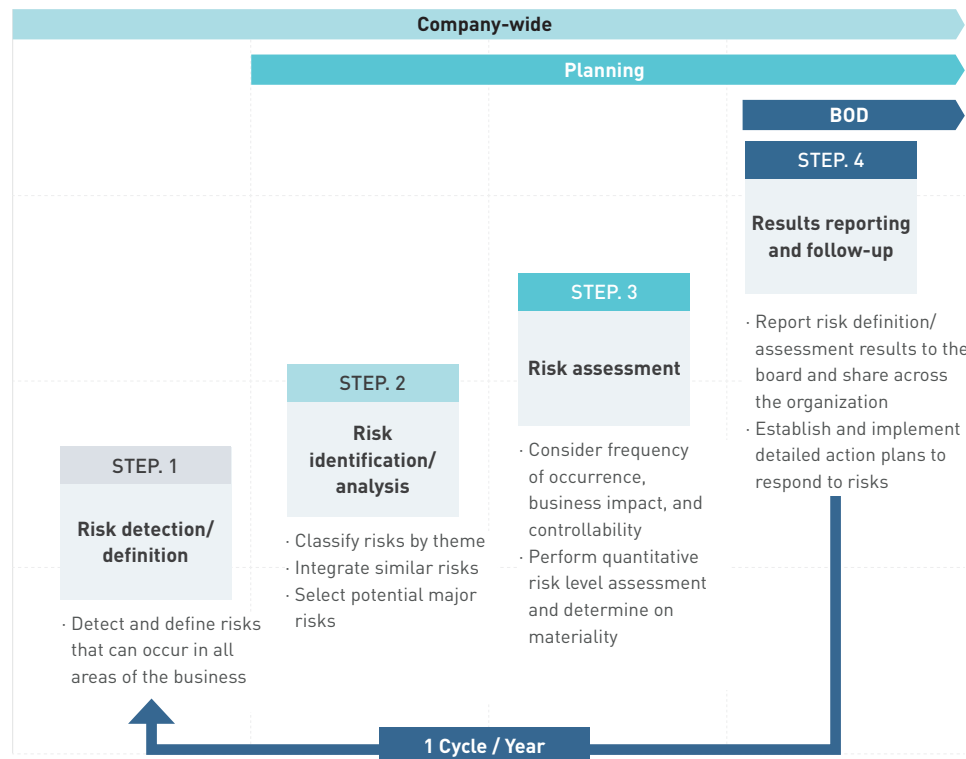


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## Company-wide Risk Management System

Hanuha TotalEnergies Petrochemical operates a company-wide risk management system aimed at identifying potential risks that may arise in all areas of the company’s business due to changes in the global business environment, and taking appropriate countermeasures in advance to ensure the sustainability of the company’s operations and development. Using the system, we define risks in all possible areas, from strategic, market and operational risks to non-financial risks to reputation and support areas (people, legal, regulatory and infrastructure), and establish appropriate countermeasures with the participation of the entire organization. In addition, material risks of high severity are identified and prioritized for targeted management through a quantitative assessment of each risk according to internal standards. The results of the company-wide risk definition and assessment are reported to the Board of Directors on an annual basis and are systematically followed up with the attention and support of management.

### Operational Process



### Types of Risk Management


Category	Type	Description
Strategy	Growth strategy	· Failure to select appropriate investment items and implement them in a timely manner
		· Stagnant growth due to inadequate response to changes in external environment/market
Market	Market environment	· Rising oil/raw material prices and unstable supply and demand
		· Decline in product demand and price due to global economic recession
		· Supplementary materials/equipment supply and demand, supplier issues, etc
Operation	Trading partner issue	· Partners’s insolvency or bankruptcy
	Transactions/Trading Regulatory violation	· Domestic protectionism, product anti-dumping lawsuits, FTA disputes, etc.
	Production disruption	· Failure to comply with trade-related legislation, including fair trade and the Petroleum Business Act
Operation	Production disruption	· Operational disruption resulting from fire, equipment failure, natural disaster, etc.
	Logistics issues	· Production disruption due to lack of dock or storage infrastructure
	Financial issues	· Shipments suspended due to Public Service and Transport workers’ Union strike and other logistical challenges
Public image	Corporate image	· Financial information errors, tax judgment errors
		· Cash liquidity risk, foreign exchange risk, etc.
Other/Support	Workforce	· Safety and environmental issues
		· Corporate social responsibility
Other/Support	Information Security/Infrastructure	· Negative media coverage, etc.
		· Labor disputes and industrial action activities
Other/Support	Information Security/Infrastructure	· Preparing for generational change
		· Talent drain, etc.
Other/Support	Information Security/Infrastructure	· Hacking (external intrusion), personal information leakage, etc.
		· Disruption to internal and external systems and services due to IT infrastructure failure (caused by power outage or fire), network failure, or other causes

## 10 Risk Management and Response

Key activities in 2023 | Building and operating a company-wide risk management system (based on climate disclosure)

### Compliance with Environmental, Societal, and Economic regulations

Non-compliance with domestic and international laws and policies can lead to financial losses (such as fines) and significant long-term damages to a company's value. We are committed to compliance by continuously monitoring the latest trends in regulations and government policies as regulations related to the environment, society, and economy are tightening. We are complying with environmental pollution and greenhouse gas emission regulations through facility improvements and transparent disclosure of information. We also make a safe work environment by installing resting zones, conducting emergency drills, and enhancing hazardous substance management systems. Furthermore, to prevent unfair trade risks such as antitrust and collusion, we have implemented internal control over financial reporting and expanded compliance checks and training for overseas business sites. We are maximizing transparency in our management through setting and implementing mid- to long-term targets for each of our actions in all potential risk areas: the environment, society, and economy.

