



Sustainable Solutions for All

Hanwha Solutions

Sustainability Report 2023

About This Report

Hanwha Solutions' 2023 Sustainability Report contains our dedication, strategy, and accomplishments in ESG management. This report provides comprehensive disclosure of our mid to long-term strategies and goals, and the current status and performance of each business division in line with global ESG disclosure standards. We will maintain transparent communication with stakeholders by consistently sharing our mid to long-term ESG management strategies and achievements through our annual sustainability report. By doing so, we aim to improve our sustainable management practices and strengthen trust with our stakeholders.

Report Overview

Through the publication of an annual sustainability report, Hanwha Solutions aims to transparently disclose the company's sustainable practices and achievements in the environmental, social, and governance domains, while actively communicating with various stakeholders.

Reporting Principles

This report has been prepared in compliance with the Global Reporting Initiative (GRI) Standards 2021. In order to disclose activities relevant to industry-specific issues, we have considered the recommendations of the Sustainability Accounting Standards Board (SASB) and the Task Force on Climate-Related Financial Disclosures (TCFD), and have incorporated indicators from the ten principles of the United Nations Global Compact and the United Nations Sustainable Development Goals (SDGs). The financial information presented in this report is based on the Korean International Financial Reporting Standards (K-IFRS).

Reporting Period

The report covers the financial and non-financial performance of the company from January 1, 2022, to December 31, 2022, and certain data from January to June 2023 is included to provide up-to-date information. Furthermore, quantitative data from the past three years (2020-2022) is included to demonstrate effective trend analysis based on sustainability context.

Reporting Scope

The financial performance of this report includes the consolidated financial information of Hanwha Solutions' head office and business sites worldwide. The non-financial performance includes information from the head office and business sites of five business divisions in Korea.

Independent Assurance

The financial data in this report has undergone independent auditing by KPMG Samjong Accounting Corporation. Non-financial data has been independently verified by the Korea Management Registrar inc. to ensure objectivity and reliability.

Inquiries

If you have any inquiries regarding this report, please feel free to contact us.

Contact : ESG Secretariat

Phone : 02-729-2700

Email : fairlaw@hanwha.com







Address : 86, Cheonggyecheon-ro, Jung-gu, Seoul

Website : www.hanwhasolutions.com

INTERACTIVE User Guide

Hanwha Solutions' Sustainability Report is created as an interactive PDF.

You can move to the relevant website and play videos to better understand the topics.

-  Go to the cover page
-  Table of contents
-  Return to previous page
-  Go to previous page
-  Go to next page
-  Go to the relevant webpage

Contents

<hr/>		<hr/>		<hr/>	
About This Report	2	TCFD Report	41	ESG Factbook	105
Contents	3	Governance	42	Economic	106
Introduction	4	Strategy	43	Environmental	107
CEO Message	5	Risk Management	51	Social	109
Company Profile	6	Metrics and Targets	52	Governance	112
<hr/>		<hr/>		<hr/>	
Overview	10	ESG Performance	53	Appendix	113
ESG Management	11	Environmental	54	Sustainability Commitments	114
Double Materiality Assessment	12	SHE Management	55	Stakeholder Communication	116
ESG Highlights	14	Environmental Management	58	GRI Standards	117
		Reducing Environmental Impact	62	SASB Index	118
		Eco-Friendly Products	68	Greenhouse Gas Assurance Statement	120
<hr/>		<hr/>		<hr/>	
Sustainable Solutions	15	Social	71	Third-Party Assurance Statement	123
Responding to Climate Change	16	Safety and Health Management	72	Awards and Memberships	125
Green Biz Innovation	21	Talent Management	76		
Safety Workplace	26	Human Rights and Diversity	80		
Ethical Management & Compliance	34	Product Responsibility and Customer Satisfaction	83		
Enhancing Work Environment &	37	Sustainable Supply Chain Management	85		
Career Development		Community Participation and Contribution	88		
		Personal Information Protection and Cybersecurity	91		
		Governance	93		
		Corporate Governance	94		
		Ethics and Compliance	98		
		Risk Management	102		



“Sustainable solutions for all,
from energy to materials”

Hanwha Solutions makes a better future
with distinctive technologies and solutions to
provide a sustainable growth for all.

Introduction

- CEO Message 5
- Company Profile 6

CEO Message

Dear stakeholders, this is Koo Yung Lee, the CEO of Hanwha Solutions.

Recently, we have faced numerous unexpected challenges, including the prolonged Russo-Ukrainian war, global inflation, volatility in exchange rates and oil prices, and extreme weather events. These circumstances have heightened the risk of recession and intensified the climate crisis, posing a threat to our lives. In the face of these multiple crises, it is crucial that we come together and overcome them collectively.

At **Hanwha Solutions**, we recognize our social responsibility to address chronic issues like the climate crisis and environmental pollution while focusing on our economic obligations as a corporation to navigate the economic downturn. As a global eco-friendly energy and materials solutions company, we are committed to seeking technology-based solutions for the issues of humanity.

We have set ambitious goals to reduce greenhouse gas emissions by 35% by 2030 and achieve Net Zero by 2050 and we are implementing detailed strategies to accomplish these targets. One of our key strategies involves transitioning to renewable energy. Last year, we initiated this transition through the Green Premium, and this year, we are expanding our procurement of renewable energy through various channels such as power purchase agreements (PPAs), renewable energy certificate (REC) purchasing, and Green Premium initiatives. Our aim is to transition 100% of our energy usage to renewable sources by 2050.

Moreover, we are actively reducing greenhouse gas emissions by improving energy efficiency and adopting clean fuels like hydrogen. We are dedicated to managing emissions at all stages of our value chain, with a focus on promoting emission reduction practices among our suppliers.

We are actively investing in climate change response technology (Climate Tech) and circular economy practices to address the global energy crisis and environmental pollution challenges.

As part of our investment initiatives, we have allocated approximately 3 trillion won toward building the Solar Hub, which will be the first integrated solar production complex in North America, and significantly expand our module production capacity in the United States from 17GW to 8.4GW, generating enough electricity to power 1.3 million homes in the United States for a year.

In the sectors of eco-friendly energy, materials, and food tech, we plan to discover and invest in companies that can create synergies with our company and collaborate in joint technology development ventures with them. In the field of green hydrogen, we are promoting the advancement of next-generation water electrolysis technology and the development of improved hydrogen storage tank technology.

In addition, we are developing CO₂ capture and utilization (CCU) technology and promoting the transition to eco-friendly raw materials to establish circular economy. We have obtained international standard certification for recycling waste plastic and utilizing it as a packaging material. Furthermore, in collaboration with leading Korean PVC companies, we have commenced the commercialization of plant biofuel-based PVC.

We are also addressing major ESG issues, including occupational safety and health, compliance, and employee competency enhancement. To achieve our goal of fostering an accident-free workplace, we are strengthening our workplace safety inspection system, proactively identifying safety risks, and continuously improving risk factors. We promote a safety mindset through management meetings and campaigns.

In order to establish a compliance culture, we conduct semi-annual compliance inspections and division-specific compliance training. We engage in various voluntary fair trade compliance activities, such as strengthening internal transaction deliberations and distributing subcontracting guidelines.

Lastly, we have introduced the title of "Pro" among our employees, implemented an employee evaluation system to assess and promote them based on their competence, and established customized training programs and job-specific training opportunities.

Dear valued employees, shareholders, and partners,

We aspire to be a global leading company that not only enhances corporate value but also contributes to the well-being and prosperity of society and mankind through our energy and material technology-based solutions. We are grateful for your continued support and dedication, and we sincerely hope that you will join us on this journey to address challenges and drive innovation together in the future.

Thank you.

May 30th, 2023
CEO **Koo Yung Lee**



Company Profile

Company Overview

General Information

Hanwha Solutions is a global energy and material technology company that is engaged in chemical, photovoltaic (PV), and real estate. We are committed to expanding our green portfolio through investments in new eco-friendly businesses such as next-generation PV and circular economy technologies, as well as the green hydrogen business. We will continue to pursue sustainable business growth based on smart eco-friendly solutions and actively contribute to creating a better future for both humanity and the planet.



Company	Hanwha Solutions Corporation
Founded	1965
Head Office	Hanwha Building, 86, Cheonggyecheon-ro, Jung-gu, Seoul, Republic of Korea
CEO	Koo Yung Lee, Dong Kwan Kim, and Yi Hyeon Nam
Employees	6,773 (Dec, 2022)
Credit Rating	Korea Ratings AA-(stable) Nice Information Service AA-(stable)
Sales	13,653.9 billion won (Dec, 2022)
Total Assets	23,831.7 billion won (Dec, 2022)

Key Businesses

Hanwha Solutions

Chemical

Qcells

Insight

Hanwha Advanced Materials *1

Hanwha Galleria *2

*1. The Advanced Materials division manages electronic materials and hydrogen tanks, and the automotive and photovoltaic-related divisions were split off into Hanwha Advanced Materials on December 1, 2022. Please note that this report refers to the division as Advanced Materials Division prior to the split-off.

*2. The Galleria Division was spun off into Hanwha Galleria on March 1, 2023. Please note that this report refers to the division as Galleria Division prior to the spin-off.

Core Values, Vision, and Mission

Hanwha Spirit

Trust and Loyalty

We embody Trust by placing the promise with customers as our highest value, and demonstrate Loyalty through our devotion to the prosperity of society and humanity through business.

Core Values of Hanwha Employees



Instead of settling for the existing standards, people with the spirit of a challenger pursue the best that come from changes and innovation.



People who demonstrate dedication try their best for the greater good while thinking highly of relationships with companies, customers and colleagues.



People of Integrity act properly based on principles and their sense of pride.

Hanwha Solutions is quickly being recognized as a global leader in energy and material technology-based solutions driven by the vision of "Sustainable solutions for all, from energy to materials."

Vision

Sustainable solutions for all, from energy to materials

Mission

We aim to deliver sustainable solutions for the planet through smart energy solutions and customer-focused materials.

Company Profile

Company Overview

Our Businesses

Since pioneering the production of Polyvinyl Chloride (PVC) in Korea, **Chemical** Division has consistently played a role in enhancing people's quality of life by manufacturing essential petrochemical products like PE, CA, and TDI. Over time, the division has evolved into a creative and competitive chemical company, venturing into high-value segments like Eco-DEHCH, hydrogenated hydrocarbon resin, and XDI. It is also dedicated to developing eco-friendly technologies and products such as waste plastic recycling and biochemicals, as part of its vision to become an environmentally conscious business.

 **Green Business:** Commercialization of green hydrogen
Building a Circular Economy System: Chemical recycling

Hanwha Galleria, previously recognized as the **Galleria** Division, originated as a distribution service company in 1976 and currently manages five department stores: Seoul Luxury Hall, Gwanggyo Branch, Daejeon Time World, Cheonan Center City, and Jinju Branch. Galleria Luxury Hall stands as Korea's foremost premium department store, offering a curated selection of global high-end brands and top-quality VIP service. With its nationwide network of department stores, **Hanwha Galleria** delivers a distinctive customer experience encompassing fashionable brands, high-quality food culture content, and innovative space design.


 **ESG Products and Expanding Customer Service:** PB products & collaborations
Eco-Friendly Workplace: Improving energy efficiency and the recycling rate in business sites

Under the slogan "Completely Clean Energy," **Qcells** Division is committed to shaping a sustainable future. As a global provider of complete green energy solutions, with a focus on solar PV cell/module and system business, the division encompasses the entire value chain, including the production of PV cells and modules, as well as the construction and operation of power plants and energy retail. Leveraging this comprehensive approach, the division plays a critical role in addressing climate change, actively promotes business in key global markets, and strives to achieve sustainable growth and development.

 **Leading a Smart Eco-Friendly Energy Life :** PV+ESS & electricity retailing



Insight Division is the no.1 developer in Korea, specializing in green energy and premium development. With expertise in the fields of Green Energy, Smart Green Complex, and Premium Lifestyle, the division builds platforms and creates new business models and values throughout the value chain, including planning, development, operation, and financial products. It aims to break away from the role of a traditional developer and become a developer specializing in total solutions for sustainable growth that combine Renewable Energy and Premium Life.

 **Smart Green Industrial Complex (RE100) Project :** Developing a green city
Renewable Energy Project : Developing renewable energy

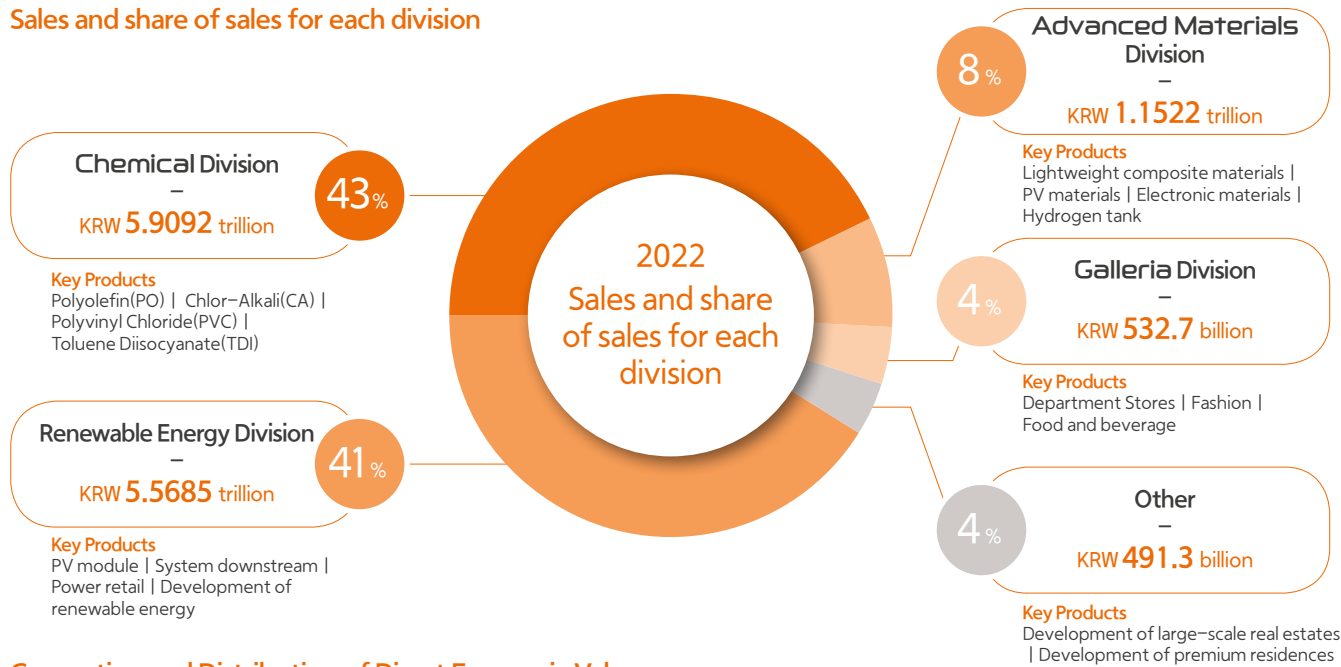
Hanwha Advanced Materials, previously known as the **Advanced Materials** Division, is a leading provider of innovative solutions in lightweight composite materials, PV, electronic materials and the hydrogen tank business. Leveraging its expertise and technologies, the division offers solutions that align with the global market's demand for lightweight and eco-friendly materials. By establishing local production and R&D systems in Korea, North America, Europe, and China, the division ensures the delivery of high-quality products and services that meet the specific requirements of different countries. Furthermore, it positions itself as a trusted partner for global customers by continuously investing in R&D, developing better solutions, and offering customized products that cater to the diverse needs of its customers.

 **Entering the Eco-Friendly Car Supply Chain :** Electric vehicle (EV) battery housing
Improving Fuel Efficiency by Lightening the Vehicle : Expanding the utilization of lightweight composites such as StrongLite

Company Profile

Financial Key Figures

Sales and share of sales for each division



Generation and Distribution of Direct Economic Values

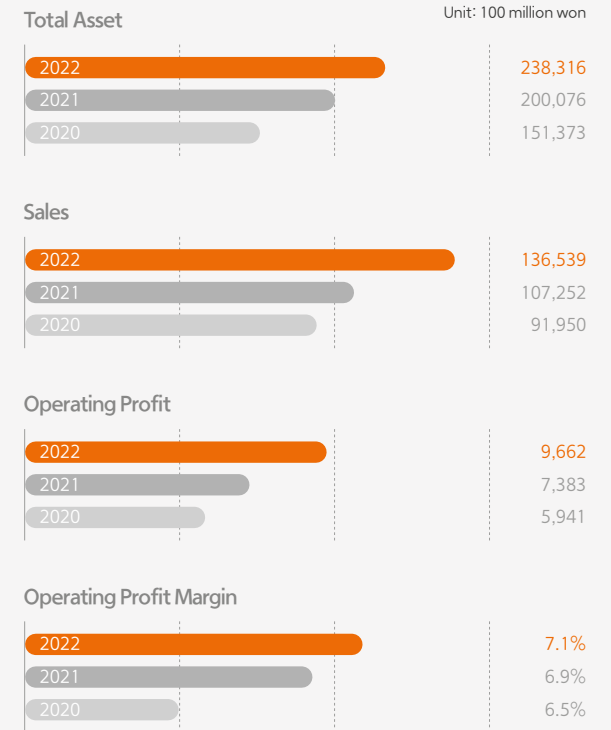
Classification		Calculation Formula	Unit	2021	2022
Direct economic value generated	Customers	Sales	KRW million	7,395,685	9,686,399
	Companies	Tangible assets acquired		474,300	637,203
	Shareholders and Investors	Interest expenses		88,373	163,220
Direct economic value distributed	Employees	Salaries + Benefits + Retirement benefits		763,354	931,194
	Suppliers	Purchase costs + Outsourcing service costs		4,822,489	6,094,112
	Community	Donations		3,976	6,343
	Government	Taxes and Utilities + Corporate tax expenses	171,051	508,097	

*Based on separate financial statements in the business report

2020–2022 Management Performances

Hanwha Solutions is engaged in creating shared value through the promotion of sustainable management with various stakeholders.

In 2022, based on our consolidated financial statements, we accomplished sales of 13.6539 trillion won, contributing to the generation of social and economic value by sharing 18.265 trillion won with our stakeholders including customers, shareholders/investors and employees.



Company Profile

Global Network



Chemical Division

Domestic Network Total 10 locations	Seoul Head Office, Central R&D Center, Yeosu Plant, TDI Plant, Ulsan 1 Plant, Ulsan 2 Plant, Ulsan 3 Plant, Daegu Branch, Busan Branch, Gwangju Branch
Global Network Total 9 locations	Asia: Hanwha Chemical (Ningbo) Co., Ltd., Hanwha Chemical (Shanghai) Co., Ltd., Hanwha Chemical Corporation Beijing Representative Office, Hanwha Chemical Corporation Guangzhou Representative Office, Hanwha Chemical (Thailand) Co., Ltd., Hanwha Chemical Malaysia Sdn.Bhd, Hanwha Chemical India Pvt. Ltd. Americas: Hanwha Cimarron Middle East: International Polymers Company (IPC)

Hanwha Advanced Materials

Domestic Network Total 6 locations	Seoul Head Office, Sejong Branch, Sejong R&D center, and Eumseong Branch*, Asan Branch
Global Network Total 11 locations	Asia: HABJ (Beijing), HASH (Shanghai) Americas: HAUS (Alabama, Michigan), HAGA (Georgia), AZDEL (Virginia), NABC (Michigan), HAMX (Monterrey) Europe: HACZ (Czech), HAGE (Germany), EBC (Germany)

Qcells Division

Domestic Network Total 5 locations	Seoul Head Office, Jincheon Plant, Eumseong Plant, Pangyo R&D Center, Gasan R&D Center
Global Network Total 9 locations	Asia: Hanwha Q CELLS (Qidong) Co., Ltd., Hanwha Q CELLS Malaysia Sdn. Bhd. Americas: Hanwha Q CELLS America, Inc., Hanwha Q CELLS USA Corp., Hanwha Q CELLS USA, INC., Hanwha Q CELLS Canada, Corp., Hanwha Q CELLS Georgia, Inc. Europe/Middle East: Hanwha Q CELLS GmbH, Hanwha Q CELLS Turkey

Hanwha Galleria

Domestic Network Total 6 locations	Seoul Head Office, Luxury Hall, Gwanggyo Branch, Time World, Center City, Jinju Branch, Gourmet 494 HANNAM
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Insight Division

Domestic Network Total 9 locations	Yongin Techno Valley, Anseong Techno Valley, West Ochang Techno Valley, 2nd Yongin Techno Valley, H Techno Valley, Ulsan KTX Station Area Complex, Pungheo and Jangcheon Districts of Changwon, Chuncheon Jade (Jade Palace, Jade Garden)
Global Network Total 8 locations	Asia: TMK A, TMK B (Japan) Americas: Cabrero, Centauro, San Alberto, Caldera, Chequen (Chile), HSIHC NHH (United States)

Q Energy Division

Global Network Total 2 locations	Europe: Q ENERGY Europe GmbH, Q ENERGY France SAS
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*Seoul Head Office, Sejong R&D Center, Sejong Branch, and Eumseong Branch are included in Hanwha Advanced Materials as of December 31, 2022.



Hanwha Solutions aims to create future growth engines by meeting the various ESG requirements of stakeholders, developing world-class eco-friendly technologies, and service innovation.

Overview

• ESG Management	11
• Double Materiality Assessment	12
• ESG Highlights	14

ESG Management

ESG Management System

ESG Policy

Hanwha Solutions aims to achieve continuous growth by establishing a long-term strategy for ESG management under the vision of "Sustainable Solutions for All" in the rapidly evolving global business environment. We contribute to creating economic, social, and environmental value by formulating and implementing sustainable management strategies, while also seeking input from diverse stakeholders.

ESG Governance

We have established the ESG Committee under the Board of Directors to promote efficient and transparent ESG management across the company. In 2022, the ESG Committee conducted reviews and discussions on 12 ESG-related issues, including donations to the Academy Foundation, and holds quarterly committee meetings. To ensure the smooth operation of the committee, we have set up an ESG Secretariat and formed dedicated departments based on each area of expertise, such as climate change, safety, human resources, and quality.

ESG Committee Meeting Status

Date	Agenda
02.17.2022	Three items, including 2021 GHG Emissions and Short-Term Net Zero Implementation Plan, ESG Bond Issuance Results, etc.
04.28.2022	Four items, including Reporting on ESG Bonds Issued and GHG Emission, Net Zero Performance in Q1 2022 and Q2 Plan, etc.
07.14.2022	Publication of Sustainability Report
07.28.2022	H1 GHG Emission and Net Zero Performance and H2 Plans
10.27.2022	Q3 GHG Emission and Net Zero Performance and Q4 Plans in 2022
12.20.2022	Two items, including Report on previously issued ESG bonds and 2022 GHG emission and Net Zero performance and 2023 plan
02.16.2023	Three items, including ESG Materiality Assessment Results

+ ESG Strategies



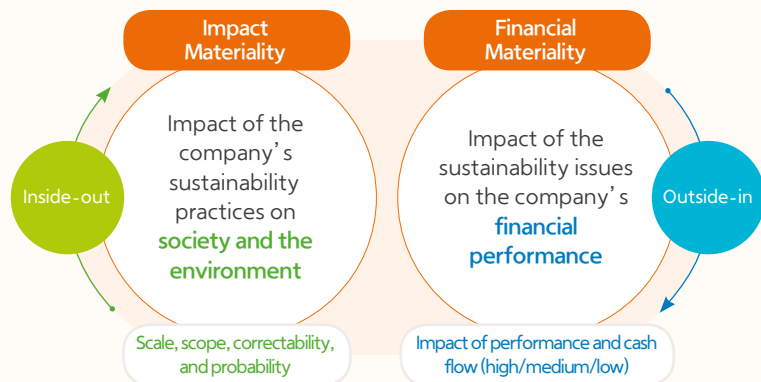
+ ESG Organizational Chart



Double Materiality Assessment

Double Materiality Assessment Process

Double Materiality Assessment



Hanwha Solutions conducted a double materiality assessment, taking into account both the environmental and social aspects as well as the potential financial impact on the company, based on the GRI Standards reporting subject selection principles.

By forming an ESG issue pool, we identified the five core ESG issues based on internal and external environmental analysis. We then identified the impacts of each selected issue, selected the final 12 impacts to be disclosed through the evaluation of environmental, social, and financial impacts, and had the assessment results reviewed and approved by the Board.

Through this report, we aim to provide transparent disclosure of our performance and activities related to the ESG core issues to our stakeholders and actively incorporate them into our management activities to further enhance our ESG management system.

Double Materiality Assessment Process



Step 1

Select ESG issues

- Form a pool of ESG issues (38 issues total)
 - A pool of ESG issues that apply to Hanwha Solutions has been identified based on sustainability international disclosure guidelines such as the GRI, and industry-specific guidelines including MSCI, SASB, S&P, etc.
- Select ESG core issues (5 issues total)
 - Peer group benchmarking, global ESG initiatives, the company's strategies and environment analysis



Step 2

Conduct a double materiality assessment

- Identify impacts on ESG Core issues
 - Identify impacts of the company's major stakeholders (employees, customers, shareholders, partners, local communities)
- Classify and measure the identified impacts
 - by impact attributes (positive/negative, actual/potential)
 - Measure environmental, social, and financial impacts by conducting stakeholder surveys (survey period: 01.30.2023–02.03.2023)



Step 3

Select core Issues

- Select major impacts for each ESG core issue (12 impacts total)
 - In consideration of environmental, social, and financial impact measurement results and industry characteristics
- Double Materiality Assessment results reviewed and approved by the Board (ESG Committee)
 - Disclose ESG core issue-specific strategies, goals, plans, and performances in the sustainability report

2022 ESG Core Issues

Issue	Definition	Page
Climate Change & Net Zero	Measures to minimize the company's impact on climate change by conducting relevant risk analysis to effectively respond to climate change, and establishing and implementing response strategies based on the results	Responding to Climate Change (p. 16)
Sustainable Products and Technologies	Development of products and technologies, which will conserve energy and natural resources in the entire process of production, consumption, and disposal of products, and minimize negative impacts on the environment	Green Biz Innovation (p. 21)
Occupational Safety and Health Management	Management activities based on safety and health strategies and management systems to provide a workplace that protects the physical and mental safety and health of employees	Safety Workplace (p. 26)
Compliance and Ethical Management	Transparent and fair ethical management practices such as prevention of corruption and bribery and measures to comply with various laws and regulations	Ethical Management & Compliance (p. 34)
Employee Development and Fair Compensation	Activities to enhance employees' skills and competencies, such as training programs for personal growth and career development and providing fair compensation and incentives for their performance	Enhancing Work Environment & Career Development (p. 37)

Double Materiality Assessment

Double Materiality Assessment Results

Hanwha Solutions identified the impacts of each stakeholder on our five core ESG issues, which were selected from the double materiality assessment. We evaluated the impact we have on the environment and society (Inside-out) as well as the financial impact of each issue on our company (Outside-in). Here are the major activities, performances, and goals we accomplished in 2022 related to the five core ESG issues.




+ Positive - Negative A: Actual P: Potential ●●● High ●●○ Medium ●○○ Low

Issue	Impact	Attribute		Social & Environmental Impact	Financial Impact	Overall Result	Response and Plans
		Positive/Negative	Actual/Potential				
Climate Change & Net Zero	Establishing an eco-friendly society by reducing GHG emissions, mitigating climate risks, and preserving the environment and biodiversity at workplaces and plants	+	P				<ul style="list-style-type: none"> Develop and implement a Net Zero implementation plan Achieve 100% transition to renewable electricity by 2050 Manage Scope 3 emissions by implementing life cycle assessment (LCA) for all Chemical Division's products (scheduled for 2023) Mitigate climate risks and minimize damage through risk assessments and a proactive response system
	(Chemical Division) Enhancing national competitiveness and attaining Net Zero through the development of GHG reduction technologies			●●●	●●●	●●●	
	Building trust with investors by establishing a climate change response system	+	A				
	Contributing to the national NDC targets by reducing GHG emissions						
	Causing disruption to local economies from physical risks and damages due to extreme weather events and climate change	-	P				
Sustainable Products and Technologies	Securing a sustainable business structure through active promotion of eco-friendly businesses and development of sustainable products and technologies	+	P	●●●	●●●	●●●	<ul style="list-style-type: none"> Establish a sustainable solar infrastructure centered on solar hubs and foster growth of the renewable energy market Invest in R&D of perovskite tandem solar cells with a goal achieving mass production in second half of 2026 and maximizing the solar cell efficiency Develop a wider range of eco-friendly products based on recycled polyethylene (rPE).
Occupational Safety and Health Management	Decrease in employees' health and their families' quality of life and damage to the residents who live near our business sites/plants	-	A	●●●	●●●	●●●	<ul style="list-style-type: none"> Inspect the safety and health management system through a safety review Prevent safety risks by conducting risk assessments
	Creating a safe working environment for suppliers through safety and health management	+	P				
Employee Development and Fair Compensation	Creating a fair labor market and of high-quality jobs			●●○	●●○	●●○	<ul style="list-style-type: none"> Implement a tailored competency-development system based on competency assessments for each leadership, role, and position Introduce a new HR system to enhance fairness in performance evaluations and compensation practices
	Enhancing work efficiency and effectiveness by strengthening employee competencies	+	P				
Compliance and Ethical Management	Damage to customers due to lack of compliance and ethical management, such as misuse of customer information	-	A	●●●	●●●	●●●	<ul style="list-style-type: none"> Review legal affairs based on internal compliance audits Operate a compliance program (CP) led by the compliance officer and relevant departments
	Establishing an environment for delivering high-quality products and services to customers through a supplier management system that emphasizes compliance and anti-corruption measures	+	P				

ESG Highlights

Key Initiatives and Performances

We are committed to fulfilling our role as a responsible corporate citizen by transparently disclosing our ESG performance from 2022 to June 2023.

	<p>Achieve Net Zero by 2050</p> <ul style="list-style-type: none"> Developed and implemented detailed strategies to achieve the goals outlined in the 2050 Net Zero roadmap Implementing K-RE100 and K-EV100 <ul style="list-style-type: none"> Green premium and renewable energy certificate (REC) Promoted long-term purchase agreements Transition to electric vehicles and charging infrastructure 	<p>Develop eco-friendly technologies</p> <ul style="list-style-type: none"> Promoted the R&D of Anion Exchange Membrane Electrolysis Cell (AEMEC) Promoted the development of eco-friendly packaging materials such as rPE Established eco-friendly research cooperation system 	<p>Promote eco-friendly products</p> <ul style="list-style-type: none"> Obtained GRS (International Renewable Standard) certification for recycled raw material (rPE) Developed the product LCA calculation process and an evaluation tool Conducted LCA for key products
	<p>Internalize a safety culture</p> <ul style="list-style-type: none"> Conducted a regular risk assessment to minimize safety and health risks with the goal of creating an accident-free worksite Renewed occupational safety and health management system certification (ISO 45001) for all business sites of Chemical, Qcells, Advanced Materials, and Galleria Division 	<p>Enhance customer communication</p> <ul style="list-style-type: none"> Scheduled to participate in RE+ 2023, the largest green energy exhibition in the United States Participated in Intersolar Europe 2023, Europe's largest photovoltaic exhibition Participated in 2023 JEC WORLD, the world's largest composite materials and application exhibition 	<p>Promote win-win and shared growth with suppliers</p> <ul style="list-style-type: none"> Improved supplier safety and health evaluation system and grading system and provided consultancy services Signed a MOU with E Credible and provided them with supplier ESG evaluation model
	<p>Ensure sound governance</p> <ul style="list-style-type: none"> Established Board evaluation guidelines and implementation plans Disclosed the board skill matrix Promoted shareholder protection activities to enhance shareholder value 	<p>Build a transparent corporate culture</p> <ul style="list-style-type: none"> Distributed compliance guidelines and reviewed the checklist Operated the Fair Trade Compliance Program Conducted ethics and compliance training for employees 	<p>Implement preemptive risk management and response</p> <ul style="list-style-type: none"> Operated a risk council and risk management department under the Board Implemented a risk assessment for each department and established response measures for each level of risks

2022
External ESG
Assessments



Grade A-



Grade B



Grade A



“Sustainable Solutions,
Sustainable Tomorrows”

Hanwha Solutions is building a better future with cutting-edge technologies and solutions for sustainable growth for everyone.

Sustainable Solutions

• Responding to Climate Change	16
• Green Biz Innovation	21
• Safety Workplace	26
• Ethical Management & Compliance	34
• Enhancing Work Environment & Career Development	37

SUSTAINABLE SOLUTIONS

Responding to Climate Change

Issue Approach

Recognizing the importance of responding to climate change, Hanwha Solutions aims to provide sustainable solutions by preparing the 2050 Net Zero Roadmap, actively addressing climate change, and seizing this opportunity to expand into new businesses.

Photovoltaic (PV) power generation through the use of idle sites

New 4.37MW in progress

The long-term REC purchase agreement

6.8 GWh per year

Green premium

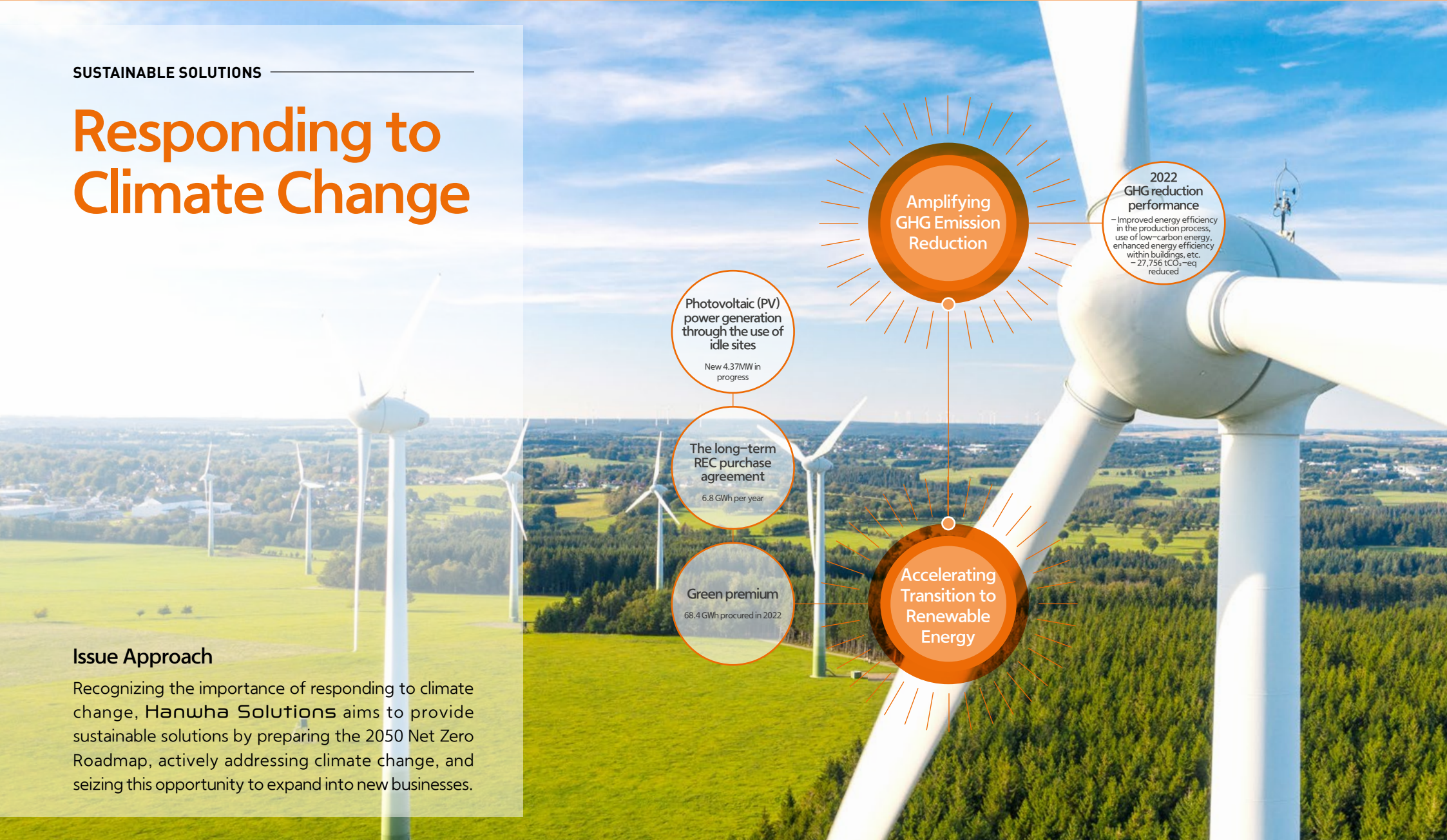
68.4 GWh procured in 2022

Amplifying GHG Emission Reduction

2022 GHG reduction performance

- Improved energy efficiency in the production process, use of low-carbon energy, enhanced energy efficiency within buildings, etc.
- 27,756 tCO₂-eq reduced

Accelerating Transition to Renewable Energy



Responding to Climate Change

2022 Response to Climate Change

GHG Emission Reduction Activities

In order to limit global temperature rise to 1.5°C and address the climate crisis, **Hanwha Solutions** has established the 2050 Net Zero Roadmap, which aims to reduce GHG emissions by 35% compared to 2018 levels by 2030 and achieve Net Zero by 2050. As part of these efforts, we have enhanced monitoring for all scopes of GHG emissions and implemented various reduction activities and R&D initiatives.

2050 Net Zero Implementation Strategy

Improve energy efficiency

- Reduce energy consumption by more than 0.5% per year by adopting high-efficiency facilities, improving processes, and optimizing operations
- In 2022, the **Chemical** Division reduced 26,413 tCO₂-eq through the GHG reduction activities

Introduce renewable energy-powered electricity

- Green premium (68,410MWh in 2022 and 80,699MWh in 2023)
- Signed a long-term REC purchase agreement (6.8GWh per year expected for the **Chemical** Division, Supplied from January 2023)

Transition to hydrogen-based fuels

- In 2022, a piping facility that can utilize electrolytic hydrogen produced in the CA(Chlor-Alkali) process as a fuel was installed at the Yeosu Plant
- We plan to reduce fuel usage by incorporating hydrogen into the pyrolysis process from 2023

Carbon Capture & Utilization (CCU)

- Promote CCU, reduction activities, and R&D (aiming to commercialize after 2035)
- Form a Net Zero Council in the **Chemical** Division and establish a cooperative system with research institutes, universities, and advanced companies
- Convert CO₂ produced from non-convertible fuel facilities and incineration facilities as a raw material

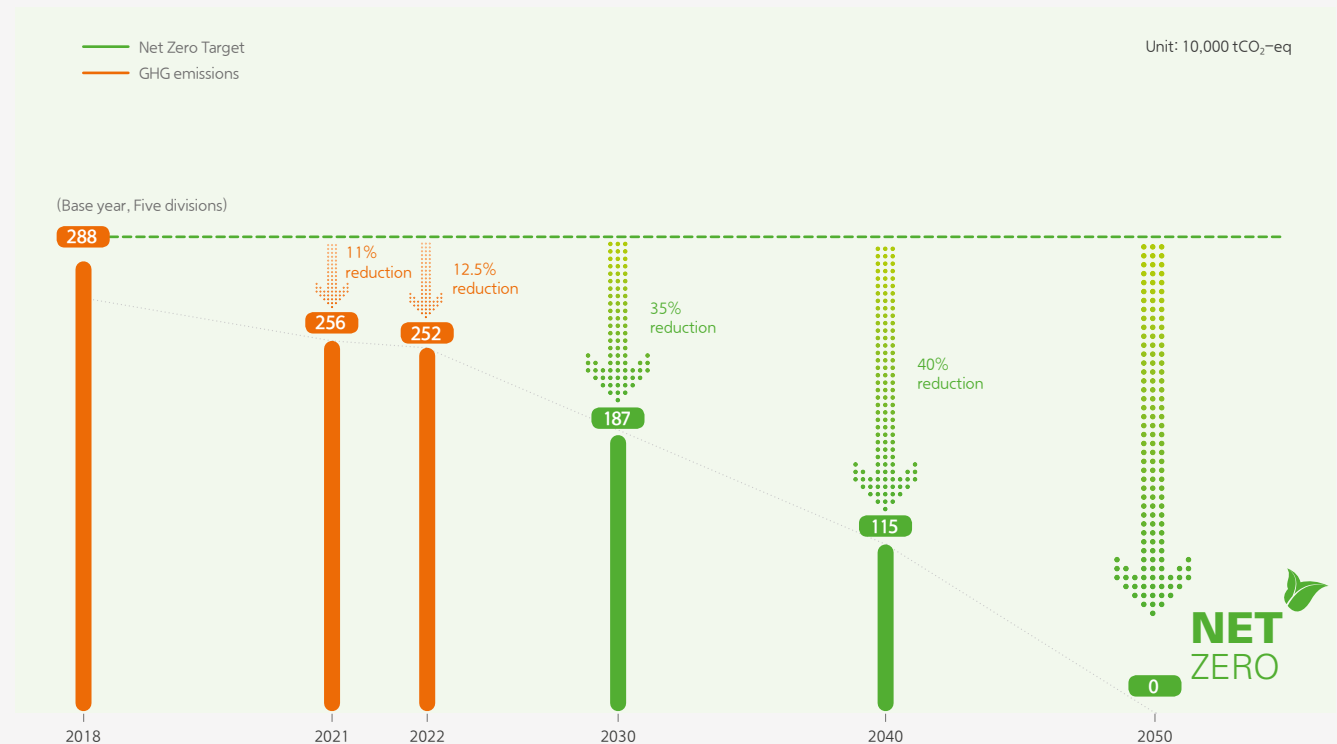
Building a circular economy and introducing eco-friendly raw materials

- Obtain eco-friendly certification (ISCC+ and GRS)
- Conduct LCA for the **Chemical** Division (plan to continuously upgrade from 2023)
- Environment Product Declaration (total 39 products in 2021-2022)
- Operate Net Zero council with suppliers(4 meeting were held in from 2022 to 1Q 2023)

SCOPE 1, 2
(Business sites)

SCOPE 3
(Value Chain)

Hanwha Solutions' 2050 Net Zero Roadmap



Responding to Climate Change

2022 Response to Climate Change

GHG Reduction Activities

In 2022, our **Chemical** Division implemented GHG reduction activities such as facility improvement, operation optimization, and process enhancement. Starting in 2023, we will focus on increasing employees' awareness of GHG reduction by incorporating implementation costs of Net Zero into the company's fund flow, and ultimately achieve Net Zero by increasing investments in low-carbon solutions and improving energy efficiency throughout the value chain.

+ Chemical Division's GHG Reduction Activities and Performance

GHG reduction performance

- Reduced Scope 1 and 2 emissions by approximately 13,800 tCO₂-eq through the introduction of high-efficiency facilities
- Reduced Scope 1 and 2 emissions by approximately 12,600 tCO₂-eq through improved energy efficiency in production processes and fuel conversion

Participation in Voluntary Carbon Market

emission credits through the voluntary carbon trading platform, Pople. The purchased credits were forest absorption and woody biomass fuel conversion credits and they were subsequently donated to Korea Green Foundation to contribute to offset carbon and raise awareness of Net Zero within society. The Korea Green Foundation utilized the credits to offset carbon emissions generated from their activities, including film festivals.

+ Carbon Credits Purchase Certificate

+ Participation in Forestry ESG Performance Sharing Session



Our **Qcells** Division is at the forefront of addressing the climate crisis by becoming the first renewable energy company in Korea to declare its voluntary participation in K-RE100. As part of our efforts to reduce Scope 1 emissions, we plan to invest in the development of low-carbon processes, which includes the installation of plasma-based high-efficiency decomposition facilities and implementing measures to minimize GHG emissions throughout our operations.

+ Qcells Division's GHG Reduction Performance and Plan

• Scope 2 (indirect emissions) reductions:

- 1) Solar power generation facilities in company idle sites such as parking lots and roofs have been operated since 2018 (1.65 GW generated in 2022)
- 2) We have scheduled the construction of an additional PV power generation facility with a capacity of 4.7GWh per year, which will enable us to convert 6.4GWh of renewable energy into electricity. We plan to adopt a real-time load management system for heating and cooling facilities and save 2.3GWh of electricity per year.

The **Advanced Materials** Division is making various efforts to reduce GHG emissions and practice Net Zero. We promote performance enhancement through facility improvement and the introduction of high-efficiency facilities at all business sites. Additionally, we continuously expand our GHG reduction and energy-saving activities, such as performance evaluation and repair of aging utilities, as well as waste recycling. We aim to achieve Net Zero emissions by 2050 through these initiatives.

+ Advanced Materials Division's Net Zero Activities and Performance in 2022

Improved the production process	1,058 kWh/MT → 1,000 kWh/MT
Applied ceramic coating on coolant pump	Reduced 29.8 tCO ₂ -eq/year → 64,824 kWh/year
Changed the type of HVAC	Reduced 184.7 tCO ₂ -eq/year → 58 million won/year
Recovered and recycled pallets	Target: 2,400EA, Achieved: 3,500EA achieved 146% → saved 131 million won

The **Galleria** Division is committed to reducing its carbon footprint by saving energy in department store operations, including power, gas, steam, and water usage. We actively identify areas for reduction and establish plans, aiming for an annual reduction target of 3% compared to the previous year's usage. At the end of each year, we assess our performance and incorporate it into the safety, health, and environmental evaluation score.

+ Energy Efficiency Investments

Center City

- Replaced High-efficiency centrifugal fan
- Replaced exhaust fan high-efficiency motor
- Improved first-floor window lighting LED

Jinju

- Replaced high-efficiency inverter of an air handling unit

+ Energy Reduction Progress in 2022

Unit: KRW million

Name	2022 Goal	2022 Performance	Achievement Rate
Luxury Hall	56.8	25	44.6%
Gwanggyo	109.6	126	114.7%
CenterCity	80.0	105	130.7%
Jinju	39.4	38	95.8%

Responding to Climate Change

2022 Response to Climate Change

Transition to Renewable Energy

K-RE100

In order to achieve Net Zero by 2050, **Hanwha Solutions** has declared Korean Renewable Energy 100% (K-RE100) for the first time among Korean renewable energy company and is promoting renewable energy procurement.

Our **Chemical** Division has set ambitious targets for increasing renewable energy usage. By 2030, we aim to achieve 21% renewable energy usage, followed by 37% by 2040, and ultimately reaching 100% by 2050. To accomplish this, we are actively participating in RE100 initiatives. In 2022, we successfully secured approximately 46GWh of electricity generated from renewable sources through the procurement of green premium and Renewable Energy Certificates (RECs).

In addition, our **Qcells** Division aims to increase the share of renewable energy to 100% by 2050. As of 2022, we have secured 1.65GWh of self-generated electricity and 22.41GWh of renewable energy as green premium. To accelerate the achievement of K-RE100, we have installed solar power generation facilities with a capacity of 4.37MW in our company. In 2023, we expect to produce approximately 30GWh of renewable electricity, including 27 GWh of green premium.

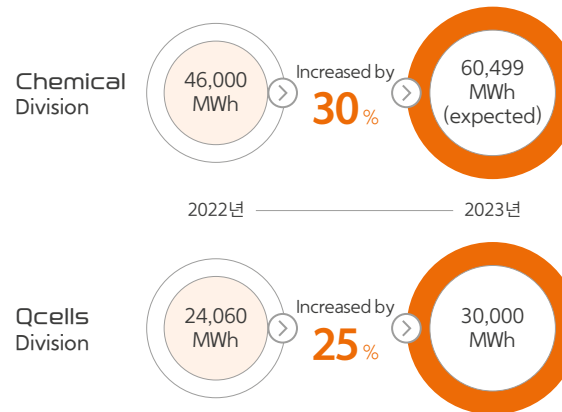
Green Premium

We participated in the government-run Green Premium Program and secured approximately 68,410 MWh of renewable energy-generated electricity in 2022 and 80,699 MWh in 2023.

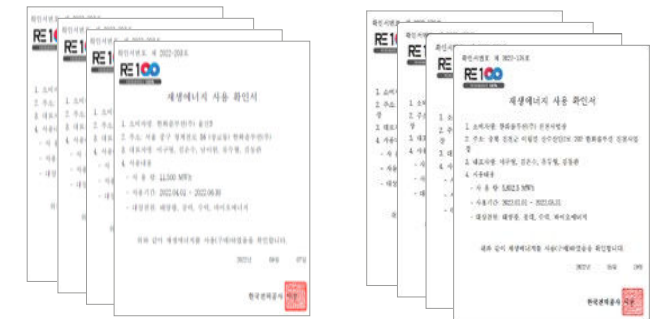
Renewable Energy Certificate (REC)

We have signed a long-term purchase agreement with Hanmaum Energy and have secured RECs of about 6.8 GWh per year since January this year. RECs are certificates issued when renewable energy is generated, and purchasing them can be recognized as the use of renewable energy. Additionally, our **Chemical** Division has signed MOUs with four renewable energy supply and brokerage companies, including Hanmaum Energy. In 2023, we plan to continue procuring renewable energy through various channels such as PPA, REC purchase, and green premium.

+ Renewable Energy-powered Electricity Procurement Status for K-RE100



+ K-RE100 Renewable Energy Use Certificates



Chemical Division's Green Premium Cases

Qcells Division's Green Premium Cases

+ The Long-Term REC Purchase Contract for K-RE100 implementation



K-EV100

We aim to reduce GHG emissions and transition all our business vehicles to eco-friendly vehicles, including electric and hydrogen vehicles, by 2030 through our participation in the K-EV100 initiative.

As part of this commitment, we regularly submit our zero-emissions vehicle (ZEV) transition plan to the Ministry of Environment. In 2022, we successfully converted one vehicle to a ZEV and established five EV charging infrastructures. We plan to further expand the number of charging infrastructures in 2023.

Through the adoption of ZEVs, we anticipate a reduction in GHG emissions of approximately 1.6tCO₂-eq per year per EV (based on the Advanced Materials Sejong branch). At the company level, we will continue implementing various activities to achieve K-EV100, including participation in the Ministry of Environment's subsidy project for standard charging facilities for EVs.

Responding to Climate Change

Implementation of Net Zero

Low-Carbon R&D

Hanwha Solutions is pursuing innovation centered on low-carbon R&D activities to address climate change and create new business models for a sustainable future.

+ Hanwha Solutions' Central R&D Center's Mission

Secure future growth engines

Building upon a solid research strategy, we are actively engaged in the research and development of core technologies, new products, and eco-friendly solutions to drive our company's next-generation ventures.

Improve the competitiveness of existing businesses

To ensure the highest competitiveness in our current businesses, we pursue research focused on upgrading existing processes, enhancing product quality, and implementing innovative cost-reduction strategies.

Become the best group of experts

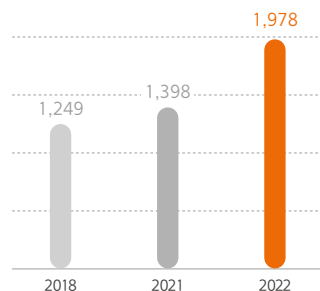
To cultivate exceptional talent for pioneering research endeavors, we are committed to creating an environment that encourages creativity and enables our researchers to thrive.

Secure the global R&D network

To solidify our position as a global market leader, we actively foster a collaborative ecosystem that brings together promising international companies and esteemed research institutes.

+ 2020-2022 R&D Investment Status

Unit: KRW 100 million



R&D of Anion Exchange Membrane Electrolysis Cell (AEMEC)

Hanwha Solutions' AEMEC technology is recognized as an innovative solution in the hydrogen production process. It is a next-generation water electrolysis technology that combines the advantages of Alkaline Electrolysis Cell (AEC) and Proton Exchange Membrane Water Electrolysis Cell (PEMEC) technologies, which enables the production of large quantities of hydrogen with low investment costs and minimal power requirements.

We are committed to further developing and refining the AEMEC technology, with the ultimate goal of commercialization. Simultaneously, we are focusing on enhancing our capabilities in core materials and large-scale processes. By doing so, we aim to successfully bring the AEMEC technology to market and expand its reach as a global business.

Alkaline Electrolysis	Initial Investment Cost	Productivity	Durability	Mass Production (commercialization)
AEC	Low	Low	High(10~20years)	Complete
PEMEC	High	High	Low(2~5years)	Complete
AEMEC	Low	High	R&D in progress (for improvement of Ion Exchange capacity, durability and mass production)	

Development of Carbon Molecular Sieve (CMS)

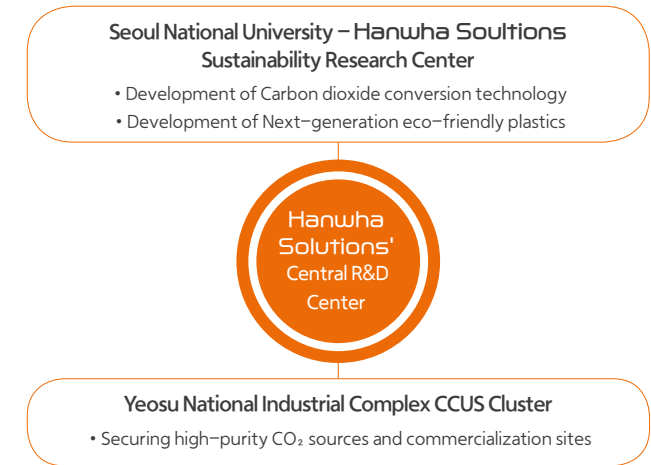
Our Chemical Division is currently developing its own technology to localize black pellet-shaped CMS materials capable of selectively absorbing and separating desired gas molecules, including CO₂, from industrial gases. This project is part of the government's 2021 Carbon Industry Foundation Creation Projects, which has received a total investment of 6.8 billion won. As part of this project, we have entered into an agreement with the Korea Evaluation Institute of Industrial Technology, and we have set a goal to complete the verification of pilot-scale facilities by 2025. We are pleased to announce that as of 2022, we have successfully completed the first stage process and reached a second stage agreement. Through the development of CMS, we plan to significantly increase the efficiency of CCUS and utilize them as the core material in our pursuit of Net Zero by 2050.

Cooperative Sustainability Research System

Since entering a business agreement with Seoul National University – Hanwha Solutions Sustainability Research Center we have been developing catalytic technologies that convert carbon dioxide into useful substances and next-generation eco-friendly plastics. In addition, we are actively promoting Net Zero research by participating in the Carbon Neutral Chemical Technology Research Council launched by the Korea Research Institute of Chemical Technology and identifying related research trends and using it as a communication channel for policy recommendations necessary to the government.

Furthermore, we have established the Yeosu National Industrial Complex CCUS cluster in collaboration with leading companies such as GS Caltex, Linde Korea, and Hyundai Glovis and signed a Corporate Consortium Agreement for CCUS Business. Through these partnerships, we intend to secure high-purity CO₂ sources and commercialization sites and pursue the entire business within the cluster as a government initiative to reduce initial investment costs in CCUS technology development.

+ Sustainability Research Cooperation System



Seoul National University – Hanwha Solutions Sustainability Research Center

- Development of Carbon dioxide conversion technology
- Development of Next-generation eco-friendly plastics



Yeosu National Industrial Complex CCUS Cluster

- Securing high-purity CO₂ sources and commercialization sites

SUSTAINABLE SOLUTIONS

Green Biz Innovation

Issue Approach

As ethical consumption continues to spread due to COVID-19 and lifestyle changes, the demand for eco-friendly products and services from customers is gradually increasing.

To respond to this trend, Hanwha Solutions is making efforts to explore diverse eco-friendly business models and contribute to the creation of a sustainable environment while considering the impact of our business practices on the environment and climate change.



Green Biz Innovation

Green Technology

Green Technology and Product & Investment Strategy

Green Technology and Product Development Strategy

1 Develop battery business partnerships

- Sign a memorandum of understanding in Seoul for comprehensive battery business cooperation for energy storage system (ESS) and other clean-tech energy solutions including urban air mobility (UAM), with three Hanwha companies (Qcells, Momentum, and Aerospace) and LG Energy Solution
- Dominate the fast-growing ESS market through the joint investment to build battery production lines in the U.S.
- Maximize synergy through cooperation in the special purpose battery development that can be applied to future new growth businesses such as urban air transportation (UAM)

2 Enter the global energy system market

- Obtain the qualification of energy system certification laboratory from UL Solutions to demonstrate excellent system and product safety verification technology
- Conduct global certification tests for energy system products, such as inverters and ESS, and obtain IL and IEC certificates
- Create a foundation to accelerate market entry into the energy system market in North America and Europe

3 Reinforce Leadership in Photovoltaic (PV) Technology

- Enhance cell production capacity at the Korean plant from 4.5GW to 5.4GW per year, and commercialize TOPCon cells which offer 1% higher efficiency than existing PERC cells starting in second half of June 2023
- Expand our market share in the US residential and commercial sectors by offering high-efficiency module products utilizing TOPCon cells
- Begin mass production of perovskite-based tandem cells, which have a theoretical maximum efficiency of 44%, starting from in second half of 2026, with the aim of preempting the PV market in the future



Aggressive investment in green R&D

Investment in cleaner production technology and a circular economy

Build a sustainable eco-friendly business model

Eco-Friendly Technology and Product Development

Eco-Friendly Products Through Waste Plastic Recycling

Hanwha Solutions is actively developing carbon resource recycling technology, which allows for the production of petrochemical raw materials like naphtha through the purification of pyrolysis oil extracted from waste plastics. We have also obtained the Global Recycled Standard (GRS) certification from Control Union, a renowned global certification body, for our Recycled Polyethylene (rPE). In addition, we are focused on the development of Post Consumer Recycled (PCR) Products that utilize rPE, aligning with the increasing demand for eco-friendly products.

In August 2022, we entered into a three-party agreement with Yonwoo and Kolmar Korea to facilitate the commercialization of eco-friendly cosmetic containers made from rPE. Furthermore, we are expanding the production of rPE industrial recycled packaging bags, which commenced in 2022, and aim to supply 10,000 tons of rPE by 2027 through collaborations with various domestic consumer goods companies.

+ Eco-Friendly Cosmetic Containers Using rPE + rPE GRS Certification



Hanwha Motiev's EV Charging Business

In line with our commitment to sustainability, our Qcells Division has pledged to participate in the K-EV100 initiative, which aims to convert 100% of the company's vehicles to eco-friendly vehicles by 2030. As part of this effort, we launched Hanwha Motiev in 2022, a comprehensive EV charging business that offers a range of solutions including consulting, investment, construction, operation, and maintenance.

Hanwha Motiev is dedicated to promoting the adoption of eco-friendly vehicles within the Hanwha Group and throughout the country. Leveraging our data-driven energy solution capabilities, we aim to provide efficient charging power utilization and alleviate the burden on the power system.

Green Biz Innovation

Green Investment

Green Investments and Purchases

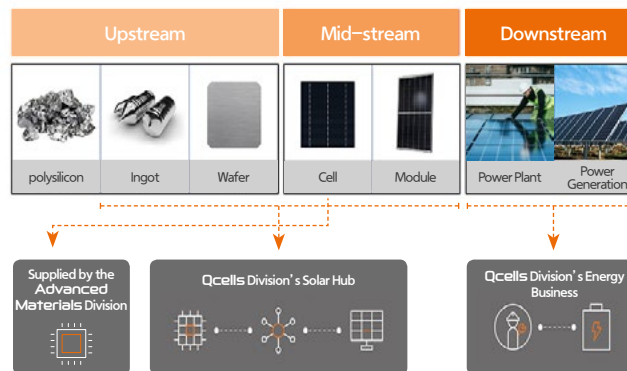
The ongoing Russo-Ukrainian war has highlighted the risks associated with fossil fuel supply and has prompted a shift towards reducing dependence on imported energy and increasing the demand for domestically produced renewable energy. This shift in energy market trends is focused on boosting domestic production rather than solely focusing on cost reduction. In Europe, there are plans to significantly increase the number of solar installations by 600 GW by 2030 through initiatives like REPowerEU and make it mandatory for public and commercial buildings to install PV modules. In the U.S, the IRA bill aims to provide tax incentives for PV installations and invest in grid infrastructure to address the volatility in renewable energy production. Aligned with these global trends, **Hanwha Solutions** plans to expand investments in eco-friendly ventures, with a particular focus on the PV business.

Solar Hub

Hanwha Solutions has plans to invest more than 3 trillion won in Georgia, USA, by 2024 to establish an integrated solar manufacturing complex named Solar Hub, capable of manufacturing 3.3GW of ingots, wafers, cells, and modules. In 2022, we acquired a stake in REC Silicon to secure a production line for polysilicon, which is a crucial raw material for PV modules. Through this strategic move, we anticipate reducing the environmental impact of the polysilicon production process by producing 16,000 tons of clean polysilicon annually thanks to its facility which is based on hydroelectric power generation.

The establishment of the Solar Hub will enable us to secure a complete solar manufacturing value chain covering the production of polysilicon, ingots, wafers, cells, and modules. The completion of the Solar Hub construction by the end of 2024 will increase our production capacity in North America from 1.7 GW to a total of 8.4 GW. This expanded capacity will provide enough electricity to sustain 1.3 million U.S. households for a year and contribute to a reduction of approximately 9.78 million tons of CO₂ emissions annually. Through this investment, we anticipate securing a supply capacity of about 19 GW by the end of 2024, with 8.4 GW produced in the U.S. Furthermore, with the upcoming operation of the Solar Hub, we aim to strengthen our position as a leading company in the U.S by establishing a full value chain production line, covering all five stages from polysilicon, as basic material, to modules as the finished product. We believe that this investment will play a crucial role in enhancing the virtuous cycle structure of the PV business and improving our overall competitiveness.

+ Solar Hub and Value Chain Roadmap



Solar Partnership with Microsoft(MS)

Hanwha Solutions has entered into a strategic solar partnership agreement with Microsoft (MS) to promote various joint PV power generation projects, aiming to expand the use of eco-friendly energy and reduce carbon emissions. Starting this year, we will supply over 2.5 GW of modules to solar power plants with which MS will sign power purchase agreements (PPAs). Additionally, we will be responsible for the engineering, procurement, and construction (EPC) of these solar power plants.

As part of MS's energy transition project, which aims for Net Zero by 2030, we will oversee the engineering and construction of PV modules. This groundbreaking agreement represents the first large-scale renewable energy procurement collaboration between a major global information and communications technology (ICT) company and a PV company.

Through this partnership, we anticipate transforming from a solar module manufacturing company to a comprehensive energy company that collaborates with global organizations. We will further strengthen our capabilities as we move towards becoming a leading complete energy company, leveraging the Solar Hub, which is scheduled to be fully operational next year.

Green Biz Innovation

Green Investment

Ethylene-Vinyl Acetate (EVA) Sheet

Hanwha Solutions is making significant investments in EVA sheets, both in Korea and the U.S., with the aim of revitalizing the renewable energy industry by enhancing the performance of solar modules. EVA sheets play a crucial role in PV modules by safeguarding the PV cells from moisture, shock, and sunlight, while also improving light transmittance and backside power generation.

To increase EVA production capacity, our Chemical Division has formed a joint venture called H&G Chemical in collaboration with GS Energy. Furthermore, we plan to expand our EVA sheet production plants in Eumseong, Chungbuk, with an investment of approximately 45.8 billion won, and in Georgia, U.S., with approximately 103 million dollars.

FoodTech Businesses

We are actively engaged in the development of cultivated meat, which serves as an eco-friendly, ethical, and sustainable alternative for future food. Furthermore, we have made strategic investments in cultivated meat startups like Finless Foods (USA) and DaNAgreen (Korea) to provide support for their research and development efforts. Through these investments, our goal is to contribute to the reduction of environmental pollution, promote animal ethics, and drive the advancement of eco-friendly technologies that offer high consumer satisfaction in the realm of future food.



Climate-Tech

As a limited partner, we invest in domestic and global funds that focus on Climate-Tech areas such as energy, food, and materials, which have the potential to significantly reduce carbon dioxide emissions and upcycle waste plastics, to gain insights into various market conditions and trends among startup companies. We also directly invest in companies that create business synergies by sharing deal flow and fostering joint development for promising technologies.

Launching of New and Renewable Energy Fund

In January 2023, we entered into a memorandum of understanding (MOU) with SKS Credit, an ESG private equity fund (PEF) company, to collaborate on the development and investment of data centers and logistics centers integrated with renewable energy. Since May 2022, our Insight Division has been driving the development of eco-friendly data centers in industrial parks located in Youngin and Anseong. Hanwha Solutions and SKS Credit have planned to raise investment funds by creating a new fund valued at 250 billion won. With our combined licensing capabilities, we aim to actively address the rapidly growing demand for eco-friendly data centers in Korea.

+ New and Renewable Energy Joing Investment MOU between Hanwha Solutions & SKS Credit



Green Biz Innovation

Green Investment

Green Bonds

Hanwha Solutions' ESG bond management framework has been assessed to align with the International Capital Market Association's (ICMA) Green Bond Principles (GBP), Sustainability Bond Principles (SBP), Sustainability Bond Guidelines (SBG), and the green bond guidelines set by the Ministry of Environment. We are proud to announce that all of our bonds have received the highest ratings of G1 and Green 1 from external evaluation agencies.

+ 2022 Green Bond Issuance and Evaluation Status

Existing

Issued 100 billion won of ESG non-guaranteed public offering bonds in June 2021
As of April 2022, all issued funds have been allocated to renewable energy (PV) businesses, such as the Qcells Division's Jincheon Plant 2 facility investment funds, etc.



- All post-evaluations by external evaluation agencies* have obtained the highest grade (G1 and Green 1)
- The achievement of climate change mitigation goals by improving the environment, including GHG reduction (approximately 43,037 tCO₂-eq) disclosed in the post-report

New

Issued 275 billion won of ESG non-guaranteed public offering bonds in January 2022
As of October 2022, about 31.6% of the funds were distributed to the introduction of large-area wafers and the construction of production lines for high-efficiency PV cells&modules with TOPCon technology.



- All post-evaluations by external evaluation agencies* have obtained the highest grade (G1 and Green 1)
- Environmental improvement effects such as securing higher renewable energy (PV) power generation with the same unit area of PV cells and modules due to new technology was disclosed in the post-report.

Issued 60 billion ESG BLCP in April 2022
As of December 2022, all issued funds were allocated to the construction of production facilities for PV modules, solar-related R&D, and EV charging business.



- Obtained G1 grade from the pre-evaluation by Korea Ratings regarding the plans on how to use the funds, and completed submission to the investor (Shinhan Bank)
- Details on how the funds were used are submitted to a credit ratings agency, every 1 year after the issuance, to evaluate whether they accord with green bond purposes, and obtained the highest grade (G1).

*Korea Ratings and NICE Investors Service

SUSTAINABLE SOLUTIONS

Safety Workplace

Issue Approach

Hanwha Solutions is striving to create a safe workplace and a sustainable corporate culture for our employees and suppliers.

In light of the implementation of the Serious Accident Punishment Act, there is an increased awareness of potential regulatory and management risks associated with safety incidents. Placing safety as our utmost value, we organized Safety, Health, and Environment (SHE) governance and systems at the global level to comply with laws and regulations and to fulfill our social responsibility.



Establishment of a Safety Culture

Enhanced safety leadership competencies led by organization manager

Promoted safety communication including Safety Town Hall and VFL

Identified and improved on-site risk factors, considering the possibility of industrial accidents

Inspected the safety and health management system through Safety Review

Safety Risk Identification and Prevention

Safety Workplace

Reinforcing Safety Leadership

Risk Review by Executive Management

At **Hanwha Solutions**, the Board review ESG risks, including those related to safety and health. This enables us to identify potential safety and health risks and develop proactive action plans to prevent safety risks in advance.

+ Article 11 of the ESG Committee Regulations

① The following matters shall be referred to the Committee.

2. Review major ESG policy activities and action plans

B. Examine Social (S) policy activities and policy objectives
– ESG risks, including safety and health risks, human rights risks, major supply chain sustainability risks, and community risks

Safety and Health Action Plan

Every year, we develop a comprehensive safety and health plan, which is then reported and discussed with the board. Based on the safety and health plan, we establish a detailed action plan for each sector to effectively achieve our goals. Through semi-annual analysis of safety and health performance, we identify areas for improvement and carry out corrective actions to address any deficiencies in goal-setting for the following year.

Safety Leadership Activities

Hanwha Solutions is undertaking a range of safety leadership activities to foster a sustainable safety culture that is crucial for achieving an accident-free workplace. These activities involve promoting safety mindfulness and instigating behavioral changes in safety leadership among managers at all levels, as well as improving safety systems.

Safety Town Hall Meetings

The **Chemical** Division organizes Safety Town Hall Meetings to communicate safety goals and visions to all employees and actively address safety issues.

These meetings serve as a platform for open discussions between management and employees, fostering effective communication. Based on the safety leadership assessment conducted in 2021, we identified five key safety tasks, including safety communication, evaluation of safety education system, risk identification and control, maintenance of tools and equipment, and implementation of penalties and rewards. In 2022, considering the COVID-19 situation, a video message about safety by the executive director of production safety was delivered to all employees. The video emphasized the importance of enhancing safety culture, workplace safety philosophy, our safety goals, vision, and action plans.

These initiatives enable us to effectively communicate our safety objectives and work together to create a safer workplace.

+ Delivery of Employee Safety Message by Executive Director of Production Safety



Visible Felt Leadership (VFL) Activities

Our **Chemical** Division has been actively enhancing safety leadership through the implementation of VFL (Visible Felt Leadership) activities across our worksites, including Yeosu, Ulsan, and TDI. The process begins with the worksite managers assessing the work environment, listening to any concerns or unsafe factors, and engaging in constructive safety conversations to encourage and provide support. Subsequently, we transition to department offices or conference rooms to conduct site manager meetings, which are attended by department heads and safety and environment supervisors. During these meetings, we share updates on daily work progress, highlight any potential risks or near misses that have been identified, discuss recent safety improvement initiatives, address matters requiring support, and review the results of VFL safety observations. Additionally, we engage in discussions to identify solutions for addressing unsafe behaviors and conditions.

Through our commitment to VFL activities, we are dedicated to strengthening safety leadership and ensuring that all employees have a secure working environment.

Safety and Health Discussions

Our **Insight** Division prioritizes safety and health by conducting regular discussions attended by executives, safety and health managers from each business site, and team managers from related departments. These discussions serve as a platform for sharing the current status of safety and health, including statistics, inspections, and accident cases, and collaboratively devise effective countermeasures to address any identified issues. To enhance our safety and health work capabilities even further, we actively participate in safety and health councils, safety and health themed fairs and seminars and stay informed with the latest trends in safety and health technology, such as accident prevention activities and smart safety products.

Safety Workplace

Minimizing Safety Risks

Identifying and Improving Risk Factors

Hanwha Solutions thoroughly manages risk factors, focusing specifically on high-risk tasks that have the potential to result in serious accidents. We establish upper limit goals and regularly create work plans to ensure that dangerous tasks or situations with the potential for accidents, serious injuries, and fatalities are not concentrated at specific times. Activities are also conducted to enhance risk factors in processes that are prone to serious industrial accidents, such as fires, explosions, and leaks. Furthermore, we actively promote site-centered activities for identifying risk factors and implement a safety mileage system that incentivizes the discovery of risks.

Entering a Safety Management Agreement

In July 2022, Hanwha Solutions signed an MOU with Korea Gas Safety Corporation to strengthen the safety management system and practice ESG management, as well as to promote collaboration in ensuring the safety of petrochemical facilities and preventing accidents. The safety technology cooperation established through this MOU will focus on promoting an IT-based mid- to long-term safety management solution roadmap, implementing on-site safety management through advanced diagnostic techniques, providing training for facility safety management technology experts, and fostering shared growth through win-win cooperation programs for small and medium-sized businesses. By 2025, our goal is to establish a risk-based inspection (RBI) system at our Yeosu and Ulsan sites, which will involve diagnosing and managing safety considering the potential risks associated with each production facility. Through these initiatives, we aim to create a working environment where safety is prioritized by advancing safety management at a global level and fostering cooperation between the two companies.

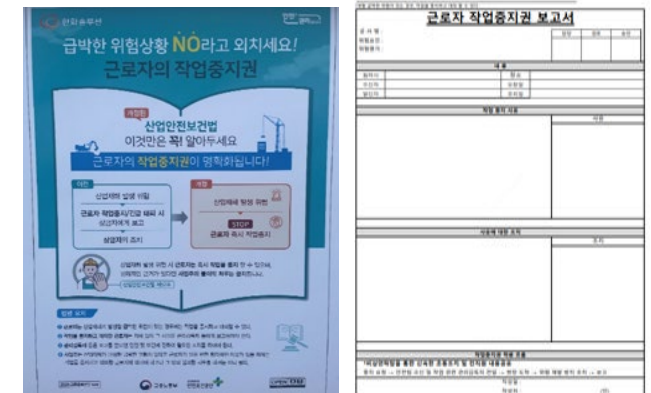
+ Safety Management Agreement Between Hanwha Solutions & Korea Gas Safety Corporation



Implementation of the Right of Work Suspension

In order to ensure the safety of our workers, we have implemented the right of work suspension in accordance with Article 52 of the Occupational Safety and Health Act. This enables workers to exercise their right to stop working in dangerous environments. If workers believe that there is a high probability of an accident occurring on the job, they can practice this right and request for work suspension.

To alleviate the burden on our employees, our Insight Division has installed information signboards on-site and conducts regular training on the right of work suspension. We also maintain records to identify and address safety risk factors, thus promoting a safer working environment for our employees.



+ Insight Division's Right of Work Suspension Implementation Status

Site	Date and Time	Details	Measures
	04-14-2022, 13:40	High winds and strong waves pose a drowning hazard. Work suspension requested	Confirmed that work cannot proceed due to swelling waves 2022.04.14 14:00 Work suspended
Goheung Bay Floating Photovoltaics (FPV)	07-14-2022, 15:40	Requested to stop crane lifting work due to instantaneous wind speed of 16 m/s	Stopped work immediately, checked the wind speed, and proceeded with work at below 10m/s (16:20)
	08-19-2022, 10:20	A worker who was installing a water structure bird prevention facility stopped work due to heat illness (high fever)	The worker immediately stopped work and rest in the shade. Normal temperature confirmed after three hours and he was sent home

Safety Workplace

Minimizing Safety Risks

Risk Assessments

Based on the safety and health management system (ISO45001), **Hanwha Solutions** has established the goal of prioritizing safety and health culture and conducts regular reviews of our annual operating performance and related matters. Through these reviews, we continuously monitor and improve safety risks and activity status. Our **Chemical** Division focuses on minimizing safety risks by evaluating the effectiveness of safety and health measures.

The **Qcells** Division conducts regular and frequent risk assessments to identify and address potential risk factors on-site. By utilizing a mobile app, we fulfill our obligation to ensure work safety by quickly identifying and addressing risk factors. We emphasize the line responsibility system and maintain a clean workplace through weekly guidance on environmental safety management priorities and periodic risk assessment meetings. We encourage worker communication and autonomous safety management.

In the **Advanced Materials** Division, we work to prevent safety accidents by conducting safety assessments through external risk assessment experts. These assessments help us identify various potential hazard factors and incorporate the findings into regular and frequent risk assessments.

Meanwhile, the **Insight** Division conducts risk assessments to prevent safety risks. From the start of construction at new sites, we conduct initial risk assessments, as well as regular and occasional risk assessments. Occasional risk assessments are conducted every two weeks to identify risk factors and establish corresponding preventive measures. These measures are reviewed by the management supervisor, safety and health manager, and site manager. We hold risk assessment meetings and daily safety inspections involving site directors and workers to ensure the implementation of preventive activities. We also prepare requests for corrective measures based on the findings of risk assessments and strive to minimize safety risks by implementing preventive measures with our suppliers.

Lastly, The **Galleria** Division conducts annual risk assessments for each business site, along with occasional assessments, to establish risk reduction measures and prevent safety accidents.

+ 2023 Chemical Division's Management Status of Key Safety and Health Evaluation Items

Key Evaluation Items	2023 Goal	Cumulative Performance
Near Misses	Cumulative Participation Rate: 70% Number of incidents: 1,503 (1 incident/year per person)	30.0% 770 incidents
Safety Leadership Activities	85 points	87.2 points
Core Task Observations (CTOs) ※ Process/Task Risk Assessment	736 times (20 times / year by operation team)	118 times

*Cumulative performance as of March 2023

+ Qcells Division's 2022 Regular Risk Assessment Results

Classification	Detail
Purpose	To proactively prevent accidents that may be caused by high-risk factors by conducting inspections to identify and address hazardous risk factors associated with each major process and task
Applicable Regulations	Article 36 of the Occupational Safety and Health Act (Implementation of Risk Assessment)
Subject	All processes of Qcells plants in Korea
Evaluator	Process engineers, Hanwha Solutions personnel, supervisors, and workers in each department *The results of the department's evaluation are further reviewed and revised by the environmental safety team
Method	4M risk assessment
Evaluation Result	Major risk factors and improvement measures(Jincheon Plant) 1. Risk factor: Simple loading on pallets when handling damaged glass → Improvement measures: Manufacturing and keeping of glass damaged collection boxes 2. Risk factor: Scratch during Deframe rework → Improvement measures: Payment of personal protective equipment 3. Risk factor: Risk of exposure to residual chemicals during equipment PM → Improvement measures: Installing fixing brackets
Risk Improvement	Risk improvement measures for major risk factors 1. Simple loading on pallets when handling broken glass items: (previous)9 → (Improved)3 2. Scratches during deframe rework(previous)8 → (Improved)2 3. Exposure to chemical residue during equipment PM: (previous)8 → (Improved)4

Safety Workplace

Minimizing Safety Risks

Conducting Safety Reviews

The **Chemical** Division conducts safety reviews to inspect and enhance the safety and health management system, including safety and health systems, material safety, risk improvement, operational safety, facility safety, and process safety. Furthermore, our safety support group actively observes and addresses unsafe behaviors related to high-risk work, identifying and mitigating potential risks to improve overall safety.

+ An Example of Safety Review Results

- **Process safety:** Improve emergency drill scenarios and strengthen trainings
- **Occupational safety:** Conduct thorough risk assessment and implement safety measures before work

+ An Example of Unsafe Behavior Analysis Results

- Maximum frequency of unsafe behavior in hot and aerial operations
- Monitor unsafe conditions and behaviors at more than 2% level in the worksite

Worksite Safety and Health Inspections

At **Hanwha Solutions**, we conduct safety and health inspections at each worksite in accordance with our safety and health management policies and goals, aiming to strengthen employee safety.

+ Safety and Health Inspections in 2022

Classification	Details
Joint and self-inspection	<ul style="list-style-type: none"> • Joint special safety inspections (quarterly) and labor relations assessments (bimonthly) • Departmental safety and health management and evaluation inspections (half-yearly)
Inspection by worksite	<ul style="list-style-type: none"> • Safety patrols led by worksite safety managers (monthly) • CSO safety and health rounds in worksites
Theme Inspection	<ul style="list-style-type: none"> • Safety theme inspections (MSDS, hazardous machinery and equipment, construction safety management, etc.) • Third-party safety and health inspections through external organizations

Critical Task Observation (CTO)

Based on the Serious Accident Reduction Roadmap and the Revision of the Risk Assessment Notice, our **Chemical** Division conducts activities to identify and address on-site risk factors in collaboration with operators and maintenance officers. These activities are led by management supervisors, including shift managers, and focus on tasks or processes that have a high possibility of leading to industrial accidents such as fires, explosions, and leaks.

+ Conditions Subject to CTO Evaluation

- Fire, explosion, leakage, and injuries that require more than first aid
- Operations/processes with conditional or unacceptable hazards
- Operations/processes that the supervisor determines are likely to cause an industrial accident
- A and B grade near misses with a high risk of accidents

+ CTO Evaluation Process

Examine risk factors	<ul style="list-style-type: none"> • Determine whether risk factors are acceptable
Establish improvement measures	<ul style="list-style-type: none"> • Prioritize highly effective measures to prevent accidents
Disclose the results	<ul style="list-style-type: none"> • Share risks identified through regular departmental safety training, Occupational Safety and Health Committee examination, and CTO during toolbox meetings (TBMs)

+ Guidelines for Identifying and Improving On-Site Risk Factors



Safety Workplace

Strengthening Safety Capabilities

Fostering Safety Professionals

Our **Chemical** Division trains professionals in the safety field, improves the company's safety training system, and secures and nurtures safety experts based on industry-academia collaborations.

Improving Employees' Safety and Health Capabilities

The **Chemical** Division has signed an MOU with Korea National University of Transportation for industry-academia collaboration and provides financial support for employees to complete courses at Seoul National University of Science and Technology and Specialized Graduate Schools. Through this initiative, we anticipate to secure 15 professionals with safety degrees by 2024. In addition, we encourage employees to obtain legal safety certificates to enhance the level of safety management on-site and ensure a stable professional workforce. We also aim to strengthen employee competencies by inviting professors from the safety department of Korea National University of Transportation and experts from the Gas Safety Corporation to provide external trainings.

Structured Safety Trainings

We conduct safety trainings in accordance with relevant laws and regulations, including the Occupational Safety and Health Act, to ensure compliance and promote a structured safety training system. Our training programs are tailored to different positions, such as recruitment, regular, special, management supervisors, and safety and health officials.

The **Qcells** Division conducts an annual training needs survey to identify areas for improvement in the safety education system for internal employees. Based on the feedback received, a comprehensive training plan is developed, focusing on enhancing the ability of management supervisors and workers to identify and address risk factors. The training programs are designed to be interactive and participatory, incorporating discussions and practical exercises.

Similarly, the **Insight** Division conducts various safety and health education programs in line with relevant laws and regulations, including the Occupational Safety and Health Act.

Internalizing a Safety Culture

Establishing a Sound Safety Culture

Our **Chemical** Division has implemented a comprehensive safe atmosphere assessment survey, consisting of 12 elements and 78 questions, conducted by an external organization. The survey aims to evaluate the existing safety culture within the division and identify areas of strength and areas for improvement. Based on the survey results, we have developed a plan to further strengthen the strengths and address the weaknesses identified.

Similarly, the **Qcells** Division conducts an annual safety culture evaluation survey, consisting of 50 questions across 5 categories. The survey assesses the level of safety culture in areas such as safety leadership, constant safety management, line responsibility system, education and training, and communication. The results of the survey are used to identify the current level of safety culture and establish improvement plans. To further encourage safety, health, and environment (SHE) activities, we incorporate them into key performance indicators (KPIs) and provide incentives for each department. We also promote site-centered safety management through various initiatives such as consulting and education with specialized organizations, implementing ESH member system for each team, offering rewards for near-miss discoveries, and distributing safety newsletters.

In the **Insight** Division, a separate budget has been allocated for safety and health activities. Semiannual safety and health evaluation scores are included in the KPIs, incentivizing collaborating departments to actively participate in safety and health initiatives. In addition, we recognize and reward accident-free workplaces to foster employee interest and efforts in safety and health.

Safety Workshop

The **Galleria** Division has conducted a safety workshop for the head of the safety and environment department and related employees. In the first half of the year, the safety and environment officers from the head office and worksites attended and reviewed updated regulations and revised safety and health documents. In the latter half of the year, the heads of the safety and health departments of the head office and worksites attended and shared performance, plans, and best practices. Through this workshop, we grasp the latest trends in the safety and environment industry and promote agreements and experience sharing for efficient safety and health management.

SHE Excellence Awards

The **Chemical** Division operates the SHE Excellence Awards every year to create an atmosphere for safety, health, and environment activities and to raise interest.

In 2022, a total of eight employees and three teams were awarded. Moving forward, we will continue to make efforts to internalize the safety and health culture while prioritizing safety as the company's utmost value.

+ SHE Excellence Award Ceremony



Safety Workplace

Internalizing a Safety Culture

Safety Golden Rules

For the purpose of preventing serious accidents and building a safety culture, Hanwha Solutions has established the Safety Golden Rules that must be followed by everyone, including employees, subcontractors, and visitors.

2022 Safety Golden Rules Operational Status

Eight critical safety rules in the workplace were selected through an employee survey (January 2022)

Began operating under the belief that "Safety Golden Rules are the highest value that must be complied with (August 2022)

Monitored violations of the Safety Golden Rules by worksite managers, executives, and team managers (we plan to expand the monitoring to include business managers and safety supervisors)

Workplace Safety Declaration and Safety Resolution Contest

In August 2022, our Qcells Division introduced Ten Safety Practice Commitments to prevent safety accidents and enhance safety culture awareness. In January 2023, we organized a safety resolution contest for employees and suppliers at Jincheon and Eumseong Plants with the aim of eliminating industrial accidents and promoting a safety culture. Through this initiative, we effectively communicated our safety and environment goals and policies to the workforce and encouraged active participation from all employees in fostering a safe working environment.

Safety Culture Enhancement Project

As the need for active safety performance management is becoming more emphasized in accordance with strengthened laws and the social atmosphere, the Chemical Division has implemented a safety culture enhancement project aimed at building a global safety culture. In collaboration with the Safety Culture Research Institute and Korea National University of Transportation, we evaluated each plant and position level based on 12 factors over a period of six months. We conducted two evaluations in 2022 and 2023, and it was confirmed that the average value of the 12 factors increased in all worksites (Overall average: 5.45 → 5.65, +0.20). Based on the evaluation results, each worksite analyzes its strengths and weaknesses to create improvement measures and implements free communication across position levels, occupations, and departments.

Furthermore, we are striving to create a site-centered autonomous safety management culture by avoiding safety activities held solely for formality and carrying out practical accident prevention activities through the internalization of risk assessments.

Create SMART Checklist

- To ensure that the safety management system is functioning properly
- The checklist items are incorporated in the worksite safety review

Improve task standardization & implementation system

- Standardize the process of serious industrial accident prevention tasks
- Notify implement measures for each worksite and improve implementation system based on the standardized process

Develop on-site safety inspection handbook

- Share improvement measures for on-site facilities for each worksite
- Strengthening the competency of safety supervisors through training programs that utilize handbooks

Safety Workplace

Ensuring Employees' Safety and Health

Chemical Risk Assessments

In order to enhance the working environment for our employees, **Hanwha Solutions** conducts risk assessments for all chemical substances and strives to develop risk management measures for high-risk processes. To achieve this, we have implemented CHARM, a qualitative chemical hazard assessment technique that utilizes data from work environment measurement result, toxicity information from the metering data management system (MDMS), and exposure standards. In 2022, we conducted CHARM-based risk assessments for one business site, and we have plans to expand this assessment to all sites in 2023. Furthermore, we are committed to minimizing employees' exposure to chemicals by establishing internal chemical management standards that are stricter than the legal requirements.

+ Chemical Risk Assessment Procedure

Select the target (process/chemical substance)	<ul style="list-style-type: none"> Select assessment targets and set evaluation units Secure relevant data (work environment measurement chart, MSDS, etc.)
Determine the probability level	<ul style="list-style-type: none"> Utilize work environment measurement results The combination of handling volume, acidity, and volatility are utilized if the measurement results are unavailable
Determine the severity level	<ul style="list-style-type: none"> Confirm whether it is carcinogenic, mutagenic and reprotoxic (CMR) substance Use exposure criteria (TWA) and toxicity values (acute, skin corrosion, specific target organ toxicity, etc.)
Determine risks	<ul style="list-style-type: none"> A stage to determine whether it is permissible For levels 6 or higher, risk reduction activities required, for risk levels 12-16, stop work immediately
Establish and implement risk reduction measures	<ul style="list-style-type: none"> Establish risk reduction measures and set priorities Establish measures such as process change, isolation, installation/improvement of ventilation systems, or wearing PPE

Employee Health Care

Worksite Health Management Activities

To promote health management of employees and subcontractors in the workplace, we mandate that each worksite establish and operate health management guidelines on health checkups, patient management, and the management of musculoskeletal and cerebrovascular hazards. To identify harmful factors, we also carry out various activities, such as conducting semiannual work environment measurements for each worksite.

+ Worksite Health Management and Operational Plan

Health Checkup	<ul style="list-style-type: none"> Identify health checkups according to legal requirements such as general and special Designate health management entities such as health managers, occupational health physician, and nurses
Patient Management	<ul style="list-style-type: none"> Establish health management standards for each worksite
Musculoskeletal and cerebral cardiovascular diseases management	<ul style="list-style-type: none"> Address work-related musculoskeletal and cerebrovascular hazards for each worksite
Work environment measurement	<ul style="list-style-type: none"> Measure and take improvement measures for each work environment and facility

Health Care Programs

The **Chemical** Division is raising interest in health through a company-wide exercise program and plans to operate a walking program using an app, allowing anyone to participate regardless of working hours.

The **Qcells** Division conducts special health checkups for employees exposed to harmful factors in each process, supervised by in-house industrial nurses and health managers. They also offer health improvement programs for quitting smoking, managing obesity, and addressing cerebral cardiovascular diseases. Additionally, one-to-one counseling services with external organizations and in-person counseling with professional counselors are provided to manage job stress among employees.

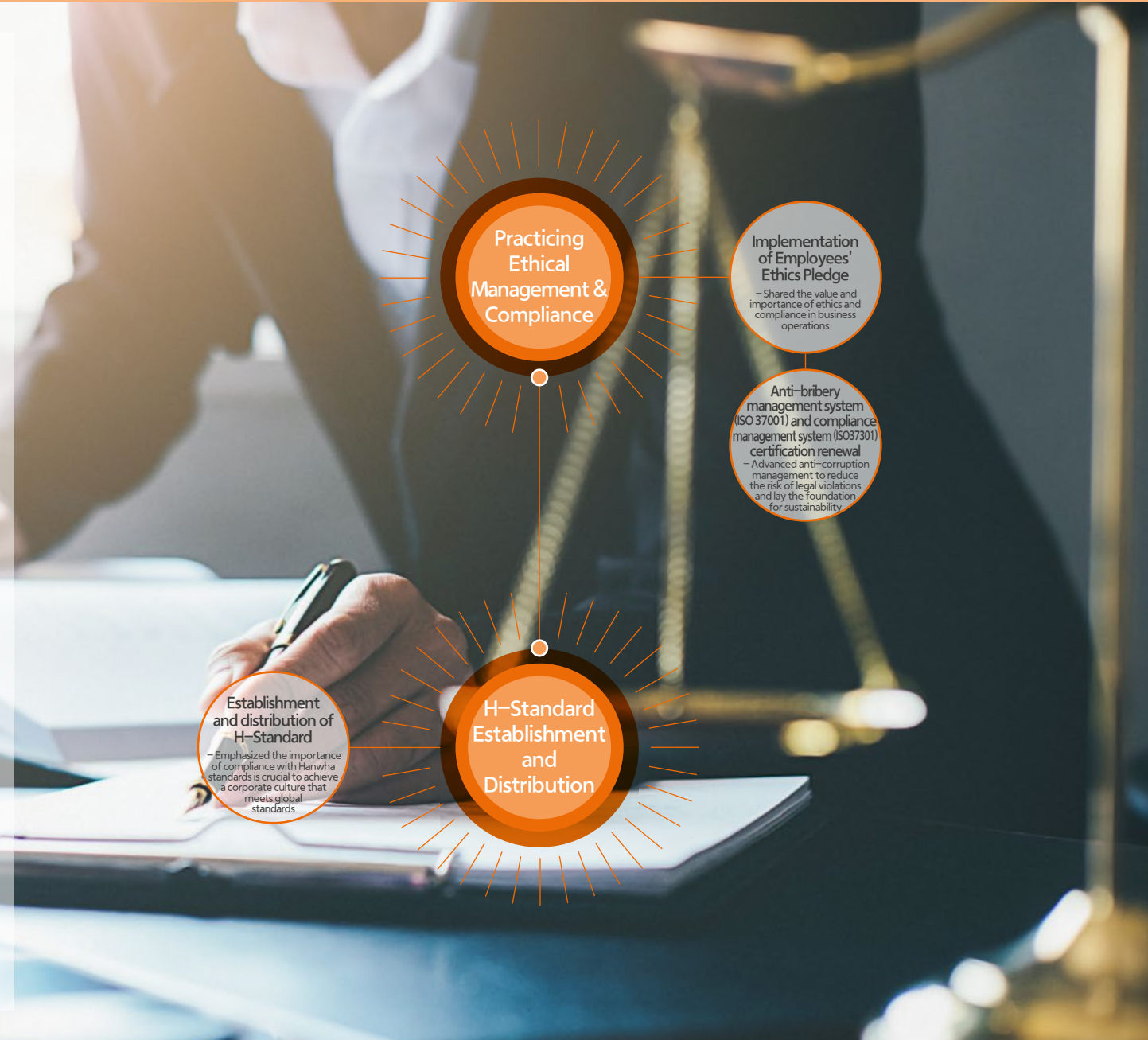
The **Insight** Division and **Galleria** Division have established health rooms at worksites and offer health counseling for elderly workers and those with abnormal health conditions.

SUSTAINABLE SOLUTIONS

Ethical Management & Compliance

Issue Approach

Ethical and compliance issues can be major risk factors in a company's business operations and are key factors in solidifying the foundation of sustainability. Hanwha Solutions complies with both domestic and international laws and regulations in all our business activities, evaluates and manages major risks through the risk council, and strives to establish a noble and ethical corporate culture as a global company that fulfills its social roles and responsibilities.



Ethical Management & Compliance

Establishing a Culture of Compliance

Compliance Regulatory Response Activities

Hanwha Solutions identifies and evaluates risks that may arise across the organization through risk management processes, and subsequently establishes and implements action plans. We also ensure compliance through regular compliance inspections throughout the year, and continuously enhance our fair trade compliance program by appointing a compliance manager and implementing the compliance program (CP) regulations as of 2022. Furthermore, we conduct regular ethics and compliance training for all employees to promote ethical management awareness.