Category	Relevant laws/regulations	Our response	Timeline
<b>Environment</b> 	Special Act On The Improvement Of Air Quality In Air Control Zones	Estimate and manage emission cap	2024 (5 year cycle)
	Act On The Integrated Control Of Pollutant-discharging Facilities	Improve facilities such as installing RTO*	2nd half of 2025
	Clean Air Conservation Act	Implement improvement activities to ensure compliance with emission standards for air pollutants	2nd half of 2026
	Chemical Substances Control Act - Designation and public notice of a toxic substance	Improve facilities using toxic substances and receive permission for new designations (e.g., cobalt oxide) and content changes (e.g., methanol)	2nd half of 2026
<b>Society</b> 	Rules on Industrial Health Standards	Reinforce flame arrestors on four storage tanks	2nd half of 2025
	Rules on Industrial Health Standards	Manage toxic substances in line with the effective date of the addition to the standard	2nd half of 2023
	Enforcement Decree Of The Fire Prevention And Safety Control Act	Report emergency response training results to fire departments since 2023 Mandate planning after checking the details of application from the fire prevention diagnosis briefing session (*first half of 2023)	2nd half of 2024
	Serious Accidents Punishment Act	Improve safety management system after analyzing violation cases in 2023	yearly
<b>Economy</b> 	Monopoly Regulation and Fair Trade Act	Implement: - Job-specific trainings for all employees - On-site compliance checks and trainings at foreign operations - Internal control over financial reporting	yearly
	Act on the Promotion of Mutually Beneficial Cooperation Between Large Enterprises and Small and Medium Enterprises		
	Fair Transactions in Subcontracting Act		

\* RTO : Regenerative Thermal Oxidizer: volatile organic compound combustion equipment

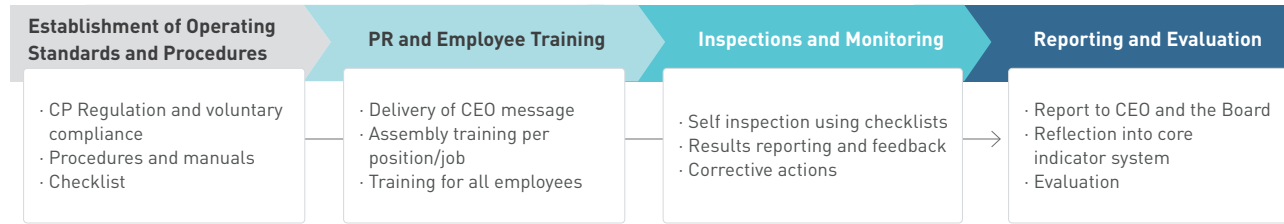
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## 11 Legal and Ethical Observance (Compliance)

Key activities in 2023 | Establishing and enhancing compliance culture

### Compliance Program

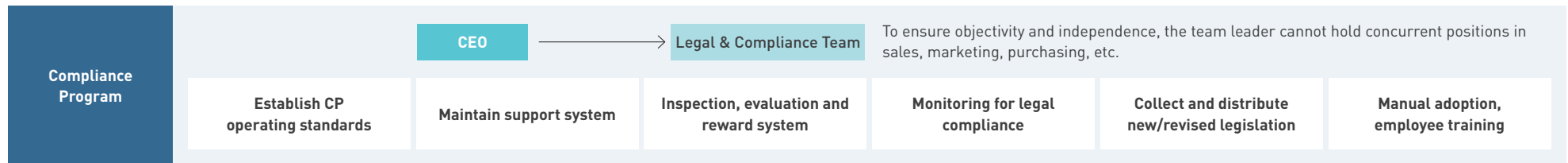
We consider compliance management one of our core values and operate our compliance program through Legal & Compliance Team that reports directly to the CEO.



### Compliance Monitoring



### Compliance Organization and Responsibilities



### Reporting Center

A hotline has been established for the efficient operation and prompt identification of violations of laws and regulations, and we protect whistleblowers who report violations by others from any discipline or retaliation.

#### Types of report

- Violation of the Antitrust and Subcontracting laws
- If employees instruct, participate in or acquiesce in any violations of the Antitrust and Subcontracting laws
- Grievous violations of other laws and those of corporate policies

#### How to report

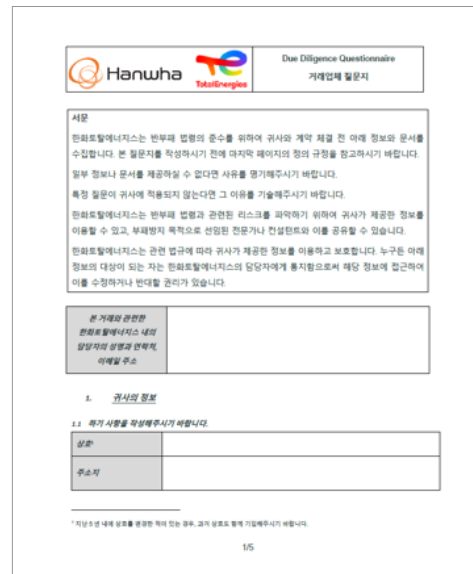
- Tel : +82-2-3415-9275
- Online : website > Sustainability > Compliance Program > Report

## 11 Legal and Ethical Observance (Compliance)

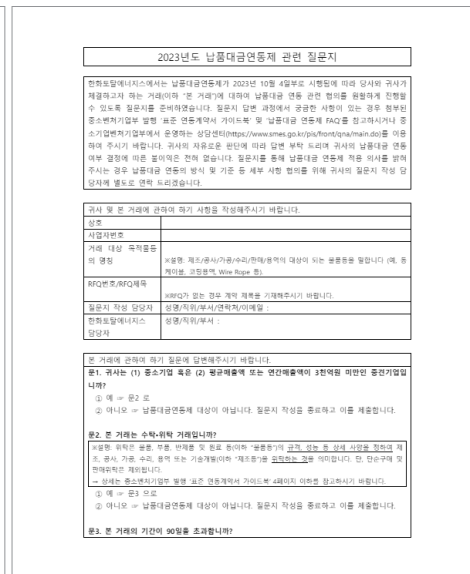
Key activities in 2023 | Establishing and enhancing compliance culture

### Upgrading the Compliance System

Various efforts are underway to effectively and proactively manage compliance risks and improve our compliance system. To proactively detect and respond to compliance risks related to international economic sanctions, anti-corruption, and anti-money laundering, we implemented a customer verification process for all companies we do business with in 2023, using the World-Check One platform provided by Refinitiv, a global financial data service provider. We also strengthened our ability to detect anti-corruption risks in advance by changing the Anti-Corruption Pre-Assessment, which we have been using since 2018, to the Vendor Questionnaire. In addition, with the introduction of the Delivery Price Indexation System in October 2023, we developed and distributed relevant guidelines, conducted relevant training to ensure compliance, and continuously monitored the implementation status.

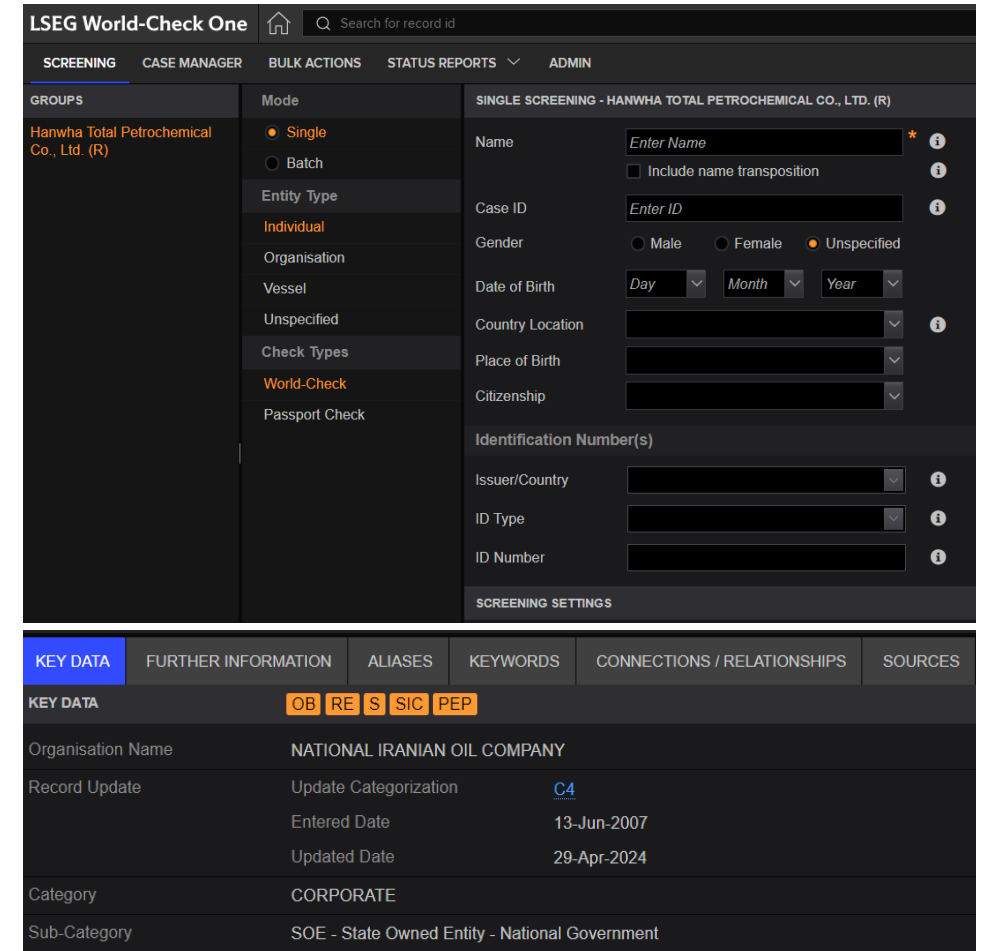


Vendor Questionnaire



Delivery Price Indexation System Questionnaire

### World-Check One



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## 11 Legal and Ethical Observance (Compliance)

Key activities in 2023 | Establishing and enhancing compliance culture

### Compliance Communication

To expand and embed a culture of compliance throughout the company, we engage in a variety of communication activities. In 2023, we reaffirmed our top management's commitment to compliance through the CEO's Compliance Management Message, and we designated HTC Compliance Week and held various training programs and events to emphasize the importance of compliance to our employees. Beginning in 2023, we also shared the latest compliance trends and related information through the quarterly Compliance Newsletter to help employees understand compliance in a short, easy, and entertaining way. We aim to further raise compliance awareness throughout the organization through these compliance communication activities.

### Compliance Training

The Legal & Compliance team systematically conducts various compliance training programs to enhance employees' understanding of compliance. General compliance training was provided to all employees in 2023 to improve understanding of, and commitment to, compliance. Our training includes a program for new hires, both experienced and fresh graduates, and special training for each job function on various topics such as the Fair Trade Act, Trade Secrets, Labor Law, Subcontracting Act, Win-Win Cooperation Act, Internal Trade Regulation, Delivery Price Indexation System, Framework Act on the Construction Industry, and the Electrical Construction Business Act to ensure that all our employees are in compliance at all times. Not only in Korea, but also in overseas branches in Shanghai, Beijing, and Japan, we provided training on trade secret protection and corporate compliance in addition to the general compliance training in 2023.

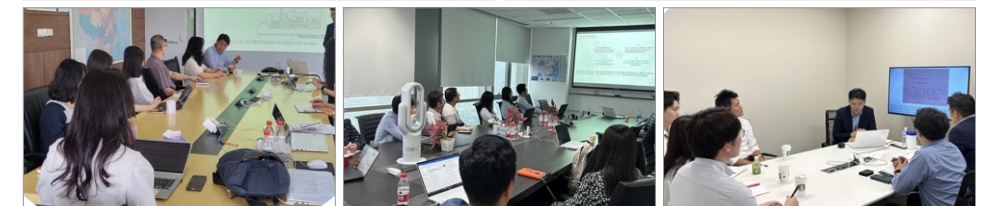
#### HTC Compliance Week

The image shows three promotional materials for HTC Compliance Week. On the left is a cartoon character with a speech bubble saying 'HTC 맞춰봐요!' and '23년 HTC Compliance Week 이번 주 한 주 동안 진행됩니다! 상서는 여기를 클릭하세요.' with a 'CLICK' button. In the middle is a crossword puzzle titled '맞춰봐요 컴플라이언스 낱말퀴즈' with a '참여하기' button. On the right is the cover of the '한화토탈에너지스 컴플라이언스 NEWSLETTER 2023/June' with a cityscape illustration.