Through these various compliance activities, we aim to proactively prevent risks, strengthen employees' consciousness, and enhance management stability to ensure the sustainable growth of the company.

+ Compliance Regulatory Response Activities

Statute	Details	Measures and Performance
Subcontracting Law (Effective 02.18.2022)	<ul style="list-style-type: none"> Requires signing a non-disclosure agreement and specify the items in the description Expands the scope of documents that are subject to preservation 	<ul style="list-style-type: none"> Revised the operating regulations of the Insider Trade Review Committee to align with the revision of the Fair Trade Act Expanded the scope of internal control by including transactions with international affiliates for deliberation Established a compliance training system to promote the internalization of ethical compliance awareness Conducted trainings on major laws related to industrial safety accidents to enhance employees' ability to respond effectively Prepared standard proposals and non-disclosure agreements and distributed guidelines to ensure compliance with legal regulations regarding the handling of technical data by contractors
Fair Economy 3 Act (Effective 12.30.2021)	<ul style="list-style-type: none"> Revises Commercial Code to improve the unstable decision-making system of companies Revises the Fair Trade Act to address the demands for fair competition order, including issues such as abuse of power by large corporations, the need for a more efficient law enforcement system, and support for innovative growth 	
Serious Accident Punishment Act (Effective 01.27.2022)	<ul style="list-style-type: none"> Outlines the management duties and responsibilities of executives to prevent serious accidents 	

+ Compliance Trainings

Training	Details
Serious Accident Punishment Act Training	<ul style="list-style-type: none"> Main contents of the Serious Accident Punishment Act & updates on the legal interpretation of Ministry of Employment and Labor and Prosecutor's Office after its implementation
Fair Trade Act Training	<ul style="list-style-type: none"> Main Contents and major cases of insider trading and unfair joint practices
Trade Secret Protection Act Training	<ul style="list-style-type: none"> Main contents and major cases related to the company's trade secret protection and prevention of third-party trade secret infringement
Anti-Corruption Law Training	<ul style="list-style-type: none"> Main contents and major cases related to bribery, embezzlement, commercial bribery, and Improper Solicitation and Graft Act

Ethical Management & Compliance

Establishing a Culture of Compliance

Ethics & Compliance Activities

Regular and Occasional Compliance Checks

At **Hanwha Solutions**, we conduct biannual compliance checks for all internal organizations in January and July led by the compliance officer. The results of these inspections are reported to the board, with the exception of the **advanced materials** division, which was excluded from the 2022 compliance check due to a split-off.

Moreover, compliance inspectors from each department conduct semi-annual self-inspections focusing on four major areas: general compliance, civil/commercial compliance, criminal/fair trade/licensing compliance, and other compliance matters. If any non-compliance issues are identified, a response plan is submitted to the compliance office for monitoring.

These compliance checks allow us to review the company's adherence to laws and regulations, as well as ensure that each department and employee involved understands and implements internal procedures. By encouraging compliance among employees and confirming their commitment to adhering to laws and regulations, we contribute to effective compliance management.

+ Compliance Inspection Status in H2 2022

Classification	Details
Inspection date	• 01.05.2023 – 01.20.2023
Purpose	• Reviewed internal work processes to promote compliance and confirmed the willingness to comply
Target	• All divisions, except advanced materials
Results and Actions Taken	<ul style="list-style-type: none"> • Conducted departmental compliance checks based on checklist • Submitted the results to the compliance office • If any issues found, actions were taken by the compliance office

Ethics Consultation and Reporting System

We operate a company reporting channel for ethical and compliance violations that occur during work. The Ethical Management Practice Secretariat ensures thorough management to prevent violations of ethics and compliance based on employees' reports on unethical work instructions, unfair trade, and corruption-related matters.

In addition, if customers and employees of supplier companies have questions regarding ethical management or if they become victims of violations of the Code of Ethics or corrupt practices, we provide the Ethical Management HOTLINE channel for consultation and reporting.

Upon receiving a report, the Ethical Management Practice Secretariat verifies the facts and takes necessary measures. We strictly maintain the confidentiality of the reporter's identity and information, ensuring that they do not suffer any disadvantages as a result of reporting.

Ethical Management HOT LINE



Ethical Management Practice Secretariat

Hanwha Bldg. 21,22F, 86,
Cheonggyecheon-ro, Jung-gu, Seoul
TEL. 02-6049-0746
E-Mail. hccethics@hanwha.com

Internalizing Employee Ethics and Compliance

Hanwha Solutions enhances the awareness of ethics and compliance among employees through regular training sessions. We have developed a comprehensive training curriculum covering compliance, anti-corruption, ethical management, anti-solicitation laws, and trade secret protection. These training programs aim to ensure that all executives and employees have a thorough understanding of the relevant regulations and strengthen their compliance capabilities.

To promote the daily practice of ethics and compliance throughout the organization, we also publish a monthly compliance letter addressed to all employees, providing valuable information on business laws, regulatory trends, and compliance management. Furthermore, during holiday periods twice a year, we distribute letters addressing ethical judgments and standards of conduct to employees, customers, and partners, encouraging active participation in ethical management.

Employee Ethics and Compliance Pledge and Inspection

We are committed to fostering a transparent and trustworthy corporate culture by promoting a strong commitment to ethics and compliance among our employees. In line with this goal, the **Galleria** Division has introduced an ethics pledge that highlights the employees' dedication to upholding the Code of Ethics. This document serves as a foundation for guiding employee behavior and value judgment, emphasizing the significance of corporate ethics and compliance. In addition, we conduct regular self-assessments to evaluate our adherence to the Code of Ethics and Practice Guidelines, fostering a corporate culture where all employees actively engage in ethics and compliance management.

SUSTAINABLE SOLUTIONS

Enhancing Work Environment & Career Development

Issue Approach

In order to support the sustainable growth of the company, Hanwha Solutions is striving to strengthen the competencies of our employees. This is accomplished through the operation of customized training programs tailored to the unique characteristics of our workforce, as well as the implementation of job-specific training courses. In 2022, we underwent a reorganization of our general HR system to promote fair performance evaluation and equitable rewards, ensuring that employees are evaluated and rewarded based on their individual contributions and achievements.



Strengthening Employee Competencies

Promoted a customized competency reinforcement system for different position levels across the company

Enhanced the performance evaluation and reward system to further recognize and incentivize exceptional performance

Introduced a more flexible minimum length of stay requirement to support the growth of exceptional talents, regardless of their position level or age

Reorganization of HR System

Enhancing Work Environment & Career Development

Strengthening Employee Competencies

Securing Top Talent

Making Efforts to Secure Top Talent

Hanwha Solutions actively engages in talent recruitment using various methods, taking into account the shift towards online work environments. We utilize job consultations and conduct online interviews through platforms such as SNS (KakaoTalk Open Chat), in addition to our existing internship programs and industry-academia collaborations. We seek both domestic and foreign experts with exceptional skills and potential, particularly in the fields of eco-friendly energy and materials, such as solar power and hydrogen.

Our recruitment process goes beyond quantitative specifications, as we emphasize job-based competencies when selecting suitable candidates. Through our recruitment-linked internship program, we identify individuals with specialized expertise. The business department actively participates in all recruitment stages, including screening, work evaluation, and verification of applicants' practical skills. Selected interns receive equal wages and benefits to full-time employees, and they are given the opportunity to transition to full-time positions after a three-month period. This recruitment approach allows us to identify outstanding talents who demonstrate job consistency, organizational fit, and cultural alignment.

+ Talent Acquisition Strategy



New Employees and Retirees Support Activities

New Employee Training

We operate Hanwha Group's and our own new hire training system for new employees. During the Hanwha Group orientation, new hires learn the Hanwha spirit, core values, and the history of the group. Through the Hanwha Solutions orientation, they gain an understanding of the solution business and develop the fundamental competencies necessary for their roles. Furthermore, we provide specialized training tailored to the job characteristics of engineers and researchers. To facilitate a smooth transition into the organization, we offer an eight-week mentoring program where new employees are paired with senior employees who provide guidance and support.

The Chemical Division implements an onboarding program that includes mentoring and training to help new employees quickly adapt and enhance their understanding of the company and foster positive relationships between mentors and mentees. Similarly, the Qcells division conducts weekly on-the-job training (OJT) reports and special lectures to aid new employees in their adaptation process. In addition, the Advanced Materials Division organizes events such as mentoring programs and worksite tours during the orientation. After one year of employment, we also operate an overseas training system for new employees.

+ New Employee Training System



Employee Retention Program

The Chemical Division organizes various activities for new junior employees, such as one-year celebrations, communication competency enhancement training, and bond-strengthening activities, aiming to enhance their competencies and promote employee retention. We also provide welcome gifts to experienced employees and share company introductions, mid to long-term strategies, and training on HR systems and welfare benefits. These efforts help new employees quickly adapt to their work and foster a strong sense of belonging. Similarly, the Qcells Division conducts quarterly orientations and implements a three-month mentoring program for experienced employees to facilitate a smooth transition. These initiatives contribute to their seamless adaptation within the organization. In the Advanced Materials Division, monitoring is conducted to ensure the successful onboarding of new and experienced employees, promoting a soft-landing experience.

Retirement and Re-Employment Training

Hanwha Solutions provides career planning education and counseling programs for retirees over the age of 50 who wish to re-employ or start a business, allowing them to lead a stable and happy life after retirement. This helps retirees and employees who plan to retire to prepare for their long-term career and develop a constructive plan. In 2023, the Advanced Materials Division is conducting a re-employment support program for two retirees.

Enhancing Work Environment & Career Development

Strengthening Employee Competencies

Professional Development Activities

Career Management Program

At Hanwha Solutions, we operate Job Market, a voluntary career management support program for employees. It allows interested individuals to apply and transfer to posted job openings within the organization. The HR department conducts regular written and one-on-one interviews for career development plans and listens to employees' grievances and requests. We also provide feedback on work performance and reputation, and design a career path that aligns with employees' capabilities, aiming to improve job engagement and work satisfaction.

Our Galleria Division conducts an annual HR Report, where employees voluntarily provide information on their current job satisfaction, desired job/department, feedback on HR, and personal details for HR reference. This information is utilized to enhance employees' work satisfaction and support their career development.

Hanwha Solutions is currently promoting the Advanced Management Program (AMP) and General Management Program (GMP) for key employees. The Advanced Materials Division is actively engaged in professional training activities through the internal MBA program.

Developing Global Talent

The Galleria Division operates the Galleria Grand Tour, an overseas market research program. It involves visiting renowned fashion and retail regions in the Americas, Europe, and Asia, aiming to enhance employees' global knowledge and gain insights into future trends in the industry.

The Advanced Materials Division runs a Junior overseas training program for new employees, which allows them to visit Advanced Materials' international subsidiaries located in the Americas and Europe. This enables us to nurture future global talents and provide them with valuable exposure to international business operations.

Job Expertise Enhancement Program

Nurturing Digital Talent

Hanwha Solutions operates an in-house Digital Transformation training program to nurture digital professionals among our employees. The program is designed to equip all employees with data literacy skills, enabling them to become citizen data scientists (CDS)*. We provide data analysis training that covers fundamental data theory, AutoML, and Excel. These training initiatives aim to enhance employees' data analysis abilities and foster a culture of digital transformation within the organization. In addition to on-the-job trainings, we also conduct the Leadership Data Literacy Workshop specifically tailored for the company's executives and team managers. This workshop serves as a platform to promote and disseminate the digital transformation culture among leaders, enabling them to effectively leverage data in decision-making processes.

*Workers who possess data analysis abilities acquired through job training, without not having undergone formal training in programming and statistics

Engineer Job Training

To attract and retain exceptional engineers, Hanwha Solutions have developed a comprehensive engineer education roadmap with a detailed curriculum overseen by our Technical Education Center. This engineer education roadmap is designed to cater to engineers at different career levels and focuses on the specific knowledge areas essential for their main job functions, such as production, quality, and environmental safety. The curriculum includes classes led by experienced senior engineers as well as external experts to provide a well-rounded learning experience.

+ Detailed Engineer Training Courses

	생산(32)	품질(30)	정비(32)	계측(36)	설비정리사(21)	환경안전(47)	디지털(23)	영문스킬(15)
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엔지니어 (236 과정)

Business Insight Reinforcement Training

In order to enhance our business competitiveness, the Galleria Division has implemented a future talent development program that fosters mutual learning among employees, centered around business projects. Each year, selected key talents are provided with dedicated time and resources for group business study sessions. At the end of the year, there is an opportunity for participants to present their learnings and insights to share with their colleagues. Satisfaction surveys are conducted upon completion of the program, and the feedback obtained is used to continuously improve and refine the program. In 2022, a satisfaction survey revealed that over 95% of participants expressed high levels of satisfaction with the program. Additionally, the division facilitates discussions among employees regarding the future direction of the business, organizes workshops to generate new business ideas, and invites experts to deliver special lectures to foster creativity and cultivate insightful thinking among the employees.

+ Future Talent Development Program Insight Sharing Session



Enhancing Work Environment & Career Development

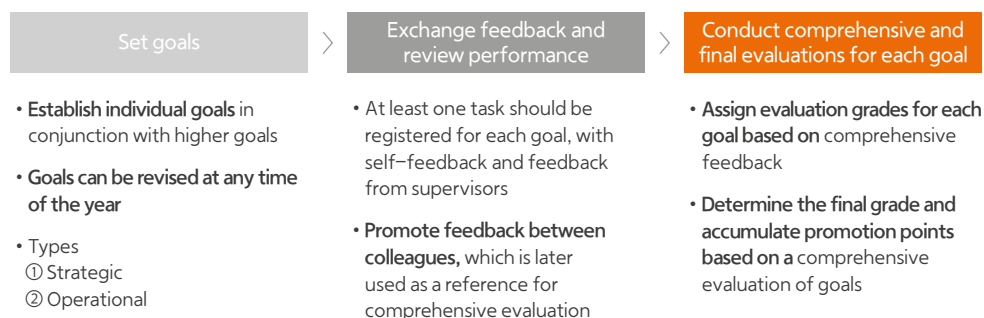
Fair and Transparent Recognition and Rewards

Fair Performance Evaluation and Rewards

In 2022, Hanwha Solutions reorganized its HR system, including the performance evaluation system, to restore the reliability of evaluations and provide fair rewards based on them. The main reforms involved dismissing the constant feedback system based on goal management and compulsory allocation of evaluation grades, and introducing a score-based evaluation approach. These changes aim to promote an evaluation system that supports individual growth, placing emphasis on the process rather than just the results. In addition, we implemented a goal management system tool using MS Teams to facilitate the goal management process. This tool enables smooth communication between employees and ensures fair evaluation based on objective data.

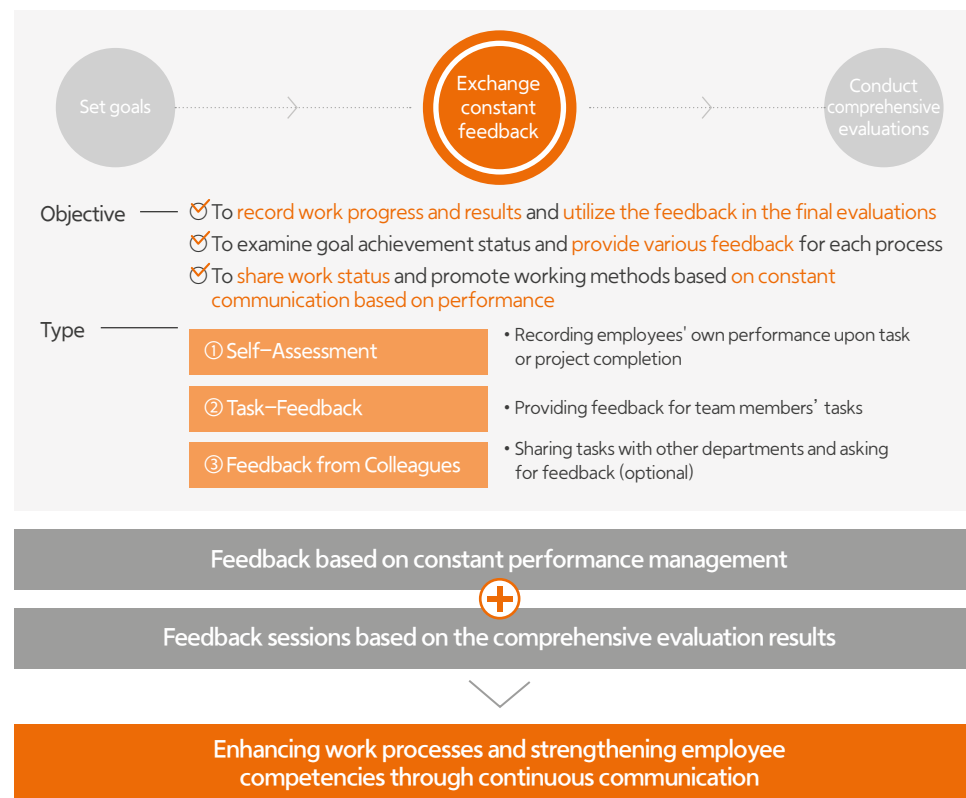
Our target items are broadly categorized into strategy and operation. Strategic goals are established to create long-term value, while operational goals pertain to specific objectives that each organization or function must achieve. Given that strategic goals are focused on future value rather than short-term results, we encourage our employees to always consider strategic goals and prioritize their implementation.

+ Goal Management System and Evaluation Process



Based on the evaluation results, we conduct one-on-one evaluation feedback sessions between team managers and team members to foster employee growth. To ensure the effectiveness of these sessions, we provide team managers with Evaluation Feedback Guidelines, which outline communication methods and expressions to use, as well as those to avoid during the session. The feedback sessions take place after the evaluation results have been made public, and employees are provided with information regarding skills that can be enhanced and guidance on growth directions.

+ Hanwha Solutions' Evaluation and Feedback Guidelines





Hanwha Solutions discloses climate-related information in line with the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD) and pledged its support for TCFD in September 2021 for more responsible activities. We will continue to advance our climate change response.

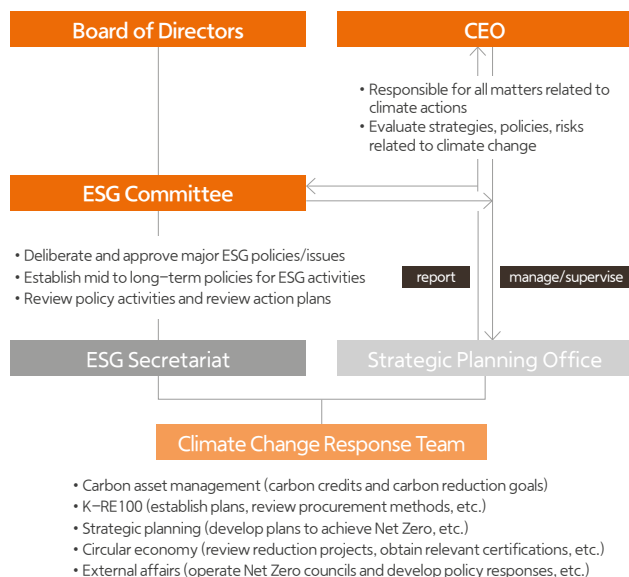
TCFD Report

• Governance	42
• Strategy	43
• Risk Management	51
• Metrics and Targets	52

Governance

Governance for Climate Action

+ Hanwha Solutions' Climate Action Organizational Structure



The Board, ESG Committee, and Management

The Board of Directors

At **Hanwha Solutions**, we are making various efforts to address climate change by enhancing our governance centered on the board. In May 2021, we established the ESG Committee under the board with the purpose of examining major ESG policies and climate-related issues, establishing mid to long-term policies for ESG activities, reviewing policy activities, and reviewing action plans. Since its establishment, the ESG Committee meetings have been held every quarter to review environment-related performance. The board has been actively supervising the ESG Committee by consistently updating their regulations.

ESG Committee and ESG Secretariat

The ESG Committee at **Hanwha Solutions** has prioritized discussions on the status and plans to achieve Net Zero by 2050 as a major agenda. As part of their responsibilities, the committee receives quarterly reports on GHG emissions and reduction activities to monitor progress on a regular basis. They also oversee the company's response to climate-related risks, in addition to GHG emissions. To ensure effective operation, the ESG Secretariat provides support to the committee in managing climate-related risks.

The Role of Management

The CEO of **Hanwha Solutions** holds the responsibility and authority for all matters related to environment and climate change. They conduct regular reviews of policies and risks through monthly briefings of the Climate Change Response Team. In order to strengthen the link between climate action activities and long-term management performance, the company reflects environmental achievements, such as GHG emissions reduction and creating a Net Zero workplace, in the KPIs of the CEO and employees and rewards them for climate-related achievements.

Climate Action Organization

The Climate Change Response Team was established in 2021 with the purpose of achieving the company's climate goals. Their responsibilities include developing strategies to achieve the target of Net Zero emissions by 2050 and adopting 100% renewable energy (K-RE100). They also play a role in promoting projects to reduce GHG emissions, managing climate-related risks and opportunities, and reporting on carbon reduction activities and future plans.

To address Scope 3 emissions, we engage with key suppliers through supply chain engagement activities and obtained certifications such as International Sustainability & Carbon Certification Plus (ISCC+) and Global Recycled Standard (GRS) to ensure sustainable practices. The company also aims to manage the carbon footprint of its chemical products through LCA.

In order to understand the impact of GHG emissions, the company incorporates Net Zero costs and emission credits into its internal accounting processes. Additionally, the internal carbon price is considered when making new business investment and withdrawal decisions.

+ ESG Committee's Main Agenda on Climate Change

Date	Department	Main Agenda
02.17.2022	ESG Committee	Reported on GHG emission status and short-term carbon reduction plan in 2021
04.28.2022	ESG Committee	Reported on GHG emissions and carbon reduction activities in Q1 and plans for Q2 2022
07.28.2022	ESG Committee	Reported on GHG emissions and carbon reduction performance in H1 and plan for H2 2022
10.27.2022	ESG Committee	Reported on GHG emissions and carbon reduction activities in Q3 2022 and plan for Q4 2022
12.20.2022	ESG Committee	Reported on GHG emissions and carbon reduction status in 2022 and plans for 2023

Strategy

Climate-related Risks and Opportunities

Hanwha Solutions manages climate-related risks and opportunities across three timeframes: short-term, medium-term, and long-term. The climate-related risks are largely divided into transition risks, including policy, reputation, market, and technology risks, and physical risks, encompassing acute and chronic risks. In terms of identifying opportunities, we analyze their impact on our business in relation to energy resources, products and services, and markets. Furthermore, we have incorporated climate-related risks within our company's risk management system to address the climate crisis in a more systematic manner. Moving forward, our plans include developing a climate-related risk management model that is specific to our business characteristics and regions. This model will enable us to scientifically calculate the financial impact of transition risks, losses, and physical risks, and incorporate them into our management strategies.

Risks and Opportunity Identification and Selection

Taking into account the recommendations of the TCFD, we established a pool of identified risk and opportunity factors. Based on the results obtained, we conducted the first screening and additional risk identification for each relevant department. Subsequently, a second screening was carried out, with a focus on the Risk Council, after integrating climate-related risks within the company's risk management system. During this process, we selected the major risk and opportunity factors for further consideration.

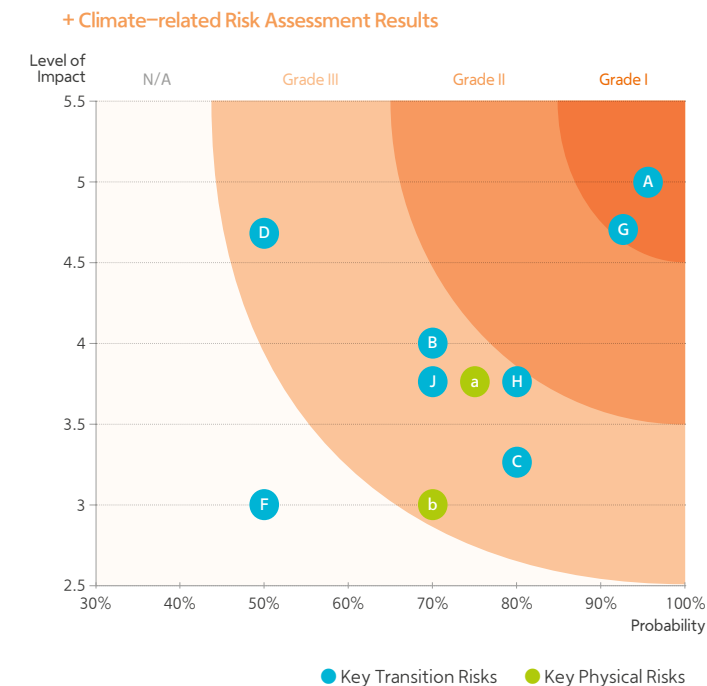
Risk and Opportunity Assessment

Based on the selected risks, we calculate the overall risk level by considering the probability and the level of impact. Based on the determined risk level, we determine the appropriate internal response. We also review the current response status, establish future action plans, and develop strategies to address the identified risks.

Hanwha Solution's Climate-related Risks

We conducted a risk assessment based on the probability and the level of impact for the major risk factors selected for review. Based on this assessment, we calculated the overall risk rating. The results identified the risk of tightening regulations related to GHG emissions and the increasing need for products manufactured using renewable energy (RE100) as the factors with the highest risk rating.

	Category	2022 Risk	Risk Assessment Ratings
Transition	Regulation/ Policy/ Law	(A) Strengthening regulations related to GHG emissions	Grade I
		(B) Introduction of obligations and regulations for existing products and services	Grade III
	Legality	(c) Exposure to litigation risk	Grade III
	Technology	(D) The emergence of low-carbon alternatives to existing products and services, the transition to low-carbon technologies, and the failure to invest in new technologies	Grade III
		(E) Changes in consumer behavior	Grade III
		(F) Market uncertainties	N/A
	Market	(G) Increasing need for products manufactured using renewable energy (RE100)	Grade I
		(H) Rising costs of raw materials and fuels	Grade III
	Reputation	(I) Preconceived notions about the field	Grade III
		(J) Mandatory climate and ESG disclosure	Grade III
Physical	Acute	(a) Production disruption due to abnormal and unpredictable weather events (cold waves, heavy rains, heavy snowfalls, typhoons, earthquakes, heat waves, etc.)	Grade III
		(b) Climate/environmental changes due to the increase in the global average temperature	Grade III



Strategy

Climate-related Risk and Opportunity Assessment

Potential Financial Impacts and Responses to Key Climate-related Risks

Hanwha Solutions classified the impact of the climate-related risks factors into short-term, medium-term, and long-term and analyzed the potential financial impact and response status. Based on this analysis, we have established a risk response plan to effectively address these risks.

Classification	Risk	Rating	Potential Financial Impact (Qualitative/Quantitative)	Response(Strategy and Status)		
Transition	Regulation/ Policy/ Law	Short to long-term	(A) Strengthening regulations related to GHG emissions – Stricter global regulations related to GHG emissions – Change in the allocation method of emission permits and introduction of a carbon border tax – Restrictions on the import of carbon-intensive products	Grade I	• In 2030, the Chemical Division is expected to have a minimum of 14.3 billion won and a maximum of approximately 30.3 billion won of emission debt due to the expansion of paid allocation and the purchase of emission credits*	• Implement of detailed carbon reduction strategies • Report the GHG emissions status to the board and management • Management of emission permits and emission by product unit
			(B) Introduction of obligations and regulations for existing products and services – Increase the recycling rate and the range of bio-based raw materials and products	Grade III	• Increased costs of regulatory response • Decline in sales of existing fossil-based products	• Promote eco-friendly business (rPE) • Acquire eco-friendly certifications (ISCC+ and GRS)
	Legality		(C) Exposure to litigation risk – Increased likelihood of climate lawsuits against companies that emit too much GHG and practices greenwashing	Grade III	• Declining corporate value due to litigation	• Monitor climate change regulations • Ensure data accuracy through third-party verification
	Technology	Medium to long-term	(D) The emergence of low-carbon alternatives to existing products and services – Leading market dominance/technology monopoly – Eco-friendly and low-carbon process/business transition costs – Risk of failure of immature technology and business R&D investment	Grade III	• Increased costs due to technology monopolies and investment failures	• Diversify technology acquisition strategies and investment in low-carbon and future business • Develop own technologies(CCU, PTC, etc.)
	Market	Medium to long-term	(E) Changes in consumer behavior – Demand for the use of circular resources and eco-friendly/low-carbon raw materials – Increased demand for product carbon footprint disclosure and management	Grade III	• Decline in sales of existing fossil-based products	• Obtain eco-friendly certifications (ISCC+ and GRS) • Promote LCAs for all products of the Chemical Division • Obtain Environmental Product Declaration
			(F) Market uncertainties – Potential policy changes in low-carbon, carbon-free raw materials, energy markets – Shortage and/or rising prices of biomass-based raw materials and hydrogen and rising prices	N/A	• Rising costs due to the increasing prices of biomass-based raw materials and hydrogen	• Monitor government policies and regulations related to biomass and hydrogen

*The main assumptions for calculating the financial impact of the risk (A) are as follows:
– Expected emissions: Business As Usual (BAU case: expected future GHG emissions if no special measures are taken)
– Emission permit pricing: supposing IEA NZE Scenario
– Paid allocation scenarios: Scenario 1) Incremental increase of 10% from 2026, 2) Increase to 100% from 2026 to 2040

Strategy

Climate-related Risk and Opportunity Assessment

Potential Financial Impacts and Responses to Key Climate-related Risks

Hanwha Solutions classified the impact of the climate-related risks factors into short-term, medium-term, and long-term and analyzed the potential financial impact and response status. Based on this analysis, we have established a risk response plan to effectively address these risks.

Classification		Risk	Rating	Potential Financial Impact (Qualitative/Quantitative)	Response(Strategy and Status)
Transition	Market	(G) Increasing need for products manufactured using renewable energy (RE100) - Rising electricity prices due to the purchase of renewable electricity - Demand for transition to renewable energy in ESG Assessment/Initiative	Grade I	• In 2030, the Chemical Division is expected to incur renewable electricity purchase costs ranging from a minimum of 66.8 billion won to a maximum of 98.7 billion won*	• Promote transition to renewable energy • Purchase green premium • Enter long-term REC purchase agreements
		(H) Rising costs of raw materials and fuels - Rising raw material prices due to reduced raw material supply - Reduction in the development/supply of fossil fuels (oil and gas) - Rising energy (power/heat source) prices - Supply disruption/price fluctuations due to abnormal climate in the supply location	Grade III	• Rise in costs due to rising raw material and energy prices	• Promote transition to renewable energy • Promote the transition to low-carbon raw materials
	Reputation	(I) Preconceived notions about the area of business - Spreading negative perceptions of fossil-based products - Risk of losing trust in the market according to the classification of stranded assets of petrochemical products due to growing interest in the climate crisis	Grade III	• Decline in sales of existing fossil-based products	• Develop eco-friendly products (building a bio and circular economy) • Diversification of mechanical (PCR) and chemical (PTC) recycling business
		(J) Mandatory climate and ESG disclosure - Sales risks such as loss of customers due to non-disclosure of information Increased probability - Decline in external trust due to the failure to implement tasks aimed at achieving Net Zero	Grade III	• Decline in corporate value	• Response to global regulations and initiatives and publish sustainability reports • Ensure data accuracy through third-party verification • Joined Korea TCFD Alliance

*The main assumptions for calculating the financial impact of the risk (G) are as follows:
 - Renewable energy procurement method: Purchase RECs
 - Electricity emission factor scenario: 1) Linear trend of the 10th Basic Plan for Electricity Supply and Demand, 2) Energy Net Zero Strategy Scenario
 - REC pricing scenario: 1) REC price decrease, 2) REC price increase

Strategy

Climate-related Risk and Opportunity Assessment

Potential Financial Impacts and Responses to Key Climate-related Risks

Hanwha Solutions classified the impact of the climate-related risks factors into short-term, medium-term, and long-term and analyzed the potential financial impact and response status. Based on this analysis, we have established a risk response plan to effectively address these risks.

Classification		Risk	Rating	Potential Financial Impact (Qualitative/Quantitative)	Response(Strategy and Status)
Physical	Acute	Short-term			
		<p>(a) Production disruption due to abnormal and unpredictable weather events (cold waves, heavy rains, heavy snowfalls, typhoons, earthquakes, heat waves, etc.)</p> <ul style="list-style-type: none"> - Damage to production and infrastructure facilities due to abnormal weather (cold waves and typhoons) in the worksite area- Increasing energy consumption and GHG emissions due to abnormal climate (heat waves and intensified cold waves) - Worker safety risks and reduction in productivity - Increasing risk of water supply in worksites due to increased areas with drought and water scarcity - Supply and demand disruptions/price fluctuations due to abnormal climate in the supply of imported raw and subsidiary materials 	Grade III	<ul style="list-style-type: none"> • Increase in transportation and repair costs • Reduced profits due to production cuts • Increased energy costs 	<ul style="list-style-type: none"> • Minimize damage through establishment of a proactive response system and risk assessment • Reducing water use in preparation for drought and promote wastewater recycling- Reduce industrial water use at Yeosu plant due to drought stage increase in Juam Dam <ul style="list-style-type: none"> - Examine water reuse project • Establish climate change response manual <ul style="list-style-type: none"> - Operate safety guidelines related to the prevention of heat-related illnesses during hot weather • Diversify of the supply of imported raw materials
	Chronic	Long-term			
		<p>(b) Climate/environmental changes due to the increase in the global average temperature</p> <ul style="list-style-type: none"> - Increasing energy costs due to change of control range due to rising average temperature - Disruption in production due to increasing frequency of physical risks caused by sea level rise - Cause outbreaks of new infectious diseases, destruction of ecosystems to climate change and extreme weather events 	Grade III	<ul style="list-style-type: none"> • Increased energy costs • Increased safety response costs 	<ul style="list-style-type: none"> • Conduct a climate-related risk assessment for customers and suppliers through a climate-related risk management model <ul style="list-style-type: none"> - Promote climate-related risk management model development

Strategy

Climate-related Risk and Opportunity Assessment

Potential Financial Impacts and Responses to Key Climate-related Opportunities

Hanwha Solutions classified the impact of the climate-related opportunities factors into short-term, medium-term, and long-term and analyzed the potential financial impact and response status. Based on this analysis, we have established a risk response plan to effectively address these risks.

	Classification	Opportunity	Potential Financial Impact (Qualitative/Quantitative)	Response(Strategy and Status)	
Opportunity	Energy resources/ resourceefficiency	Short-term	<p>Sale of carbon credits for reduction activities</p> <ul style="list-style-type: none"> - Generating surplus emission allowances due to GHG reduction - Opportunities to generate additional revenue from external carbon offset projects - Reducing energy costs by improving process efficiency due to the implementation of Net Zero 	<ul style="list-style-type: none"> • Increased profits and reduced operating costs through the sale of emission permits • Reduced sensitivity to changes in the price of emission permits 	<ul style="list-style-type: none"> • Establish emission management and reduction strategies to achieve Net Zero emissions by 2050 • Secure carbon-neutral financial resources through the sale of surplus carbon credits and the improvement of energy efficiency and energy conversion • Review offset projects under the carbon offset scheme(internal/external)
	Energy Resources/ Resilience/ Products and Services	Mid to long-term	<p>Power generation policies related to the expansion of renewable energy usage ratio</p> <ul style="list-style-type: none"> - Expanding green power opportunities as the proportion of renewable energy generation within the country increases - Improve corporate reputation due to increasing use of renewable energy - Expanding the hydrogen industry ecosystem - Increasing opportunities for renewable energy procurement as the solar industry grows 	<ul style="list-style-type: none"> • Reduced exposure to fossil fuel price fluctuation • Increased profits from the sale of premium products • Increased capital availability as investment increases • Increased profits from sales of low-carbon and premium products 	<ul style="list-style-type: none"> • Increase the use of renewable electricity to achieve K-RE100 • Promote hydrogen-based fuel conversion and procure carbon-free steam • Promote business review and technology development for the production of green power-based products
	Products and services	Short to long-term	<p>Securing eco-friendly competitiveness of solar products</p> <ul style="list-style-type: none"> - Increasing need for low-carbon PV product certification - Absorb demand for low-carbon products 	<ul style="list-style-type: none"> • Increased profits from the sale of low-carbon products • Increased capital availability as investment increases 	<ul style="list-style-type: none"> • Increase investment in solar business • Implement domestic solar module carbon foot print(CFP) • Adopt the European Carbon Footprint Product (CFP) certification system
	Products and Services/ Market/ Resilience	Mid to long-term	<p>Increasing demand for eco-friendly/recycled plastics</p> <ul style="list-style-type: none"> - Absorbing eco-friendly and low-carbon demand - Pioneering and preempting new markets related to eco-friendly plastics - Reducing exposure to petroleum-based raw material price fluctuations 	<ul style="list-style-type: none"> • Increased sales due to increased demand for eco-friendly/low-carbon products • Increased return on investment as brand value and corporate reputation improves 	<ul style="list-style-type: none"> • Promote mechanical recycling of waste plastic (rPE packaging materials) • R&D of chemical recycling technology of waste plastic (production of plastic raw materials through the advancement of waste plastic pyrolysis oil) • Procure eco-friendly raw materials and reviewing business • Develop a CCU technology for reduction limits and expand into a business • Acquired GRS and ISCC+ certification

Strategy

Climate-related Scenario Analysis

Scenario Analysis and Management Strategy Related to Climate Change

In accordance with the TCFD recommendations, **Hanwha Solutions** conducts climate-related scenario-based analysis to assess the potential impact of climate change on the organization and its resilience. Through this analysis, we identify and evaluate the potential impact of climate change on our business activities, and utilize the results to establish a comprehensive Net Zero strategy with the aim of achieving net-zero emissions by 2050. To demonstrate our commitment, we have set a Scope 1 and 2 emission reduction target of 35% in 2030 and 60% in 2040 compared to the emissions in 2018 to reduce the global average temperature to a level significantly below 2°C(WB2C) compared to the pre-industrial level.

Development of a Climate-related Risk Management Model

The climate-related risk management model is used to predict corporate risks and related losses arising from climate change and climate policies, and to manage uncertainty in management decision-making.

We have entered into business agreements with prestigious organizations such as the Financial Supervisory Service, the British Embassy, Ewha Women's University, and five other companies to develop a climate-related risk management model. Currently, we are in the process of developing a research model on transition risk and physical risk in collaboration with Ewha Women's University and the Financial Supervisory Service. This will not only allow us to identify and manage climate-related risks and uncertainties within our organization, but we also recognize the importance of collaboration with various stakeholders.

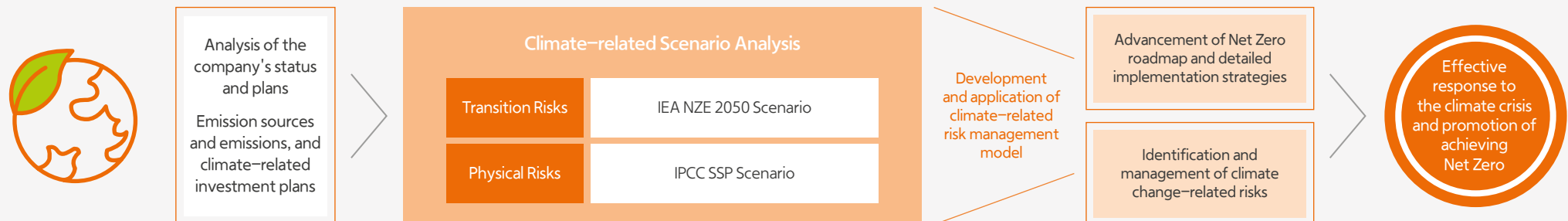
+ An Climate Risk Management Model Agreement



+ Climate-related Risk Management Model Development Process

	Transition Risks	Physical Risks
Step 1 Conceptualize and design a model	<ul style="list-style-type: none"> Analyze current status and plans 	<ul style="list-style-type: none"> Examine and select abnormal climate-related analysis indicators
Step 2 Develop a model	<ul style="list-style-type: none"> Set scenario variables and design new scenarios Calculate the financial impact according to the scenario 	<ul style="list-style-type: none"> Conduct past and future climate analysis Estimate risks
Step 3 Improve the model	<ul style="list-style-type: none"> Derive improvement measures and advance the model considering climate change response and Net Zero status 	

Climate Change Scenario Analysis and Utilization



Strategy

Climate-related Scenario Analysis

Transition Risks

In the case of Climate-related transition risk analysis, we conducted a detailed analysis of the impact of each GHG reduction measure based on the company's Net Zero goal and roadmap to achieve net-zero emissions by 2050. We plan to use the results of this analysis in examining and further advancing our current carbon reduction strategies.

Assumptions and Approaches

After examining various domestic and international climate scenarios, we used the Net Zero Emissions by 2050 (IEA NZE 2050) scenario, a 1.5°C scenario, in our analysis, considering our emissions and reduction goals.

The IEA NZE 2050 scenario outlines a pathway to achieve net zero carbon emissions by 2050 for the global energy sector, with a particular focus on solar and hydrogen as the primary energy sources. Given our significant Scope 2 emissions, we deemed it appropriate to adopt this scenario in formulating our climate change response measures and Net Zero strategy.

+ Hanwha Solution's Climate-related Transition Risk Analysis

IEA NZE 2050 Scenario	
Classification	Details
Overview	<ul style="list-style-type: none"> A scenario that shows the path to net-zero CO₂ emissions in the global energy sector by 2050. Assumes achieving 100% universal energy access by 2030, limiting the global temperature rise to 1.5°C, and global emissions achieving net-zero paths.
Characteristics	<ul style="list-style-type: none"> Refers to changes in energy production, transportation, and consumption as key pillars and analyzes the carbon reduction methodologies and reduction volume for achieving net zero by 2050. Differences compared to the IPCC Scenario <ul style="list-style-type: none"> Focus on solar/hydrogen/wind power as the main energy source Less CCUS and bioenergy share

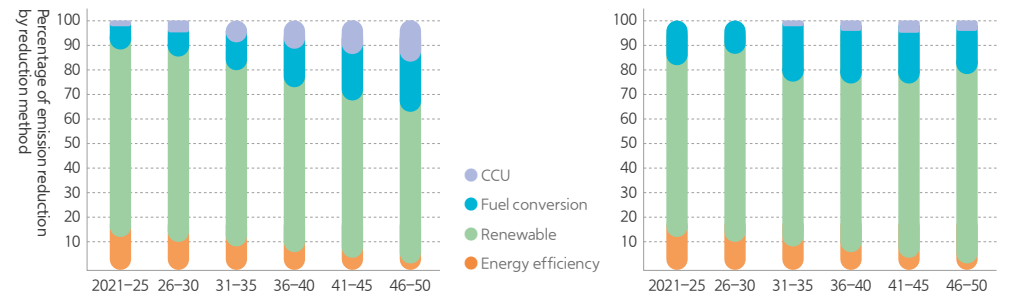
Analysis Results

According to the analysis of the emission reduction rate for each reduction method, it was found that renewable energy plays a significant role in achieving emission reductions in the IEA 2050 scenario, while the proportion of fuel conversion and CCU gradually increases by 2050 compared to the early 2020s.

Similarly, we have renewable energy as the highest share and incorporated GHG emission reduction rates based on hydrogen and fuel conversion in our Net Zero strategy.

Considering the proportion of our Scope 1 emission rate, we included CCU lower than compared to the IEA NZE 2050 scenario. However, we plan to utilize the analysis results while acknowledging the difference compared to global data.

+ Emission Reduction Rate by Reduction methods in Scenario



IEA NZE 2050 Scenario

- Transitioning to renewable energy sources results in the highest reduction rate
- The reduction rate through fuel conversion starts low initially but gradually increases over time, becoming the second highest reduction method.

Hanwha Solutions' Net Zero Roadmap

- Transitioning to renewable energy sources results in the highest reduction rate
- Fuel conversion results in the second-highest reduction rate since 2026

Strategy

Climate-related Scenario Analysis

Physical Risks

In the case of climate-related physical risk analysis, we conducted a detailed analysis at both the company and supply chain levels to mitigate both acute and chronic risks.

Assumptions and Approaches

We conducted the analysis by selecting seven abnormal climate indicators to assess the physical risks. To guide our analysis, we utilized the Shared Socioeconomic Pathways (SSP) framework, which was adopted in the Intergovernmental Panel on Climate Change (IPCC) AR6 WGI report.

+ Hanwha Solution's Climate-related Physical Risk Analysis

Physical Risk Indicators and Scenario

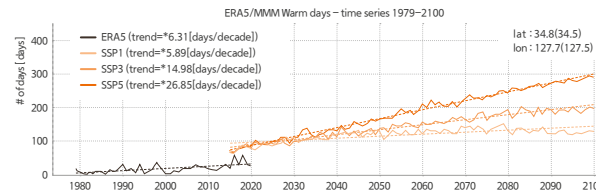
Classification	Details
Abnormal Climate Indicators	• (Temperature) Warm Days: The number of days in the year with temperatures above 95th percentile compared to the past
	• (Temperature) Cold days: Maximum number of consecutive days kept below 0°C
	• (Temperature) Maximum/minimum daily average temperature by year
	• (Precipitation) No rain days: Maximum number of consecutive days with less than 10 mm of precipitation
	• (Precipitation) Rainy days: Days of the year with more than 100 mm of precipitation per day
	• (Precipitation) 99th Percentile days: The number of days in the year with more than 99th percentile of rain compared to the past
	• (Wind) Windy days: The number of days throughout the year with the average daily wind speed of more than 10 m/s
IPCC SSP Scenario	• A scenario that takes into account changes in the socioeconomic structure depending on the level of GHG reduction and the climate policies in each country.
	• Takes into account each country's demographics, economic development, ecosystem factors, resources, technological development, policies, etc.
	• Divided into five scenarios (SSP1-1.9, SSP1-2.6, SSP2-4.5, SSP3-7.0, SSP5-8.5) according to future mitigation and adaptation efforts related to climate change.
	• SSP1 refers to sustainable economic growth, and SSP5 refers to the unrestricted development

Analysis Results

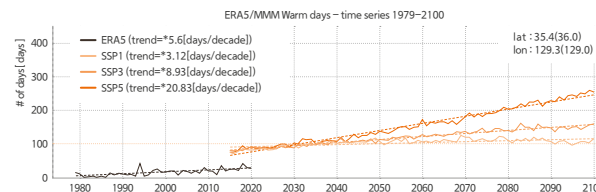
Through this analysis, we have identified seven abnormal climate indicators in our Yeosu and Ulsan plants, as well as globally. We have observed a particularly significant increase in physical risks under the SSP5-8.5 scenario, characterized by high fossil fuel use. Building upon these findings, we will develop a comprehensive strategy to achieve our Net Zero goals and foster sustainable development. This strategy will include various climate adaptation activities aimed at mitigating chronic physical risks. In addition, we are planning to enhance our climate-related risk management model and extend its application to encompass supply chain physical risk management, beyond our company's boundaries.