#### HTC Compliance Education



#### Delivery Price Indexation System Training

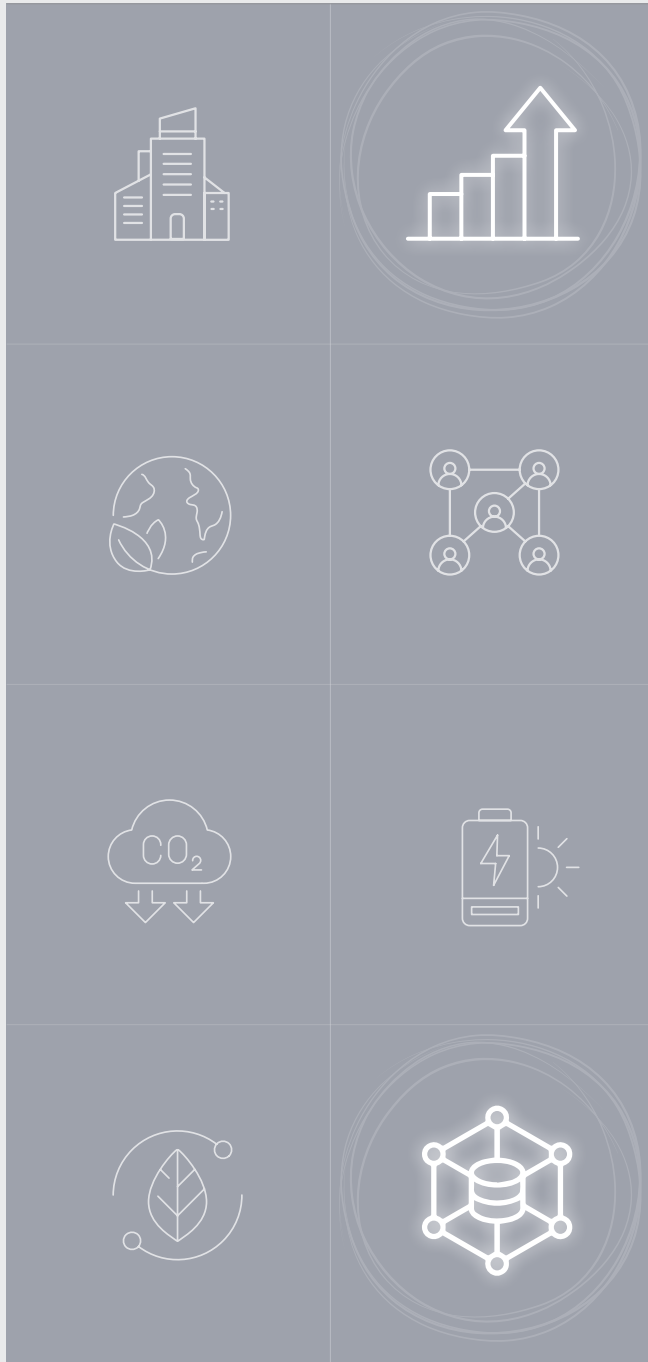


Shanghai

Beijing

Japan





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## Economic

### Economic Performance

#### Economic Value Creation

Category	Unit	2021	2022	2023
Revenue	KRW million	9,846,060	13,958,693	11,438,129
Pretax income	KRW million	872,569	89,618	-100,918
Net profit	KRW million	646,031	68,549	-82,258

#### Economic Value Distribution

Category	Unit	2021	2022	2023	
Shareholders and investors	Dividend and Interest	KRW billion	696	135	150
Employees	Wage	KRW billion	213	188	209
	Employee benefits	KRW billion	53	56	61
	Stock bonus	Share	0	0	0
Suppliers	Purchasing and service costs	KRW hundred million	76,138	121,222	99,301
Government	Income tax	KRW billion	227	21	-19
Local communities	Social contribution investment	KRW hundred million	70	74	97

#### R&D Investment

Category	Unit	2021	2022	2023
R&D investment cost	KRW million	37,121	38,613	47,310

## Environmental

### Safety and Health Management

#### Occupational Accidents

Category	Unit	2021	2022	2023	
Employees	Cases of death	cases	0	0	0
	No. of accidents*	cases	1	2	0
Suppliers	Cases of death	cases	0	0	0
	No. of accidents*	cases	1	1	3

\* Based on industrial accident reports submitted to the Korea Occupational Safety & Health Agency.

### Environmental Management

#### Greenhouse Gas\*

Category	Unit	2021	2022	2023
Total GHG emissions (Scope 1 + Scope 2)	tCO <sub>2</sub> eq	4,855,317	4,848,698	4,571,101
Scope1	tCO <sub>2</sub> eq	4,053,754	4,074,991	3,786,004
Scope2	tCO <sub>2</sub> eq	801,563	773,707	785,097

\* Emissions at the time of credit submission

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## Energy

Category	Unit	2021	2022	2023
<b>Total energy consumption</b>	TJ	107,697	108,567	105,075
Direct energy consumption	Subtotal	90,293	90,754	86,524
	Gasoline	7	7	7
	Diesel	41	35	35
	Kerosene	14	15	14
	LNG	2	2	2
Indirect energy consumption	Other*	90,230	90,694	86,465
	Subtotal	17,404	17,814	18,551
	Electricity	15,078	16,168	15,133
	Steam	2,326	1,646	3,418

\* By-product fuel use

## Pollutants

Category	Unit	2021	2022	2023	
Air Pollutants	NOx	ton	9,653	8,440	6,748
	SOx	ton	127	131	48
	Dust	ton	17	12	8
Water Pollutants	TOC	ton	40(COD)	49(COD)	38
	SS	ton	3	3	6

## Water and Wastewater

Category	Unit	2021	2022	2023
<b>Total water usage</b>	ton	26,661,263	27,962,477	25,644,173
Reuse Volume	ton	4,693,742	4,246,052	3,539,358
Reuse Rate	%	18	15	14
Wastewater discharge	ton	3,001,772	2,796,091	3,356,397

## Waste

Category	Unit	2021	2022	2023	
<b>Total amount of generated waste</b>	ton	19,636	17,421	19,526	
General waste	Subtotal	ton	10,693	9,787	11,190
	Recycling	ton	7,669	6,356	6,239
Designated waste	Subtotal	ton	8,943	7,634	8,336
	Recycling	ton	8,601	7,441	7,673
Rate of recycled waste (General waste+Designated waste)	%	83	79	71	
Waste disposal costs	KRW hundred million	18	11	17	