+ Chemical Division's Physical Risk Scenario Analysis Result

Chemical Division's Physical Risk Scenario Analysis Result



Yeosu Production Site



Scenario Analysis Results

- In 1980–2020, the number of warm days increased by 6.3 days in Yeosu and 5.6 days in Ulsan every 10 years.
- In 2020–2100, in the case of SSP1 (sustainable growth), the number of warm days will increase by 5.6 days in Yeosu and about 3.1 days in Ulsan every 10 years, showing a tendency for the warm day index to be lower than in the past.
- However, in the case of SSP5 (unrestricted development), the number of warm days increases by 26.9 days in Yeosu and by 20.8 days in Ulsan every 10 years.

Response Measure and Status

- Mitigate risks through sustainable development, such as achieving Net Zero
- Continuous monitoring and address these physical risks

Risk Management

Risk Management Process

Hanwha Solutions regularly identifies and evaluates climate change issues and risks to ensure effective response strategies. Our approach includes integrating climate-related risks into the company's risk management system and preparing comprehensive risk reports that outline the current response status and future plans.

The Climate Change Response Department oversees the climate-related risk management process, which involves identifying both internal and external issues, understanding stakeholder demands, assessing actual damages, and reviewing previous response efforts to identify climate-related physical/transition risks and opportunities. We conduct thorough analyses to assess the impacts and probability for identified risks and opportunities and report them to the management and ESG Committee to develop strategic and financial plans that incorporate climate-related risks. For example, in order to mitigate our two Grade 1 risks—Strengthening regulations related to GHG emissions and the increasing need for the production of renewable energy products—we regularly report on the status of GHG emissions, reduction activities, and transition to renewable energy to the board. Additionally, we report on the detailed implementation strategies for Net Zero to the management.

Furthermore, we are advancing climate-related risk management by identifying climate-related risks and opportunity factors based on the company-wide risk management system and establishing evaluation criteria and methodologies for identified risk and opportunity factors.

+ Climate Change Risk Identification and Assessment Process



Metrics and Targets

GHG Emission Reduction Targets

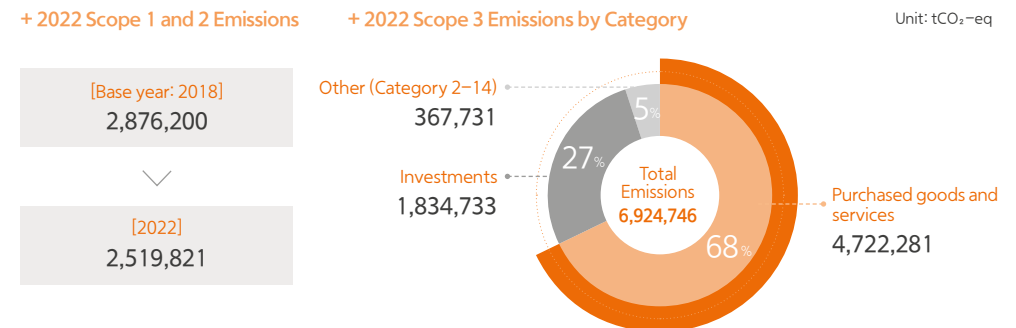
Scope 1 and 2 Emissions Management

In order to reduce Scope 1 and 2 emissions, we plan to continuously improve energy efficiency at our business sites and transition from fossil fuel-based energy to eco-friendly energy. As part of this effort, we will first reduce the company's emissions by reducing energy consumption through low-carbon and high-efficiency business facilities, process improvement and operation optimization, waste heat recovery, and thermal insulation improvement. To achieve K-RE100, we plan to increase the proportion of renewable energy powered-electricity use to 21% by 2030, 37% by 2040, and 100% by 2050. Starting in 2023, we will increase the supply of solar-based renewable energy power through long-term REC purchase agreements.

We also have set a goal to switch to 100% zero-emission vehicles by 2030 through our participation in K-EV100 and plan to further reduce GHG emissions by replacing process fuel and externally procured steam production fuel with internally produced hydrogen at our CA site. In addition, we are developing CCU technology that can capture carbon for the reduction limit and recycle it as raw material, with the goal of introducing it after 2030.

Scope 3 Emissions Management

We have determined purchased products and services, and investments as key categories among the 15 categories of Scope 3. In order to reduce Scope 3 emissions, our Chemical Division plans to identify the environmental impact of all chemical products through LCA and acquire ISCC+ and GRS certifications to implement the procurement of raw materials based on biomass and plastic recycling. In addition to our internal efforts, we plan to manage GHG emissions at all stages of the value chain to promote emissions reduction to our suppliers. We are currently sharing information about attaining Net Zero by forming a Carbon Neutral Council with key suppliers.



Metrics and Targets

GHG Emission Reduction Activities

Hanwha Solutions has declared its commitment to achieve 2050 Net Zero and has established mid to long-term goals to actively respond to climate change. To ensure progress towards this goal, we closely manage key indicators such as GHG emissions, profit and loss from emission permits, and energy usage on a monthly basis. Furthermore, we have implemented an improvement plan to minimize the impact of climate change on our business activities through a quantitatively assessment.

GHG Emission Management and Reduction Activities

We are currently developing a computerized system that will enable us to effectively manage GHG emission targets and performance, emission permit status, and K-RE100 implementation status. We also plan to reduce Scope 1 and 2 emissions through energy efficiency improvements, transition to renewable energy sources, and adoption of hydrogen-based fuels. Furthermore, we will manage Scope 3 emissions by implementing carbon capture, promoting a circular economy, and addressing the upstream carbon intensity of our products.

Division	SCOPE 1	SCOPE 2	SCOPE 3
Chemical Division	Improve energy intensity through the installation of high-efficiency facilities, process improvement, and operation optimization		Perform carbon capture R&D Chemical Division conduct LCA
		Procure green premium&Sign a long-term REC purchase contract (2022) and purchase RECs (1 Q 2023)	Obtain ISCC+ and GSR (1 Q 2023) Sign a CCUS consortium agreement
	Reduce fuel consumption by using electrolyzed hydrogen produced in the CA department process as an internal fuel (1 Q 2023)		Operate the Supplier Carbon Neutral Council Acquire and renew Environment Product Declaration (for 39 products)
Qcells Division	Establish low-carbon process by introducing plasma-based high-efficiency removal facility		Reduce acid and alkali chemical usage through additive experiments
	Save energy of 2.3 GWh per year by optimizing cooling systems		Reduce the use of product packaging materials (reduced by 26% compared to 2021)
	Promote the construction of a new 4.37 MW solar power generation facility using idle land in plants (within 2023)		Complete solar module carbon foot print(CFP) for all solar modules
Insight Division		Acquire a stake in the development of PV modules with a minimum capacity of 50 MW	
Advanced Materials Division	Reduce power usage by 58 kWh/MT by improving the product production process		Promote pallet recovery and recycling
	Apply ceramic coating on coolant pumps Adopt electrostatic precipitator secondary treatment system		Develop and supply ultra-lightweight and high-strength composite materials for eco-friendly vehicles
Galleria Division		Replace motors and inverters for the HVAC system Replace display lighting with LED lights in Center City	



Hanwha Solutions pursues portfolio diversification through creative and competitive technological innovation and service improvement. We aim to expand sustainable value through active and sincere activities.

ESG Performance

• Environmental	54
• Social	71
• Governance	93



Environmental

Hanwha Solutions aims to reduce its impact on the natural environment, strive for a sustainable society, and provide eco-friendly green solutions for everyone through continuous technology development and product innovation.

KEY PERFORMANCE

Safety, Health, and Environment (SHE) Management

Declaration of 'Safety, Health and Environment goals and policies' and promotion of related activities

- Objective: "Create an accident-free workplace and achieve Net Zero"



2022 SHE investment budget: 135.6 billion won

- Invested in large-scale facilities to reduce vinyl chloride monomer (VCM) and pollutant emissions and improvement of facilities to prevent leakage of hazardous chemicals



Strengthened SHE management governance system

- Carried out regular safety and health accident prevention and improvement activities led by the Safety and Health Management Committee
- Strengthened dedicated safety and health environment department for each division under the company's SHE organization led by the Chief Safety Officer (CSO)



Environmental Management

Continuous renewal of the environmental management system (ISO-14001) certification, since participating in Korea's first international environmental management pilot project in 1995

- The Central R&D Center obtained environmental management system certification in 2022



Advancement of the environmental performance evaluation system for worksites

- Advanced quantitative environmental performance evaluation system based on the Ministry of Environment's environmental evaluation system guidelines
- Conducted evaluations using environmental performance data and promoted development of environmental management strategy and policy using the evaluation results



Eco-Friendly Products

Establishment of product LCA calculation process and the development of evaluation tool

- Performed LCA calculation for all products of Chemical Division
- Plan to promote continuous product LCA with the established calculation process and developed assessment tool
- Active review and promotion of packaging materials based on eco-friendly materials for Qcells Division's Net Zero



Eco-friendly certifications

- The Chemical Division acquired the Global Recycled Standard (GRS) certification for rPE- The Advanced Materials Division obtained GRS and RCS for composite materials for automobile
- Qcells Division promoted eco-friendly certifications such as International Environment Product Declaration (EPD), EPEAT, and EPD Italy through LCA



SHE Management

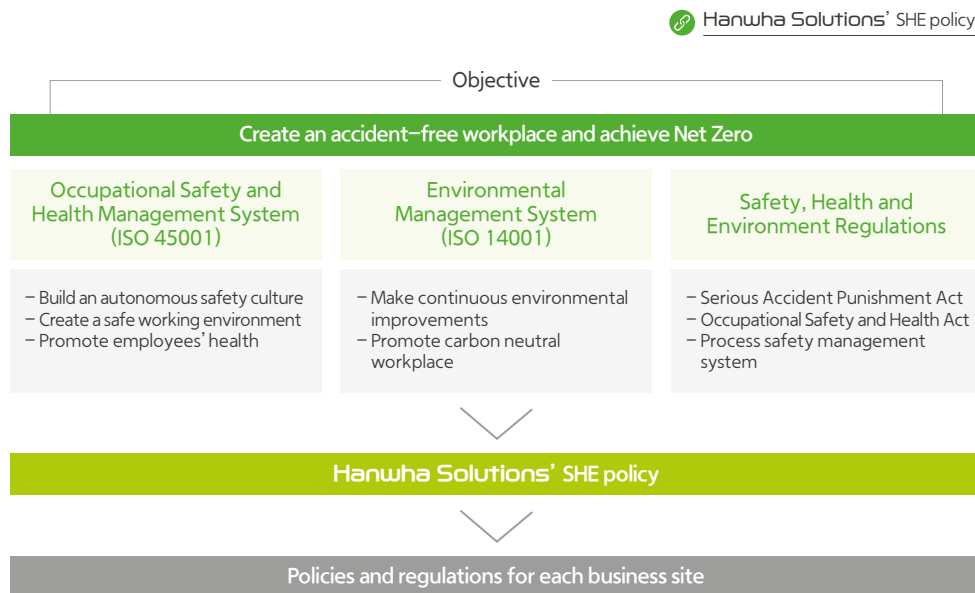
SHE Management System

SHE Management Policy

Since declaring the SHE program ECO-YHES in 1991, Hanwha Solutions have been continuously promoting effective SHE management practices and fulfilling our social responsibilities. In February 2022, we officially announced a new goal to "Create an accident-free workplace and achieve Net Zero."

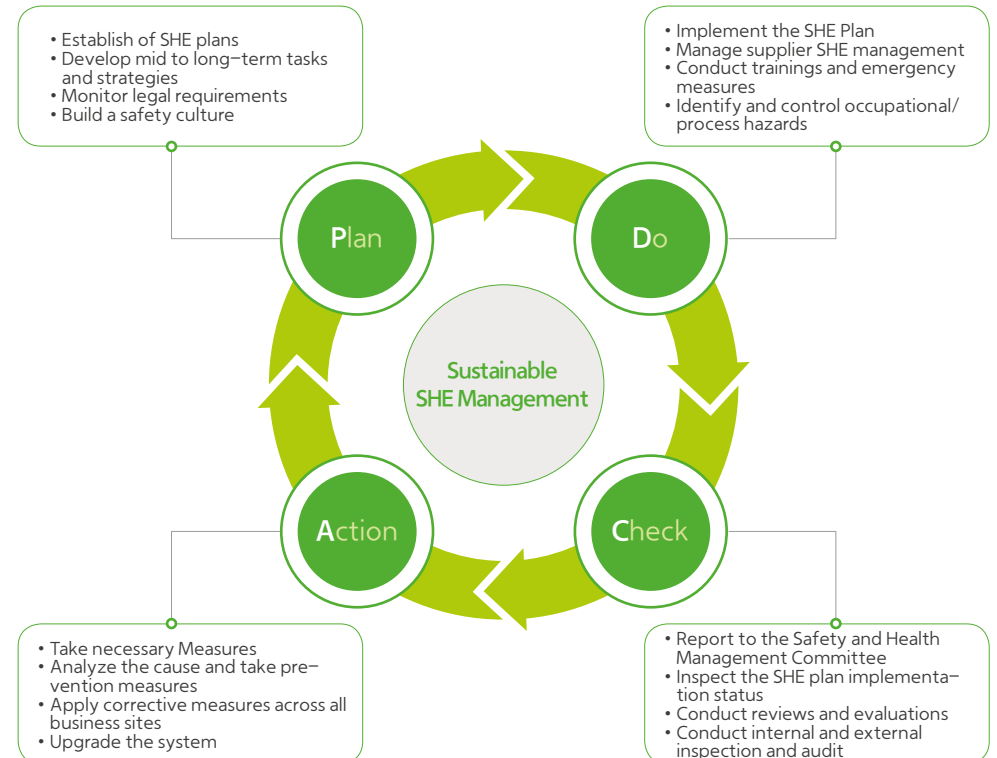
SHE Management Policy

We have established a robust and sustainable SHE management system, leveraging advanced systems and strong execution capabilities. We have formulated policies and regulations in alignment with ISO 45001, ISO 14001, and relevant global SHE laws to promote proactive SHE management practices. We actively engage with stakeholders through effective communication and encourage their participation to enhance our cooperation system.



SHE Management System

Adhering to the PDCA cycle mandated by ISO, we diligently implement SHE management and continuously make improvements through regular inspections and certification by external experts.

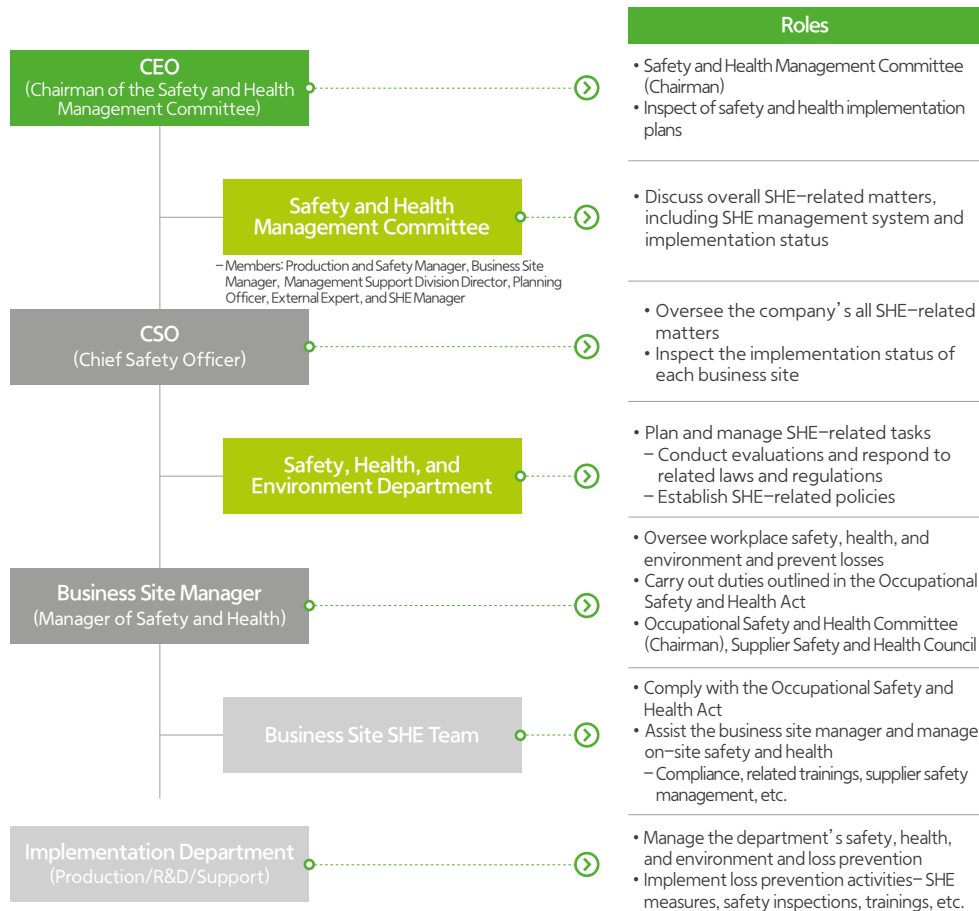


SHE Management

SHE Management System

SHE Management Governance

We have reinforced our SHE management governance system to proactively prevent and address safety and health incidents. Our Safety and Health Management Committee consists of key stakeholders including the CEO, the Chief Safety Officer (CSO), relevant executives, and the general SHE manager of the business sites. Additionally, we have established dedicated SHE departments at each business site to implement a rational and objective decision-making process and promote compliance with laws and regulations, as well as proactive accident prevention measures.



Hanwha Solutions has established a dedicated SHE organization along with an implementation team for each division and business site to assign independent responsibilities and authority.

The **Chemical** Division implements comprehensive management led by the Safety, Health, and Environment Office, including planning and managing the SHE responsibilities across the company, evaluating the workplace environment, and monitoring relevant laws.

In January 2022, the **Qcells** Division appointed the CSO of the Safety, and Health, Environment Office and granted independent responsibilities and authorities. We plan to continue enhancing employee and stakeholder satisfaction by implementing effective eco-friendly management centered on the CSO.

The **Insight** Division conducts safety and health diagnosis and evaluation, monitors laws and regulations, and assigns safety and health officers at each business site, including the head office.

The **Advanced Materials** Division has established a dedicated SHE organization for each business site to operate an environmental management system, proactively comply with legal requirements, monitor pollutant emissions, and address risks.

The **Galleria** Division has appointed a CSO in the head office and has been operating the Safety and Health Management Team since January 2022. We have also appointed a safety and health manager for each business site to create a safe work environment, protect the safety and health of employees, comply with laws and regulations, and strengthen accident prevention activities.

SHE Management

SHE Management Activities

SHE Management Investment and Expenditure

In 2022, Hanwha Solutions invested about 135.6 billion won in promoting SHE management. We have plans to further increase our investment to about 145.2 billion won in 2023, which represents an 8% increase compared to the previous year.

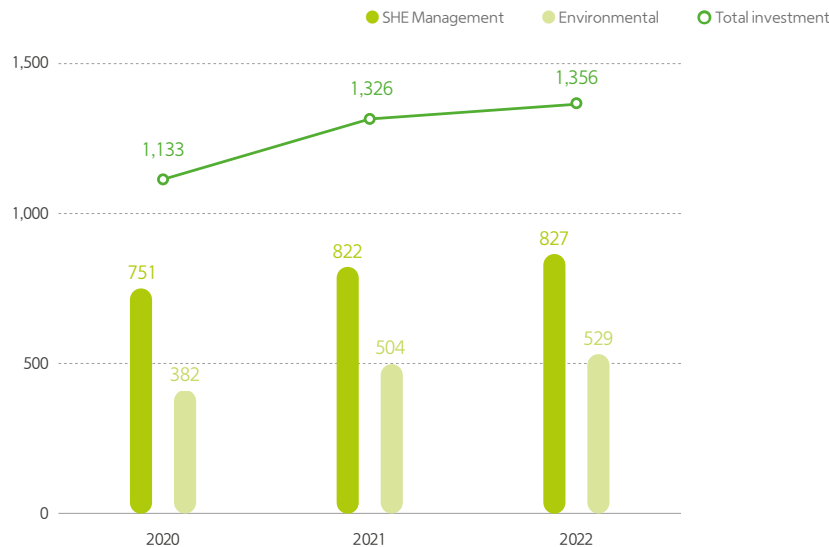
2022 SHE Management Investment Performance

Hanwha Solutions

- Invested in safety, health, and environment facilities to secure process safety and reduce pollutant emissions
- Implemented professional consulting to establish safety culture and compliance (PSM, integrated environmental permit, etc.)

+ Hanwha Solutions' SHE Investment and Expenditure Status

Unit: KRW 100 million



By Division				
Chemical	Qcells	Insight	Advanced Materials	Galleria
<p>Replace and improve old equipment to improve process safety and prevent accidents</p> <p>Invest in air pollution reduction such as improving the vent gas system, reducing VCM, and installing TMS</p>	<p>Invest in facilities like vacuum cart to prevent chemical accident leakage</p> <p>Invest in developing an ESH portal and utilizing a site daily inspection app</p>	<p>Introduce HIU to further advance the SHE management</p> <p>Inspect workplace safety and replace old facilities</p>	<p>Build a SHE management system through digital transformation and improve old facilities</p> <p>Invest in SHE-related education and training</p>	<p>Invest in electricity, and replace air conditioning unit and elevator equipment</p> <p>Replace of old electrical equipment to improve energy efficiency and reduce usage</p>

+ 2022 SHE Investment Performance by Division

Unit: 100 million won

Total	Chemical	Qcells	Insight	Advanced Materials	Galleria
1,356	1,200.5	91.8	9.3	16.8	37.6

Environmental Management

Environmental Management System

Environmental Management Policy

Hanwha Solutions has established environmental management practice guidelines and promotes various activities based on them. To achieve the Net Zero goal and optimize resource and energy efficiency throughout management activities, we operate an implementation department for each business site. These departments effectively set and manage environmental management goals, plans, and detailed activities. Furthermore, we strengthen the management of major environmental indicators to build an eco-friendly workplace and lay the foundation for a sustainable business through active participation in eco-friendly activities.

 [Environmental Management Guidelines \(Full\)](#)

Environmental Management System (ISO 14001) Certification

All of our business sites in the **Chemical**, **Qcells**, **Galleria**, and **Advanced Materials** divisions have obtained ISO 14001 certification. The **Chemical** Division acquired ISO 14001 certification for the Central R&D center in 2022. To ensure the ongoing compliance and maintenance of ISO 14001 certification, we will continue to enhance our internal and follow-up audits, as well as refine our operational processes.

2025년 중장기 목표

Division	ISO 14001 Certification Status
Chemical	• 8 locations, including Yeosu 1,2,3 Plant, TDI Plant, Ulsan 1,2,3 Plant, and Central R&D Center
Qcells	• All locations, including Jincheon Plant and Eumseong 2 plant, etc.
Advanced Materials	• All locations, including Sejong Branch, Eumseong Branch
Galleria	• 4 locations, including Luxury Hall, Gwanggyo Branch, Center City, and Jinju Branch

Environmental Performance Evaluation and Management

We are pleased to announce that we have successfully achieved our targets for GHG emissions, energy consumption, water usage, and waste management in 2022 through our proactive environmental improvement efforts. However, we have identified a slight increase in air pollution intensity due to the addition of emissions from new facilities that are exempt from installing air pollution prevention facilities, as mandated by self-measurement obligations. We remain committed to our environmental goals and will continue our continuous improvement efforts such as installing additional prevention facilities to minimize our environmental impact and ensure a sustainable future.

Environmental Performance and Goals

KPI	Unit	2022 Target	2022 Performance	2023 Target	2025 Target
GHG Intensity	tCO ₂ -eq/KRW 100 million	33.1	26.0	25.2	
Energy Intensity	GJ/KRW 100 million	660	519	503	
Air Pollutant Intensity (NOx,SOx, Dust)	Kg/KRW 100 million	2.62	2.75	2.67	Reduction by 3% each year
Water Intensity		169	140	136	
Waste Intensity	Ton/KRW 100 million	0.51	0.49	0.48	

*by sales

Environmental Performance Evaluation and Management Status by Division

Chemical Division	Manage the performance of major environmental indicators, share and discuss key issues and bench marking (BM) for each business site, through semiannual environmental sessions and monthly regular meetings, to minimize environmental risks and improve the workplace environment
Qcells Division	Manage performance based on Hanwha Solutions' environmental performance evaluation system and improve performance through annual environmental audits
Advanced Materials Division	Set reduction goals for major environmental indicators and promote activities to achieve them
Galleria Division	Operate a separate checklist for annual environmental performance evaluation and conduct comprehensive evaluation along with safety and health activities

Carbon Emission Management System

We have implemented the Mangrove System, which utilizes IoT, AI, and machine learning technologies, to automate the monitoring and management of both our direct and indirect carbon emissions. Through this system, we aim to accurately measure future energy usage and carbon emissions, and leverage data analysis to facilitate smart and efficient emission management.



Environmental Management

Environmental Management System

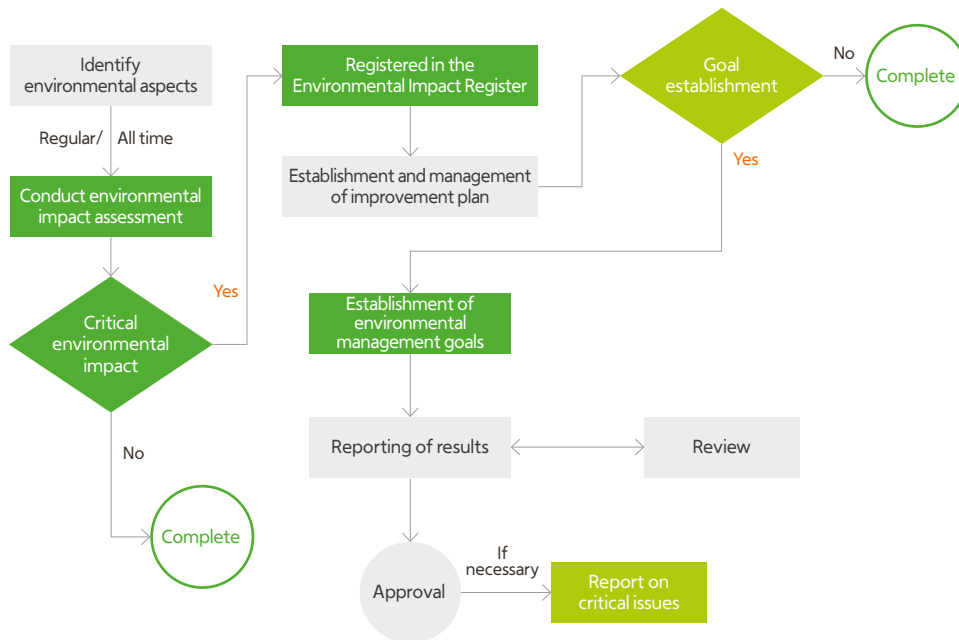
Environmental Impact Assessment

Hanwha Solutions establishes internal criteria for assessing environmental impacts, taking into account applicable laws and regulations, frequency of occurrence, degree of environmental pollution, and product-specific environmental impact assessment criteria. Environmental impact assessments are conducted for activities at the unit, process, and business area levels, following the established standards. These assessments are conducted regularly (once every three years) and on special occasions. The final environmental impact rating is determined by aggregating the quantified results from environmental aspects and environmental impact assessment tables. Based on the ratings and results, improvement plans are developed by registering critical environmental impacts in the internal register for each team. The SHE team manager responsible for safety, health, and environment reviews the feasibility of established goals and provides support as needed.

* Environment Aspect: Refers to organization's activities, products and services that can interact with the environment, including water pollution, air pollution, waste generation, odor, noise and vibration, soil pollution, handling of natural resources and materials, and biodiversity conservation

** Environmental Impact: Refers to positive and negative impacts that environmental aspects can have on the environment directly or indirectly

+ Environmental Impact Assessment Process



+ Critical Environmental Impact Ratings and Registration Criteria

Classification	Score	Actions Required
H (High)	13 points and above	<ul style="list-style-type: none"> • Subject to registration in the Critical Environmental Impact Register • Matters that require immediate action (if difficult, set them as priority items) • Immediately promote as detailed environmental management goals • Regular monitoring is required for each detailed promotion item
M (Medium)	10–12 points	<ul style="list-style-type: none"> • Subject to registration in the Critical Environmental Impact Register • Immediately promote as detailed environmental management goals • Regular monitoring is required for each detailed promotion item
L (Low)	10 points or below	<ul style="list-style-type: none"> • Not subject to registration in the Critical Environmental Impact Register • Maintain the current level and conduct routine management • Register them in the environmental impact register and establish detailed goals, if the constant improvement is desired

Environmental Management

Environmental Management System

Environmental Impact Assessment

In 2022, Hanwha Solutions conducted a regular environmental impact assessment, which identified critical environmental impacts such as wastewater treatment and leakage that could affect the local community and the surrounding environment. Based on these results, we closely monitor the impact of these environmental aspects on the local community through the Environmental Impact Register and implement specific mitigation plans and measures for each impact.

Furthermore, our Chemical Division actively pursued the acquisition of integrated environmental permits for each business site and conducted emission impact analysis for environmental facilities. The Ministry of Environment reviewed and deemed the results of the analysis to be suitable, leading to the achievement of several business sites within the division obtaining the integrated environmental permits.

+ Emission Impact Assessment Details - Chemical Division Yeosu Plant

Emission Impact Analysis Method	<ul style="list-style-type: none"> Complied with the Method of Emission Impact Analysis as outlined in Article 6, No. 4 Act on The Integrated Control of Pollutant-discharging Facilities Evaluated the surrounding environmental impact of 20 air pollutants items emitted from facilities 																												
Reviewed by the Ministry of Environment	<ul style="list-style-type: none"> Verify the adequacy of the emission impact analysis method and detailed item selection of the operator (Yeosu Plant) through the review and modeling by experts from the National Institute of Environmental Research and Environmental Expert Auditors 																												
Results	<table border="1"> <thead> <tr> <th>Classification</th> <th>Item</th> <th>Rationale</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Area</td> <td>Scope of the region</td> <td>Check the input topographic map</td> <td>Good</td> </tr> <tr> <td>Meteorological information</td> <td>Utilize of standard program materials</td> <td>Good</td> </tr> <tr> <td rowspan="2">Input Data</td> <td>Environmental quality target level</td> <td>Act on The Integrated Control of Pollutant-discharging Facilities</td> <td>Good</td> </tr> <tr> <td>Existing pollution level</td> <td>Yeosu Meteorological Bureau data</td> <td>Good</td> </tr> <tr> <td rowspan="3">Object of Analysis</td> <td>Target outlet</td> <td>Outlet impact analysis</td> <td>Good</td> </tr> <tr> <td>Pollutant discharge information</td> <td>Self-measurement, other business sites</td> <td>Good</td> </tr> <tr> <td>Outlet information</td> <td>Outlet design drawing</td> <td>Good</td> </tr> </tbody> </table>	Classification	Item	Rationale	Result	Area	Scope of the region	Check the input topographic map	Good	Meteorological information	Utilize of standard program materials	Good	Input Data	Environmental quality target level	Act on The Integrated Control of Pollutant-discharging Facilities	Good	Existing pollution level	Yeosu Meteorological Bureau data	Good	Object of Analysis	Target outlet	Outlet impact analysis	Good	Pollutant discharge information	Self-measurement, other business sites	Good	Outlet information	Outlet design drawing	Good
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+ 2022 Environmental Impact Assessment Results (sample, Ulsan Plant)

Department	Identification No.	Process	Environmental Aspects (Detailed processes and activities)	Environmental Impact Reduction Plan	Community Environmental Impact
VCM Production Team	F-201	VCM2 HTC Process	EDC/CM LEAK (Water pollution)	<ul style="list-style-type: none"> Replace the entire coil as there is a risk of leakage due to aging 	<ul style="list-style-type: none"> Block the runoff of wastewater into local rivers to prevent ecosystem destruction and species mortality due to a decrease in dissolved oxygen (DO)
	V-820	VCM2 Waste Water Treatment Process	Wastewater treatment and wastewater leak (water/soil)	<ul style="list-style-type: none"> Complete the sludge cleaning as the damage to the outer wall/floor of the water collection tank is suspected, and repair the suspected leakage area 	<ul style="list-style-type: none"> Block the runoff of wastewater into local rivers to prevent ecosystem destruction and species mortality due to a decrease in dissolved oxygen (DO) Prevent soil acidification due to the accumulation of pollutants in the soil
PVC Production 1 Team	V-344	MPS-1 Polymerization process	Leakage during VCM storage and storage (air pollution)	<ul style="list-style-type: none"> Conduct a drill after creating an emergency leakage scenario 	<ul style="list-style-type: none"> Prevent respiratory diseases in the community caused by the air pollutants
Logistics Team	3,4 Packing room	Packing	Breakouts/dust caused by machine trouble	<ul style="list-style-type: none"> Redesign and replace dust collector TYPE 	<ul style="list-style-type: none"> Prevent damage to communities from dust explosions
Safety, Health, and Environment Team	Waste oil station	Waste oil station	Fire when storing waste oil (soil, water quality, waste generation)	<ul style="list-style-type: none"> Comply with waste and waste oil installation standards No mixing waste oil with other reactive substances Inspect fire extinguishing facilities once a month 	<ul style="list-style-type: none"> Block the runoff of wastewater into local rivers to prevent ecosystem destruction and species mortality due to a decrease in dissolved oxygen (DO) Prevent soil acidification due to the accumulation of pollutants in the soil Prevent respiratory diseases in the community caused by the air pollutants Prevent damage to communities from dust explosions

Environmental Management

Environmental Management–Related Regulatory Response Activities

Hanwha Solutions monitors the constantly evolving laws and regulations related to environmental management to prevent risks in advance. In particular, we aim to strengthen the execution of ESG management by consistently identifying and responding to global regulatory trends related to environmental impacts, including GHG reduction.

+ Environmental Management Regulatory Response

Statute	Details	Measures and Performance									
<p>Framework Act On Net Zero And Green Growth For Coping With Climate Crisis (Effective 03.25.2022)</p>	<ul style="list-style-type: none"> Specifies Net Zero as a national vision by 2050 and set mid to long-term national GHG reduction targets By 2030, companies are required to meet their reduction goals by 40% compared to 2018 	<p>In November 2021, Hanwha Solutions acknowledged the urgency of the climate crisis and actively engaged in the global initiatives. As a proactive measure, we made a commitment to achieve Net Zero by 2050 even before the implementation of the Framework Act On Net Zero And Green Growth For Coping With Climate Crisis. We are currently making thorough preparations to effectively implement Net Zero, including transitioning to an eco-friendly production structure.</p>									
<p>Act On The Control And Aggravated Punishment Of Environmental Offenses (Effective 02.19.2021)</p>	<ul style="list-style-type: none"> Establishes guidelines regarding the prevention of environmental pollution and the enforcement of strict penalties for any acts that cause harm or damage to the environment 	<p>To prevent environmental pollution and ensure thorough management of environmental facilities, we provide training to all employees that emphasizes the importance of environmental pollution prevention and facility management. In addition, we conduct environmental sessions and inspections and regularly manage each department to ensure the proper operation of facilities, following an environmental facility inspection checklist.</p>									
<p>Act on The Integrated Control of Pollutant-discharging Facilities (Effective 01.01.2017)</p>	<ul style="list-style-type: none"> Requires investigation and analysis of the impact of pollutant discharge on the surrounding environment The phased implementation over a 5-year period for industries subject to integrated environmental management starting from 2017 	<p>We establish principles and standards of environmental management in accordance with domestic and international legal regulations. For this purpose, we have developed an integrated environmental system that allows us to effectively manage environmental impacts within our business sites. To meet the stricter emission standards associated with the integrated environmental permit, we have installed additional prevention facilities and enhanced our monitoring and internal management system for environmental facilities.</p> <p>+ Integrated Environmental Permit Acquisition Status</p> <table border="1" data-bbox="871 1307 2076 1425"> <thead> <tr> <th data-bbox="871 1307 1180 1347">Chemical Division</th> <th data-bbox="1180 1307 1525 1347">Advanced Materials Division</th> <th data-bbox="1525 1307 1848 1347">Qcells Division</th> </tr> </thead> <tbody> <tr> <td data-bbox="871 1355 1180 1417">Yeosu 3 Plant and Ulsan 2 Plant (Acquired in 2021)</td> <td data-bbox="1180 1355 1525 1417">Yeosu 1 and 2, Ulsan 1 and 3, TDI Plant (acquired in 2022)</td> <td data-bbox="1525 1355 1848 1417">Sejong Branch (Scheduled for 2024)</td> </tr> <tr> <td></td> <td></td> <td data-bbox="1848 1355 2076 1417">Jincheon Branch (Scheduled for 2024)</td> </tr> </tbody> </table>	Chemical Division	Advanced Materials Division	Qcells Division	Yeosu 3 Plant and Ulsan 2 Plant (Acquired in 2021)	Yeosu 1 and 2, Ulsan 1 and 3, TDI Plant (acquired in 2022)	Sejong Branch (Scheduled for 2024)			Jincheon Branch (Scheduled for 2024)
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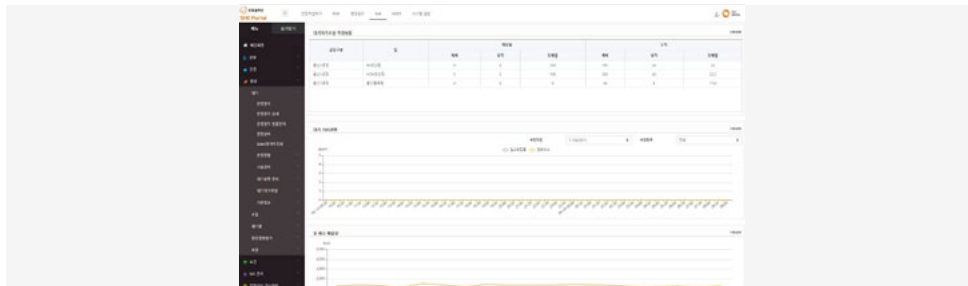
Reducing Environmental Impact

Pollutant Management

Air Pollutant Management System

To establish an effective environmental management system, the **Chemical Division of Hanwha Solutions** has converted all of its business sites into integrated environmental permit sites. We have also implemented the SHE Portal, which enables efficient management of environmental data. Furthermore, to enhance on-site management efficiency and effectiveness, we have reviewed and revised all internal environmental regulations. We have significantly strengthened our internal standards for pollutant emissions, aiming to keep them within 30% of the legal requirements. In addition, we have plans to reconstruct the monitoring system of the TDI Plant to ensure comprehensive monitoring and proper operation of emission facilities and prevention facilities.

+ Air Pollutant Monitoring Feature in the SHE Portal



The **Qcells Division** consistently conducts self-inspections and invests in air pollutant reduction facilities to contribute to the promotion of clean air. We carefully examine the raw materials and implement various reduction activities across all processes, including substituting substances that contribute to the formation of nitric oxide (NOx) and enhancing the removal efficiency of treatment facilities.

As a result of these efforts, we achieved a reduction in air pollutant emissions of over 18% compared to the company's baseline year (average value of 2020–2021) in 2022. Additionally, the **Qcells Division** recognized the severity of the nation's fine dust issue early on and actively participated in the Voluntary Agreement on Fine Dust Reduction organized by the Chungbuk Provincial Government in April 2018 to contribute to fine dust reduction.

Similarly, the **Advanced Materials Division** implements proactive measures to manage air pollutants by applying internal management standards that are more stringent than the legal requirements. We regularly monitor air pollutant emissions through certification from external measurement agencies and gradually minimize them by incorporating environment-related tasks as key performance indicators (KPIs).

Air Pollutant Management Activities

Our **Chemical Division** has strengthened close monitoring of air pollution-related facilities, and in the Yeosu plant, we successfully reduced NOx emissions by approximately 69% in 2022 compared to 2021. Additionally, we are actively investing in air pollutant reduction, which includes improving the vent system, installing additional stripping facilities to reduce Vinyl Chloride Monomer (VCM), and installing prevention facilities for the hopper silo. In the future, we plan to build a bag filter, A/C tower, and a separate waste gas incineration system to reduce Total Hydrocarbon (THC) emissions by 591 tons per year.

+ Chemical Division's Yeosu Plant Air Pollutant Management Plan

1

Installation of hydrogen boiler SCR or ultra-low NOx burner within 2024
→ Further reduction of NOx emissions

2

Promotion of the construction of a hydrogen blending system by decomposition of VCM
→ Reduction of GHG and NOx emissions

The **Qcells Division** has installed air pollution prevention facilities tailored to each type of pollutant to effectively remove pollutants from process facilities. For major facilities, we have implemented a Telemetry System (TMS) to continuously measure and manage emission concentrations, ensuring that air pollutant emissions are kept within internal standards.

Similarly, in 2022, our **Advanced Materials Division** implemented an electrostatic precipitator (EP) secondary treatment system to enhance the dust collection efficiency of environmental prevention facilities. We have also actively participated in measures to reduce high-concentration fine dust and have taken steps to replace outdated environmental operating facilities.

Reducing Environmental Impact

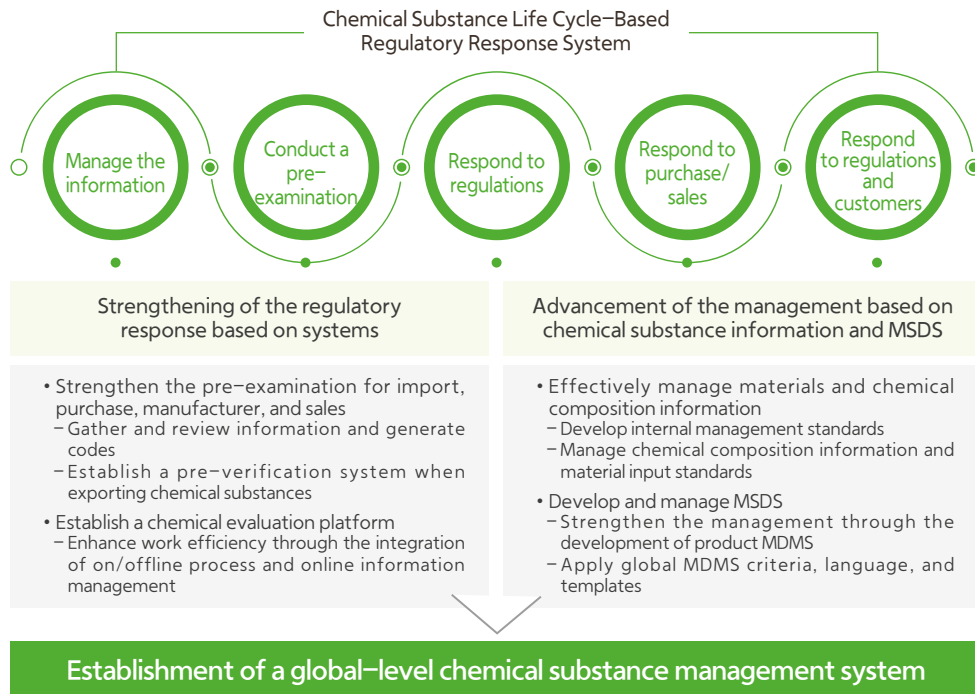
Pollutant Management

Hazardous Chemical Management System

Advancing the Chemical Management System

Hanwha Solutions monitors global chemical laws and regulations and conducts regular inspections to ensure proper use, transportation, and storage management of chemical substances, aiming to prevent hazards and damages. We are committed to proactively responding to regulations on hazardous substances in each country, including national regulations, and meeting the expectations of all stakeholders while preserving the environment. To establish an effective chemical management system, we have developed a comprehensive database containing information on all chemical substances to better respond to the regulations and implemented advanced Material Safety Data Sheet (MSDS)-based management.

+ Chemical Management Promotion Plan and Goal



Hazardous Chemical Management Activities

In February 2023, the **Chemical** Division became the first to receive certification for compliance with the Chemical Accident Prevention and Management Plan. To maintain our position, we plan to conduct internal inspections of the Chemical Accident Prevention and Management Plan starting this year.

Hazardous Chemical Emission Reduction Activities by Division

The **Chemical** Division focuses on managing and reducing VCM emissions. In 2022, we achieved an 11% reduction compared to 2021 through process improvements. We are committed to implementing various improvement measures to further expand our reduction activities.

+ VCM Emission Reduction Plan

Year	Yeosu Plant	Ulsan Plant
2023	<ul style="list-style-type: none"> • Improve r-VCM (replace the dispersant combination) • Duplicate TR-3 Purge gas incineration pipe 	<ul style="list-style-type: none"> • Install additional stripping to MPS-2 process (expected to reduce 4.4 tons)
2024	<ul style="list-style-type: none"> • Duplicate TR-1/2 Purge gas incineration pipe • Strengthen the management of facilities such as stripper 	<ul style="list-style-type: none"> • Install additional stripping for SPVC process (expected to reduce 0.2 tons)
2025	<ul style="list-style-type: none"> • Install low-concentration VCM adsorption equipment • Seal nonpoint pollutant sources 	<ul style="list-style-type: none"> • Monitor the latest VCM reduction technology trends and confirm the applicability

In order to reduce the emission of hazardous chemicals, **Hanwha Solutions Qcells** Division is conducting constant reviews and lab tests for process improvements. For example, the Jincheon Plant in the **Qcells** Division carefully examines the harmful chemicals used in the etching process, develops and applies recipes that can reduce the number of chemical inputs per product compared to the existing ones, and minimizes the use of alkaline chemicals. As a result, the chemical use was reduced 1,459 tons/year from July 2021 to June 2022.

To comply with the continuously strengthened environmental, safety, and health regulations, our **Advanced Materials** Division has established the Chemical Management System (CMS). The CMS aims to block the source of hazardous substances, ensure compliance, and effectively manage environmental and safety, and health tasks as part of our eco-friendly policy. Additionally, we apply a hazardous substance management procedure to our entire supply chain to strictly minimize the use of hazardous substances.