\* Fully outsourced with no internal processing

## Environmental Investments and Expenditures

Category	Unit	2021	2022	2023	
<b>Green products</b>	Green product purchases	KRW million	-	-	728
	Green product sales	KRW million	-	-	2,131
Environmental investments	KRW million	16,737	39,430	94,048	

\* Based on internal investment performance data

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## Social

### Status of Employees

#### Employment

Category	Unit	2021	2022	2023	
Total number of employees	person	1,788	1,825	1,856	
By employment type	Regular	1,772	1,797	1,828	
	Male	1,639	1,659	1,677	
	Female	133	138	151	
	Percentage of regular employees	%	99.0	98.0	98.0
	Non-regular	person	16	28	28
	Male	person	12	15	17
	Female	person	4	13	11
Percentage of non-regular employees	%	1.0%	2.0%	2.0%	
By gender	Subtotal	1,788	1,825	1,856	
	Male	1,651	1,674	1,694	
	Female	137	151	162	
By age	Subtotal	1,788	1,825	1,856	
	Ages under 30	282	314	316	
	Ages 30 to 39	579	600	614	
	Ages 40 to 49	338	310	295	
	Ages 50 to 59	569	574	596	
	Ages 60 or above	20	27	35	

#### Years of continuous service

Category	Unit	2021	2022	2023	
Average years of continuous service	Regular	year	14	14	15
	Non-regular	year	1	0	1

#### Diversity of employees

Category	Unit	2021	2022	2023	
Female managers	Number of female managers (team lead and above)	person	41	45	51
	Percentage of female managers	person	10.3	10.7	11.8
	Number of female executives	person	-	-	1
	Percentage of female executives	person	-	-	2.6
Marginalized classes (regular+ non-regular)	Persons with disabilities	person	40	42	40
	Persons with national merits	person	52	51	50
	Foreign nationals	person	-	-	-

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## New Recruitment

Category	Unit	2021	2022	2023
Total number of new hires (Korea)	person	66	166	143
By employment type	By employment type	66	166	143
	Regular	55	124	129
	Non-regular	11	42	14
By gender	Subtotal	66	166	143
	Male	63	138	122
	Female	3	28	21
By age	Subtotal	66	166	143
	Ages under 30	44	126	104
	Ages 30 to 39	13	24	21
	Ages 40 to 49	2	4	6
	Ages 50 to 59	0	3	3
	Ages 60 or above	7	9	9

## Parental Leave

Category	Unit	2021	2022	2023	
Parental leave users	Number of users	person	8	11	11
	Male	person	1	4	7
	Female	person	7	7	4
	Number of people returning (return rate)	person(%)	9 (100)	11 (100)	10 (91)
	Male	person(%)	4 (100)	3 (100)	7 (100)
	Female	person(%)	5 (100)	8 (100)	3 (75)
	Retention rate over 12 months after returning to work	%	89.0	100	100
	Male	%	75.0	100	100
	Female	%	100	100	100

## Training and Evaluation of Employees

Category	Unit	2021	2022	2023	
Training costs	Total training costs	KRW million	1,156	1,715	2,497
	Training costs per person	KRW thousand	645	939	1,348
Training hours*	Total training hours	hours	87,495	137,639	222,762
	Training hours per person	hours	49	75	120
Percentage of employees who received performance evaluations	Regular	%	98.0	97.0	98.0
	Non-regular	%	2.0	3.0	2.0
	Male	%	92.0	92.0	91.0
	Female	%	8.0	8.0	9.0

\* All internal training time, including both statutory and job training, are recorded using the training system from 2022.

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## Governance

### BOD

#### Operation of the Board of Directors (BOD)

Category	Unit	2021	2022	2023	
BOD composition	Inside directors	person	3	3	3
Number of BOD meetings held		sessions	9	8	6
Attendance of BOD	Inside directors	%	87.3	87.5	75.0
	Inside directors (excluding retired directors)	%	92.6	87.5	100.0
The agenda of BOD		cases	43	41	37
Registered directors	Number of persons	person	6	6	6
	Total remuneration	KRW million	1,327	4,135	3,920
	Average remuneration per person	KRW million	221	689	653
Audit (Committee) member	Number of persons	person	2	2	2
Compensation Committee	Number of meetings held	sessions	0	1	1
	Attendance rate	%	-	100	100
Shareholders with 5% or more	Hanwha Impact Co.	%	50	50	50
	TotalEnergies Holdings U.K. Limited	%	50	50	50

#### Ethical Management and Compliance

Category	Unit	2021	2022	2023	
Non-compliance cases	Number of violations	cases	1	4	0
	Amount of penalty	KRW million	10	55	0

#### Information Security

Category	Unit	2021	2022	2023	
Status of information security Violations	Leakage of personal information	cases	0	0	0
	Number of improvements following internal privacy reviews	cases	5	8	7
Information security training	Participants	person	1,699	1,678	1,732

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## · Statement of use

Hanwha TotalEnergies Petrochemical has reported information on sustainable management from January 1, 2023 to December 31, 2023, by applying GRI standards.

## · GRI Used: GRI1

Foundation 2021

## · Applicable GRI Sector Standards

N/A (Hanwha TotalEnergies Petrochemical is classified into the 'Community Chemicals' industry by standards such as GICS and Sustainalytics, and there are no Sector Standards applicable as of the publication date.)

GRI Standards	category	Disclosure No.	Disclosure Name	Reporting Page	ETC.
<b>Universal Standards</b>					
<b>GRI 2 : General Disclosures 2021</b>	The organization and its reporting practices	2-1	Organizational details	6, 46	
		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	-	First published report
		2-5	External assurance	66	
	Activities and workers	2-6	Activities, value chain and other business relationship	7-10	
		2-7	Employees	58	
		2-8	Workers who are not employees	58	2023 Business Report 252p
	Governance	2-9	Governance structure and composition	46-47	
		2-10	Nomination and selection of the highest governance body	46-47	
		2-11	Chair of the highest governance body	46-48	
		2-12	Role of the highest governance body in overseeing the management of im-pacts	46-48	
		2-13	Delegation of responsibility for managing impacts	48	
		2-14	Role of the highest governance body in sustainability reporting	48	
		2-15	Conflicts of interest	47	
		2-16	Communication of critical concerns	49	2023 Business Report 233p

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GRI Standards	category	Disclosure No.	Disclosure Name	Reporting Page	ETC.	
<b>Universal Standards</b>						
<b>GRI 2 : General Disclosures 2021</b>	Governance	2-17	Collective knowledge of the highest governance body	-	Information unavailable: Difficulty in collection of clear data	
		2-18	Evaluation of the performance of the highest governance body	47		
		2-19	Remuneration policies	-	2023 Business Report 252p	
		2-20	Process to determine remuneration	-	2023 Business Report 252p	
		2-21	Annual total compensation ratio	-	2023 Business Report 252p	
		Strategy, policies and practices	2-22	Statement on sustainable development strategy	5	
			2-23	Policy commitments	14	
			2-24	Embedding policy commitments	11, 14	
			2-25	Processes to remediate negative impacts	50	
		Stakeholder engagement	2-26	Mechanisms for seeking advice and raising concerns	38,52	
	2-27		Compliance with laws and regulations	-	2023 Business Report 291p	
	2-28		Membership associations	69		
	2-29		Approach to stakeholder engagement	49		
	2-30		Collective bargaining agreements	38		
<b>Material Topics</b>						
<b>GRI 3: Material Topics 2021</b>	Material Topics	3-1	Process to determine material topics	12-13		
		3-2	List of material topics	12-13		
		3-3	Management of material topics	14		

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GRI Standards	category	Disclosure No.	Disclosure Name	Reporting Page	ETC.
<b>Economic Performance</b>					
GRI 201: Economic Performance 2016	Economic performance	201-1	Direct economic value generated and distributed	56	
GRI 203: Indirect Economic Impacts 2016	Indirect economic impacts	203-1	Infrastructure investments and services supported	43-44	
GRI 205: Anticorruption 2016	Anti-corruption	205-2	Communication and training about anti-corruption policies and pro-cedures	52-54	
<b>Environmental Performance</b>					
GRI 302: Energy 2016	Energy	302-1	Energy consumption within the organization	57	
GRI 305: Emissions 2016	Emissions	305-1	Direct (Scope 1) GHG emissions	56	
		305-2	Indirect (Scope 2) GHG emissions.	56	
		305-7	Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	57	
GRI 306: Effluents and Waste 2016	Waste	306-3	Waste by type and disposal method	57	
		306-4	Waste diverted from disposal	57	
		306-5	Waste directed to disposal	57	
<b>Social Performance</b>					
GRI 401: Employment 2016	Employment	401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	39	
GRI 403: Occupational Health and Safety 2018	Occupational Health and Safety	403-1	Occupational health and safety management system	29	
		403-2	Hazard identification, risk assessment, and incident investigation	30	
		403-3	Occupational health services	33	

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GRI Standards	category	Disclosure No.	Disclosure Name	Reporting Page	ETC.
<b>Social Performance</b>					
<b>GRI 403: Occupational Health and Safety 2018</b>	Occupational Health and Safety	403-4	Worker participation, consultation, and communication on occupational health and safety	30-32	
		403-5	Worker training on occupational health and safety	30-32	
		403-6	Promotion of worker health	33	
		403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	41	
		403-9	Work-related injuries	56	
<b>GRI 404: Training and Education 2016</b>	Training and Education	404-1	Average hours of training per year per employee	56, 59	
		404-2	Programs for upgrading employee skills and transition assistance programs	37	
<b>GRI 405: Diversity and Equal Opportunity 2016</b>	Diversity and Equal Opportunity	405-1	Diversity of governance bodies and employees	58	
<b>GRI 413: Local Communities 2016</b>	Local Communities	413-1	Operations with local community engagement, impact assessments, and development programs	43-44	
<b>GRI 414: Supplier Social Assessment 2016</b>	Supplier Social Assessment	414-2	Negative social impacts in the supply chain and actions taken	42	

## Chemical - Sustainability Disclosure Topics & Accounting Metrics

Topic		Response
Greenhouse Gas Emissions	① Gross global Scope 1 emissions, percentage covered under emissions-limiting regulations	56p
	② Percentage covered under emissions-limiting regulations Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions re-duction targets, and an analysis of performance against those targets	N/A 15-21p
Air Quality	① NOx ((excluding N2O), ② SOx	57p 57p
Energy Management	① Total energy consumed	57p
	② Percentage grid electricity	Power received 1,775,580.420MWh
	③ Percentage renewable	-
	④ Total self-generated energy	Power generated [STG/GTG#1/2/3/4] 968,911 MWh
Water Management	① Total water withdraw	No worksites with 'High Risk' water stress
	② Total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress Number of incidents of non-compliance associated with water quality permits, standards, and regulations Description of water management risks and discussion of strategies and practices to mitigate those risks	No violations of water quality permit standards
Hazardous Waste Management	Amount of hazardous waste generated	57p
	Percentage recycled	57p
Workforce Health & Safety	① Total recordable incident rate (TRIR) for (a) direct employees and (b) contract employees	56p
	② fatality rate for (a) direct employees and (b) contract employees	56p
	Description of efforts to assess, monitor, and reduce exposure of employees and contract workers to long-term (chronic) health risks	33p
Product Design for Use-phase Efficiency	Revenue from products designed for use-phase resource efficiency	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	① & ② not reported
	② Percentage of such products that have undergone a hazard assessment	We evaluate the use of substances that have been investigated to be harmful to the human body and the environment from a customer's perspective and employs stricter control measures than required by legal standards.
	③ Discussion of strategy to manage chemicals of concern, Discussion of strategy to develop alternatives with reduced human and/or environmental impact	③ 25-27p
Management of the Legal & Regulatory Environment	Discussion of corporate positions related to government regulations and/or policy proposals that address environmental and social factors affecting the industry	51p
Operational Safety, Emergency Preparedness & Response	① Process Safety Incidents Count (PSIC)	①,②,③ Number of our Tier 1/2/Minor accidents: 0/0/0.09
	② Process Safety Total Incident Rate (PSTIR)	There was no history of serious transportation accidents during the reporting period."
	③ Process Safety Incident Severity Rate (PSISR) Number of transport incidents	