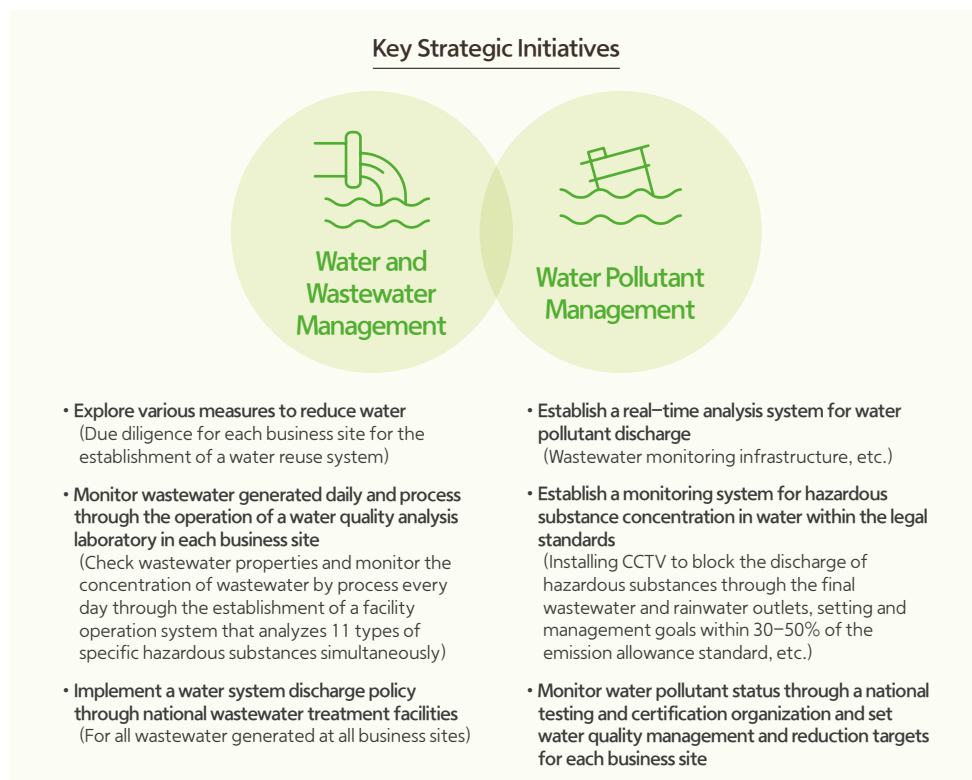
Reducing Environmental Impact

Water Management

Water Management System

Hanwha Solutions is building a system to review and analyze water, wastewater, and water pollutant management and reduction plans from various angles to strengthen water resource management.

Water Resources Management System



Strengthening the water management system at a global level

Strengthening the Water Resource Management System

Since July 2022, we have initiated plans to conduct a water reuse diagnosis in collaboration with specialized organizations and develop a step-by-step water resource management roadmap. This roadmap will serve as a guide for upgrading the company's water resource management system. It will include identifying mid to long-term water use targets for the entire company and outlining specific tasks to increase the reuse rate of water resources.

+ Water Reuse Diagnosis Details

Diagnostic Background and Overview

- Due to the increase in uncertainty in water management due to the rise in global temperature and climate abnormalities, related policies and ESG assessments is becoming stricter.
 - Ministry of Environment: Promoting policy to improve water reuse rate in accordance with the Basic Plan for Water Reuse (2021–2030)
 - U.S. and Europe: Establishing guidelines for the reuse of treated sewage water
- A plan to enhance the water reuse rate through a water use diagnosis is becoming necessary.
 - Consider the target of mid and long-term water use intensity (3%/annual reduction) and derive tasks to increase the reuse rate

Research Service Schedule

- Dec 2022–Mar 2023 Examine waste water reusability through a water quality analysis on cooling tower blowdown water, final effluent, etc.
- Apr 2023–May 2023 Assess the feasibility through through a reuse facility design for expected reusable wastewater
- June 2023 Establish a step-by-step roadmap

Reducing Environmental Impact

Water Management

Water Management Activities

+ Water and Wastewater Reduction Activities

Hanwha Solutions has established the mid to long term goals with an aim of reducing water consumption by 3% every year. All our business sites conduct monthly monitoring of the water usage and constantly carry out reduction activities.

The Chemical Division actively reviews and implements wastewater reuse plans for each process, resulting in a successful reduction of approximately 542,000 tons of wastewater discharge per year. Furthermore, we focus on minimizing water input in the scrubber and wastewater generation by managing the operation of the scrubber, water use, and implementing blower shut down during and after working hours.

The Qcells Division analyzes pollutant discharge in real-time through the establishment of wastewater monitoring infrastructure, ensuring that the concentration of hazardous substances in the water is constantly managed within legal regulations. Internally, we strictly adhere to standards by setting them within 50% of the emission allowance standard, and we monitor the concentration by operating our own water quality analysis equipment to assess the properties of wastewater (pH, T-P, T-N, SS) for each process on a daily basis. In 2022, we further enhanced our monitoring capabilities by installing additional TOC analysis equipment, allowing us to monitor seven types of water pollutants independently.

+ Water Use Intensity Improvement Measures and Plans

Improvement Activities	Type	Improvement/Management	Date	Expected Reduction (ton)
Manage scrubber wash water conductivity and reduce compressor and pump seal water	Improvement	Management	June 2022	165,000
Reduce wastewater through the reuse of H-2	Installation	Investment	Mar 2023	26,800
Install air heater power trap for CPVC process				6,400
Recycle 2nd decanter wastewater from CPVC process			Dec 2023 (scheduled)	40,800
Improve the drain water in preparation for freezing in winter	Improvement	Management	Jan 2022	72,000
Identify current status of mechanical seal water and improve recycling				16,000
Reduce the amount of recycled wastewater due to external supply of DW			Jan 2024 (scheduled)	80,000

Water Pollutant Management Activities

In addition to implementing a wastewater quality monitoring system, our Chemical Division has achieved a significant reduction of nearly 75% in the total phosphorus concentration of river effluent by implementing a low phosphate program for cooling tower blowdown water. We actively promote water pollutant reduction activities, including regular analysis and management of wastewater properties. Through improvements in our wastewater separation system, we have successfully reduced both the volume of wastewater generated and the risk of untreated wastewater leakage.

+ Chemical Division's Ulsan 2 Plant Water Pollutant Management Activities

Establishing water quality monitoring system for wastewater

Replacing the reaction tank of the physicochemical treatment facility for stable wastewater treatment

Installing wastewater catchment tank vent gas adsorption equipment and sludge pond odor removal equipment



Reducing Environmental Impact

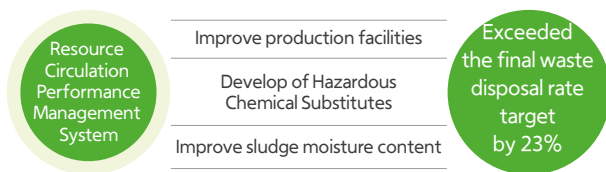
Waste Management

Waste Management System

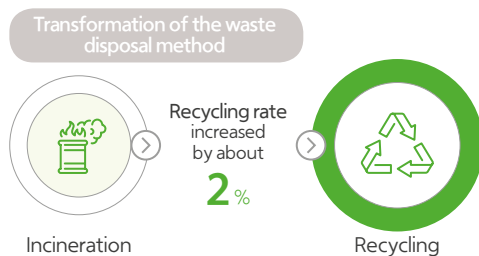
Hanwha Solutions is committed to establishing a virtuous resource cycle throughout all processes, from the procurement of raw materials to the production and shipment of products. We have set goals for resource circulation, encouraged waste recycling, and implemented targets for reducing the use of raw and auxiliary materials as KPIs to minimize waste generation.

The Qcells Division is at the forefront of reducing waste generation throughout the entire production and processing of products. Since the implementation of the Resource Circulation Performance Management System in 2020, we have consistently worked towards reducing waste generation by enhancing production facilities, developing alternatives to hazardous chemicals, and improving sludge moisture content. These efforts have resulted in the Jincheon Plant surpassing the baseline target by 23% in 2022, achieving the final waste disposal rate.

+ Qcells Division



+ Advanced Materials Division



Waste Management Activities

We conduct physical and chemical analysis for the recycling of waste generated in the production process, aiming to discover recyclable items based on this. Through these efforts, our Chemical Division has significantly improved the recycling rate of incineration and landfill waste, including process sludge, and has achieved the result of recycling 550 tons of waste every year.

PET Can Become Clothes Project

We have collaborated with eco-friendly startup companies to implement the PET Can Become Clothes Project. As part of this initiative, we have installed 12 Internet of Things (IoT)-based PET bottle bins in the COEX exhibition hall. Through the Today's Separate Collection app, users can earn points by disposing of PET bottles in these bins. Once they accumulate a certain number of points, they can exchange them for items like beverages



Expanding the Application of rPE

The Chemical Division is committed to supplying eco-friendly materials and has obtained the Global Recycled Standard (GRS) certification for recycled polyethylene (rPE). The GRS certification is granted to products that contain more than 20% recycled raw materials. Hanwha Solutions has obtained GRS certification for the entire production, processing, and distribution process of rPE. Our goal is to produce and supply 10,000 tons of rPE per year by 2027. We use rPE as a packaging raw material for eco-friendly cosmetic containers, contributing to the revitalization of resource circulation. We are also actively developing various renewable raw materials and expanding the range of applications.



In June 2022, the Advanced Materials Division obtained GRS certification for automotive composite materials and RCS certification for SuperLite and IntermLite products used in automotive interior materials. RCS certification is granted to products made of more than 5% recycled raw materials, verifying their eco-friendliness by tracking the source and production process of recycled raw materials.

In 2022, the Advanced Materials Division produced 10,872 tons of RCS-certified products and obtained GRS certification for its lightweight composite product ranges, StrongLite and BuffLite.

Reducing Environmental Impact

Waste Management

Waste Management Activities

The **Chemical** and **Qcells** Division prioritize the use of eco-friendly materials for both raw and subsidiary materials in their manufacturing and sales processes. They also promote the use of no-label packaging for easier recycling. By utilizing recyclable materials such as PP and PE as single materials in product packaging, they have been recognized as excellent in terms of recycling according to the packaging material structure evaluation system under the Act On The Promotion Of Saving And Recycling Of Resources.

For protectors used in the packaging of PV modules to provide external protection, raw and subsidiary materials consisting of over 85-90% recycled materials are employed, contributing to domestic resource circulation. The company has made efforts to reduce the use of packaging materials by implementing improvements in packaging methods, resulting in a 26% reduction in packaging materials compared to the previous year for domestic products.

Similarly, the **Galleria** Division is actively working towards reducing the generation of synthetic resin waste. They introduced eco-friendly water dispensers ahead of the ban on single-use plastic umbrellas in large-scale stores.

	Branch	Eco-Friendly Water Dispenser
Luxury Hall	EAST	7
	WEST	7
Gwanggyo	Main Building	11
	Passage	9
Center City		7
Jinju		6

Biodiversity and Soil Pollution Management

Biodiversity Protection System

All our business sites conduct regular environmental impact assessments in compliance with ISO 14001 requirements to identify and manage biodiversity impacts. Furthermore, we actively engage in environmental cleaning activities in collaboration with environmental organizations such as the county office and the Korean Association for Conservation of Nature. These activities include periodic cleaning around industrial complexes as well as initiatives like "1 Company 1 River" and "1 Company, 1 Mountain," enabling us to contribute to environmental preservation in the local community and fulfill our corporate social and environmental responsibilities.

Biodiversity Protection Activities

+ Korea National Park Service Agreement Project

Hanwha Solutions has signed a business agreement with the Korea National Park Service to cooperate in conserving national parks, which serve as carbon reservoirs for our nation. In 2022, we supported the installation of solar energy power generation facilities at the Jirisan Nogodan Shelter in collaboration with the Korea National Park Service. We also covered the expenses for recruiting researchers and conducting research activities at the Climate Change Response Station. Additionally, we installed solar streetlights in the national park villages to enhance the living environment and promote energy savings.

Furthermore, we provided support for investigating and researching ecosystems that are vulnerable to climate change in collaboration with the Climate Response Station. The National Park Research Institute operated a citizen scientist education program and monitored the flowering and emergence times of indicator species(7 plants, 2 amphibians, and 1 gourd) that can identify climate change signs. We conducted research on the growth status of coniferous species, particularly focusing on Korea's endemic fir tree, and disclosed findings to the public. Moreover, we are actively engaged in sustainable conservation activities by securing genetic resources(20,000 globular trees and 30,000 spruce trees) for the restoration of subalpine conifers and operating local nurseries, thus responding to climate change in a sustainable manner.

Soil Pollution Management System

To prevent soil contamination and safeguard the surrounding ecosystem, we have taken several measures. These include the installation of a dedicated storage facility for specific soil management materials, as well as the implementation of primary protective measures such as discharge walls. In addition, secondary safety measures have been put in place, such as the installation and operation of detection and alarm devices.

Soil Pollution Management Activities

The **Chemical** Division operates an internal inspection register for soil pollution prevention facilities and conducts regular soil contamination testing to minimize the negative environmental impact on soil.

Beautiful and Natural Forest Restoration Project

We are actively involved in environmental conservation activities within the local community, including initiatives such as removing invasive species like ragweed and bass, planting native plants, and promoting clean-up campaigns like "1 Company 1 Trail." Furthermore, we are expanding our environmental conservation activities in collaboration with Gyeryongsan National Park (research center), Gyeongju National Park (Ulsan Plant), and Bukhansan National Park (Seoul business site).



Eco-Friendly Products

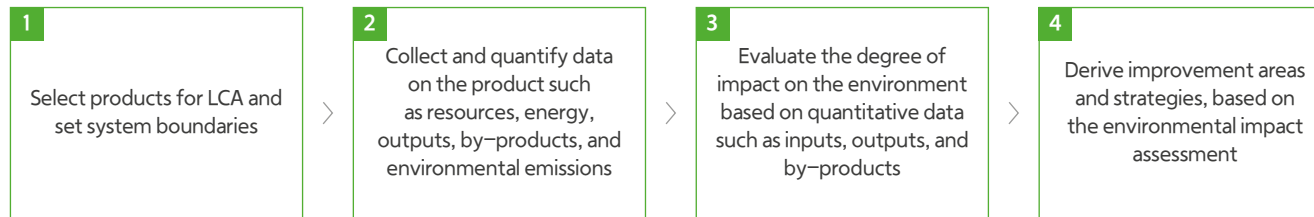
Eco-Friendly Technology

Product Life Cycle Assessment (LCA) Policy

With the global ESG trends and the increasing consumer demand for product environmental information disclosure, the significance of product Life Cycle Assessment(LCA) has been increasing. In line with this, we have taken the initiative to promote LCA calculations and integrate them into our internal processes for each product.

Hanwha Solutions is committed to conducting product LCAs using the same seven indicators as the environmental product declaration (EPD), utilizing our assessment tool. In the **Chemical** Division, we aim to determine LCA values for 202 products categorized by grade, while in the **Qcells** Division, we plan to assess 458 products based on module product specifications.

LCA Process



Based on the process above, we plan to identify and manage the carbon intensity of each product based on the carbon footprint calculated in the LCA results. We will also establish strategies to reduce GHG emissions and minimize environmental impact, and carry out related activities and investments accordingly.

Implementing Product LCA

The **Chemical** Division conducts its own LCAs following international standards for evaluating environmental impact categories. To ensure a more precise and quantitative analysis of environmental impact throughout the entire product process, we have established a database containing environmental impact factors such as raw material content ratio, production period, additive status, and transportation method for major products. We are committed to advancing our LCA process further.

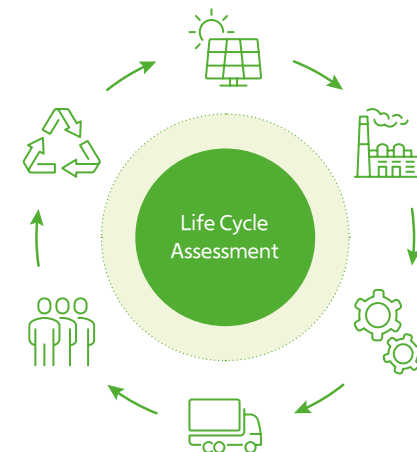
Similarly, the **Qcells** Division has obtained the Carbon Footprint for Product (CFP) certification, which is currently operational in the French market. We continuously conduct LCAs for the production of PV modules to expand our lineup of eco-friendly certified products. In 2014, we were the first Korean company to obtain CFP certification.

Obtained LCA-Based Eco-Friendly Certification

Our **Qcells** division is dedicated to developing eco-friendly products that utilize more sustainable materials compared to traditional PV modules. Our aim is to become a sustainable company that not only contributes to carbon reduction in the product service stage but also throughout the entire value chain by incorporating eco-friendly practices at the manufacturing stage.

To achieve this objective, we gather and analyze quantified environmental impact data based on product LCA. We utilize this data to meet the legal standards required for obtaining major eco-friendly product certifications in different countries. By acquiring these certifications and offering eco-friendly premium value to our customers, we strive to make significant contributions to carbon reduction and overall environmental impact reduction, working towards a sustainable future.

Currently, the division is actively pursuing eco-friendly certifications such as International Environmental Product Declaration (EPD) certification, EPEAT certification for electronic products in the United States, and EPD Italy certification.



Eco-Friendly Products

Eco-Friendly Investments and Purchases

Eco-Friendly Investment Strategies

Mandating an Environmental Safety Review Form

Hanwha Solutions proactively identifies environmental impacts by implementing an environmental safety review for all facility investments in the plants located in Korea. When installing or improving new facilities, we conduct thorough technical reviews and economic analyses to assess factors such as technology, profitability, and the impact on GHG emissions.

+ Investment and Environmental Safety Review Process



An Example of the Environmental Safety Review

Construction Overview	<ul style="list-style-type: none"> Name of the construction and department in charge, starting and expected completion date, etc.
Review on Safety	<ul style="list-style-type: none"> Obtainment of safety permits (Occupational Safety and Health Act, Framework Act on Fire Protection, etc.) Insurance coverage and applicable standards (if any)
Review on Environment	<ul style="list-style-type: none"> Obtainment of environmental permits (air, odor, water, soil pollution, the use of hazardous chemicals, off-site risk assessment, etc.) Environmental impact considerations when designing (e.g.) <ul style="list-style-type: none"> Review on the introduction of low-pollution processes (fluctuation in air and water pollution level, etc.) Review on energy reduction processes (fluctuation in energy usage, design to minimize electricity usage considering specifications of facilities, etc.)
Permits and Actions Required(examples)	<ul style="list-style-type: none"> [Safety] Must comply with Occupational Safety and Health Act and in-house safety and health regulation during construction [Environment] Not subject to air permit at the moment, but generation of related substances will be measured separately during mass production

Eco-Friendly Purchase Strategies

Eco-Friendly Product Purchasing and Management

To reduce environmental pollution and promote energy and resource conservation, Hanwha Solutions implements a management system for the purchase of eco-friendly products. When acquiring materials, fixtures, and electronic products for our plants, we actively encourage our divisions to choose products that have been recognized for their eco-friendliness, such as those with eco-mark certifications or GR marks.

+ Recommended Eco-Friendly Products

- Products with Eco-marks certified by the Environmental Technology and Environment Industry Support Act
- Products with GR marks certified by the Act on the Promotion of Saving and Recycling of Resources
- Products with Energy Saving marks and High-efficiency Equipment marks certified by the Energy Use Rationalization Act
- ⋮
- Other products that have been recognized as eco-friendly by the Environment and Safety Team

Each product category has a dedicated department responsible for managing the list of eco-friendly products and monitoring the purchase history. Once a year, these departments report their findings to the Environment and Safety Team. Moreover, the departments prioritize eco-friendly products for purchases according to this management system. The Environment and Safety Team, then, checks the purchase history and encourage the departments for eco-friendly purchases.

+ Managed Products by Department



With our eco-friendly product purchase strategy, Hanwha Solutions achieved a total 420 million in eco-friendly products and services purchases (total purchase amount: KRW 813.4 billion) in 2022, accounting for a 0.005% share of our overall purchases. This represents an increase of approximately 190 million won (Total purchase amount: KRW 65735 billion) compared to KRW 230 million in the previous year, and a 0.001%p increase in proportion. We will continue to actively expand our purchase of eco-friendly products and services in the future.

Eco-Friendly Products

Eco-Friendly certification

Environmental Product Declaration(EPD) And Eco-Friendly Product Certification

GRS and RCS Certification

The **Chemical** Division has obtained GRS certification for rPE materials for the entire supply stage, including the production, processing, and distribution stages, in February 2023. GRS certification has significance as an international standard that demonstrates compliance with environmental, social, and chemical responsibilities, as well as the use of recycled raw materials and effective supply chain management. We have also supported small and medium-sized suppliers by assisting them in obtaining certification for their entire supply chain, including the use of recycled raw materials, and covering the costs of consulting and certification.

In June 2022, our **Advanced Materials** Division achieved Recycled Claim Standard (RCS) certification, along with GRS certification for automotive composite materials. We are continuously increasing the utilization of renewable raw materials to reduce carbon emissions throughout the entire production process. These efforts enable us to actively promote the production of various eco-friendly products and contribute to resource circulation and waste plastic recycling.

+ GRS and RCS Green Certification Overview



GRS	RCS
An eco-friendly certification for products containing more than 20% recycled raw materials	An eco-friendly certification for products containing more than 5% recycled raw materials

Environmental Product Declaration and ISCC+ Certification Status



- Environmental Product Declaration (EPD): A disclosure of environmental information throughout the entire process of products and services

Chemical Division

- Certifications obtained for a total of 39 product (6 in 2021, 33 in 2022)



- ISCC+(International Sustainability Carbon Certification plus): An international sustainability certification is given to products that use eco-friendly raw materials throughout the production process, in compliance with the EU's Renewable Energy Directives.

Chemical Division

- Ethylene Vinyl Acetate Copolymer (EVA) of Polyolefin (PO) Department
- Polyvinyl Chloride (PVC) products (including PSR, CPVC, CP) of PVC Department

Green Store Certification

Our **Galleria** Division has obtained and continuously renews the Green Store certification awarded by the Ministry of Environment.

+ Galleria Division's Green Store Designation Status As of February 2022

Designation No.	Company	Store	Location
제014호	Galleria Department Store	Center City	Chungnam
제016호	Galleria Department Store	Luxury Hall	Seoul
제062호	Galleria Department Store	Jinju	Gyeongnam
제654호	Galleria Department Store	Gwanggyo	Gyeonggi

Green Card Agreement

The **Galleria** Division has signed a green card agreement with the Ministry of Environment, promoting green living and the consumption of environmentally friendly products. This initiative includes the establishment of a green card point-of-sale (POS) system and the implementation of related campaigns to encourage customers and partners to adopt sustainable practices. Furthermore, the division has implemented the Green Department Store Operation Guidelines, prioritizing the use of eco-friendly certified materials and goods in business procurement, building construction, and interior design.



Social

Hanwha Solutions contributes to a better future and sustainable growth for all and strives to grow together with stakeholders based on a culture of respect for people and society.

KEY PERFORMANCE

Safety and Health Management

Occupational Safety and Health Management System (ISO 45001) Certification

- Continuous renewal for all workplaces in the Chemical, Qcells, Advanced Materials, and Galleria Division



Supplier safety and health evaluation system

- Improved the supplier safety and health evaluation system
- Conducted supplier safety and health evaluations with a credit rating agency and provided consulting (Chemical Division)



Win-win cooperation safety and health programs

- Participated in the safety and health Win-Win Cooperation Program led by Korea Occupational Safety and Health Agency and recognized as an Excellent Workplace (Galleria Division)
- Improved supplier safety and health and prevented industrial accidents through risk assessment and technical support



Talent Management

Job expertise programs to strengthen business competitiveness

- Digital specialist, engineer, and business insight enhancement trainings



Global and professional expert trainings

- Advanced of the voluntary career management support program Job Market
- Enhanced work satisfaction through tailored career path design for employees with various capabilities.



Reorganization of the position levels and titles for a horizontal organizational culture

- Promoted the transition from the existing seniority-based rank system to a role-based growth system



Human Rights and Diversity

Human Rights Charter and Roadmap

- Declared the human rights management policy to protect and respect the human rights of all stakeholders
- Established a roadmap to systemize, regularize, and advance the human rights management



Grievance counseling and reporting system to protect human rights and prevention of infringement

- Designate a grievance handler for each business site and listen to opinions through the hotline
- Implemented Galleria Division's Annual HR Report System



Human rights trainings and protection activities

- Implemented regular human rights trainings for all employees
- Implemented human rights protection activities in the distribution service industry (Insight and Galleria Division)



Safety and Health Management

Safety and Health Management System

Safety and Health Management Strategy and Management System

In response to the rapidly changing safety and health environment, **Hanuha Solutions** has developed the 2025 Safety & Health Environment Strategy. This strategy is based on thorough accident analysis, safety culture measurements, staff and facility reviews, and employee interviews. With the 2025 Strategy in place, we have identified four strategic tasks to establish an effective and autonomous safety and health management system. Additionally, we have set annual goals across the company and devised plans to achieve these tasks at each of our business sites.

Safety and Health Management Strategy



Safety and Health Management Plan

Chemical	Qcells	Insight	Advanced Materials	Galleria
<ul style="list-style-type: none"> Establish a site-centered safety management system Safety Leadership Implementation Enhancement Project Advance the system and check the implementation status Establish a long term injured reserve (LTIR) target - 2023: 0.3 - 2024: 0.2 - 2025: 0.1 	<ul style="list-style-type: none"> Improve the execution ability of leaders and internalize a safety mindset Systemize the safety and health inspections centered on sites Implement activities to establish a safety culture Establish a long term injured reserve (LTIR) target - 2023: 0.9 - 2024: 0.5 - 2025: 0.1 	<ul style="list-style-type: none"> Strengthen the organizational safety and health management system Reinforcement of safety inspections Establish a safety culture 	<ul style="list-style-type: none"> Improve the safety and health management system Improve the level of process safety management (PSM) Establish a safety culture 	<ul style="list-style-type: none"> Strengthen the safety and health management system Strengthen the risk management Strengthen safety awareness and spread the safety culture

Occupational Health & Safety Management System (ISO 45001) And Related Certifications

The **Chemical**, **Qcells**, **Advanced Materials**, and **Galleria** Divisions maintain ISO 45001 certification for all of their business sites. To ensure the continued maintenance of the certification, we proactively monitor workplace risks by conducting internal and annual external audits, and actively promote improvement activities based on the findings.

Division	Current safety and health-Related Certification Status
Chemical, Qcells, Advanced Materials Division	Occupational Safety and Health Management System (ISO 45001) Certification (All Workplaces)
Galleria Division	Occupational Safety and Health Management System (ISO 45001) certification (all business sites) Earthquake Safety Facility Certification by Ministry of the Interior and Safety (Jinju Branch)

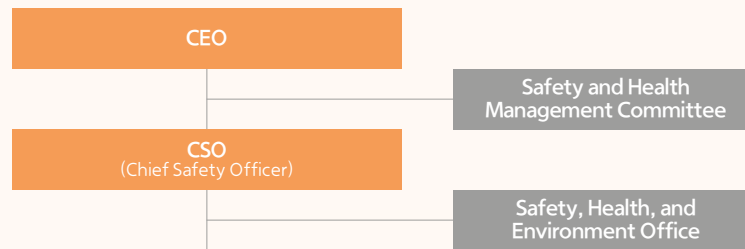
Safety and Health Management

Safety and Health Management System

Safety and Health Governance

Hanwha Solutions continuously enhances its safety and health governance to create a workplace free from accidents and promote the wellbeing of its employees. The Safety and health Management Committee plays a crucial role in this effort, conducting regular activities to prevent accidents at their core. These activities include developing division-specific action plans and establishing dedicated organizations aligned with the company-wide safety and health strategy. Moreover, detailed safety and health organizations are formed within each department and business site to facilitate smooth safety and health operations.

Safety and Health Management Organization



Safety and Health Organizations by Division



The **Chemical** Division conducts evaluations of the implementation status of safety and health at its business sites. These evaluations are centered on the operation of the Safety and health Management Committee and the production safety director, who is responsible for overseeing the company's safety, health, and environmental matters.

In January 2022, the **Qcells** Division appointed a CSO for the Safety, Health, and Environment Office to provide independent responsibility and authority. The CSO strengthens safety and health governance by conducting annual reports and seeking approvals from the board of directors on important safety and health plans and matters.

The **Insight** Division is centered on the Safety and health Support Office at the head office. It promotes the operation of an independent safety and health organization and conducts accident prevention activities by assigning a safety and health team and management supervisor for each business site.

With the implementation of the Serious Accident Punishment Act on January 27, 2022, the **Advanced Materials** Division has established a safety and health team with the goal of building a safety and health system. The organization is responsible for conducting semi-annual inspections/evaluations of safety and health management and quarterly special safety inspections.

The **Galleria** Division appointed a CSO at the head office and established the Safety and health Management Team in January 2022 to strengthen compliance with safety and health laws and the management of accident prevention activities. In addition, a safety and health management officer and a management supervisor are appointed for each business site to provide further support for on-site safety and health activities.

Safety and Health Management

Safety and Health Management System

Advancing the Safety and Health Evaluation and Management

Safety Culture Assessment

Every year, **Hanwha Solutions** evaluates the level of safety culture using the Hanwha Group's Safety Culture Diagnosis Tool ECO-YHES Will2.0. This tool consists of questions for each safety and health field, including safety leadership, constant safety management, line responsibility, education and training, and communication. In the **Chemical** Division, a separate safety culture diagnosis is conducted through an external expert organization since 2022.

To improve the level of the safety culture, related activities such as safety leadership, theme proposals, safety mileage, and safety, health, and environment awards are carried out. Furthermore, the incorporation of safety and health environment activities into KPIs is being promoted, and awards are given to encourage participation from business departments.

Strengthening Emergency Preparedness

In the event of an emergency, we conduct emergency drills to establish rapid, safe, and effective response capabilities, aiming to minimize workplace damage. These drills are conducted semi-annually and once a year for each business site, based on various scenarios. The objective is to establish a safety and health accident damage prevention system that includes identifying issues and implementing improvement activities through result analysis after the drills.

The **Advanced Materials** Division, in particular, conducts regular accident damage forecasts and incorporates them into emergency scenarios to create effective drills. Training cycles are established, and priorities are set by grading scenarios based on their likelihood and severity. With the implementation of the Serious Accident Punishment Act, the division enhances its emergency response capabilities by incorporating additional response measures specific to each department into the emergency scenarios, aiming to prevent further damage.

Safety Program

To create an environment that encourages employee participation in safety prevention and to raise awareness about safety, health, and the environment, **Hanwha Solutions** implements various safety programs.

Safe Mileage Program	SHE Award	Safety Golden Rules
<ul style="list-style-type: none"> A mileage system to reward outstanding activities, such as making safety improvement proposals, to foster an autonomous safety culture. Conduct evaluations based on internal standards that take into account the expected safety improvement effects 	<ul style="list-style-type: none"> Award the teams that have contributed to preventing industrial accidents by carrying out identification and improvement activities for work and facilities once a year Implement awards throughout the year to continuously motivate employees and business sites to actively participate in safety, health, and environment management 	<ul style="list-style-type: none"> Establish and operate Safety Golden Rules that applies to all employees Establish a culture that places safety and health as the company's utmost value 

+ Emergency Drill Details

- Method:** Activate the Emergency Action Committee to simulate and respond to various emergency scenarios based on actual situations
- Business sites and teams subject to the drill:** Selected in consultation with the safety, health, and environment team within the business site
- Scenario:** Select one of the existing emergency drill scenarios
- Led by:** The Safety, Health and Environment Team within the business site
- Production Team Activities**
 - Conduct on-site emergency drills based on scenarios
 - Report to the control room on the situation since the drill
- Control Room Activities**
 - Gather members of the Emergency Action Committee
 - Participated by the production safety director and the Director of Safety, Health and Environment
 - Suppose the actual situation with the reported situation(Announcement of emergency, briefing, etc.)

Safety and Health Management

Safety and Health Management System

Supplier Safety and Health Management Policy

Advanced the Supplier Safety and Health Evaluation System

The **Chemical** Division has specified the rating system from three to five grades and expanded the allocation of safety evaluation points from 40% to 50% to improve supplier safety and health evaluation. The evaluations are conducted in collaboration with credit rating agencies. Through this process, we classify the safety and health capabilities of our suppliers into grades 1 to 7. For companies with grades 6 to 7, we provide consulting to upgrade the grade and conduct a re-evaluation.

In 2022, the **Insight** Division conducted regular evaluations of suppliers. The evaluation process included rating suppliers based on management evaluation, with a focus on credit ratings, financial indicators, performance quality, and safety. In 2023, we have plans to enhance the existing evaluation criteria and impose restrictions on bidding participation and sanctions for suppliers whose evaluation results fall below a certain grade.

The **Advanced Materials** Division supports suppliers through risk assessment recognition support and training for management supervisors. We also conduct year-end evaluations for both internal and external suppliers, recognizing and rewarding excellent performers. To further enhance the safety and health management capabilities of our suppliers, we conduct regular workplace tours, joint health inspections, and monthly safety and health consultations, aiming to prevent accidents.

+ The Advanced Materials Divisions' safety and health Performance of Suppliers

Classification	Performance
Workplace Safety Rounds	Every two days
Joint safety and health Inspection	Quarterly
safety and health Council	Monthly
Risk Assessment Recognition Support	2 companies
Supervisor Training Support	4 companies

The Safety and Health Win-Win Cooperation Program and Certified as an Excellent Workplace

Each of our business sites actively participates in the safety and health Win-Win Cooperation Program, hosted by the Korea Occupational safety and health Agency. The **Chemical** Division's Yeosu Plant and TDI Plant have received Grade A recognition for their successful implementation of a win-win safety and health management system with their suppliers.

Similarly, the **Qcells** Division's business sites have also participated in the weekly safety and health Win-Win Cooperation Program, organized by the Occupational safety and health Agency, and have achieved an A grade. They engage in various activities such as safety quizzes, slogan contests, joint workplace inspections, safety rounds for suppliers, and CPR and first aid training to promote safety culture.

The **Advanced Materials** Division actively participates in the safety and health Win-Win Cooperation Program and has been awarded the highest grade, Grade A, for its exemplary cooperation in safety and health.

The Luxury Hall in the **Galleria** Division has also participated in the 2022 safety and health Win-Win Cooperation Program and has obtained an A Grade. It has been recognized both internally and externally for its close collaboration with suppliers and its high level of awareness and implementation of safety and health management.



Supplier Safety and Health Policy

The **Insight** Division has established employee suggestion boxes at each worksite to facilitate regular feedback collection from both suppliers and employees. In addition, labor relations council meetings serve as a platform for discussing and addressing any concerns or suggestions related to safety and health matters.

+ Employee Suggestion Box at Worksites



Furthermore, we place great emphasis on incorporating the opinions and input of workers when assessing workplace risks. Through anonymous SNS operation dedicated to safety and health matters, we have successfully achieved a 100% grievance handling rate in 2022.

Talent Management

Talent Recruitment and Evaluation System

Hanwha's Ideal Talent

Based on Hanwha's core values of challenge, dedication, and integrity, both our **Chemical** Division and **Qcells** Division have developed a guide outlining the ideal talent and principles for our employees. By adhering to these core values, we cultivate a culture of excellence and ensure the ongoing success of our human resources.

+ Hanwha's Core Values



CHALLENGE

Instead of settling for the existing standards, people with the spirit of a challenger pursue the best that come from changes and innovation.



DEDICATION

People who demonstrate dedication try their best for the greater good while thinking highly of relationships with companies, customers and colleagues.



INTEGRITY

People of Integrity act properly based on principles and their sense of pride.

+ Hanwha Solutions' Ideal Talent



A collective mission for a better future

We share the sense of mission to create a better tomorrow. We put our best efforts into creating a 'solution to respond to the climate crisis' for us and the next generation.



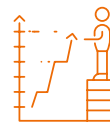
Unwavering pursuit of excellence

We are armed with invincible entrepreneurship. Unstoppable tenacity and persistence make us not only at the top of the industry but also an irreplaceable leaders at all times.



Taking responsible ownership with dedication

As the owner of the job, we always think about business performance and compensation from a long-term perspective. To move faster than your competitors, we act quickly without procrastination and be responsible for results.



Unleashing unprecedented differentiation beyond boundaries

We have an audacious goal of overturning common sense in the industry. We focus on a core goal, create differentiation with details and continue to generate performances that are one step ahead.



Embracing change to seize future opportunities

We are neither complacent nor settle for past performances in an ever-changing market. We face the harsh reality and prepare for the future preemptively to create new opportunities.

Transparent Recruitment Without Discrimination

At **Hanwha Solutions**, we prohibit child labor, forced labor, and discrimination in hiring, placement, promotion, salary, and education based on gender, religion, political opinion, social status, nationality, or race. We continuously monitor and comply with international labor standards and domestic labor laws. We have established consistent evaluation criteria through interviewer training to ensure equal opportunities for all applicants and operate a fair recruitment system. Additionally, certain points are granted to nationally registered persons with disabilities and national veterans during the recruitment process.

Labor Practice Risk Management

We have conducted a risk assessment for various labor-related risks, established action plans to address major risks, evaluated the results of implementing these actions, and made necessary improvements to relevant measures.

+ Hanwha Solutions' Recruitment Direction

People at Hanwha have different colors and characteristics!

- We recruit talent according to the characteristics of each job.

We look forward to opening a sustainable tomorrow with a "customized recruiting system."

- We select talent through recruitment throughout the year.
- We select through clear and detailed job descriptions.
- We recruit without discrimination.

Hanwha people can focus on more fundamental things!

- We have eliminated unnecessary personality tests.

Talent Management

Strengthening Employee Competencies and Fair Rewards

Employee Competency Enhancement Policy

Hanwha Solutions has implemented a comprehensive career development plan that encompasses all employees, aiming to foster talent effectively through position-specific talent development systems. We offer diverse educational programs to enhance the capabilities of our employees and enhance our overall competitiveness. By identifying the ideal talent required to execute our business strategies and establishing talent development strategies, we strive to align our workforce with organizational goals. To evaluate the impact of training on our employees, we conduct comprehensive assessments. Leadership and job competencies of employees in CL (Career Level) 3-4 are evaluated annually, and the individual assessment results are analyzed to guide future education and coaching initiatives.

+ Education and Training System

Classification	Executive	CL4(P)	CL4	CL3	CL2	CL1
Leadership	One-on-one coaching	Organizational management competencies				
		PL leadership coaching				
		Leadership evaluation & Feedback				
		Executive training courses				
		Leadership reinforcement training at each career level				
		New team manager	Candidates for promotion		Junior change-up	
Global		Global job training				
		Global talent				
		Global BIZ capabilities				
		Language support for expatriate candidates				
		One-on-one language coaching				
		Support online language courses and external language schools				
Common/ Value	Executive onboarding	Orientation training and mentoring program			HPMP	
		Innovative leader course				New employee mentoring
		Value practice activities				
		Prevention of sexual harassment, bullying, and improvement of awareness of persons with disabilities				

+ Main Employee Competency Enhancement Activities



In 2021, we implemented MS Teams across the entire company, establishing a smart workplace environment that enables employees to effectively carry out their work anytime and anywhere using both PC and mobile devices. MS Teams is utilized for real-time collaboration, allowing employees to engage in video conferencing, report on their work progress, share schedules and work-related data, and manage annual goals.



The Galleria Division provides support for the cost of the OPIc examination for all employees once every two years. Moreover, we are committed to enhancing the language skills of our employees through various initiatives, including an annual award of 300,000 won for those who improve their OPIc grades.



For employees who have worked at Hanwha Solutions for more than 5 years, we support their professional development through the Chaеum Leave program. This program allows employees to take up to 2 years of unpaid leave to pursue job-related degrees, certifications, and language studies. Upon returning to work, they are assigned to positions that make effective use of their expertise, leading to improved job satisfaction and professional career development.



The Qcells Division is committed to supporting the growth of its employees and fostering their leadership capabilities through various activities, including special lectures, coaching sessions, and leadership lettering.

Talent Management

Strengthening Employee Competencies and Fair Rewards

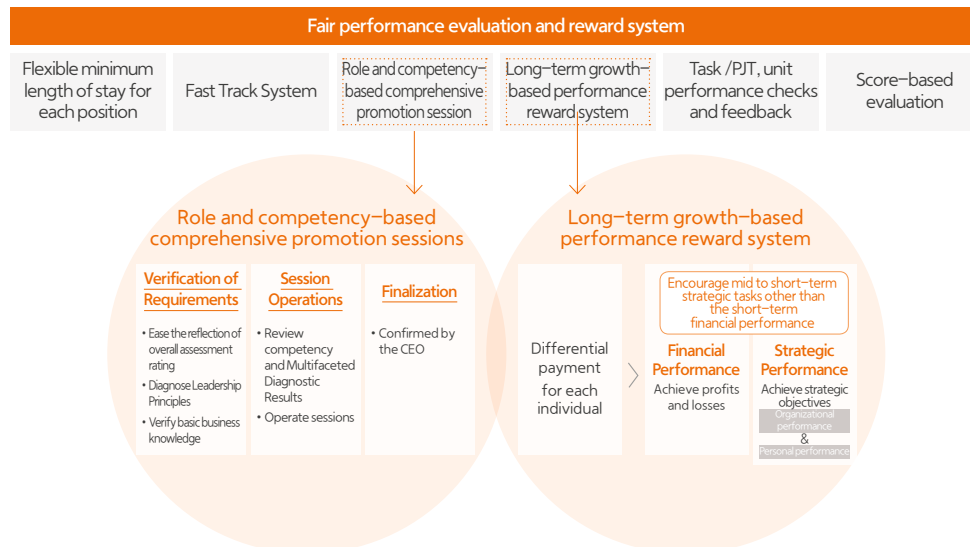
Performance Evaluation and Reward System

Fair Performance Evaluation and Reward System

Hanwha Solutions has implemented a performance and goal management system through MS Teams to enable effective communication and feedback between team managers and members. This system allows for clear alignment of goals and facilitates regular evaluations based on the feedback received, ensuring fairness and objectivity in performance assessments.

To promote career growth and development, we have introduced a flexible minimum length of stay for each position and established a Fast Track system. This allows employees to maximize their potential and advance in their careers based on their capabilities, regardless of factors such as position, age, or gender. The company also maintains a balanced ratio of evaluation grades to ensure accurate assessments and has implemented a comprehensive promotion session system that takes into account individual roles and competencies. Performance pay at Hanwha Solutions is calculated by linking financial performance and strategic achievements, creating a performance-based reward system that focuses on the company's mid to long-term strategic objectives.

Additionally, we grant Restricted Stock Units (RSUs) to our executives. RSUs are a performance-linked compensation system that has gained popularity in companies such as Google, Facebook, and Tesla. The maturity period of the RSUs granted by Hanwha Solutions is typically 5-10 years, aligning with the employees' mid to long-term performance and providing incentives for sustained excellence.



Benefits

We are committed to stabilizing the lives and improving the welfare of our employees so that they can focus on their work during working hours and enjoy a fulfilling life outside of work. To achieve this, we operate various welfare programs aimed at increasing employee motivation, promoting work engagement, and enhancing their overall quality of life.

We prioritize work-life balance for our female employees and provide support programs for maternity and childcare, including parental leave and paid feeding time. Both the Chemical and Galleria Divisions have received the Excellent Family-Friendly Company certification from the Ministry of Gender Equality and Family, acknowledging our efforts to implement policies that promote employee welfare.

The Galleria Division is expanding employee benefits and perks based on the labor agreement, taking into consideration the feedback and opinions of our employees. We have increased financial aid for the first semester of university education for employees' children to 3.6 million won, which is 400,000 won higher than before. Additionally, we have raised the coverage for employee expenses related to meals, health checkups, transportation, and security. We remain committed to improving our welfare system to provide a better environment for our employees and enhance work efficiency and productivity.

+ Employee Benefits

Classification		Detail
Working Hours	Flextime	A flexible work system that limits the average working week to 40 hours along with staggered time
	PC-OFF system	Limiting the use of PCs outside of work hours to support life in the evenings
Pregnancy support	Mom's Package and reduced working hours	Provide pregnant female employees with benefit guides, work aids, and congratulatory gifts, eligible to apply for a reduction in paid working hours by up to 2 hours per day (within 12 weeks of pregnancy or more than 36 weeks)
	Pregnancy Support and allow time for prenatal screening	First 30 days of paid leave and up to 2 million won support system, guaranteed 4 hours of paid regular checkup time per day
Maternity/Parenting Support	Miscarriage and Stillbirth Leave	The number of vacation days is granted differently depending on the period of pregnancy
	Childbirth Congratulatory Pay	A congratulatory pay of 250,000 won for employees who have given birth to a child
	Pre and Post-maternity Leave	Up to 90 days of vacation including the days before and after childbirth (120 days for multiple births)
	Paid Feeding Time	Twice a day, each with at least 30 minutes of paid feeding time (for 1 year after childbirth)
	Maternity Leave	Up to 6 months of vacation is granted for female employees who are pregnant and raising children
Leave	Sabbatical Program	Grant leave for employees with a certain period of time of employment to recharge

Talent Management

Employee Communication

Organizational Culture Assessment

Every year, **Hanwha Solutions** conducts a company-wide survey to gather feedback from employees and assess the organizational culture. This survey aims to foster an environment that encourages open expression of opinions and to gain insights into employees' perspectives on corporate leadership, values, behaviors, work atmosphere, and HR systems. By conducting this survey, we are committed to maintain a healthy and desirable corporate culture. The survey results help us identify any potential issues or problems within the organization and provide valuable input for shaping future improvement strategies and directions.

Internal Communication Activities

Hanwha Solutions promotes horizontal and comfortable communication to drive organizational innovation. We regularly conduct divisional meetings with CEOs to foster open communication. During these meetings, CEOs directly address anonymously collected questions from employees, enabling management to understand employees' concerns and provide practical solutions. Through this, we aim to foster a culture of transparent and honest communication.

Communication With Millennials and Gen Z

Hanwha Solutions operates a Reverse Mentoring Program centered on management to communicate directly with millennials and Gen Z and better understand each other. This is a mentoring program in which employees in their 20s and 30s become mentors to executives or managers and share the latest trends and knowledge, as well as exchange ideas such as technology coaching. Through online and offline mentoring, we activate communication between generations, listen to different opinions, and provide an opportunity to better understand each other.

Expanding the Organizational Communication

Our **Chemical** Division operates an official YouTube channel that contains videos of company news and employees' stories. We strive to promote information sharing within the company by delivering major events and management-related news to employees in

the fastest way. We collaborate with external experts to regularly produce content that is useful for corporate life.

Recently, we have produced a new promotional video that shares the company's vision for the future, enhancing the sense of belonging and pride of our employees.

In addition, to attract excellent talent, we communicate with the younger generation about the company's work by producing job and employee introduction content. We also engage in various activities to communicate with the company's stakeholders. We will continue to produce various video contents to share information and promote effective communication between employees.

The **Insight** Division conducts quarterly meetings for each business unit. The executive in charge is present, providing team members with an opportunity to better understand each other's work and support smooth communication.

Lastly, the **Galleria** Division implements various campaigns to promote communication within the organization. We hold events such as the Gal TALK campaign, Galleria Advent Calendar, and Head Office Christmas Display to commemorate the organizational culture and enhance understanding among employees. Moving forward, we plan to expand communication and connection between employees and share positive energy by continuously holding various events to improve the organizational culture.