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# GHG Verification Statement

## 1. Target of assurance

Hanwha TotalEnergies Petrochemical Co.,Ltd. 2023 Greenhouse Gas Emission Energy Usage Specifications

## 2. Assurance Standards

Assurance guidelines for operating the GHG emission trading system, guidelines for reporting and certification of GHG trading systems, emission plans distributed to NGMS(National GHGs Management System)

## 3. Assurance Procedures

The assurance was conducted on the greenhouse gas emission specification according to the guidelines on the reporting and certification of the GHG emission trading system and the emission plan distributed to NGMS, and the assurance level was performed to satisfy the reasonable assurance level

## 4. Assurance Data

[Unit : tCO<sub>2</sub>-eq/year]

Emission by Business site				
Business Emission Sector	Head Office	Seoul Branch	Local Office	Subtotal
Scope 1	3,819,784.752	301.435	0.9	<b>3,820,087.087</b>
Scope 2	790,192.366	539.724	14.958	<b>790,747.049</b>
Total	4,609,977	841	15	<b>4,610,833</b>

[Unit : tCO<sub>2</sub>-eq/year]

Emission by Greenhouse Gas							
Greenhouse Gas	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Total
Emissions	4,601,584.756	2,003.964	7,245.415	0	0	5,975.822	<b>4,610,834.135</b>

※Reference : There is a difference in the amount of emissions and total emissions by greenhouse gas and the sum of the emissions by business site.

## 5. Limitations

The assurance is applied with the sampling method in accordance with the assurance plan recognized by the National of Environmental Research for the specification of GHG emission and related data and information provided by Hanwha TotalEnergies Petrochemical Co.,Ltd., based on the "Regulated guidelines and emission plans distributed to NGMS." Therefore, there is a limitation to the detection errors that can be caused by sampling limitation.

## 6. Opinions

Hanwha TotalEnergies Petrochemical Co.,Ltd.'s 2023 GHG emission Specification satisfies the materiality criteria and was prepared using accurate parameters and activity data as a whole. Therefore, it was decided that the greenhouse gas emissions described in the specification were "appropriate" according to the guidelines for reporting and certification of the greenhouse gas trading system.

## 7. Comprehensive Opinion

Through the assurance, it is certified that GHG emissions and energy consumption of Hanwha TotalEnergies Petrochemical Co.,Ltd. were appropriately collected, prepared and reported in accordance with the guidelines, and that emission facilities were calculated and reported without omission.

2024. 08

President of Korea Gas Safety Corporation.

Gyurng-Goog Bahk 



# Independent Assurance Statement

**To: The Stakeholders of Hanwha TotalEnergies Petrochemical Co.,Ltd.**

## Overview

BSI (British Standards Institution) Group Korea (hereinafter referred to as the "Assurer") was requested to verify the 2024 **Hanwha TotalEnergies Petrochemical** sustainability Report (hereinafter referred to as the "Report"). The Assurer is independent of **Hanwha TotalEnergies Petrochemical** and has no major operational financial interest other than the assurance. This assurance opinion statement is intended to provide information related to the assurance of the **Hanwha TotalEnergies Petrochemical** report relating to the environment, social and governance (ESG) to the relevant stakeholders and may not be used for any purpose other than the purpose of publication. This assurance opinion statement was prepared based on the information presented by the **Hanwha TotalEnergies Petrochemical** and the assurance was carried out under the assumption that presented the information and data were complete and accurate.

**Hanwha TotalEnergies Petrochemical** is responsible for managing the relevant information contained within the scope of assurance, operating the relevant internal control procedures, and for all information and claims contained in the report. Any queries that may arise by virtue of this independent assurance opinion statement or matters relating to it should be addressed to **Hanwha TotalEnergies Petrochemical** only.

The Assurer is responsible for providing **Hanwha TotalEnergies Petrochemical** management with an independent assurance opinion containing professional opinions derived by applying the assurance methodology to the scope specified, and to provide the information to all stakeholders of **Hanwha TotalEnergies Petrochemical**. The Assurer shall not bear any other responsibility, including legal responsibility, to any third party other than **Hanwha TotalEnergies Petrochemical** in providing the assurance opinion and shall not be liable to any other purpose, purpose or stakeholders related thereto for which the assurance opinion may be used.

## Scope

The scope of engagement agreed upon with **Hanwha TotalEnergies Petrochemical** includes the following:

- Reporting contents during the period from January 1st to December 31st 2023 included in the report, some data included the half of 2024.
- 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.
- In Accordance with the four principles of AA1000 AccountAbility in the report, based on the type of Sustainability Assurance based on AA1000AS v3 and if applicable, the reliability of the sustainability performance information contained in the report.

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

- Financial information in Appendix.
- Index items related to other international standards and initiatives other than the GRI.
- Other related additional information such as the website, business annual report.

## Assurance Level and Type

The assurance levels and types are as follows;

- Moderate level based on AA1000 AS and Type 1 (confirmation to the four principles as described in the AA1000 Accountability Principle 2018 in the report.)

# Independent Assurance Statement

## Description and sources of disclosures covered

Based on the scope and methodology of assurance applied, the assurer reviewed the following Disclosures based on the sampling of information and data provided by **Hanwha TotalEnergies Petrochemical**.

### [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]

201-1, 203-1, 205-2, 302-1, 305-1~2, 305-7, 306-3~5, 401-2, 403-1~7, 403-9, 404-1~2, 405-1, 413-1, 414-2

## Methodology

As a part of its independent assurance, the Assurer has used the methodology developed for relevant evidence collection in order to comply with the verification criteria and to reduce errors in reporting. The Assurer has performed the following activities;

- A top-level review of issues raised by external parties that could be relevant to organizations policies to provide a check on the appropriateness of statements made in the report.
- Discussion with managers and staffs on organization's approach to stakeholder engagement.
- Review of the supporting evidence related to the material issues through interviews with senior managers in the responsible departments.
- Review of the system for sustainability management strategy process and implementation
- Review of materiality issue analysis process and prioritization by reviewing materiality issue analysis process and verifying the results
- Verification of data generation, collection and reporting for each performance index and document review of relevant systems, policies, and procedures where available
- An assessment of the company's reporting and management processes concerning this reporting against the principles of Inclusivity, Materiality, Responsiveness and Impact as described in the AA1000 AccountAbility Principles Standard (2018).
- Visit of the **Hanwha TotalEnergies Petrochemical** Seoul Office to confirm the data collection processes, record management practices.

## Limitations and approach used to mitigate limitations

The Assurer performed limited verification for a limited period based on the data provided by the reporting organization. It implies that no significant errors were found during the verification process, and that there are limitations related to the inevitable risks 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.

## Competency and Independence

BSI (British Standards Institution) is a leading global standards and assessment body founded in 1901. BSI is an independent professional institution that specializes in quality, health, safety, social and environmental management with almost 120 years history in providing independent assurance services globally. No member of the assurance team has a business relationship with **Hanwha TotalEnergies Petrochemical**. The Assurer has conducted this verification independently, and there has been no conflict of interest. All assurers who participated in the assurance have qualifications as an AA1000AS assurer, have a lot of assurance experience, and have in-depth understanding of the BSI Group's assurance standard methodology.

## Opinion Statement

The assurer was carried out by a team of sustainability report assurers in accordance with the AA1000 Assurance Standard v3. Assurer planned and performed this part of our work to obtain the necessary information and explanations assurer considered to provide sufficient evidence that **Hanwha TotalEnergies Petrochemical's** description of their approach to AA1000 Assurance Standard and their self-declaration of compliance with the GRI standards were fairly stated.

On the basis of our methodology and the activities described above, it is our opinion that the information and data included in the Report are accurate and reliable and the Assurer cannot point out any substantial aspects of material with mistake or misstatement. We believe that the economic, social and environment performance indicators are accurate and are supported by robust internal control processes.

# Independent Assurance Statement

## Conclusions

The Report is prepared in accordance with the GRI Standards. (Reporting in accordance with the GRI standards). The detailed reviews against the AA1000 AccountAbility Principles of Inclusivity, Materiality, Responsiveness and Impact and the GRI Standards are set out below.

## Inclusivity: Stakeholder Engagement and Opinion

Hanwha TotalEnergies Petrochemical defined government/public institutions, financial institutions/investors, employees, local communities, business partners and customers as a Key Stakeholder Groups. In order to collect opinions by each stakeholder groups in the context of sustainability, operated the stakeholder engagement process. Hanwha TotalEnergies Petrochemical was conducting a review of the stakeholder engagement process at the governance level in order to reflect the major issues derived through the stakeholder engagement process in sustainability strategy and goals. Hanwha TotalEnergies Petrochemical disclosed the results related to the process in the Report.

## Materiality: Identification and reporting of material sustainability topics

Hanwha TotalEnergies Petrochemical implemented its own materiality assessment process in consideration of the major business and operational characteristics to derive important reporting issues related to sustainability. In the materiality assessment, Hanwha TotalEnergies Petrochemical conducted the analysis of global sustainability reporting or assessment standards, and analyzed international disclosure standards and evaluation indicators, benchmarking the same industry, and analyzing major regulatory issues to derive the impact and financial materiality. Hanwha TotalEnergies Petrochemical derived 11 key ESG issues through the relevant process, and disclosed GRI topic standards disclosures related to material issues in the Report.

## Responsiveness: Responding to material sustainability topics and related impacts

Hanwha TotalEnergies Petrochemical operated a management process for key ESG issues in the context of sustainability derived from the materiality assessment. Hanwha TotalEnergies Petrochemical established mid- to long-term sustainability plans and goals in according to the management methodology established to effectively reflect the expectations of key stakeholders. Hanwha TotalEnergies Petrochemical reviewed through major management organizations such as ESG working-level consultative bodies/strategic group teams/management consultative bodies, disclosed the process including policy, indicator, activity and response performance on key ESG issues in the Report.

## Impact: Impact of an organization's activities and material sustainability topics on the organization and stakeholders

Hanwha TotalEnergies Petrochemical identified the scope and extent of the impacts to the organization and key stakeholders in the context of the sustainability of the key ESG issues reported. Hanwha TotalEnergies Petrochemical established sustainability strategies and objectives based on the analysis results of major impacts, including risks and opportunities for material issues at the governance level, disclosed mid- to long-term plans and strategic system in the Report.

# Independent Assurance Statement

## Recommendations and Opportunity for improvement

The assurer will provide the following comments to the extent that they do not affect the result of assurance;

- It may be helpful to advance the sustainability management system by establishing an environmental and social performance indicator management system in key sustainability aspects and ensuring the reliability and accuracy of those performance indicators through internal control procedures.
- It may be helpful to advance the sustainability management system by specifying detailed objectives for each task in accordance with ESG management implementation strategies and disclosing their achievements and performance.
- It may be helpful to advance the sustainability management system by advancing the management system of key environmental performance indicators, such as the development of the LCA methodology for key production items, by considering the key business characteristics that affect various industries within the value chain.

## GRI-reporting

Hanwha TotalEnergies Petrochemical provided us with their self declaration of compliance within GRI Standards. Based on our review, we confirm that social responsibility and sustainable development indicators with reference to the GRI Index. The Assurer confirmed that the Report was prepared in accordance with the GRI Standards and the disclosures related to the Universal Standards and Topic Standards Indicators based on the data provided by Hanwha TotalEnergies Petrochemical. The sector standard was not applied.

Issue Date: 07/08/2024

For and on behalf of BSI [British Standards Institution]:

BSI representative

**Jungwoo Lee**  
Lead Assurer, ACSAP



**Seonghwan Lim**  
Managing Director of BSI Korea



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<b>Korea Plastics Pipes Research Society</b>	<b>Korea Industrial Safety Association (Chungnam Western Branch)</b>	<b>Korean Standards Association</b>	<b>The Federation of Korean Industries</b>
<b>The National Quality Master Association</b>	<b>Seosan Chamber of Commerce and Industry</b>	<b>Korea Industrial Technology Association</b>	<b>Korea Economic Research Institute</b>
<b>Korea Chemicals Management Association</b>	<b>Korea Petrochemical Industry Association</b>	<b>Environmental Preservation Association (Daejeon-Chungnam)</b>	
<b>Korean Union of Chemical Science and Technology Societies</b>	<b>Korea International Trade Association</b>		