+ Chemical Division's Internal Communication Activities

Square	Hanwha Solutions' unique internal bulletin board for content on various topics such as organizational culture, economic and industrial trends, and humanities
Solmate	An online monthly newsletter that delivers informative content including company news to employees and their families
Communication Day	Bimonthly employee exchange time to get to know each other and strengthen bonds

Building Labor Relations Based on Trust

Hanwha Solutions adheres to the Constitution and relevant laws and regulations to protect the rights of employees, including the freedom of association, collective bargaining, and collective action. We strive to foster smooth communication and achieve win-win growth between labor and management. This involves engaging in wage and collective bargaining with labor unions, as well as conducting individual quarterly labor-management councils at the head office and each business site. These platforms serve as opportunities to address grievances, gather feedback on working conditions and HR systems, and facilitate open dialogue between employees and management.

In the **Qcells** Division, we place emphasis on communication and cooperation with workers through the labor-management council. In addition to quarterly labor-management councils, we facilitate employee engagement through the Q-Board for general employees and the Hanmaum council for professionals.

Similarly, the **Advanced Materials** Division conducts quarterly labor-management councils to actively support communication with workers.

+ Qcells Division's Labor Negotiation Channel

Q-Board	<ul style="list-style-type: none"> • A communication channel for regular employees • Collects employees' opinions and demands through labor relation councils and discusses solutions
Hanmaum Council	<ul style="list-style-type: none"> • A communication channel for professionals • Promotes the protection of workers' rights and interests, gathering opinions to improve competitiveness and resolution of on-site problems through labor relation councils

The **Galleria** Division operates a labor-management council to foster mutual interests and collaboration between labor and management. Throughout 2022, we have proposed one labor-management agenda per quarter at both the head office and five business sites. As a result, we have successfully resolved over 150 labor-management issues, contributing to the betterment of our employees working conditions. Furthermore, we actively engage with our employees by conducting workplace visits to identify and address any difficulties they may be facing. To enhance communication with the head office, the HR team has also conducted consultations with employees at the five business sites. These ongoing efforts demonstrate **Hanwha Solutions'** commitment to promoting employee autonomy and improving working conditions.

Human Rights and Diversity

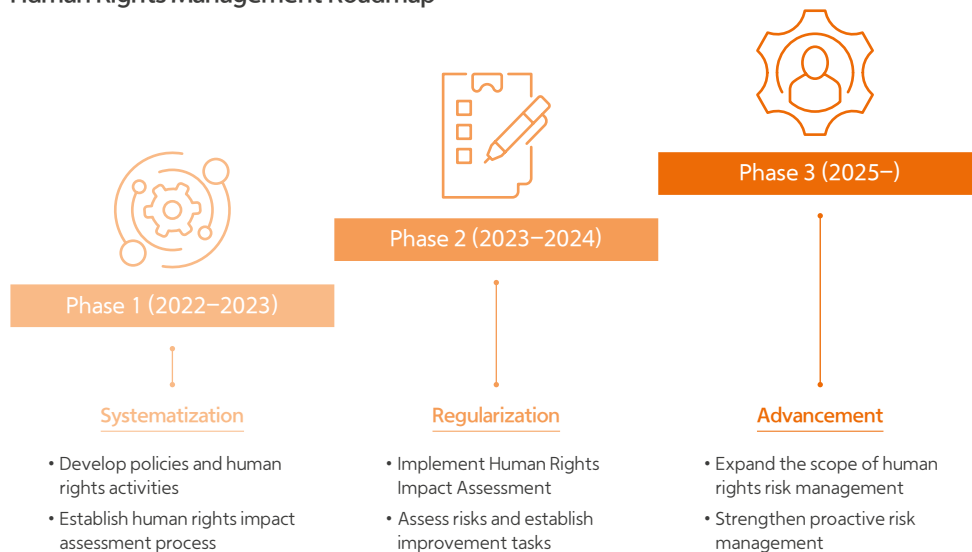
Human Rights Management System

Human Rights Management Policy

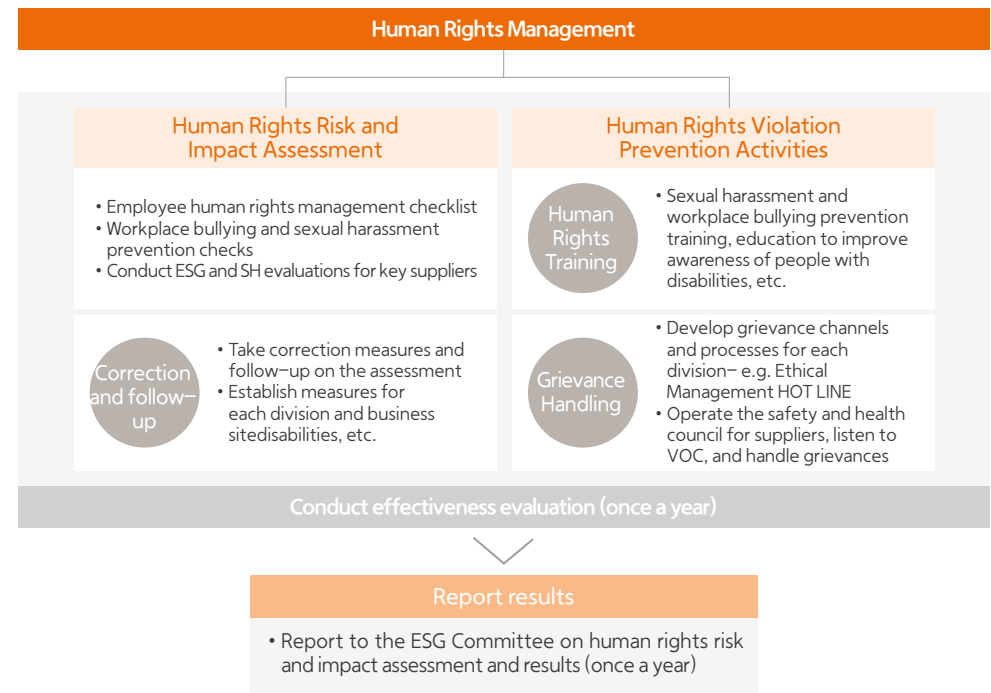
Hanwha Solutions protects and respects the human rights of all stakeholders affected by our business activities. We follow the Ten Principles of the UN Global Compact (UNGC), the Universal Declaration of Human Rights, and the UN Guiding Principles (UNGPs) on Business and Human Rights. We operate human rights training and a grievance counseling and reporting system for all employees to ensure effective human rights management. We have established human rights management guidelines and internal checklists to proactively manage human rights risks. In addition, we conduct self-inspections and risk assessments every year and develop action plans based on the results of the measures, which are then reviewed by the ESG Committee for further improvements.

 [Hanwha Solutions' Human Rights Charter](#)

Human Rights Management Roadmap



Human Rights Management Process



Human Rights Management Guidelines

Based on international standards such as the Universal Declaration of Human Rights, the United Nations Guiding Principles (UNGPs) for Business and Human Rights, the United Nations Global Compact(UNGC), and the OECD Guidelines for Multinational Enterprises, Hanwha Solutions has established human rights management guidelines and principles. These guidelines and principles encompass various aspects, including human rights, non-discrimination in the working environment, and the prohibition of forced labor.

Human Rights and Diversity

Human Rights Risk Management

Grievance Counseling and Reporting System

Hanwha Solutions operates various grievance counseling and reporting systems to protect human rights and take action against unethical and human rights violations, as well as grievances experienced in the workplace. As part of these efforts, we operate various grievance handling channels, including an ethical management HOT LINE, for our employees and various stakeholders.

Grievance Counseling and Reporting System by Division

The **Chemical** and **Advanced Materials** Division operates various channels, such as an internal private bulletin board, a grievance email account, and a HR hotline, to facilitate prompt discussions of work or personal concerns for employees at all business sites. Since 2021, we have also implemented an ombudsman system for each business site to address feedback on performance evaluation and the working environment. Regular reports on grievance handling status are provided to the CEO, ensuring that measures for protecting human rights are carried out without unfair treatment towards the victims, while maintaining anonymity.

The **Qcells** Division operates a global reporting system through the Global Ethics Hotline and has promptly responded to all five reports received in 2022.

– Grievance Handling Process: Report received → Discussions and processing of the report → Recording of the process in the system

The **Insight** Division follows an internal procedure for grievance handling and plans to enhance it by conducting annual workplace harassment surveys, installing grievance boxes, and appointing grievance counselors for the head office and each business site.

– Grievance Handling Process: Report received (online/offline) → Report to the division head → Investigation conducted → HR Council convened → Results shared

The **Galleria** Division conducts the annual HR Report program. Employees voluntarily complete and submit surveys regarding current job satisfaction, desired jobs/departments, and HR-related feedback. We provide support for employees in grievance handling, work satisfaction improvement, and career development based on this information.

+ 2022 HR Report Operational Status

Total Employee	Number of Submissions	Interview Details
1,090 employees	353 employees	Interviews were conducted with more than 60 employees regarding job transfer, work dissatisfaction, and other complaints

Human Rights Training and Protection Activities

We provide human rights training to all employees, including non-regular employees, to promote a culture of human rights within the workplace and proactively mitigate human rights risks. In addition to legally required training such as annual workplace harassment prevention, sexual harassment prevention, personal information protection, and disability awareness improvement, we also raise awareness of human rights issues through messages posted on the company's bulletin board, fostering a healthy workplace culture.

In the **Insight** and **Galleria** Divisions, we specifically focus on implementing human rights protection activities for employees in the distribution industry, taking into account the unique characteristics of the industry.

+ Insight and Galleria Division's Human Rights Protection Activities for Distribution Workers

Classification	Details
Employees' Right to Health	<ul style="list-style-type: none"> Improved employee rest spaces in department stores to enhance the health of employees who work standing for long hours through the placement of chairs and posters Regular stretching sessions conducted through external organizations to prevent musculoskeletal diseases
Emotional Health for Service Workers	<ul style="list-style-type: none"> Established an internal response manual in dealing with verbal abuse or unreasonable demands from customers Placed posters in high traffic areas to promote and encourage respect for workers Provided regular psychological therapy and job stress management training to help alleviate workers' emotional fatigue. Provided handbook materials and training for service workers
A Safe Workplace Environment	<ul style="list-style-type: none"> Conduct inspections for illegal filming in workplaces and install emergency bells to proactively ensure safety Implemented mandatory education for individuals who are required to report child abuse

Human Rights and Diversity

Diversity and Inclusion

Fostering the Culture of Human Rights

Hanwha Solutions respects the human rights of all stakeholders and supports the Ten Principles of the UN Global Compact (UNGC) on human rights, labor, environment, and anti-corruption.

Non-discriminatory Work Environment

Hanwha Solutions is dedicated to establishing an inclusive and equitable corporate culture by prohibiting discrimination based on factors such as gender, generation, educational background, and region. We value and support individuals with disabilities, recognizing and nurturing their unique abilities. To address potential structural discrimination faced by women, we have developed division-specific plans for eliminating such barriers. Moving forward, we plan to promote diversity and inclusion by implementing evaluation criteria for employees returning from maternity and paternity leave, as well as providing leadership training for female leaders.

In 2022, the Galleria Division made efforts to promote work-life balance and to support employees in starting families, such as a gift certificate program to celebrate the birth of children. Additionally, we have continuously renewed our family-friendly certification since December 2014, reflecting our commitment to maintaining an excellent family-friendly management system.

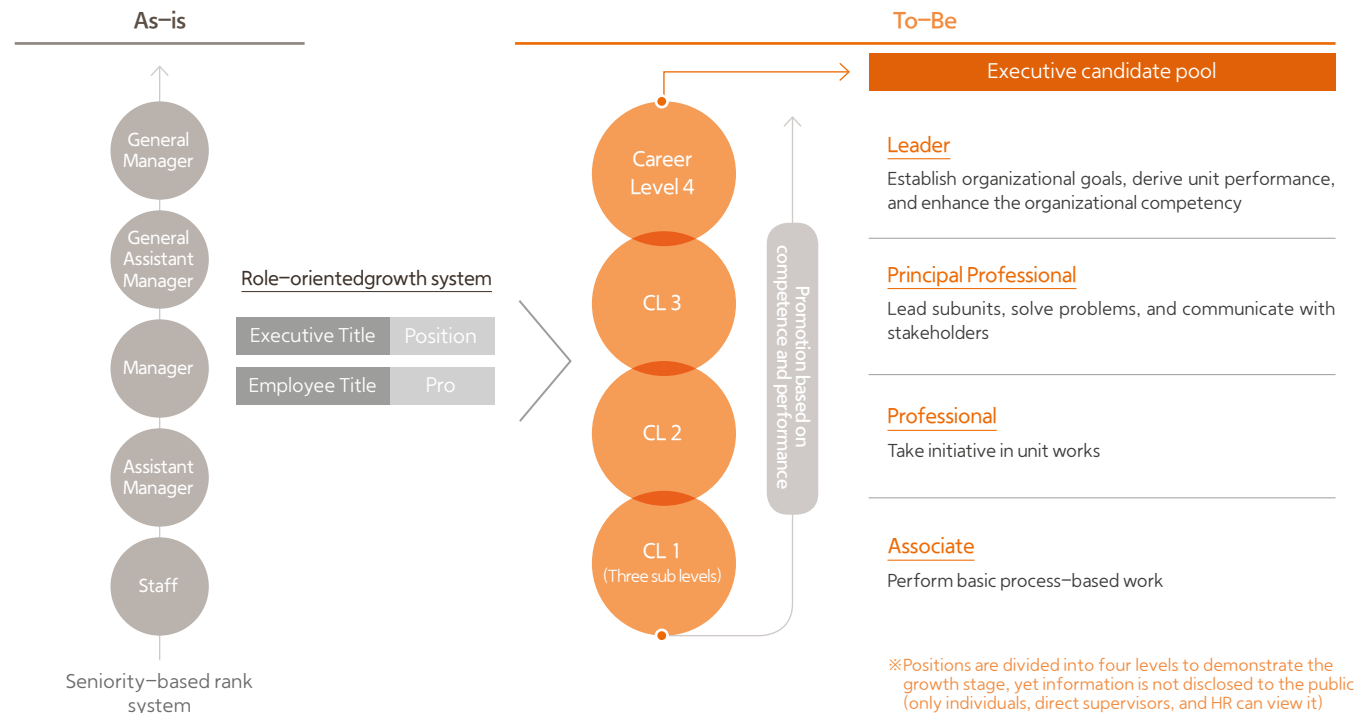
The Insight Division is currently exploring measures to enhance the family-friendly support system, such as introducing pregnancy checkup leave and enhancing parenting programs.

Building a Horizontal Organizational Culture

To establish a horizontal organizational culture, we have reorganized positions and titles, unifying them as "pros" for all employees. The position levels of executives have been eliminated, and titles now reflect their specific roles, such as "executive." To emphasize that job titles represent responsibilities rather than vertical relationships, the previous five position levels have been simplified to four career levels: CL1-CL4. This initiative promotes open expression of opinions among team members and creates the foundation for an efficient organization based on competence.

The Insight Division plans to enhance the organizational culture through various initiatives. This includes conducting business unit-level meetings to foster a horizontal organizational culture, creating a comfortable atmosphere among employees, and promoting a casual dress code to enhance work productivity and engagement.

+ Position Levels and Title System Reorganization Status



Product Responsibility and Customer Satisfaction

Quality Management System

Quality Management Policy

Hanwha Solutions prioritizes customer value in all of its business operations and aims to be a leading global company known for providing exceptional products and services. To achieve this, we have implemented a tailored quality management approach at each of our business sites, considering the unique characteristics of our products. Our dedicated employees are committed to ensuring customer satisfaction by deeply understanding the company's quality policy and actively engaging in quality management practices.

+ Quality Management Policy

- We establish and implement quality goals that exceed customer expectations.
- We establish accurate standards and produce reliable products through strict product quality management.
- Through process improvement, we continuously reduce the defect rate and manufacturing costs.
- We actively respond to evolving market demands and promote quality innovation and new product development with our core competencies.

Quality Management Governance

Hanwha Solutions places great emphasis on quality improvement and product optimization. All our business sites across the globe operate adhering to the requirements of the quality management system standard. We have a quality control organization and a supervisor for each production process. All performance and improvement opportunities are reported to the CEO. In addition, we have formed a separate organization to reflect customer needs and manage quality issues and claims through innovative activities. Our aim is to spread a customer-oriented culture within the organization.

Quality Management Management Certification

In our commitment to delivering high-quality products and services to our customers, we have obtained the ISO 9001 certification, which is an internationally recognized standard for quality management systems. In addition, we have also pursued and acquired additional certifications specific to our divisions to further enhance our quality standards and ensure customer satisfaction.

+ Product and Service Quality Certification Status by Division

Chemical

- Acquired quality management system (ISO 9001:2015) certification
- PE, W&C, PVC, PSR, VCM, CA products obtained BIS certification in India
- Obtained KS certification of Korean Industrial Standard for CA chlorine, hydrochloric acid, caustic soda products
- Obtained Japan Sanitation Resin Council Certification (JOHSPA) certification for additives (LLD3120, LLD4300N, LLD4300) used in PE products
- Acquired US International Hygiene and Safety Agency (NSF) Certification for CA Caustic Soda and CPVC Resin Products
- Obtained Hygiene and Safety Certification for CA Hypo Water Treatment System

Qcells

- Acquired quality management system (ISO 9001:2015) certification
- TUV Rheinland PV module quality inspection obtained Quality Controlled PV (QCPV) certification
- Maintaining all global certification for solar module products (IEC, UL, KS, CFP)

Insight

- Acquired quality management system (ISO 9001:2015) certification in the renewable energy plants

Advanced Materials

- Acquired automotive quality management system (IATF16949:2016) and quality management system (ISO 9001:2015) certification
- Acquired Business Continuity Management System (ISO22301:2019) certification (Sejong Plant)
- Received the highest grade in the automotive OEM regular supplier evaluation
- Acquired Aviation Quality Management System (AS9100:2018)

Galleria

- Acquired the 'Very Excellent' certification by the Ministry of Food and Drug Safety's hygiene rating system for food and beverage companies (229 locations in total in 2022)
- Maintaining HACCP certification for livestock products (Luxury Hall, Center City, Pearl)

Quality Control and Competitiveness Enhancement

At Hanwha Solutions, we place great importance on quality control at every stage of our production process to ensure consistent quality and adherence to standards. In the Chemical Division, we have implemented a customer activity called "Hello Orange" which involves monitoring customer companies to identify their needs and address any complaints. Through this initiative, we actively utilize customer feedback to drive quality improvement and enhance overall product satisfaction. In 2023, we have planned to conduct 12 Hello Orange activities with a proactive approach to prevent quality issues and establish a comprehensive customer database for better insights and analysis.

+ Quality Management Activities by Division

Chemical

- Total Operation Performance (T.O.P) activities
- Sales and Operation Planning (S&OP) activities
- Data Report based on QM-focused management within MES System

Qcells

- Regular raw material company evaluation and purchase strategy linked to evaluation results
- Quality Assurance Agreement (QAA) for companies
- New photovoltaic quality inspection (QCPV) with inspection periods up to three times longer than International Electrotechnical Commission (IEC) quality inspection standards
- Change process in case internal changes occur and new products are introduced
- Identify issues through daily process patrol

Insight

- EPC project quality management system
- Horizontal development of collection cases and review of new project targets based on Lessons Learned Database

Advanced Materials

- Quality management system training led by experts
- Semiannual molding supplier quality seminar
- Semiannual quality trend report

Galleria

- Food safety inspections (four times a year)
- Hygiene inspection organized by a food safety professional examination organization (SGS) (twice a year)

Product Responsibility and Customer Satisfaction

Quality Management System

Business Innovation Based on Customer Needs

In **Qcells** division, we prioritize reflecting customer demands as much as possible from contract to production when handling large-scale orders in the U.S. We deeply understand and comply with the customer's requirements for local inspection during plant system audits and production periods. Our aim is to promote product inspection standards that align with high-level quality requirements based on customer expectations rather than our own standards. Following the signing of the contract, we conduct numerous customer and product assessments to ensure stable production and enhance customer satisfaction.

Within the **Insight** Division, we conduct analysis on defects and complaints that arise during the operation and maintenance (O&M) of power plants, as reported by our customers, through our Lessons Learned database. This allows us to identify issues and take appropriate measures from the customer's perspective, thereby increasing customer satisfaction and achieving stable operation of power plants. Moreover, we actively collect customer feedback, with a focus on project performance, and implement necessary improvement measures to continually enhance customer satisfaction.

Securing Talent

To emphasize the significance of quality and enhance related skills, our HR team organizes training programs for our engineers and internal auditors. These training sessions incorporate diverse approaches, including inviting industry experts, and we actively encourage employee participation in the process and quality enhancement through idea proposals and small group activities. In order to reinforce expertise in specific production processes, we provide support to employees seeking to obtain qualifications as quality experts, such as ISO 9001 certification auditors and VDA 6.3 auditors.

Within the **Insight** Division, we facilitate knowledge sharing of quality issues through the Lessons Learned database and offer job-specific training programs to enhance the improvement competencies of our Energy Solution Department.

Customer Communication Activities

Enhancing Customer Communication

Customer Communication Activities

Hanwha Solutions has implemented a VOC (Voice of the Customer) management system to ensure prompt response to customer inquiries and complaints. This system enables us to address consumer damages in a fast and fair manner, leading to improved customer satisfaction. We actively collect customer opinions and suggestions and incorporate them into our products, further enhancing customer experience. Furthermore, we analyze the root causes of complaints and implement measures to prevent recurrence, fostering long-term customer relationships.

In collaboration with the Korea Vinyl Environment Association (KOVEC), our **Chemical** Division has developed promotional videos and animations for polyvinyl chloride (PVC). This initiative aims to boost sales and enhance consumer understanding of our PVC products.

+ PVC Promotional Video and Animation



Our **Galleria** Division utilizes various social media channels, such as the official website, APP, KakaoTalk, Facebook, Instagram, T Story blog, and Naver Post, to provide information on discounts and events. We also strive to expand consumer communication channels by operating an integrated Voice of the Customer (VOC) system, as well as the Consumer Satisfaction (CS) and Card Call Center. We actively collect inquiries, suggestions, and complaints through online and offline channels and prioritize resolving them through one-on-one communication between customers and our operators. In addition, we conduct weekly and monthly analyses of results and share the implications within the company. CS experts are assigned to each business site to ensure quality control through system planning, CS training, and a moment of truth (MOT) approach.

Enhancing Customer Satisfaction

We continue to manage and improve various channels to enhance customer satisfaction, and will continue to strive to improve customer satisfaction based on continuous technology development and the highest level of quality control.

Our **Chemical** Division's FM department conducts customer satisfaction surveys through email and Google surveys every November. In addition, the PVC department collaborated with Korea Research Company to conduct satisfaction surveys with 85 domestic and 70 overseas companies from March to October 2022. The survey will be conducted once every two years, and it will be conducted again in 2023.

The **Qcells** Division implements active customer management based on strict quality control and a strong network of local partners. The company conducts quality control under conditions that are up to three times higher than the quality inspection standards of the International Electrotechnical Commission (IEC), and recently was selected as a Top Performer for the seventh consecutive year in the 2022 Solar Module Reliability Evaluation conducted by PVEL.

Furthermore, based on brand reputation and user satisfaction, our **Qcells** Division was selected as the Solar Top Brand in the U.S., Europe, and Australia by EUPD Research. The division has been selected for 9 consecutive years in Europe and 7 consecutive years in Australia, continuing its continuous growth. In the United States, it was selected as the Solar Top Brand for the first time in 2022, further strengthening its position in the global market.

Sustainable Supply Chain Management

Supply Chain ESG System

Supply Chain Management Policy

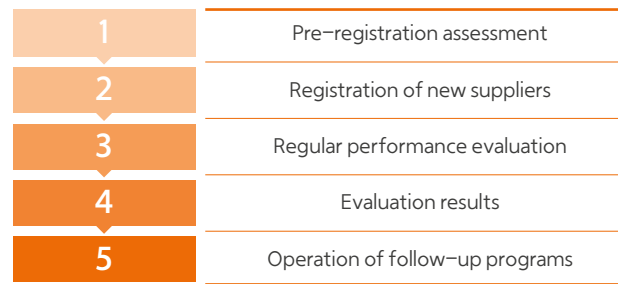
Hanwha Solutions has implemented a supply chain management policy aimed at enhancing ESG competitiveness and mitigating associated risks within our supplier network. The policy mandates that the ESG Committee conducts assessments of significant sustainability risks in the supply chain (as stated in Article 11 of the ESG Committee Regulations). We evaluate suppliers based on various criteria, including employment practices, safety measures, management stability, and accounting transparency. Feedback is provided for each category through comprehensive analysis.

To ensure adherence to ESG management regulations and requirements, we have established a supplier code of conduct, which is incorporated into contractual agreements to reinforce compliance obligations. We are in the process of developing a monitoring system to ensure ongoing compliance. In addition, based on the outcomes of ESG evaluations, we offer various forms of support, including training and consulting, to help our suppliers enhance their capabilities. By strengthening ESG practices within our supply chain, we aim to contribute to a more sustainable future.

Supplier Selection and ESG Risk Assessment Policy

In our pursuit of a sustainable partner network, Hanwha Solutions has implemented Supplier Selection and Management Guidelines to identify and mitigate supply chain risks. When onboarding new suppliers, we conduct thorough assessments that encompass ESG sustainability: safety, health and environment, compliance, anti-corruption, and adherence to delivery schedules. These evaluations involve a comprehensive checklist that considers credit risk ratings, financial information, and business stability factors. We conduct regular sustainability evaluations for our existing suppliers, which include assessments of creditworthiness. We also evaluate the suppliers for each order in terms of environment, safety, corporate, labor managements, etc., and take into account these evaluation results for next supplier selection process. This process ensures to strengthen the ESG management capabilities of our partners and enhance collaboration with reliable and responsible suppliers who align with our sustainability goals.

+ Supplier Evaluation Management Process



Strengthening the ESG management capabilities of our suppliers

Supplier Status

Hanwha Solutions upholds international standards and maintains fair and transparent relationships with our suppliers, guided by our management philosophy of "Far Together." As of 2022, we have established partnerships with a total of 5,110 companies, primarily located in areas such as Seoul, Yeosu, Ulsan, and Daejeon.

Chemical	Qcells	Insight	Advanced Materials	Galleria
1,638 companies	603 companies	170 companies	973 companies	1,726 companies

Conflict Minerals Management

Hanwha Solutions acknowledges the risks associated with disputed minerals, including tin, tantalum, tungsten, and gold mined in conflict zones in Africa, as outlined in the U.S. Conflict Minerals Act. We are fully committed to preventing social problems such as violations of local residents' rights and human rights abuses that may arise from the use of these minerals.

In line with our commitment, we ensure that our Qcells module products are free from conflict minerals. We continuously verify our supply chain and conduct regular evaluations to ensure compliance and prevent any related issues. By doing so, we actively contribute to preventing disputes associated with mineral mining and actively participate in global efforts for sustainable development.

Supply Chain ESG Activities

Strengthening Suppliers' ESG Capabilities

In collaboration with eCredible, a professional rating agency, our Chemical Division has entered into a MOU to support the ESG evaluation model for our suppliers. Currently, we have conducted ESG evaluations for 19 small to medium-sized supplier companies, focusing on areas such as environmental management and systems, ethical management and social responsibility, and management stability and systems.

Following the evaluation process, we provide each company with an ESG evaluation report that includes detailed assessment results and recommendations for improvement. By doing so, we contribute to enhancing the ESG performance of our suppliers. In addition, since 2016, we have been covering the costs of credit evaluations for approximately 100 small and medium-sized suppliers each year, facilitating various win-win activities.

+ ESG Assessment Support Cases



Sustainable Supply Chain Management

Supply Chain ESG Activities

Supplier Communication Activities

Hanwha Solutions holds regular meetings with representatives of major suppliers to share the company's status and issues, and actively listens to their opinions. In 2022, we conducted two rounds of meetings and discussed topics such as ESG management, safety and health management, and shared growth VOC. To enhance the safety and health awareness of our suppliers, we are promoting a safe workplace by producing and distributing safety and health management guidebooks.

Supplier VOC Management

Through the monthly Safety and health Council, we actively listen to suppliers' opinions. We have installed several safety suggestion boxes within worksites where suppliers are easily accessible, available at any time. We provide rewards for excellent suggestions and implement corresponding improvements. By participating in the Safety and Health Win-Win Cooperation Program hosted by the Korea Occupational Safety and Health Agency, both the Incheon and Eumseong plants have achieved the highest grade of A.

+ Supplier Safety Suggestion Box in Jincheon Plant



Principle of Shared Growth

Hanwha Solutions is committed to establishing a fair trade order and promoting shared growth through the implementation of the Four Practices of Fair Trade and Shared Growth. We prioritize proactive measures to address supply chain risks and enhance ESG management throughout our supply chain. In line with our commitment, we evaluate the Shared Growth Index and actively promote fair trade agreements with our partners. Currently, we have signed fair trade agreements with 206 partners, fostering a sustainable shared growth system. Through various support activities, we strive to establish win-win partnerships with our suppliers and enhance the efficiency of the industrial ecosystem. We will continue to provide support for our suppliers' overall management activities, ensuring mutual benefits and sustainable growth.

+ Four Practices of Fair Trade and Shared Growth

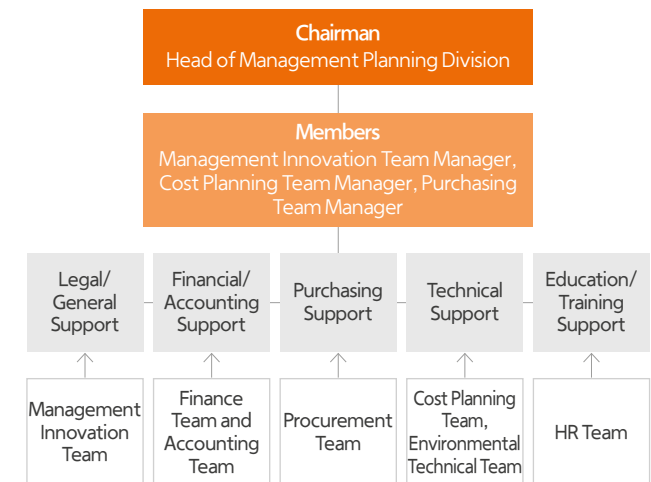
- Desirable Contract Signing Practices**
 - Determine an appropriate delivery date, and if a shorter delivery date is set, negotiate with the partner and reach an agreement.
 - Adjust the transaction amount through reasonable unit price calculation and adjustment methods.
- Supplier Selection Practices**
 - Criteria to ensure fairness and transparency in partner selection and cancellation criteria.
- Fair Supplier Selection and Registration Practices**
 - Review the adequacy of criteria and procedures for selecting, registering, and terminating when entering into large-scale contracts.
- Best Practices for Document Issuance and Preservation**
 - Standards to be issued in the event of subcontracting.

Shared Growth Governance

Hanwha Solutions promotes supply chain risk prevention and win-win activities with suppliers through organic collaboration based on the Four Practices of Shared Growth.

In particular, the **Advanced Materials** Division has maintained long-term and friendly partnerships with its suppliers by signing a Shared Growth Business Agreement in 2009. Moreover, the Shared Growth Promotion Committee has been established to promote win-win activities, including financial support, technology, environment, and safety support, education and training support, and general support.

+ Advanced Materials' Shared Growth Promotion Committee



Sustainable Supply Chain Management

Shared Growth Promotion Activities

Shared Growth Program - Technology/Education Support Green Startup Support

Hanwha Solutions selects green startups and provides various benefits to grow together as business partners, such as providing the necessary funds to demonstrate their business models. In 2022, we signed an agreement with Oysterable, a plastic collection box platform provider, and have been carrying out regular business to activate the separation and recycling of PET bottles.



Polymer Processing Technology Seminar

We share not only on-site experience but also expertise and tips with small to medium-sized suppliers through quality improvement, new technology training, and new product introduction. We have held the Polymer Processing Technology Seminar to provide technical lectures to our partners, improving their business capabilities and experiences, and contributing to shared growth.

Global Recycled Standard (GRS) Certification Acquisition Support

We strive to strengthen win-win cooperation with suppliers and expand the use of eco-friendly raw materials. To support this, we cover expenses for the acquisition of GRS certification and provide consulting for raw material supply partners and product shipping partners regarding rPE materials.

Shared Growth Program - Financial Support Win-Win Fund

Through strategic partnerships with major banks, we have established a win-win fund of 71 billion won to support our suppliers. This fund offers loans and interest rate benefits, enabling suppliers to access financing at a reduced interest rate of 0.4-1.0%P compared to the market rate. In 2022, we provided loans totaling 23.5 billion won to 35 suppliers, assisting them in their financial needs.

Win-Win Payment System

To facilitate effective fund management for our partners, we have implemented a win-win payment system in collaboration with financial institutions. This system allows for early cash conversion at a low cost, leveraging our strong credit rating. In 2022, approximately 320 billion won was disbursed through this system, significantly contributing to the financial stability of our suppliers.

Early Payment and Liquidity Support Program

Ahead of the Lunar New Year and Chuseok (Korean Thanksgiving) holidays, we proactively make early payments to small to medium-sized suppliers who may face financial challenges due to increased expenses such as employee bonuses. In 2022, we disbursed approximately 13.5 billion won in advance to 391 suppliers. Furthermore, as a gesture of goodwill, we purchase local specialties and send them as holiday gifts to our suppliers' employees and major customers. This practice not only fosters a win-win culture with our suppliers but also contributes to the growth of the local economy.

In the Galleria Division, we have implemented a three-cycle payment policy for small to medium-sized food and beverage suppliers. Under this policy, we disburse a total of 107.7 billion won in three installments over a 10-day period each month. During the holiday season, we have paid a total of 22.9 billion won to 586 suppliers over the past three years.

Enhancing the Cash Payment Rate

The Chemical Division pays 100% of the settlement amount in cash to secure the financial health of small to medium-sized suppliers, helping them increase business stability by improving cash flow. The Qcells Division pays 100% of the payment in cash to partners who have signed a mutual growth agreement.

Shared Growth Program - Strengthening Competitiveness ESG Assessment and Funding Program

As ESG management becomes a new paradigm in global corporate management, we have collaborated with credit rating agencies to establish ESG management policies and promote sustainable management for our suppliers. We have provided ESG consulting support to 19 major partners to help them enhance their ESG practices.

The Sales Channel, Shared Growth, and Fair Trade Agreements

The Galleria Division discovers products from small to medium-sized businesses in each region, builds a high-value brand through storytelling that blends local characteristics, and supports sales channels by launching them in the Arumdri store. As of 2022, 60 brands generate a total of more than 2.2 billion won in sales. Since 2012, the division has signed and operated a shared growth and fair trade agreement with major small and medium-sized businesses to establish a fair trade culture and mutually beneficial partnerships. As of 2022, a total of 284 agreements have been signed, providing benefits such as relaxation of payment conditions, reduction of commission rates, and welfare to improve productivity.

Supplier Safety and Health (SH) Evaluation Support

In order to respond to safety regulations, we conducted a safety and health (SH) evaluation support project that diagnoses and consults on the overall safety and health management of suppliers. Based on the Serious Accident Punishment Act, we evaluated the safety capabilities of our suppliers based on seven major items such as management system, hazardous risk factors, budget investment, and listening to opinions. Currently, a total of 102 suppliers are participating and improving the level of safety and health management.



Community Participation and Contribution

Community Impact System

Community Impact Strategy

Hanwha Solutions has built solid trust with the local community based on the founding philosophy of "Business Patriotism" and the Hanwha spirit of "Trust and Loyalty." We seek to fulfill our social responsibilities as corporate citizens based on the principle of "Far Together" as a social contribution philosophy. We aim to respond to the global climate crisis by conducting activities to promote the sustainability of eco-friendly energy and to solve problems local communities are facing by collaborating with local social welfare organizations. By 2025, we intend to implement at least one common program as our response to the climate crisis and at least one community impact activity for each business site in Korea. Through this, we will strive to develop effective corporate social responsibility (CSR) programs and continue to communicate more closely with local communities to solve the problems they face.

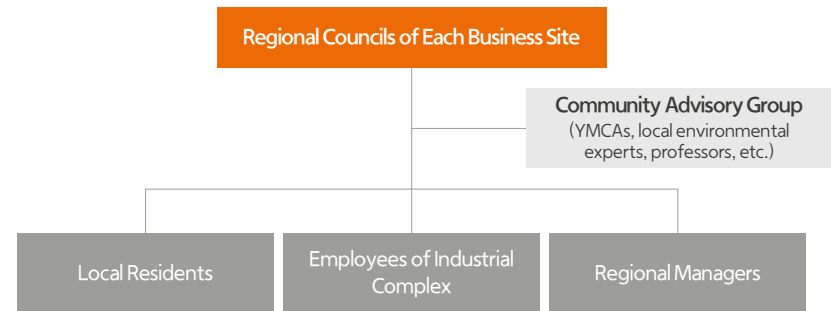
Some employees from each business division at Hanwha Solutions voluntarily contribute to the Creating a Brighter World Fund, which aims to address various issues faced by local communities. The fund enables them to identify problems and provide support to neighbors in need through donations and volunteer activities. In addition, the company is dedicated to creating a clean and healthy local community by organizing environmental cleanup initiatives in the vicinity of its business sites and engaging in carbon protection activities in nearby national parks. All funds raised by employees, along with matching grants, are exclusively used for community outreach endeavors within the local community. Hanwha Solutions has also entered into agreements and actively carries out donations and volunteer activities in collaboration with partner organizations.

Community Impact Governance

Hanwha Solutions maintains an ongoing dialogue with local stakeholders to identify local issues and collaboratively seek solutions. As part of this effort, the company enforces that the ESG Committee conducts a review of community risks to address any potential challenges.

Within the Chemical Division, a regional council has been established to actively engage with local residents. By collecting their opinions and requirements, the division plans and implements social contribution activities. To address environmental concerns, an expert group comprising environmental experts and professors has been formed in collaboration with the YMCA to gather diverse perspectives. The division is committed to promoting community outreach activities in various areas, including support for children and adolescents, the elderly, and individuals with disabilities, aiming to contribute to the development of local communities and problem-solving.

Similarly, the Qcells Division maintains close communication with North Chungcheong Province and Jincheon County. Through continuous engagement, the division identifies local community issues and collaborates on finding appropriate solutions.



Philosophy	Going further together
Vision	We are committed to discovering solutions for a better future for everyone.
Mission	We pursue sustainable solutions for environmental and social issues.
	Addressing climate change Contributing to the community
2023 Goal	Operate community activity advisory committee participated by local welfare organizations
2024 Goal	Developing programs tailored to the area through gathering opinions of the community activity advisory committee
2025 Goal	At least one common company program to address the climate crisis At least one community outreach activity for each business site in Korea

Community Participation and Contribution

Community Impact System

Community Impact Activities

Transition to Green Energy Support Program

Background and Key Issues

- The financial challenges faced by energy-vulnerable groups in the region, particularly in relation to increased heating and cooling costs and electricity expenses

Expected Impact

- Reducing energy and heating costs for energy-vulnerable groups, and secure eco-friendliness in the community, as well as improving the air quality through the expansion of energy and reduction of fine dust

Climate Crisis and Renewable Energy Awareness Program

Background and Key Issues

- The importance of energy conservation and the low awareness of climate crisis and environmental issues among vulnerable groups in the region

Expected Impact

- Improving energy efficiency, raising awareness of climate crisis, and promoting eco-friendly practices

Bur-cucumber Removal Activity

Background and Key Issues

- Disturbance of the ecosystem and death of plants due to invasive Bur-Cucumber

Expected Impact

- Conservation of river biodiversity and native plants

Solar Power Support Program

The Qcells Division acknowledges the challenges faced by energy-vulnerable groups and has taken proactive measures to address them. Through collaborations with external organizations like the Korea Energy Agency, Busan City, and Jincheon County, the division has signed MOUs to provide free solar power generation facilities to low-income individuals and welfare organizations. In 2022, the division made significant contributions to the energy utilization of vulnerable groups. It provided 20 kW of photovoltaic (PV) modules and power generation facilities to welfare facilities in Busan, and 2.8 kW to low-income families in Jincheon.

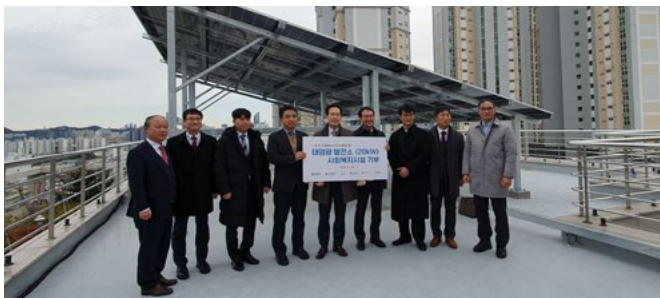
Environmental Solutions for a Greener Earth

In collaboration with ChildFund Korea, we operate the Environmental Solutions for a Greener Earth Program. The program includes various initiatives such as a campaign to raise awareness on the climate crisis, participatory online environmental education, and a project to support energy efficiency improvement for energy-vulnerable groups. In 2022, we introduced the Enamon Expedition Program, an online energy conservation and environmental education program. Through this program, we provided environmental education and training to 1,554 elementary school students and 50 teachers, and implemented energy efficiency and environmental improvement projects at five local children's centers.

Renewable Energy Awareness Training

The Qcells Division organizes one-day classes focused on eco-friendly solar energy to educate local youth about the significance of renewable energy and provide accurate information. In 2022, we successfully trained 250 students, and we plan to expand the program in the future to reach even more participants.

+ Solar Power Support Program



+ Environmental Solutions for a Greener Earth Program



+ Renewable Energy Awareness Training



Community Participation and Contribution

Community Impact System

Community Impact Activities

Education and Fundraising Initiatives for Vulnerable Groups

Background and Key Issues	<ul style="list-style-type: none"> Economic dependence and limited access to learning opportunities faced by vulnerable households
Expected Impact	<ul style="list-style-type: none"> Laying the foundation for economic independence, improving the level of education and treatment for children in crisis, and revitalizing the local welfare community

Empowering Vulnerable Groups to Recover from the Impact of COVID-19

Hanwha Solutions provided donations to support vulnerable groups affected by the COVID-19 pandemic. These donations included support items, cultural experience field trips for low-income children and adolescents, home training equipment and emotional support kits for low-income individuals with disabilities, and initiatives to prevent heat-related illnesses among vulnerable elderly individuals during the summer.

Brighter World Fund

In order to support those in need, we established the Brighter World Fund, in which employees voluntarily contribute a portion of their monthly salary. The company matches these donations by contributing 1.5 times the amount donated by employees. In 2022, approximately 7.07 billion won was donated to the Brighter World Fund, including contributions from the company's employee-driven fund.

Education Donations

The Chemical Division addressed the issue of limited learning opportunities by organizing science classes and hands-on learning experiences for 25 elementary school students from vulnerable households. Since 2021, the division has also been providing education and training funds to support youth in building a solid foundation for independence and enhancing their skills and capabilities for future success, ultimately fostering their growth as responsible and valuable members of the community.

+ Empowering Vulnerable Groups to Recover from the Impact of COVID-19



+ Education Donations



Todak Todak Healing Story

Since 2021, the Chemical Division has been providing support for children in crisis by dispatching professional counselors who specialize in psychological therapies such as art therapy and play therapy counseling. We support the production of 100 book covers and sponsor books created by the R&D center employees.

Happy Sharing Refrigerator & Together Far Island and Community Project

The Chemical Division is installing Happy Sharing Refrigerators in the community center for local residents in the welfare blind spot in the Yeosu area. We started with five locations in 2020 and have expanded to 10 locations as of 2022, contributing to the creation of a warm community culture where residents themselves share with their neighbors in need. In addition, we provide personal quarantine hygiene products to residents of neighboring islands through Together Far Island and Community activity.

Qcells Para Sports Team

Recognizing the difficulties faced by athletes with disabilities in the Chungbuk region due to economic and environmental factors, the Qcells division established the Hanwha Qcells Para Sports Team in 2019. We take the lead in revitalizing disabled sports in the region by directly employing athletes with disabilities, providing support for training supplies for competitions, and offering rewards. As of June 2023, there are 36 athletes participating in six sports, and they have achieved significant accomplishments, including winning a total of 81 medals since their participation in the National Para Sports Competition.

+ Todak Todak Healing Story



+ Happy Sharing Refrigerator Program



+ Qcells Para Sports Team Award Ceremony



Personal Information Protection and Cybersecurity

Information Security System

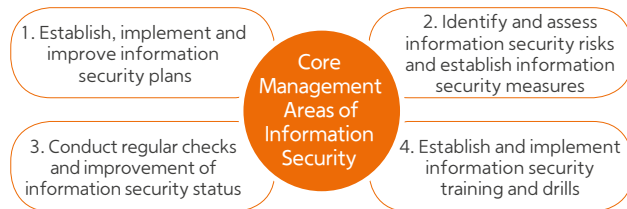
Information Security Policy

Information Security Policy

Hanwha Solutions places a strong emphasis on information security and adheres to global security laws and regulations, including the Personal Information Protection Act, General Data Protection Regulation (GDPR), and California Consumer Privacy Act (CCPA). We have implemented an internal information security policy and management system to ensure compliance. Our commitment to security involves actively monitoring the latest trends in information security and regularly updating our policies to enhance the level of security. The information security policy is readily accessible to all employees, and we provide ongoing training and information-sharing initiatives to ensure that all employees are well-informed and compliant with security practices.

Information Security Core Management Areas

We have established four core management areas for information security and create a stable information protection environment through continuous risk monitoring. Based on our internal crisis management manual, we have divided the crisis management process into four stages (normal, caution, warning, and risk) to ensure prompt response to information security risks. This approach allows us to maintain a secure information protection environment and build trust and safety with our customers.



Information Security Certifications

To establish an effective information security management system, Hanwha Solutions obtained the Information Security Management System (ISMS) certification in October 2022 for external information service systems. This certification ensures that we operate a consistent and effective information security management system. Furthermore, we transparently disclose the company's information protection status in accordance with the information security disclosure system.

Information Security Management System (ISMS) certification



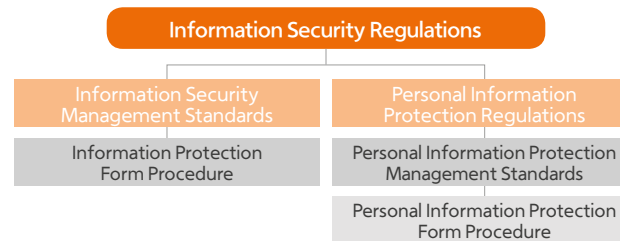
Information Security Governance

We appoint a Chief Information Security Officer (CISO) to oversee structured information security management. The CISO is selected from executives with a minimum of 10 years of experience in information security or information technology, and they do not hold concurrent positions other than those specified by relevant laws. Furthermore, we establish an Information Security Committee responsible for deliberating and deciding on major information protection matters within the company. Our information security departments continue to promote various activities and initiatives to enhance information protection and raise security awareness among executives and employees.

+ Information Security Committee Organizational Chart



+ Regulations and Management System



Fostering a Information Security Culture

Responding to Information Security Incidents

Hacking and Cyberattack Response Training

To prevent cyber security incidents, we conduct biannual drills focused on hacking email and cyberattack scenarios. In 2022, we conducted cyberattack tests to simulate threats such as ransomware and distributed denial-of-service (DDoS) attacks. We provide also training to our employees to enhance their awareness and equip them with the skills to respond to malicious emails, including advertisements and phishing emails that may contain malware.

Strengthening Cybersecurity Capabilities

We operate an integrated security control center that remains operational at all times to effectively respond to ongoing cyber threats and security breaches. This center enables us to monitor network traffic in real-time, allowing us to prepare for external hacking attacks and the presence of malicious code. In addition, we prioritize the protection of information by promptly detecting and blocking any malicious or suspicious traffic, especially when a certain threshold of data leakage to external sources is detected.

Raising Employees' Awareness of Information Security

To enhance the security awareness of our employees, we actively engage in various industry-related activities, including attending external seminars and training sessions as a member of the Korean Academy of Industrial Security. In addition, we announce information protection guidelines and precautions through events like Security Person Day and regular email communications. To emphasize the significance of cybersecurity and information protection, we conduct quarterly Clean Office Days, encouraging all employees to actively participate.

In particular, the Galleria Division is dedicated to improving the expertise of our IT professionals through specialized information security trainings.

Personal Information Protection and Cybersecurity

Personal Information Protection

Supplier Information Protection Support

We support our suppliers' information security activities in order to foster an information security culture. It is mandatory for suppliers to sign a security agreement when entering into a contract with us. Upon contract expiration, we assess the management of personal information to ensure comprehensive risk prevention, including the prevention of key information and personal information leakage. During projects, we review suppliers' checklists, and the **Galleria** Division conducts biannual checks and training for personal information consignment companies.

Information Security Checks

Diagnosing Weaknesses of Infrastructure

Twice a year, we conduct security verification activities for IT systems to identify and improve infrastructure vulnerabilities, taking into account the latest trends. When introducing new assets and systems, we prioritize secure coding inspections and conduct thorough security reviews to ensure the safety of information security.






Information Security Assessment

Hanwha Solutions has developed a measurement model called the Information Security Maturity Level, which encompasses four areas: management security, physical security, technical security, and personal information protection. Using this model, we annually evaluate the level of our security management in each field, aiming to enhance the security awareness of our employees and prevent the leakage of the company's proprietary technology.

Personal Information Protection

We strictly comply with domestic laws to protect the personal information of customers and employees. We operate internal management plans and guidelines for personal information protection and appoint a personal information protection officer. This officer designs and operates a personal information policy and manages personal information management regulations at the department level of the workplace to ensure thorough compliance.

Hanwha Solutions Personal Information Management Policies by Division

-  [Chemical Division](#)
-  [Qcells Division](#)
-  [Insight Division](#)
-  [Advanced Materials Division](#)
-  [Galleria Division](#)

Protection of Personal Information Rights

Hanwha Solutions respects the right of information providers to their personal information during the collection and usage process. We explicitly obtain prior consent from the individuals whose information is being collected. Furthermore, we make efforts to apply notation standards in compliance with the Personal Information Protection Act, ensuring that information subjects have a clear understanding of the procedures for consenting to the collection and usage of their personal information.

Customer Information Risk Management and Reinforcement

Customer Information Risk Management

We have implemented procedures to proactively identify and mitigate internal and external risk factors, ensuring more secure management of customers' personal information. When our internal employees handle customer information, we conduct checks to ensure its appropriateness for the intended purpose, the suitability of authority, the change history, and recovery. Furthermore, we have established access control procedures to prevent unauthorized external access, and we enforce the use of two or more secure authentication methods when accessing systems that contain customer information. Moreover, we have obtained personal information protection liability insurance to safeguard the rights and interests of the individuals whose information we handle.

Selection and Training of Personal Information Handlers

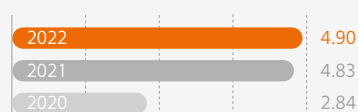
The **Galleria** Division consistently designates individuals responsible for handling personal information as access holders. Furthermore, we ensure the secure processing of personal information by conducting annual personal information protection training and checks for our employees. To actively prevent unauthorized disclosure, we strictly review the access records of our personal information processing system on a monthly basis.

+ Information Security Maturity Level Assessment Results

Chemical Division



Galleria Division



Qcells Division¹⁾



Advanced Materials Division¹⁾



Insight Division¹⁾



¹⁾In 5 point scale

¹⁾ Recent disclosures in 2022 are disclosed for Qcells, Insight and Advanced Materials Divisions



Governance

Hanwha Solutions aims to strengthen its transparent and sound governance structure and create ESG value for various stakeholders through a focus on ethical management, compliance, and shareholder-friendly practices.

KEY PERFORMANCE

Transparent and sound governance

Disclosure of Board of Directors' Board Skill Matrix

- Promoted disclosure of competencies of board members and diversity information such as gender and nationality



Board Evaluation Guidelines and Implementation Plan

- Evaluated the board's role and responsibilities, independence, operating procedures and improvements, etc.



Shareholder-friendly management

Shareholder protection activities

- The public offer was made instead of granting the right to purchase shares for the split-off of the **Advanced Materials Division** (Hanwha Advanced Materials Co., Ltd.), based on the Financial Services Commission's Measures to Enhance the Rights and Interests of General Shareholders Related to the Listing of Split-Off Subsidiaries.



Ethical Management & Compliance

Regular and occasional compliance checks

- Conducted compliance inspections in January and July for all organizations led by the compliance officer and compliance office
- Submitted the compliance inspection results of each department to the compliance officer, and the compliance office informed the department of corrective measures



Implementation of Employee Ethics Pledge

- Spread the value and importance of the company's ethics and compliance to employees and establish a culture of ethical management



Corporate Governance

The Board of Directors

Establishment of the Corporate Governance Charter

In December 2021, **Hanwha Solutions** introduced the Corporate Governance Charter as a commitment to establishing a transparent and sound governance structure, protecting shareholder interests, and promoting fair corporate activities. The Corporate Governance Charter serves as an organizational mechanism for effective management and supervision of corporate affairs. Based on this, **Hanwha Solutions** is dedicated to building a more balanced governance system by ensuring fairness, transparency, and independence in its governance practices.

 [Hanwha Solutions' Corporate Governance Charter](#)

+ Composition of the Board of Directors (As of March 31, 2023)

Role	Name	Position	Gender	Date of Birth	Areas of Expertise	Career	Date of Appointment	Term
Inside directors	Koo Yung Lee	CEO of The Qcells Division	M	04.07.1964	Qcells Division	<ul style="list-style-type: none"> Former Head of business, Hanwha Chemical Former CEO of The Chemical Division CEO of The Qcells Division (Current) 	03.23.2023 (re-elected)	2 years
Inside directors	Dong Kwan Kim	CEO of The Strategy Division	M	10.31.1983	Strategy Division	<ul style="list-style-type: none"> Former CCO, Hanwha Qcells & Advanced Materials CEO of Hanwha Corporation CEO of Hanwha Aerospace CEO of Hanwha Solutions Strategy Division (Current) 	03.24.2022 (re-elected)	2 years
Inside directors	Yi Hyeon Nam	CEO of The Chemical Division	M	03.14.1964	Chemical Division	<ul style="list-style-type: none"> Former Head of Hanwha General Chemical's NewBusiness Promotion Department Former CCO of Polyolefin Business, The Chemical Division CEO of The Chemical Division (Current) 	03.24.2022	2 years
Non-Executive Director	In-Hwan Kim	CEO of Hanwha Advanced Materials	M	04.29.1968	Advanced Materials Division	<ul style="list-style-type: none"> Former Head of Polymer department, Hanwha Total Energies Former CEO of The Advanced Materials Division CEO of Hanwha Advanced Materials (Current) 	03.23.2023	2 years
Outside Directors	Man-Gyu Choi	Outside Director	M	1955.10.14	Finance and Accounting	<ul style="list-style-type: none"> Former Vice-chef of Credit Support Headquarters, Woori Bank Former CEO of the Overseas Corporation, Woori Bank China Outside Director, SKC Kolon PI Inc. 	03.24.2022 (re-elected)	2 years
Outside Directors	Jeong-Ho Seo	Outside Director	M	08.20.1969	Law (Attorney)	<ul style="list-style-type: none"> Former National Tax Service, Ministry of Finance and Economic Affairs Former Examiner, National Tax Tribunal Lawyer, WIZ Law Group (Current) 	03.24.2022 (re-elected)	2 years
Outside Directors	Ji-Hyeong Park	Outside Director	M	01.28.1968	Economics (Professor)	<ul style="list-style-type: none"> Former professor at Wayne State University Former Director of Center for Asia and Global Economic Order, Seoul National University Professor of Economics at Seoul National University (Current) 	03.24.2022 (re-elected)	2 years
Outside Directors	Jae-Soo Jang	Outside Director	M	07.20.1962	New business and technology development	<ul style="list-style-type: none"> Former Director of Samsung Future Technology Development Center CEO of Korea University Holdings (Current) 	03.23.2023	2 years
Outside Directors	Satoshi Shima	Outside Director	M	04.25.1958	Establishment of new business strategy	<ul style="list-style-type: none"> Former member of the House of Representatives in Aichi Prefecture Former Senior vice-president, CEO's office of the Softbank Corp. Outside director of Hanwha Solutions 	03.24.2022 (re-elected)	2 years
Outside Directors	Amanda Bush	Outside Director	F	12.02.1977	Petrochemical & Energy M&A (Attorney)	<ul style="list-style-type: none"> Lawyer, Jackson Walker LLP (Current) St. Augustine Capital Partners (Current) Outside director of Hanwha Solutions 	03.24.2022 (re-elected)	2 years

Composition of the Board of Directors

The Board of Directors at **Hanwha Solutions** is comprised of directors elected at the general shareholders' meeting in accordance with the company's internal regulations. The board operates independently and rationally to ensure responsible management in a rapidly changing business environment. The composition of the board follows the requirements stated in Article 29 of the Articles of Incorporation, which includes a majority of outside directors with expertise in various fields. As of March 2023, the board consists of 10 members, including 3 inside directors, 1 other non-executive director, and 6 outside directors, making up 60% of the board.

Corporate Governance

Composition of the Board of Directors

Procedures and Criteria for Appointment of Directors

We appoint directors at the general shareholders' meeting in accordance with the Commercial Code and the articles of incorporation and establish a framework for managing and supervising the company more objectively by forming a board with diverse perspectives and viewpoints. Before the general shareholders' meeting, detailed information on the main occupations and biographies of director candidates is disclosed in both Korean and English to provide shareholders with sufficient information to assess the suitability of the candidates. The selection of outside directors is based on criteria such as their independence, expertise, diversity, practical experience, and compliance with commercial laws. The candidates recommended by the Outside Director Nomination Committee are carefully considered during the selection process.

Board Independence, Professionalism, and Diversity

Hanwha Solutions maintains a transparent governance structure built on the fundamental principle of "Board of Directors and Committee-oriented Management." In accordance with the established rules, directors who have a vested interest in specific matters are prohibited from exercising their voting rights. Moreover, these directors are not counted towards the number of directors present, which enhances the independence of the board. Our board is composed of members with diverse expertise, transcending factors such as race, nationality, and gender. We prioritize the provision of accurate and comprehensive management information to outside directors in a timely manner. This ensures that decisions are made after active discussions at the board, which consists of global experts from various fields, including the United States and Japan

+ Board of Directors' Board Skill Matrix

Classification	Koo Yung Lee	Dong Kwan Kim	Yi Hyeon Nam	In-Hwan Kim	Man-Gyu Choi	Amanda Bush	Bush Satoshi Shim	Jeong-Ho Seo	Ji-Hyeong Park	Jae-Soo Jang
Leadership	●	●	●	●	●	●	●	●	●	●
CEO experience	●	●	●	●	●	●	●	●	●	●
Competency	Global	●	●	●	●	●	●	●	●	●
	Management and Accounting	●	●	●	●	●	●	●	●	●
	Policy Administration						●	●		
	Research and Development				●				●	●
Law						●	●			
Date of Appointment	2019	2020	2022	2023	2018	2020	2020	2020	2020	2023
Diversity	Independence				●	●	●	●	●	●
	Age	59	39	59	55	67	45	65	53	55
	Nationality	Korea	Korea	Korea	Korea	Korea	U.S.	Japan	Korea	Korea
	Gender	Male	Male	Male	Male	Male	Female	Male	Male	Male

Committees within the Board of Directors

Hanwha Solutions has established four board committees, including the Audit Committee, Insider Trading Committee, Outside Director Nomination Committee, and ESG Committee. These committees aim to enhance professionalism and objectivity in decision-making processes and conduct comprehensive and thorough reviews of various agenda items. The purpose, regulations, and activities of each committee are consistently disclosed in detail on the Hanwha Solutions website. Additionally, an internal monitoring system audit opinion is prepared to assess the operation and performance of each committee, ensuring effective supervision.

Hanwha Solutions
Board Committee
Regulations and Operation Status

[Hanwha Solutions' Board Committee Regulations](#)

[Hanwha Solutions' Board Committee Operation Status](#)

+ Composition and Role of Board Committees As of March 23, 2023

	Board of Directors			
Composition	Audit Committee 3 Outside Directors	Outside Director Nomination Committee 4 Outside Directors	Insider Trading Committee 4 Outside Directors	ESG Committee 4 Outside Directors
Chairman	Man-Gyu Choi	Ji-Hyeong Park	Jeong-Ho Seo	Ji-Hyeong Park
Members	Ji-Hyeong Park, Jae-Soo Jang	Man-gyu Choi, Jeong-Ho Seo, Jae-Soo Jang	Man-Gyu Choi, Ji-Hyeong Park, Jae-Soo Jang	Man-gyu Choi, Jeong-Ho Seo, Jae-Soo Jang
Duties	<ul style="list-style-type: none"> Supervise the work of the management and executives Appoint an external auditor Manage and control internal risks 	<ul style="list-style-type: none"> Establish, check, and improve the principles for the appointment of outside directors Manage and verify outside director candidates 	<ul style="list-style-type: none"> Supervise insider trading policies in accordance with the Fair Trade Act Establish, operate, and approve of insider trading management standards (approved insider transactions worth over 5 billion won) 	<ul style="list-style-type: none"> Establish mid to long-term ESG policies and deliberation on major issues Establish and revise ESG regulations Review ESG activities and conduct regular and occasional evaluations
Number of Meetings Held	6 times	1 times	10 times	6 times
Agenda	14 (Resolution 5, Report 9)	1 (Resolution 1)	38 (Resolution 38)	12 (Resolution 1, Report 11)

Corporate Governance

Board Operations

Board Activities

We hold quarterly meetings and ad hoc meetings to discuss important matters. Detailed information on the agenda is shared with the directors at least seven days prior to the meeting, allowing them sufficient time for thorough review and in-depth discussions. In 2022, a total of 13 board meetings were conducted, during which key decisions were made, including the split-off of the lightweight composite materials and photovoltaic material businesses within the **Advanced Materials** Division, as well as the spin-off of the **Galleria** Division.

 Hanwha Solutions' Board Operation Status

Enhancing the Expertise of Outside Directors

We strive to create an environment that enables outside directors to effectively fulfill their duties on the board and board committees by facilitating various activities and providing necessary information. In 2022, training was not provided to all outside directors; however, in 2023, we have planned training sessions specifically for new non-executive directors and outside directors to familiarize them with the current status and strategies of each division. In the case of the Audit Committee, regular internal and external training sessions are conducted to enhance their understanding of Internal Control over Financial Reporting (ICFR) and stay updated on the latest revisions of laws and regulations. These training sessions are designed to help the committee members clearly understand their roles and responsibilities, particularly in the context of ESG management.

+ Audit Committee Training Status

Date	Attended Auditor	Main Details
12. 31. 2021		Internal Control over Financial Reporting (ICFR) Key Issues and Connections
02. 17. 2022		Audit strategy and Internal Control over Financial Reporting (ICFR)
04. 19. 2022	Man-Gyu Choi,	ESG disclosure and Audit Committee oversight points
04. 28. 2022	Ji-Hyeong Park, Han-Joo Lee	Introduction to the Annual Audit Schedule and Focus Areas
08. 31. 2022		Problems of the audit committee system and improvement measures
11. 30. 2022		Independence of outside auditors to be perceived by the audit committee

Board Assessment & Remuneration

Board Assessment

We regularly conduct evaluations of our inside directors to ensure their effectiveness and contribution to the company. At the end of their two-year term, we conduct a comprehensive internal evaluation that assesses their ability to provide appropriate advice on major management decisions within their area of expertise, as well as their professionalism and proactive engagement as outside directors. The evaluation results are carefully considered in the decision-making process for reappointment, encouraging the board to actively fulfill their duties and uphold responsible management practices.

+ Board Assessment Details

Subject and Method	Details	Results
<ul style="list-style-type: none"> ESG committee members individually evaluate multiple-choice questionnaires Conducted once a year The management planning team aggregates and summarizes the results 	<ul style="list-style-type: none"> Roles and responsibilities: Fair and faithful performance of duties, etc. Structure: Board Composition, Independence, and Leadership Operation: Procedures, agenda, activities of outside directors, board committees Evaluation and improvement: Establishment of board evaluation process and improvement plan, etc. 	<ul style="list-style-type: none"> Establishment of improvement plan (Chemical Division's Management Planning Team) Report results and improvement plans to the board Disclose in Sustainability Reports

Board Remuneration

In order to enhance transparency and fairness in the roles of outside directors and to ensure effective supervision of management activities, the company adheres to the total directors' remuneration limit approved by the general shareholders' meeting. The directors' remuneration limit is set at 9 billion won, and all director remunerations are paid within this approved limit.

Unit: KRW million

Classification	Total	Average per Person	Number of People
Registered Director	5,504	1,376	4
Outside Director	275	92	3
Member of the Audit Committee	252	84	3
All	6,031	603	10

Corporate Governance

Shareholder-friendly management

Equity and Capital Structure

The total number of shares that can be issued under Hanwha Solutions' articles of incorporation is 300,000,000 shares, and the par value of one issued share is 5,000 won. As of December 31, 2022, the company had a total of 192,402,234 outstanding shares.

Transparent Management Information Disclosure

In order to establish a sound governance structure that is the foundation for sustainable growth, we strive to prioritize transparency as the core principle of corporate management and provide accurate information to shareholders and market stakeholders regarding overall management activities in a timely manner. We promptly disclose the required disclosures according to laws and regulations, and if necessary, we disclose matters that may have a significant impact on the decision-making of shareholders and stakeholders. We also ensure that corporate information is accessible to all stakeholders simultaneously, without giving preferential treatment or discrimination to specific information users.

In line with the ESG management system, we are committed to transparently disclosing ESG performance and establishing relevant policies for the sustainable growth of the company.

+ Voting Rights Status

Classification		Number of shares
Total number of outstanding shares	Common share	191,278,47
	Preferred share	1,123,737
Number of non-voting shares	Common share	2,941,716
	Preferred share	1,123,737
Number of shares with voting rights restored	Common share	-
	Preferred share	1,113,237
Number of shares eligible for voting rights	Common share	188,336,781
	Preferred share	1,113,237

Strengthening the Shareholders' Rights and Interests

Shareholder Protection Policy

In the event of an incident that causes a significant change in the company's ownership structure or major business, Hanwha Solutions grants the right to purchase shares as a means to gather opinions from minority shareholders and protect the rights of dissenting shareholders. To encourage active participation and voting by shareholders, the company is implementing a paper voting system and an electronic voting system, which enable shareholders to exercise their voting rights without physically attending the general shareholders' meeting. We are committed to protecting shareholders' rights and encourage all shareholders to exercise their voting rights by proxy, thereby facilitating the exercise of voting rights by shareholders.

Shareholder Communication

We maintain active communication with shareholders and investors through various activities and channels, such as sending a written prospectus on the company's website, conducting regular IR conferences, calls, and sharing other important business matters. The company transparently discloses information to stakeholders about the company's ESG management intentions and activities through the publication of sustainability reports and corporate governance reports, as well as general management activities.

+ IR Activities

Classification	Details	Performance
Earnings Presentation	• Quarterly earnings release (of materials/ conference call/audio webcasting) in Korean and English	4 times
NDR (Non-Deal Roadshow)	• Domestic: Regular NDR following earnings release (offline/online) • Overseas: Regular NDR and conference call with investors (occasionally)	6 times (Domestic: 4 times, Overseas: 2 times)
Conference/ Corporate Day	• Participate in domestic/overseas conferences and corporate day organized by investment banks	10 times (Domestic: 3 times, Overseas: 7 times)
Company Visits (1:1 and group meetings)	• Company visits / conference calls (frequently)	About 130 times

Shareholder Proposal System

Hanwha Solutions has implemented the Shareholder Proposal system, which allows shareholders who hold more than 5/1,000 of the total number of outstanding shares to propose agenda items for consideration at the general shareholders' meeting. This system enables shareholders to actively participate in the management of Hanwha Solutions by directly expressing their opinions and ideas. By incorporating these shareholder proposals into board discussions and decision-making processes, we strive to create an innovative and shareholder-friendly management environment that promotes mutual communication and engagement.

Shareholder Return Policy

In 2021, we announced a mid-to long-term shareholder return policy, which involves allocating 20% of consolidated free cash flow to return to shareholders over a period of five years, with the aim of enhancing shareholder value. However, in 2022, due to the continued investment in sustainable growth, particularly in the solar business, the consolidated free cash flow turned negative, making it challenging to finance shareholder returns. If dividend-able cash flows are generated through ongoing growth investments in the future, we plan to fulfill our shareholder return policy by providing cash dividends or implementing share buybacks.



Consolidated operating profit (excluding one-time profit) - Net Interest Expense - Corporate Tax Expense + Depreciation Expense - Working Capital Increases and Decreases - CAPEX & Investment Acquisition

Other Shareholder Protection Policies

Hanwha Solutions conducted a tender offer to protect its shareholders in response to the split-off of Hanwha Advanced Materials Co., Ltd. The tender offer was conducted in accordance with the Measures to Enhance the Rights and Interests of General Shareholders Related to the Listing of Split-Off Subsidiaries, announced by the Financial Services Commission. Instead of granting the right to purchase shares, the company implemented an offer. The proceeds from the offer amounted to 70 billion won, which was derived from the sale of a portion of shares of Hanwha Advanced Materials. As a result of the open offer, a total of 1,362,800 shares of common stock and 10,500 shares of preferred stock were involved.

Ethics and Compliance

Ethics and Compliance System

Ethics and Compliance Policy

Hanwha Solutions operates an ethics and compliance management system that is based on various internal regulations, including compliance and anti-corruption policies and a code of ethics practice guidelines.

In 2022, we conducted an annual evaluation of the effectiveness of our compliance control standards and related systems through external law firms. Compliance activities, including risk mitigation measures, were effectively implemented, and the compliance control standards and policies were evaluated to ensure they met the current evaluation standards. It was confirmed that the system was operating appropriately and effectively. In April 2023, the Code of Ethics Practice Guidelines were revised to include quantitative and specific goals related to unfair trade and unfair competition. These revisions aim to provide clear guidance and disclosure on ethical judgments and standards of behavior. Through this effective compliance system, we support all employees in understanding and adhering to these ethical principles, ensuring they are reflected in their decision-making processes.

+ Company Objectives Related to Fair Trade and Unfair Competition Prevention in the Code of Ethics Practice Guideline

- Company Objectives Related to Fair Trade and Unfair Competition Prevention Achieved 0 cases of unfair trade and unfair competition
- Ensure compliance with laws and regulations related to fair trade and unfair competition through the semi-annual compliance inspection procedure
- Identify and evaluate unfair trade and unfair competition risks that may exist in workplace, and establish and implement improvement measures
- Conduct compliance training at least once a quarter to inform unfair trade and unfair competition-related laws and regulations, and prevent related violations from occurring
- Take unfair trade and unfair competition prevention/mitigation measures at the board level through the report and approval of risk management tasks
- Achieved the final goal of 0 cases of unfair trade and unfair competition cases per year

Ethics and Compliance Governance

The Compliance Office, which is directly managed by the CEO, has established the Ethical Management Practice Secretariat for each director. The secretariat's main objective is to promote ethical management in daily operations by emphasizing ethical values and management principles such as compliance and ethics education, regular communication, and providing necessary notices. It also focuses on improving the practical implementation of ethical management through monitoring various operational matters.

In 2022, the Ethical Management Practice Secretariat continued to report to the board regarding compliance performance and goals, compliance assessment results, and the establishment status of the anti-corruption prevention system.

+ Ethics and Compliance Organization



Ethics and Compliance

Ethics and Compliance System

Ethics and Compliance Certifications

Hanwha Solutions has acquired international standards for the anti-bribery management system (ISO 37001) and compliance management system (ISO 37301) to establish effective anti-corruption management, aiming to create a sustainable market.

In 2022, we also received confirmation that there were no abnormalities in the ISO 37001/37301 certification maintenance audit and reported the results of compliance control activities and operations to the board. We will continue to implement ethical and compliance management in accordance with relevant global standards.

+ 2022 Internal audit related to the maintenance of ISO 37001/37301 certification

Classification	Details
Date/Scope	• 2022.10.24-25 / All divisions except Advanced Materials
Purpose	• Identify the operability, suitability and effectiveness of ISO37001/ISO37301 PDCA and expand the company-wide compliance and anti-corruption management system
Non-qualified Item (example)	• Missing status of key stakeholders and insufficient review of major risks, etc.

+ 2022 Compliance Support Activity Result

Activity	Details															
Routine compliance support activities	• Conducted contract and legal reviews for all divisions															
Verification	• Maintain ISO 37301 (Compliance Management) certification and ISO 37001 (Anti-Corruption) certification in 2022															
Compliance Letter	• Published monthly															
Ethical Management Activities	• CEO's compliance management letter carried out twice a year															
Annual Compliance Training	<table border="1"> <thead> <tr> <th>Classification</th> <th>Subject</th> <th>Method</th> </tr> </thead> <tbody> <tr> <td>Serious Accident Punishment Act</td> <td>Compliance Law, Safety & Health Department, Korea Factory, Purchasing, Logistics, Research Department Manager</td> <td>Online</td> </tr> <tr> <td>Fair Trade Act</td> <td>Compliance Legal, DT, Purchasing, Planning, Sales & General Affairs Officer</td> <td>Online</td> </tr> <tr> <td>Trade Secret Protection Act</td> <td>Sales, purchasing, R&D, production technology workers, career changers</td> <td>Online</td> </tr> <tr> <td>Anti-Corruption Act</td> <td>DT, purchasing, planning, sales, finance, etc.</td> <td>Online</td> </tr> </tbody> </table>	Classification	Subject	Method	Serious Accident Punishment Act	Compliance Law, Safety & Health Department, Korea Factory, Purchasing, Logistics, Research Department Manager	Online	Fair Trade Act	Compliance Legal, DT, Purchasing, Planning, Sales & General Affairs Officer	Online	Trade Secret Protection Act	Sales, purchasing, R&D, production technology workers, career changers	Online	Anti-Corruption Act	DT, purchasing, planning, sales, finance, etc.	Online
Classification	Subject	Method														
Serious Accident Punishment Act	Compliance Law, Safety & Health Department, Korea Factory, Purchasing, Logistics, Research Department Manager	Online														
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Trade Secret Protection Act	Sales, purchasing, R&D, production technology workers, career changers	Online														
Anti-Corruption Act	DT, purchasing, planning, sales, finance, etc.	Online														

Fair Trade Compliance

Fair Trade Compliance Policy

In addition to adhering to the principles of fair trade, we have introduced the Four Practices of Fair Trade and the Code of Ethics Practice Guideline to ensure the protection of the rights and interests of various stakeholders.

 [Code of Ethics Practice Guideline](#)

Fair Trade Compliance Program

Hanwha Solutions operates the Compliance Program (CP) to strengthen the trust of all stakeholders and uphold fair trade practices. The CP serves as an internal compliance system that sets out the fundamental standards and procedures for executives and employees to follow in order to comply with fair trade laws and regulations while carrying out their duties.

To ensure effective implementation of the CP, we have appointed a Chief Compliance Officer (CCO) who is entrusted by the CEO with the authority and responsibility to oversee all aspects of CP operation. The CCO plays a vital role in promoting company-wide compliance with fair trade laws and preventing any violations. Furthermore, a dedicated CP Department has been established under the supervision of the CCO to support the smooth operation of the CP.

+ Fair Trade Compliance Program System



Ethics and Compliance

Fair Trade Compliance

Fair Trade Activities

Hanwha Solutions identifies and evaluates risks related to fair trade and unfair competition for each business sector to strengthen its commitment to fair trade and sincere voluntary compliance activities. After conducting regular risk assessments and deriving a risk rating that considers the probability of occurrence and the impact of the risk, we develop an action plan based on the assessment. The Chief Compliance Officer (CCO) and the CP department monitor compliance with laws and systems in the risk response process for efficient implementation. Furthermore, through regular training and feedback from practitioners, we enhance fair trade compliance activities and foster a fair trade culture. We will continue to achieve fair trade with customers and suppliers while promoting transparency and fairness in our business environment.

+ Fair Trade Risk Assessment and Response Measures by Division

Division	Risk	Results	Measures Taken	Future Plans
Strategy	[Operational Risk/Compliance] Risk due to violation of purchasing-related laws such as the Fair Trade Act and the Subcontracting Act	No Level (Monitor)	<ul style="list-style-type: none"> Completed compliance check and result report for all teams in P&A room: Compliance inspections and results of results for the second half of 2021 and the first half of 2022 were implemented in February and September 2022 Completion of internal compliance training organized by the Compliance Office: Serious Accident Punishment Act Training (Q1), Fair Trade Act Training (Q2), Unfair Competition Prevention Act Training (Q3) 	<ul style="list-style-type: none"> Continuous promotion of compliance checks and result reports for all P&A teams Promotion of continuous internal compliance training organized by the Compliance Office Completion of compliance training for compliance officers in the P&A room and promotion of internal awareness training
Chemical	[Compliance] Risk of collusion between peers	No Level (Monitor)	<ul style="list-style-type: none"> Conducted regular training once a year Ensured compliance with the Fair Trade Act during association activities Continuously suggesting employees to avoid unnecessary individual meetings/contacts 	<ul style="list-style-type: none"> Planned to be maintained throughout the year Introduction of compliance training outcome evaluation system
Qcells	[Compliance] Risk of violation of laws such as fair trade and anti-corruption	No Level (Monitor)	<ul style="list-style-type: none"> Adhered to the fair bidding process Established the scope of work through a thorough contract review and prevent issues during the project 	<ul style="list-style-type: none"> Adhere to the bidding process provides business opportunities to more companies and win-win Continuous compliance with internal contracts and purchasing processes to prevent legal and public payment issues
	[Supplier Supply and Demand Management] Inventory supply and demand management and allocation management risk	No Level (Monitor)	<ul style="list-style-type: none"> Shared inventory status with Daily Update Developed company selection criteria during shortage Selected companies without bribery issues 	<ul style="list-style-type: none"> Advancement of transparency work through Excel management area system transfer Prevent risk occurrence through sharing and real-time confirmation within the business unit
Insight	[Compliance] Fair Trade Risk	No Level (Monitor)	<ul style="list-style-type: none"> Established operational regulations of the Insider Trading Review Committee (January) and assessed risks through Insider Trading Review Committee (16 cases) 	<ul style="list-style-type: none"> Continuous monitoring and management through the Insider Trading Review Committee
Galleria	[Bidding and Company Selection] Enjoyment in the bidding and company selection process for business, concerns about money and valuables, and risks related to compliance with the Fair Trade Act [Ordering/Contract Management] Risk of excessive quotation/transaction amount downward adjustment and unreasonable condition demand	Level III (Caution)	<ul style="list-style-type: none"> Implemented integrated fair trade training on laws including the Large-Scale Distribution Business Act, Fair Trade Act, and Labeling and Advertising Act applicable to the distribution field Established a new organization was established to strengthen fair trade management in November 2022 	<ul style="list-style-type: none"> Contain risks through compliance with internal regulations and constant training and self-monitoring of departments Operate audit team and conduct of regular diagnosis

Ethics and Compliance

Fair Trade Compliance

Insider Trading Management

With the recent revision of the Fair Trade Act, compliance risks associated with insider trading have increased, including the expansion of regulations pertaining to unfair support and profiteering. To address these strengthened regulations, the Hanwha Group Compliance Committee has established Insider Trading Review Guidelines, which are applicable to all group companies.

Hanwha Solutions conducts insider trading reviews for all of its affiliates. To facilitate this process, an Insider Trading Committee has been formed within the board to obtain approval for significant matters related to large-scale insider trading. For smaller insider trading cases that do not require board approval under the law, we have developed our own insider trading review regulations to ensure compliance.

In addition, we have comprehensively revised the Insider Trade Review Regulations under the supervision of the Insider Trading Committee in order to align with the Fair Trade Act. Furthermore, we are fostering a transparent and fair ecosystem by implementing competitive bidding principles and enhancing administrative procedures and document formats for insider trading deliberations, thus preventing unfair trade practices among affiliates.

+ Insider Trading Organization



Internal Control over Financial Reporting (ICFR)

Enhancement of Internal Control System Operation

In 2018, the Act on External Audits of Corporations underwent a complete revision, resulting in the strengthening of the level of external auditor certification from "review" to "audit". In response to this, we have successfully upgraded our Internal Control over Financial Reporting (ICFR) to incorporate the revised model standards through consultation with external accounting organizations. As part of this upgrade, we have introduced the Internal Accounting Management System (ICARUS) and established a dedicated internal accounting team. Furthermore, we have developed performance evaluation standards for the Internal Control over Financial Reporting (ICFR) and incorporated them into the evaluation of team members' key performance indicators (KPIs). To address business risks that have a significant impact on the internal accounting management system, we conduct risk identification meetings twice a year, allowing us to proactively address and mitigate potential risks.

Internal Control over Financial Reporting Audit and Reporting

Hanwha Solutions has been certified by an independent external auditor for the adequacy of the operation status of the internal accounting management system. The CEO and the internal accounting manager refer to the operation status of the internal accounting management system as announced by the Internal Accounting Management System Steering Committee. They conduct an annual inspection to evaluate the effectiveness of the internal accounting management system. The Audit Committee assesses the report on the operation status of the internal accounting management system based on the evaluation standards and reporting model established for the internal accounting management system. The findings and recommendations for improvement are then reported to the board for necessary actions.

Establishment and Operation of Consolidated Internal Accounting Management System

To prepare for the introduction of the consolidated internal accounting management system audit in 2023, we are currently implementing a project in collaboration with an external accounting organization to establish the consolidated internal accounting management system. This project involves setting up specific procedures and operations for each major subsidiary to ensure that the expanded scope of evaluation on a consolidated basis is properly addressed. Furthermore, we have implemented company-level controls throughout the entire Hanwha Group, including ethics regulations and fraud prevention programs, with an aim to promote accounting transparency and enhance the reliability of financial statements.

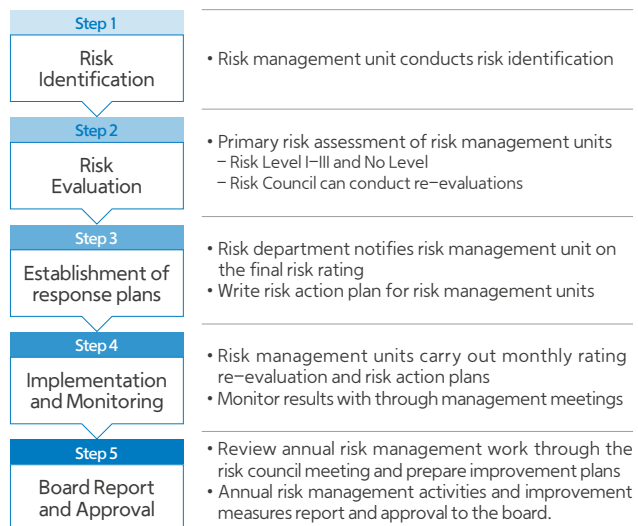
Risk Management

Strengthening the Risk Management

Integrated Risk Management System

In December 2021, Hanwha Solutions implemented a new risk management regulation to establish a risk management process capable of identifying, preventing, and responding to risk factors that may arise throughout business activities. This initiative aims to strengthen the foundation for maintaining the company's management soundness and safety. The risk management process comprises five steps: risk identification, evaluation, establishment of response plans, implementation and monitoring, and reporting. Additionally, we assess the impact level of each risk based on strategic importance, urgency, and management impact, and develop response plans categorized into four stages according to the risk level. Regular evaluations take place annually when departments establish their business plans, while ad hoc evaluations can be conducted as needed, such as new product or service launches, shifts in the external environment, or organizational restructuring. Furthermore, each department conducts monthly risk reassessments and maintains ongoing monitoring of risk factors.

+ Risk Management Process



Risk Management Governance

Hanwha Solutions has formed a risk council under the board for systematic risk management, and designates a risk management officer for each sector to carry out risk identification and management activities. The head of the Compliance Division was appointed as the head of the risk department to oversee all procedures related to risk assessment and action, and was given the responsibility and authority to report the results of risk assessment and action to the board. By identifying risks by risk management units, assigning risk ratings, and taking necessary measures, managing them as a whole, and reporting the results to the board, we not only strengthen the company-wide risk reporting system but also preemptively prevent risk factors. In addition, when major issues occur, decisions are made after in-depth discussions with management on various risks through management reports.

+ Risk Management Organization



Risk Management Measures

We constantly monitor possible financial risk factors such as market, liquidity, and capital to create stable and sustainable business performance. We manage financial risks centered on the Finance Office and establish policies, identify, evaluate, and respond to risks through close collaboration with relevant departments. Furthermore, we establish a management process to respond to tax risks due to changes in the external environment, report tax-related matters to management, and continuously monitor and respond to the enactment and revision of domestic and foreign tax laws, precedents, and government policy trends. To respond to rapid changes and increasing uncertainties in the business environment, we evaluate and manage operational risks related to business sustainability for ESG management. We plan and implement strategic responses to ESG risks that may arise in business operations and actively and proactively respond to them.

+ Response by Risk Rating

Risk Rating	Risk Monitoring	Response Measures	Report to the Board
Level I	Monthly risk assessment for each department	Develop measures, Manage at a company level (Leverage company meetings)	Report the improvement results of each risk rating once a year
Level II	Notify the Risk Department in case a new risk occurs or the rating changes	Develop measures, Manage at a division level (Utilizing division meetings)	
Level III		Develop measures, Manage at a team level	
No Level		Manage at a team level	

+ Managing Corruption-Related Risks

We effectively manage risks related to corruption through our comprehensive risk management system. Each department identifies potential corruption risks associated with business operations, assesses their severity, and implements measures to mitigate these risks. This includes establishing and executing action plans based on the risk level. The Compliance Office collects the outcomes of these risk management efforts and presents them to the Board of Directors for approval.

Risk Management

Risk Management by Type

+ Key Risk Status by Division

	Risk	Measures Taken	Future Plan
Strategy	(Level III) Missing or non-compliance with internal recruitment procedures (personal information leakage, labor practices-related risks)	Since June 2022, we have introduced the electronic signature solution and Glosign, and we are managing it without omission through the collection of employment documents. Completed of monthly employee onboarding orientation and information security training and trade secret training	• In addition to existing measures, interviewer training will be conducted to prevent leakage of personal information that may occur during the interview process
	(Level III) Risk of loss, theft, leakage, change, or damage of business information or personal information	Newly developed system security inspection and improvement measures before operation Expansion of malicious mail response training semi-annually, reducing the risk rate of malicious emails Conduct information security training for all new employees	• New system security checks, penetration hacking, and malicious mail response drills • Establish information security training course for employees across the company • Develop security risk assessment index in 2023
Chemical	(Level I) Strengthening regulations related to GHG emissions	① Implemented carbon neutral activities • Established the 2050 Net Zero Strategy/Action Plan (Chemical Division : established detailed implementation strategy), quarterly report on GHG emissions to the Board of Directors and the ESG Committee • Strengthened the management of greenhouse gas emissions/emission permits at business sites (Chemical Division: reflect the cost of carbon credits and Net Zero in the 2023 expense plan) ② Response to Emission Trading System • Monitored and responded to emission Trading System(Benchmark-based allocation, etc.) ③ Promotion of LCA for all products of Chemical Division to manage emissions by product unit	① Implemented carbon neutral activities • Implement carbon reduction activities • Report emissions to the board ② Response to emission credits • Discover of internal reduction projects ③ Emission management by product unit • Upgrading LCA for all products of Chemical Division • Establish an eco-friendly supply chain and introduction of GHG reduction technology
	(Level I) Increasing demand for renewable energy-based product production under RE100	• Participated in green premium (46GWh, 2022), purchased RECs (contract for Q4 2022, supply in 2023), and signed MOUs related to renewable energy with 4 renewable energy supply and intermediary operators	• Increase the amount of renewable energy purchased and expand procurement methods (REC, PPA, etc.)
Qcells	(Level III) Investigation response and punishment risk in the event of a serious accident under the of the Serious Accident Punishment Act	• Operate a dedicated safety and health organization (safety and health team), establish and allocate budget • Identified harmful risk factors by June 2022 and inspection of improvement procedures	• Identify harmful risk factors by November 2022 and assess improvement procedures
	(Level III) Risk of exchange rate fluctuations	• Continuously monitored exchange rate fluctuations, minimized exchange risk through exchange rate hedges, reported and monthly foreign exchange profit and loss	• Develop additional exchange risk response processes and reporting systems
Insight	(No Level) Corruption risk: Issues such as solicitation in government affairs	• Conducted annual anti-corruption training and required relevant personnel to sign an ethics pledge	• Continue to conduct annual anti-corruption training and require relevant personnel to sign an ethics pledge in 2023
	(Level III) Lack of rational mid to long-term strategy, lack of timely grasp of market status, and lack of consensus among executives and employees reduce the company's mid- to long-term growth potential.	• Implemented mid to long-term strategy updates in December 2021 and June 2022 • Held management briefing sessions will be held in January and July 2022	• We are developing a business plan for 2023, and we plan to continue managing it semi-annually
	(Level III) Failure to open up new markets due to lack of mid- to long-term development strategy and lack of timely review of new businesses	• Established a strategic business model within the industrial complex and promote commercialization	• After the successful launch of Pilot PJ, we plan to continue discovering the next business
Galleria	(No Level) Corruption risk: Management risks due to violations of laws and regulations such as the prohibition of solicitation and graft, anti-corruption, and insufficient management of company regulations	• Established divisional ethics regulations in August and sent out management compliance messages in January and August 2022	• Continue to monitor legal risks and send compliance management messages
	(Level III) Missing tax payment and non-refund of VAT	• Collected opinions from external experts such as customs corporations	• Redefine departmental work roles and processes for risk management Improvement
	(Grade III) Arbitrary allowancefor failure to meet quality standards of products and services to be delivered	• Established a new organization and audit team to strengthen management in November 2022 • Conducted constant training and monitoring within the quality control department	• Control risks through internal compliance and constant training and self-monitoring within the department, and operate constant diagnosis centered on the audit team

Risk Management

Risk Management by Type

In addition to conducting risk management for each business division, **Hanwha Solutions** also implemented risk management and response measures in accordance with the Risk Management Regulations for significant non-financial risks associated with ESG issues. These risks were identified through the double materiality assessment, and the results of the risk management efforts were then reported to the board.

+ ESG Issues and Key Non-Financial Risk Measures

Non-financial Risks	Related Measures	ESG Issues
Risk of safety and environment-related accidents (Serious accidents, environmental pollution accidents, etc.)	<ul style="list-style-type: none"> • Reflection of Serious Accident Punishment Act regulations (Operation of a dedicated organization, reflection of budget, etc.) 	<ul style="list-style-type: none"> • Strengthening of the occupational safety and health system to respond to serious accidents • Compliance with environmental regulations and management of hazardous chemicals and air pollutants
Market Risk (Market uncertainty – costs, volatility related to product prices, changes in consumer behavior – green/low-carbon preferences)	<ul style="list-style-type: none"> • Monitoring of trends such as raw material/product prices and regular reporting • Formula-based contracts • Eco-friendly product research and development • Establish a clean technology development strategy and increase investment 	<ul style="list-style-type: none"> • Establish a clean technology development strategy and increase investment
Financial Risk (Exchange rate fluctuations, liquidity risks, etc.)	<ul style="list-style-type: none"> • Continuous exchange rate fluctuations monitoring • Balance of funds plan and performance analysis (daily/weekly/monthly/3 months), communication with related departments 	<ul style="list-style-type: none"> • Other
Supply chain risk (Logistics (cargo solidarity), securing raw materials, etc.)	<ul style="list-style-type: none"> • Continuation of securing vehicles that are not part of the union • Diversification of export methods (related to securing pre-emption), securing multiple and alternative transportation/suppliers 	<ul style="list-style-type: none"> • Other
Risk of violation of laws and regulations (Fair trade, subcontracting, serious accidents, etc.)	<ul style="list-style-type: none"> • Training on related laws and regulations for related business personnel, pre-legal review process • Operation of insider trading review by each division 	<ul style="list-style-type: none"> • Reinforcement of compliance and ethical management • Compliance with environmental regulations and management of hazardous chemicals and air pollutants
Climate risk (Strengthening ESG-related regulations such as GHG and Net Zero)	<ul style="list-style-type: none"> • Review and implementation of annual plans to achieve Net Zero and K-RE100 goals, and disclosure of climate information 	<ul style="list-style-type: none"> • Promotion of activities to achieve Net Zero in response to climate change
Human rights risk (Workplace bullying, sexual harassment, etc.)	<ul style="list-style-type: none"> • Conduct regular workplace bullying and sexual harassment prevention training • Establish regulations and operating processes for preventing harassment and damage relief at the workplace • Designate a workplace bullying/sexual harassment prevention counselor or response officer 	<ul style="list-style-type: none"> • Other



ESG Factbook

• Economic	106
• Environmental	107
• Social	109
• Governance	112

Economic

Consolidated Financial Statement

Classification	2020	2021	2022
Assets			
Current assets	4,958,365	6,073,960	8,573,295
Cash and cash equivalents	1,199,837	1,567,163	2,548,380
FVTPL - financial assets	2,920	-	-
Other financial assets	192,785	229,553	339,937
Trade receivables and other receivables	1,457,526	1,631,759	2,195,999
Other current assets	327,678	331,309	373,671
Inventories	1,431,588	2,231,502	3,060,108
Current income tax assets	10,521	16,789	17,946
Non-current assets held for sale	335,510	65,885	37,254
Non-current assets	10,178,955	12,523,570	13,634,375
FVTPL - financial assets	1,858	33,629	94,922
FVTOCI - financial assets	48,541	56,186	56,660
Other financial assets	62,139	209,559	300,440
Long-term trade receivables and other receivables	3,837	2,839	6,216
Investments in associates and joint ventures	2,685,164	3,438,403	3,744,628
Investment property	142,187	212,428	199,763
Property, plant and equipment	6,416,485	6,451,599	6,879,452
Intangible assets	413,851	1,580,567	1,644,438
Right-of-use assets	309,714	381,096	405,921
Other non-current assets	16,286	35,938	100,646
Deferred tax assets	78,892	121,327	201,292
Financial business assets	-	1,410,042	1,624,027
Total assets	15,137,320	20,007,572	23,831,697

Classification	2020	2021	2022
Liabilities			
Current liabilities	5,251,126	5,787,890	6,808,491
Trade payables and other payables	1,556,392	2,441,733	2,388,214
Short-term borrowings	2,971,926	2,611,134	3,002,811
Other financial liabilities	222,158	292,209	537,937
Provisions	51,059	54,458	47,835
Other current liabilities	302,576	296,578	446,063
Current income tax liabilities	147,015	91,778	385,632
Non-current liabilities	3,918,479	4,774,478	5,685,432
Long-term trade payables and other payables	15	173,506	39,969
Long-term borrowings	2,716,648	3,263,693	4,205,363
Other financial liabilities	379,992	469,362	633,646
Net defined benefit liabilities	446,565	455,223	397,180
Long-term employee benefits	27,893	26,716	29,635
Provisions	106,858	112,193	127,509
Other non-current liabilities	6,382	5,880	22,412
Deferred tax liabilities	234,127	267,905	229,718
Financial business liabilities	-	1,243,957	1,440,862
Total liabilities	9,169,604	11,806,325	13,934,786
Equity			
Equity attributable to owners of the company	5,929,092	8,159,421	8,920,571
Capital stock	821,171	978,241	978,241
Capital surplus	798,470	2,003,249	2,320,051
Capital adjustments	(10,328)	(24,176)	(154,154)
Accumulated other comprehensive income	(110,010)	150,693	215,028
Retained earnings	4,429,789	5,051,414	5,561,405
Non-controlling interests	38,623	41,826	976,341
Total equity	5,967,715	8,201,247	9,896,912
Total liabilities and equity	15,137,320	20,007,572	23,831,697

Environmental

Environmental Management

Classification		Unit	2020	2021	2022		
Greenhouse Gas Emissions							
Total emissions (Scope 1 + Scope 2)			2,400,441	2,557,067	2,519,821		
Direct GHG emissions (Scope 1)			409,412	411,718	390,020		
Indirect GHG emissions (Scope 2)				2,415,349	2,129,814		
Subtotal			6,211,098	6,925,654	6,924,746		
GHG emissions ^{1),2)}	Other Indirect GHG emissions (Scope 3) ³⁾	By category	tCO ₂ -eq	1. Purchase of goods and services	4,287,560	4,667,393	4,722,281
				2. Capital goods	60	165	181
				3. Fuel and energy-related activities	150,525	164,692	165,005
				4. Upstream transportation and distribution	45,633	47,791	51,261
				5. Waste generated in operations	11,220	11,773	13,718
				6. Business travel	600	1,809	3,884
				7. Employee commuting	7,924	8,957	9,245
				8. Upstream leased assets	-	-	-
				9. Downstream transportation and distribution	116,122	122,095	121,180
				10. Processing of sold products	-	-	-
				11. Use of sold products	-	-	-
				12. End-of-life treatment of sold products	3,412	3,058	3,165
				13. Downstream leased assets	128	171	92
				14. Franchises	-	-	-
				15. Investments	1,587,914	1,897,749	1,834,733
Biogenic CO ₂ emissions			-	-	-		
GHG emission intensity ¹⁾		tCO ₂ -eq/ KRW 100 million	42.0	34.6	26.0		
Greenhouse Gas Reduction							
GHG reductions	Total reductions (Scope 1 + Scope 2)		37,580 ⁴⁾	59,514 ⁴⁾	30,959		
	Scope 1 reductions		tCO ₂ -eq	1	60	4,684	
	Scope 2 reductions			37,579	59,454	26,275	
GHG reduction activities		Initiatives	93 ⁴⁾	158 ⁴⁾	156		

Classification		Unit	2020	2021	2022	
Energy						
Total energy consumption ¹⁾			47,767,057	50,320,968	53,056,600	
Direct energy consumption	Subtotal ¹⁾		6,069,773	5,322,147	5,877,916	
	Gasoline		9,129	11,995	12,440	
	Diesel		18,825	19,673	28,177	
	Kerosene		6,522	41,126	7,773	
	LNG		3,436,049	3,446,162	2,285,238	
	LPG		683,898	543,614	525,870	
	Other			1,259,578	3,018,418	
	Consumed ¹⁾		Subtotal	41,475,486	44,752,478	44,149,684
			Power	36,304,558	39,247,574	38,465,996
			Steam	5,170,928	5,504,904	5,683,688
Indirect energy consumption	Produced		Subtotal	146,842	171,387	374,425
			Power	11,077	45,976	257,000
			Air conditioning	-	-	-
			Heating	-	-	-
			Steam	135,765	125,411	117,425
			Subtotal	-	-	14,781
			Power	-	-	-
			Air conditioning	-	-	-
			Heating	-	-	-
			Steam	-	-	14,781
Energy consumption reductions ¹⁾		Subtotal	550,967	1,020,642	469,945	
Amount of renewable energy consumed at business sites		MWh	3,154	12,863	71,548	
Renewable energy consumption rate		%	0.0	0.1	0.2	
Energy consumption intensity		GJ/KRW 100 million	835 ⁴⁾	680 ⁴⁾	548	

* Scope of environmental management reporting: Domestic business sites including Seoul head office, Yeosu/Ulsan plants, Jincheon plant, etc.
 1) Data in 2020 and 2021 are modified with data certified in Korea Emissions Trading Scheme (ETS). There may be a difference in the total emission value as the data are rounded off by each business site based on the GHG assurance statement.
 2) Galleria and Insight division's GHG emission data are included after the merger in 2021
 3) Differences in past year emissions occurred due to changes in Scope 3 emission calculation methodology
 4) Data corrected due to changes in data calculation standard

Environmental

Classification	Unit	2020	2021	2022
Water				
Water discharged (wastewater)		6,405,120 ¹⁾	7,359,409	6,707,732
Water consumption	Total water consumed	11,117,887 ¹⁾	12,874,064 ¹⁾	13,554,473
	Water intensity	194.5	174.1	139.9
	Total reused water	744,033	897,356	896,093
	Water reuse rate	6.7	7.0	6.6
Water intake	Total water intake	14,984,288	17,071,361	17,513,342
	Surface water	421,185	560,304	593,148
	Ground water	-	13,055	-
	Seawater	-	-	-
	Produced water	-	-	-
	Third-party water	14,563,103	16,498,002	16,920,194
Water Pollutants				
Water pollutants	COD/TOC emissions ²⁾	371	356	203
	BOD emissions	290	115	154
	SS emissions	222	185	136
Air Pollutants				
Air pollutants	ODS emissions	tCFC-eq	-	-
	NOx emissions	182	173	233
	SOx emissions	6	11	11
	Dust emissions	20	18	23
Chemicals				
Chemical emissions	Ton	339	306	209
Environmental Certifications				
Percentage of ISO 14001-certified business sites	%	85	89	95
Certified business sites	Number	17	17	18
Business sites subject to certification	Number	20	19	19
Green Businesses				
Eco-friendly products and services	Sales	KRW 100 million	4,479 ¹⁾	6,207 ¹⁾
	Percentage of sales	%	8.0	9.2
Eco-friendly R&D cost	KRW 100 million	75	107	171
Environmental Investments				
Green bonds and funds issued	KRW 100 million	-	1,000	3,350
Investment in environmental facilities	KRW 100 million	115	244	228
Environmental Training				
Environmental Training hours	Hour	19,999	17,365	25,716
Number of employees participating in environmental training	Person	4,775	4,370	5,021

Classification	Unit	2020	2021	2022	
Waste					
Waste generation	Total generated ¹⁾	Ton	79,149 ¹⁾	85,083 ¹⁾	
	Waste intensity	Ton/KRW 100 million	1.4	1.1	
	Designated (hazardous) waste generated		31,494	32,644	
	General (non-hazardous) waste generated		47,655	52,439	
Waste disposal	Total waste disposed		40,202	47,426	
	Subtotal		19,114	18,439	
	Designated (hazardous) waste	Landfill	530	233	
		By type	Incinerated	3,395	3,448
			Other	15,187	14,755
	General (non-hazardous) waste	By method	Internal	452	-
			Third-party	18,662	18,439
		Subtotal	20,887	21,762	
	By type	Landfill	16,974	17,275	
		Incinerated	3,915	4,490	
Other		-	-		
By method	Internal	464	563		
	Third-party	20,423	21,200		
Total recycled waste		39,148	44,880		
Total waste recycling rate ¹⁾		%	49.2 ¹⁾	52.7 ¹⁾	
Waste recycling	Subtotal		12,379	14,204	
	Designated (hazardous) waste	Pretreatment for reuse	-	-	
		By type	Recycled	12,379	14,204
			Recovered	-	-
	General (non-hazardous) waste	By method	Internal	-	-
			Third-party	12,379	14,204
		Subtotal	26,769	30,676	
	By type	Pretreatment for reuse	-	-	
		Recycled ¹⁾	26,769 ¹⁾	30,676 ¹⁾	
		Recovered	-	-	
By method	Internal	-	-		
	Third-party	26,769	30,676		

1) Data corrected due to changes in data calculation standard

2) Due to changes in data calculation standards, TOC emissions is disclosed in 2022, and COD emissions in 2020 and 2021

Social

Classification	Unit	2020	2021	2022	
Employment					
Total number of employees		6,672	6,747	6,773 ¹⁾	
Registered executives		11	10	10	
By employment type	Full-time employees	Person	6,496	6,524	6,579
	Percentage of full-time employees		97.4	96.7	97.1
	Temporary employees		176	223	194
	Percentage of temporary employees	%	2.6	3.3	2.9
Gender	Male		5,602	5,650	5,868
	Female		1,070	1,097	1,205
By age	Ages under 30		1,944	1,744	1,802
	Ages 30 to 39		3,490	3,677	3,767
	Ages 50 and above			1,326	1,204
By position	Executives	Male	98	119	117
		Female	–	2	5
	Managerial ⁶⁾	Male	1,283	1,376	1,558
		Female	163	193	235
	Non-managerial	Male	4,221	4,159	3,984
		Female	Person	907	902
By occupation	Management		98	121	103
	General		2,222	2,268	2,282
	Research		320	320	454
	Office		209	207	172
	Professional		3,649	3,609	3,555
	Contract		174	222	207
By region	Korea		6,672	6,747	6,773
	Overseas		110	157	132
Non-affiliated employees ¹⁾	Male	1,194	1,221	1,708	
	Female		222	650	
Length of Service					
Average years of service	Year	10.1	10.8	10.0	

1) Data based on business report

2) The number of full-time position retirees included

3) Voluntary turnover includes resignation and turnover due to study or other personal reasons, and involuntary turnover includes retirement, disciplinary dismissal, and forced resignation.

4) Data corrected due to changes in data calculation standards

5) Based on the amount of welfare benefits in the (separate) financial statements in the business report

6) Manager and higher, excluding executives

Classification	Unit	2020	2021	2022		
Recruitment						
Total number of new hires		236	558	1,132		
Gender	Male	172	433	931		
	Female	64	125	201		
By age	Ages under 30		131	234	633	
	Ages 30 to 39		Person	96	283	459
	Ages 50 and above			9	41	40
By employment type	Full-time (entry-level)		74	235	452	
	Full-time (experienced)		74	162	460	
	Temporary employees		88	161	220	
Turnover and Retirement						
Total turnover ²⁾		296	399	457		
Gender	Male	241	314	345		
	Female	55	85	112		
By age	Ages under 30		Person	119	155	138
	Ages 30-39			77	142	178
	Ages 40-49			34	47	79
	Ages 50 and above			66	55	62
Rate of voluntary turnover ³⁾	%	3.7 ⁴⁾	5.3 ⁴⁾	5.1		
Voluntary turnovers	Person	246	354	342		
Labor Relations						
Union	Employees eligible for membership		person	2,240	2,192	2,064
	Union members			1,600	1,602	1,521
	Rate of membership		%	71.4	73.1	73.7
Labor Council	Agendas	Number	625	605	571	
Benefits						
Benefits	Total benefit cost		KRW million	64,170	72,933	110,494 ⁵⁾
	Benefit cost per person			9.6	10.8	16.3 ⁵⁾
Diversity of Employees						
Female Employee	Number of female leaders (general manager and above)		Person	163	195	236
	Percentage of female leaders		%	10.6	11.6	12.3
Disabled	Number of disabled employees			142	159	117
Veterans	Number of veteran employees		Person	165	158	144
Foreigner	Number of foreign employees			23	25	29

Social

Classification	Unit	2020	2021	2022
Parental Leave				
Employees who used parental leave	Male	11	12	23
	Female	53	64	61
Employees scheduled to return after parental leave	Male	10	12	11
	Female	65	50	76
Employees who returned from parental leave	Male	10	12	11
	Female	63	45	74
Return-to-work rate after parental leave	Male	100.0	100.0	100.0
	Female	96.9	90.0	97.4
Safety and Health Management System				
Percentage of safety and health-certified business sites		95.0	100.0	100.0
Certified business sites	Number	19	19	19
Business sites subject to certification		20	19	19
Safety and Health Investments				
Safety and Health investment cost	Total	104,765	108,770	136,533
	Repair fee	57,153	89,577	102,992
	Inspection (diagnosis and consulting)	40,188	12,246	10,869
	Education and training	1,033	505	259
	Safety equipment (PPE)	1,386	1,377	1,729
	Workplace environment (health check-up)	1,971	1,836	2,107
	Reward and campaigns	390	382	907
	Other	2,644	2,847	17,669

Classification	Unit	2020	2021	2022	
Occupational Accidents					
Total number of business sites		19	21	25	
Business sites with work-related accidents	Number of business sites	4	8	7	
	Ratio of business sites	21.0	38.0	28.0	
Number of occupational accidents	Employees (company)	1	5	5	
	Suppliers	5	8	4	
Number of serious accidents (excluding casualties)	Employees (company)	0	0	0	
	Suppliers	0	0	0	
Rate of occupational accidents	Employees (company)	0.00	0.00	0.00	
	Suppliers	0.00	0.00	0.00	
Rate of serious accidents (excluding casualties)	Employees (company)	0.00	0.00	0.00	
	Suppliers	0.00	0.00	0.00	
Casualties	Employees (company)	0	0	0	
	Suppliers	0	0	0	
Fatality rate	%	0.00	0.00	0.00	
Occupational Illness Frequency Rate (OIFR) Number of occupational diseases *1,000,000 / Total working hours	Employees (company)	0.00	0.00	0.00	
	Suppliers	0.00	0.00	0.00	
Injury Frequency Rate Number of injuries per million working hours	Employees (company)	0.10	0.50	0.51	
	Suppliers	0.79	1.37	0.62	
Occupational Illnesses					
Business sites with work-related illnesses	Number of business sites	0	1	0	
	Ratio of business sites	0.0	13.0	0.0	
Number of occupational illnesses	Employees (company)	0	1	0	
	Suppliers	0	0	0	
Employee Training and Career Management					
Training hours	Training hours per employee	9.8	8.9	17	
	Total training hours	63,848	58,041	111,288	
Gender	Male	Total training hours	26,262	26,854	94,382
		Average training hours per employee	4.8	4.7	16
	Female	Total training hours	6,188	7,032	16,905
		Average training hours per employee	6.1	6.6	15
By employment type	Full-time	Total training hours	33,373	33,620	105,410
		Average training hours per employee	5.1	5.2	16
	Contract	Total training hours	138	266	5,877
		Average training hours per employee	0.8	1.5	30.3
Performance Evaluation					
Employees eligible for performance evaluation	Person	3,937	4,296	4,668	
Number of employees who received regular performance evaluation		3,937	4,296	4,668	
Percentage of employees who received regular performance evaluation		100.0	100.0	100.0	

Social

Classification	Unit	2020	2021	2022
Equal Opportunity				
Ratio of female-to-male salary	%	60.0	57.0	55.0
Average salary per person	Male	67	65	81
	Female	40	37	45
Customer Satisfaction				
VOC status	Number of complaints received	1,430	1,709 ¹⁾	785
	Number of complaints processed	1,430	1,709 ¹⁾	785
	Processing rate of customer complaints	%	100.0	100.0
Social Contribution				
Donated amount	Subtotal	5,225 ¹⁾	4,718 ¹⁾	7,073
	Social welfare	1,585	515	1,466
	Education scholarship	2,389	2,438	3,162
	Environment and culture	357	566	1,330
	Other		870	1,114
Win-Win Cooperation				
Supplier Status	Total number of suppliers	4,826	5,670	5,110
	Number of newly registered suppliers	1,475	1,294	983
	Total supplier purchases	5,204,669	7,225,997	6,932,605
Supplier financial support	Total budget	74,000	81,000	71,000
	Total financed	23,767	24,465	23,500
Customer Privacy				
Number of customer privacy breaches	Number of personal information leakages	0	0	0
	Number proven customer privacy violations and loss of customer information	0	0	0
	Total monetary losses incurred as a result of information security breaches or cybersecurity incidents	0	0	0

1) Data corrected due to changes in data calculation standard

Governance

Classification	Unit	2020	2021	2022	
Board of Directors and Committees					
Total	person	11	10	10	
Inside directors	person	5	4	4	
Outside directors	Number of outside directors	6	6	6	
	Ratio of outside directors	55.0	60.0	60.0	
Female directors	Number of female directors	1	1	1	
	Ratio of female directors	9.0	10.0	10.0	
Attendance rate	Inside directors	100.0	100.0	100.0	
	Outside directors	97.0	96.0	95.0	
Number of meetings held	number	11	10	14	
Average tenure of directors	month	22	23	35	
Agenda	Number of agendas	0	0	119	
	Number of agendas with outside director's objections	1	0	0	
Audit Committee	Ratio of outside directors	100.0	100.0	100.0	
	Number of meetings held	7	6	6	
	Ratio of female directors	0	0	0	
Outside Director Candidate Recommendation Committee	Ratio of outside directors	100.0	100.0	100.0	
	Number of meetings held	1	1	1	
	Ratio of female directors	0	0	0	
ESG Committee	Ratio of outside directors ¹⁾	2021년 신설 ¹⁾	100.0	100.0	
	Number of meetings held	0	3	6	
	Ratio of female directors	0	0	0	
보수	Highest remuneration amount	KRW million	1,368	2,700	3,600
	Average annual salary per person Employees ²⁾	KRW million	75	72	86
Ethics & Compliance					
Anti-corruption risk assessment	Business sites that conducted the assessment	number	13	21	15
	Total number of business sites	number	13	21	21
	Percentage of business sites that conducted the assessment	%	100.0	100.0	71.0

Classification	Unit	2020	2021	2022
Anti-corruption Communication and Training				
Ethics training hours ³⁾	hour	1,091	4,496	3,060
	Number of participants ³⁾	1,088	4,496	2,344
Anti-corruption (ethics) training	Number of executives who completed ethics training	15	18	14
	Percentage of executives who completed ethics training	16.0	15.5	11.5
Anti-corruption policy (Code of Ethics)	Number of employees who completed ethics training	1,073	4,478	2,330
	Percentage of employees who completed ethics training	16.1	66.7	34.4
Anti-corruption and ethics violations	Number of suppliers who signed the code of ethics	N/A	N/A	N/A
	Number of employees who signed the code of ethics	848	1,230	913
Fair trade training	Number of violations	0	0	5
	Employee disciplines	0	0	5
	Termination of contract (supplier)	0	0	0
Internal compliance reporting	Number of people who completed the training	789	501	738
	Number of employee training sessions	2	4	2
	Number of supplier training sessions	0	0	0
Anti-competitive Practices	Training Hours	789	683	1,160
	Total number of reports	8	3	0
Violation of Laws and Regulations	Number of reports resolved	8	3	0
	Subtotal ³⁾	4	3	4
Legal action taken due anti-competitive practices	Monetary sanctions	1	2	4
	Non-monetary sanctions	3 ³⁾	1 ³⁾	0
Penalties	Occurrences in the current reporting period	0	0	2,519
	Occurrences in the previous reporting period ⁴⁾	15,687	5	0

1) ESG Committee was established in May 2021

2) Data in 2020 and 2021 corrected due to changes in data calculation standard

3) Data corrected due to changes in data calculation standards

4) In 2020, a fine was imposed for violating the Fair Trade Act, and administrative litigation is currently in progress, and the 2021 data is corrected due to a change in the data calculation standard











Appendix

• Sustainability Commitments	114
• Stakeholder Communication	116
• GRI Standards	117
• SASB Index	118
• Greenhouse Gas Assurance Statement	120
• Third-Party Assurance Statement	123
• Awards and Memberships	125

Sustainability Commitments

UN SDGs Commitment

Hanwha Solutions will promote ESG activities that link the direction of sustainable management with the detailed goals of the SDGs, and participate in the achievement of the United Nations Sustainable Development Goals (SDGs), which are the common goals of mankind, in order to solve environmental, social, and economic problems in an integrated manner.

UN SDGs	Response Objectives	Detailed Objectives	Hanwha Solutions' Main Activities
	Ensure healthy lives and promote well-being for all at all ages	<ul style="list-style-type: none"> • 3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all • 3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination 	<ul style="list-style-type: none"> • Establish goal of creating accident-free workplaces • Strengthen safety leadership and promote serious accident response activities • Verify and manage environmental safety performance through internal and external environmental audits
	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	<ul style="list-style-type: none"> • 4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations 	<ul style="list-style-type: none"> • Operate Hanwha Qcells Para Sports Team • Provide employment support service Stepping-Stones Project for NEET people • Happy Sunshine Season 2, Creating a Clear School Project Activities
	Ensure access to affordable, reliable, sustainable and modern energy for all	<ul style="list-style-type: none"> • 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix • 7.3 By 2030, double the global rate of improvement in energy efficiency 	<ul style="list-style-type: none"> • Invest and provide green energy solutions such as solar and wind power • Develop water electrolysis technology to build a green hydrogen value chain • Invest in eco-friendly energy companies such as Lancium and REC Silicon
	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	<ul style="list-style-type: none"> • 8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services 	<ul style="list-style-type: none"> • Establish and observe the four principles of shared growth • Support partners through the creation of a Win-Win Fund • Sign MOU for mutual cooperation in ESG field to support eco-friendly startups
	Ensure sustainable consumption and production patterns	<ul style="list-style-type: none"> • 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse 	<ul style="list-style-type: none"> • Promote PVC Zero for raw and subsidiary materials for manufacturing and sales • R&D of eco-friendly PE packaging materials • R&D of eco-friendly materials that recycle marine waste
	Take urgent action to combat climate change and its impacts	<ul style="list-style-type: none"> • 13.2 Integrate climate change measures into national policies, strategies and planning 	<ul style="list-style-type: none"> • Promote eco-friendly management to achieve 2050 Net Zero • Support climate change-related initiatives such as TCFD and K-RE100 • Awarded CDP A-grade and received the Carbon Management Sector Honors
	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	<ul style="list-style-type: none"> • 15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development 	<ul style="list-style-type: none"> • Conduct environmental impact assessment at all workplaces and environmental cleanup activities in local communities • Implement natural environment conservation activities through the signing of an MOU with the National Park Service • Promote the Environmental Solutions for a Greener Earth program
	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	<ul style="list-style-type: none"> • 16.5 Substantially reduce corruption and bribery in all their forms • 16.6 Develop effective, accountable and transparent institutions at all levels 	<ul style="list-style-type: none"> • Establish company-wide risk management regulations • Acquired ISO 37301 and ISO 37001 certifications for all divisions • Conduct regular compliance inspections and complete ethics and compliance education for all employees

Sustainability Commitments

UNGC Commitment

Hanwha Solutions joined the United Nations Global Compact (UNGC) in 2012 and aligns with its Ten principles concerning human rights, labor, environment, and anti-corruption. These principles are integrated into all aspects of our corporate activities.

	UNGC Ten Principles	Hanwha Solutions' Main Activities
Human Rights	<p>Principle 1. Businesses should support and respect the protection of internationally proclaimed human rights; and</p>	<p>Hanwha Solutions adheres to the conventions of the International Labor Organization (ILO) as well as global labor laws and regulations. We incorporate provisions regarding the respect and protection of human rights into its Code of Ethics and actively conducts human rights education to enhance awareness and promote the advancement of human rights.</p>
	<p>Principle 2. make sure that they are not complicit in human rights abuses.</p>	
	<p>Principle 3. Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;</p>	<p>Hanwha Solutions complies with the Constitution and related laws to ensure employees' rights that must be respected fundamentally, such as the right to organize, bargain collectively, and act collectively, and promotes win-win cooperation by holding quarterly labor-management councils.</p>
Labour	<p>Principle 4. the elimination of all forms of forced and compulsory labour;</p>	<p>Hanwha Solutions excludes all forms of forced labor.</p>
	<p>Principle 5. Principle 5. the effective abolition of child labour; and</p>	<p>Hanwha Solutions prohibits the employment of minors and child labor.</p>
	<p>Principle 6. the elimination of discrimination in respect of employment and occupation.</p>	<p>Hanwha Solutions guarantees equal opportunities to all applicants, operates a fair recruitment system, and does not discriminate in hiring, placement, promotion, salary, and education based on gender, religion, political opinion, social status, nationality, or race.</p>
Environment	<p>Principle 7. Businesses should support a precautionary approach to environmental challenges;</p>	<p>In order to actively respond to the climate crisis, Hanwha Solutions declared 2050 Net Zero in November 2021 and is promoting various ESG activities to achieve this. All of Hanwha Solutions' business sites have acquired ISO 14001 certification for the sustainable operation of the safety, health, and environmental management system.</p>
	<p>Principle 8. undertake initiatives to promote greater environmental responsibility; and</p>	<p>Hanwha Solutions has declared its support for the TCFD and discloses information in accordance with the TCFD recommendations. In addition, by participating in climate change-related initiatives such as Carbon Disclosure Project (CDP) and K-RE100, we will fulfill our responsibilities and efforts by prioritizing ESG management activities and minimizing environmental impacts for sustainable growth.</p>
	<p>Principle 9. encourage the development and diffusion of environmentally friendly technologies.</p>	<p>Hanwha Solutions is committed to expanding its support and investment in the development of eco-friendly technologies, including hydrogen and solar power. We aim to contribute to the creation of a sustainable environment by actively seeking and discovering eco-friendly business models.</p>
Anti-Corruption	<p>Principle 10. Businesses should work against corruption in all its forms, including extortion and bribery.</p>	<p>Hanwha Solutions has successfully maintained the international standard certifications for its compliance management system (ISO 37301) and anti-bribery management system (ISO 37001) for two consecutive years. As a result, the company is recognized for its commitment to transparent corporate management activities on a global scale.</p>

Stakeholder Communication

Hanwha Solutions defines customers, shareholders and investors, executives and employees, suppliers, local communities, and governments as the main stakeholders that have a direct or indirect impact on corporate management activities. We operate various communication channels to create value and listen to opinions with stakeholders, and through this, we actively collect various opinions and strive to reflect them in decision-making.

Keystakeholders	Communication channels	Interests	Hanwha Solutions' Main Activities
Clients	<ul style="list-style-type: none"> Official website and SNS channels (All year round) Visit/Invited Seminar (all year round) VOC Channel (all year round) Customer satisfaction survey (once a year) Business Report and Sustainability Report 	<ul style="list-style-type: none"> Prevention of leakage of personal information Enhance product and service quality Producing sustainable, eco-friendly products 	<ul style="list-style-type: none"> Develop products and services that reflect customer needs Implement customized quality control according to product characteristics Conduct Life Cycle Assessment (LCA) for the Chemical and Qcells Division Conduct surveys and improve customer satisfaction Achieved 100% VOC handling status in 2022
Shareholders & Investors	<ul style="list-style-type: none"> Regular General Meeting of Shareholders (once a year) Extraordinary General Meeting of Shareholders (if necessary) NDR & IR Meetings (quarterly) Company Information Session (quarterly) Business Report, Audit Report, Corporate Governance Report, Sustainability Report 	<ul style="list-style-type: none"> Management strategy to enhance corporate value Risk management activities Promotion of shareholder-friendly management Quick and accurate communication 	<ul style="list-style-type: none"> Establishment of the Corporate Governance Charter Establishment of mid to long-term shareholder return policy Activities to strengthen shareholder-friendly policies Transparent disclosure of information through business reports, corporate governance reports, sustainability reports, etc.
Employees	<ul style="list-style-type: none"> Grievance Handling Channel (all year round) Intranet bulletin board (all year round) Employee meetings and workshops (all year round) Organizational Culture Survey (once a year) Labor Council (quarterly) 	<ul style="list-style-type: none"> Work-life balance Employee safety and health Talent development and career management Fair performance evaluation and reward 	<ul style="list-style-type: none"> Implementation of employee empowerment program Operate a variety of benefits plans Establish a culture that respect for human rights Operate of a fair and reasonable performance compensation system Create a safe and pleasant work environment
Suppliers	<ul style="list-style-type: none"> Grievance Handling Channel (all year round) Meeting with representatives of supplier companies (if necessary) Training for suppliers (all the time) 	<ul style="list-style-type: none"> Building a fair partnership Win-win management and ESG support activities Fair Trade 	<ul style="list-style-type: none"> Establish and comply with the four principles of fair trade Support for ESG competency enhancement of suppliers and improvement of safety and health evaluation system Create and operate win-win fund Participate in the 'Safety and Health Win-Win Cooperation Program'
Community	<ul style="list-style-type: none"> Regional Council Activities (all year round) Community impact activities (all year round) 	<ul style="list-style-type: none"> Community development and revitalization Creating value for the local community Environmental conservation 	<ul style="list-style-type: none"> Operate the Community Council Implement social contribution activities for vulnerable groups Implement transparent donation
Government	<ul style="list-style-type: none"> Membership and activities of the association (all year round) Support and cooperation with public institutions and government departments (all year round) 	<ul style="list-style-type: none"> Compliance with laws and regulations Industry-related policy involvement Strengthening public-private partnerships 	<ul style="list-style-type: none"> Comply with tax requirements Create jobs Implement joint projects with the government and public organizations

GRI Standards

Disclosure No.	Description	Page	Note
GRI 2 - General Disclosures			
2-1	Organizational details	6, 9	
2-2	Entities included in the organization's sustainability reporting	9	
2-3	Reporting period, frequency and contact point	2	
2-4	Restatements of information	6	Explanation on the reporting scope according to the spin-off/split-off of business divisions
2-5	External assurance	123, 124	
2-6	Activities, value chain and other business relationships	7, 8	
2-7	Employees		
2-8	Workers who are not employees	109	
2-9	Governance structure and composition	94, 95	
2-10	Nomination and selection of the highest governance body	96	
2-11	Chair of the highest governance body		
2-12	Role of the highest governance body in overseeing the management of impacts	11, 27, 42, 51, 80, 85, 95	
2-13	Delegation of responsibility for managing impacts	11, 95	
2-14	Role of the highest governance body in sustainability reporting	12, 95	
2-15	Conflicts of interest	95	
2-16	Communication of critical concerns	96, 102, 103, 104	
2-17	Collective knowledge of the highest governance body	94, 95, 96	
2-18	Evaluation of the performance of the highest governance body		
2-19	Remuneration policies	96	
2-20	Process to determine remuneration		
2-21	Annual total compensation ratio	96, 112	
2-22	Statement on sustainable development strategy	5, 11	
2-23	Policy commitments	79, 81, 115	
2-24	Embedding policy commitments	11, 79, 81, 85, 86, 87	
2-25	Processes to remediate negative impacts	59, 60, 81, 88	
2-26	Mechanisms for seeking advice and raising concerns	80, 81, 99, 100, 101	
2-27	Compliance with laws and regulations	98, 99, 100, 101	
2-28	Membership associations	79, 125	
2-29	Approach to stakeholder engagement	116	
2-30	Collective bargaining agreements	109	
GRI 3 - Material Topics 2021			
3-1	Process to determine material topics	12	
3-2	List of material topics		
3-3	Management of material topics	13	

Disclosure No.	Description	Page	Note
GRI 201 - Economic Performance			
201-2	Financial implications and other risks and opportunities due to climate change	43, 44, 45, 46, 47	
GRI 302 - Energy			
302-1	Energy consumption within the organization	107	
302-2	Energy consumption outside of the organization	■ Information incomplete	To be disclosed
302-3	Energy intensity		
302-4	Reduction of energy consumption	107	
302-5	Reductions in energy requirements of products and services	■ Information incomplete	To be disclosed
RI 305 - Emissions			
305-1	Direct (Scope 1) GHG emissions		
305-2	Energy indirect (Scope 2) GHG emissions		
305-3	Other indirect (Scope 3) GHG emissions	107	
305-4	GHG emissions intensity		
305-5	Reduction of GHG emissions		
305-6	Emissions of ozone-depleting substances (ODS)		
305-7	Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	108	
GRI 403 - Occupational Safety and Health			
403-1	Occupational safety and health management system	72, 73	
403-2	Hazard identification, risk assessment, and incident investigation	28, 29, 30, 75	
403-3	Occupational health services	33	
403-4	Worker participation, consultation, and communication on occupational safety and health	27, 31, 32, 33	
403-5	Worker training on occupational safety and health	31, 74	
403-6	Promotion of worker health	33	
403-7	Prevention and mitigation of occupational safety and health impacts directly linked by business relationships	28, 29, 30, 74, 75	
403-8	Workers covered by an occupational safety and health management system		
403-9	Work-related injuries	110	
403-10	Work-related ill health		
GRI 404 - Training and Education			
404-1	Average hours of training per year per employee	110	
404-2	Programs for upgrading employee skills and transition assistance programs	38, 39, 77	
404-3	Percentage of employees receiving regular performance and career development reviews	110	
GRI 205 - Anti-Corruption			
205-1	Operations assessed for risks related to corruption	98, 99, 112	
205-2	Communication and training about anti-corruption policies and procedures	112	
205-3	Confirmed incidents of corruption and actions taken	98, 99, 100, 112	

SASB Index

Sector : Chemicals

Table 1. Sustainability Disclosure Topics & Accounting Metrics			Hanwha Solutions' Response	
Topic	Code	Accounting Metric	2021	2022
Greenhouse Gas Emissions	RT-CH-110a.1	Gross global Scope 1 emissions	411,718tCO ₂ -eq(domestic sites)	390,020tCO ₂ -eq (domestic sites)
		Percentage covered under emissions-limiting regulations	100%	100%
	RT-CH-110a.2	Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets	page 81-86	page 17,51,52
Air Quality	RT-CH-120a.1	Air emissions of the following pollutants: (1) NO _x (excluding N ₂ O)	173ton	233ton
		(2) SO _x	11ton	11ton
		(3) Volatile Organic Compounds (VOCs)	N/A	12.6 ton
		(4) Hazardous Air Pollutants (HAPs)	N/A	3.7 ton
Energy Management	RT-CH-130a.1 RR-ST-130a.1	(1) Total energy consumed	50,320,968GJ ¹⁾	53,056,600GJ
		(2) Percentage grid electricity	78%	76.50%
		(3) Percentage renewable	0.30%	0.20%
		(4) Total self-generated energy	46,307GJ	283,781GJ
Water Management	RT-CH-140a.1 RR-ST-140a.1	(1) Total water withdrawn	18,359,667ton	17,513,342ton
		(2) total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress	No high risk of water stress worksites	85,155m ³ , 0.7%
	RT-CH-140a.2	Number of incidents of non-compliance associated with water quality permits, standards, and regulations	No violations	No violations
	RT-CH-140a.3 RR-ST-140a.2	Description of water management risks and discussion of strategies and practices to mitigate those risks	page 36	page 64,65
Hazardous Waste Management	RT-CH-150a.1	Amount of hazardous waste generated	32,657ton	34,503ton
	RR-ST-150a.1	Percentage recycled	43.0%	40.6%
Community Relations	RT-CH-210a.1	Discussion of engagement processes to manage risks and opportunities associated with community interests	page 54-56	page 60,67,89,90
Workforce Health & Safety	RT-CH-320a.1	(1) Total recordable incident rate (TRIR) for (a) direct employees and (b) contract employees	Employees: 0.75/Suppliers: 0.78	Employees: 1.73/Suppliers: 1.87
		(2) fatality rate	0%	0%
	RT-CH-320a.2	Description of efforts to assess, monitor, and reduce exposure of employees and contract workers to long-term (chronic) health risks	page 41	page 29,33
Product Design for Use-phase Efficiency	RT-CH-540a.2	Revenue from products designed for use-phase resource efficiency	page 37-38	page 68,70

1) Data corrected to meet the emission trading system certification amount

SASB Index

Sector : Chemicals

Table 1. Sustainability Disclosure Topics & Accounting Metrics			Hanwha Solutions' Response	
Topic	Code	Accounting Metric	2021	2022
Safety & Environmental Stewardship of Chemicals	RT-CH-410b.1	(1) Percentage of products that contain Globally Harmonized System of Classification and Labeling of Chemicals (GHS) Category 1 and 2Health and Environmental Hazardous Substances	Not applicable	page 63
		(2) Percentage of such products that have undergone a hazard assessment	page 38, 48	100%
	RT-CH-410b.2	(1) Discussion of strategy to manage chemicals of concern	page 37	page 33,63
		(2) Discussion of strategy to develop alternatives with reduced human and/or environmental impact	page 16-23, 37	page 20,22,60,69
Genetically Modified Organisms	RT-CH-410c.1	Percentage of products by revenue that contain genetically modified organisms (GMOs)	Not applicable	Not applicable
Management of the Legal &Regulatory Environment	RT-CH-530a.1	Discussion of corporate positions related to government regulations and/or policy proposals that address environmental and social factors affecting the industry	page 65-66	page 58,59,61
Operational Safety,Emergency Preparedness & Response	RT-CH-540a.1	Process Safety Incidents Count (PSIC)	N/A	0
		Process Safety Total Incident Rate (PSTIR)	N/A	0
		Process Safety Incident Severity Rate (PSISR)	N/A	0
	RT-CH-540a.2	Number of transport incidents	N/A	0

Sector : Solar Technology & Project Developers

Hazardous Waste Management	RR-ST-150a.2	Number and aggregate quantity of reportable spills, quantity recovered	Not applicable	Not applicable
Ecological Impacts ofProject Development	RR-ST-160a.1	Number and duration of project delays related to ecological impacts	Not applicable	Not applicable
	RR-ST-160a.2	Description of efforts in solar energy system project development to address community and ecological impacts	page 19, 21, 55	page 19,23,89,90
Management of Energy Infrastructure Integration & Related Regulations	RR-ST-410a.1	Description of risks associated with integration of solar energy into existing energy infrastructure and discussion of efforts to manage those risks	page 81-83	page 43-46
	RR-ST-410a.2	Description of risks and opportunities associated with energy policy and its impact on the integration of solar energyinto existing energy infrastructure	page 21, 81-83	
Product End-of-life Management	RR-ST-410b.1	Percentage of products sold that are recyclable or reusable	page 38	page 68, 70, 108
	RR-ST-410b.2	Weight of end-of-life material recovered, percentage recycled	No products reaching their life cycle limits	No products reaching their life cycle limits
	RR-ST-410b.3	Percentage of products by revenue that contain IEC 62474 declarable substances, arsenic compounds,antimony compounds, or beryllium compounds	Not applicable	Not applicable
	RR-ST-410b.4	Description of approach and strategies to design products for high-value recycling	page 21-22, 38	page 20,22,66,68,70
Materials Sourcing	RR-ST-440a.1	Description of the management of risks associated with the use of critical materials	page 51, 53	page 23,85
	RR-ST-440a.2	Description of the management of environmental risks associated with the polysilicon supply chain	Not applicable	

Greenhouse Gas Assurance Statement

Introduction

DNV Business Assurance Korea Ltd. (“DNV”) was commissioned by Hanwha Solutions Corporation (“Hanwha Solutions”) to verify the Hanwha Solutions’ Greenhouse Gas Inventory Report for the calendar year 2022 (“the report”) based upon a reasonable level of assurance. Hanwha Solutions is responsible for the preparation of the GHG emissions data on the basis set out within the guidelines on the operation of GHG emission trading scheme (“ETS”) (Notification No. 2022-279 of Ministry of Environment)’. Our responsibility in performing this work is to the management of Hanwha Solutions only and in accordance with terms of reference agreed with them. DNV expressly disclaims any liability or responsibility for any decisions, whether investment or otherwise, based upon this assurance statement.

Scope of Assurance

The GHG emissions data covered by our examination comprise Direct emissions (Scope 1) and Energy indirect emissions (Scope 2) from Hanwha Solutions boundary of the report;

- GHG emissions under verification: GHG emissions from 2022
- Organizational boundary for reporting: Hanwha Solutions Corporation (in Korea)

Verification Approach

The verification has been conducted by DNV on February to March 2023 and performed in accordance with the verification principles and tasks outlined in the guidelines on the operation of GHG ETS (Notification No.2022-279, Korean Ministry of Environment) and the verification guideline for GHG ETS (Notification No. 2021-112, Korean Ministry of Environment). We planned and performed our work to obtain all the information and explanations deemed necessary to provide us with sufficient evidence to provide a reasonable verification opinion concerning the completeness of the emission inventory as well as the reported emission figures in ton CO₂ equivalent. As part of the verification process;

- We have reviewed the GHG emissions report for the calendar year 2022
- We have reviewed and verified the process to generate, aggregate and report the emissions

Conclusions

As a result of the work described above, in our opinion nothing has come to our attention that would cause us to believe that the GHG emissions set out in Hanwha Solutions’ report are not fairly stated. The GHG emissions of Hanwha Solutions for the year 2022 were confirmed as below;

Greenhouse Gas Emissions of Hanwha Solutions Corporation for Year 2022 Unit: ton CO₂eq

Hanwha Solutions	Direct emission (Scope 1)	Energy indirect emissions (Scope 2)	Total emissions
Emissions for the preceding three based on years 4th commitment period	449,442.744	2,185,641.522	2,635,070
Emissions for surrender of emissions permits	390,020.017	2,129,814.078	2,519,821

※ Total emissions = Direct emissions(Scope 1) + Energy indirect emissions(Scope 2)
 ※ In order to report the GHG emissions as an integer, the rounded number on the statement might be different from the number on the system with ± 1 tCO₂-eq



May 2023 Seoul, Korea

Country Manager **Jang-Sub Lee**
DNV Business Assurance Korea Ltd

Greenhouse Gas Assurance Statement

Terms of Engagement

This Assurance Statement has been prepared for Hanwha Solutions Corporation. LRQA was commissioned by Hanwha Solutions Corporation (Hanwha Solutions) to assure its GHG Report for the calendar year 2022 (hereafter referred to as “the Report”). The Report relates to the categories 3, 4 and 5 of indirect GHG emissions. Hanwha Solutions’ geographical boundary includes its own domestic sites and its subsidiaries listed in the annex to this document. The main activities of the organization include manufacturing of petrochemical products and solar modules and the GHG emissions have been consolidated using operational control approach.

Management Responsibility

Hanwha Solutions’ management was responsible for preparing the claim, report and conformity with the ISO 14064-1:2018 and for maintaining effective internal controls over the data and information disclosed. LRQA’s responsibility was to carry out an assurance engagement on the Report in accordance with our contract with Hanwha Solutions. Ultimately, the Report has been approved by, and remains the responsibility of Hanwha Solutions.

LRQA’s Approach

Our verification has been conducted in accordance with ISO 14064-3:2019, ‘Specification with guidance for verification and validation of greenhouse gas statements’ to provide limited assurance that GHG data as presented in the Report have been prepared in conformance with ISO 14064-1:2018, ‘Specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals’. To form our conclusions the assurance engagement was undertaken as a sampling exercise and covered the following activities:

- visited the headquarters of Hanwha Solutions and reviewed processes related to the control of GHG emissions data and records;
- interviewed relevant staff of the organization responsible for managing GHG emissions data and records; and
- verified historical GHG emissions data and records at an aggregated level for the calendar year 2022.

Level of Assurance & Materiality

In accordance with our contract agreement, the assurance was conducted at a limited level of assurance at a materiality of 5% for Categories 3, 4 and 5. The opinion expressed in this Assurance Statement has been accordingly formed.

LRQA’s Opinion

Based on LRQA’s approach nothing has come to our attention that would cause us to believe that the GHG emissions for Categories 3, 4 and 5 disclosed in the Report as summarized in Table 1 below are not materially correct and that the Report has not been prepared in conformance with ISO 14064-1:2018.

Dated: 2 May 2023



Byung-Gil Lim
LRQA Lead Verifier
On behalf of LRQA
2nd Floor, T Tower, 30, Sowol-ro 2-gil, Jung-gu,
Seoul, Republic of Korea

LRQA reference number: SEO00001263

Greenhouse Gas Assurance Statement

Table 1. Summary of Hanwha Solutions, GHG Report 2022

Scope of GHG emissions	Tonnes CO ₂ e	
	Hanwha Solutions' own domestic sites and its subsidiaries	Hanwha Solutions' own domestic sites
Category 3 – Indirect GHG emissions from transportation		
· Upstream transportation – transportation of products purchased in domestic sites.	51,261	51,261
· Business travel – personal cars, buses, trains, domestic and international flights.	3,884	3,884
· Employee commuting – commuting by personal cars, buses and subway in domestic sites.	9,245	9,245
· Downstream transportation - transportation of products sold in domestic sites.	121,180	121,180
Category 4 – Indirect GHG emissions from products used by organization		
· Purchased goods and services - production of products purchased in domestic and overseas sites.	5,280,617	4,722,281
· Capital goods – production of electronic devices and home appliances purchased in domestic sites.	181	181
· Fuel and energy related activities - upstream emissions of fuel and electricity purchased in domestic and overseas sites.	293,566	165,005
· Waste generated in operations – treatment of waste generated from operations in domestic sites.	13,718	13,718
Category 5 – Indirect GHG emissions associated with the use of products from the organization		
· End of life treatment of sold products – treatment of packaging materials for sold products in domestic sites.	3,165	3,165
· Downstream leased assets – operation of buildings leased by Hanwha Solutions.	92	92
· Investments - emissions from category 1 and 2 of affiliated companies and joint ventures which Hanwha Solutions invests but doesn't have operational control over and the subsidiaries invested by Hanwha Solutions that are not included in categories 3–5.	1,834,733	1,834,733
Notes: 1. Our work excludes verification of Category 1 and 2 emissions in accordance with our contract with Hanwha Solutions. 2. Category 1 and 2 emissions for Hanwha Solutions have been verified using an operational control approach for the same reporting period by DNV Business Assurance Korea in accordance with the guidelines on emission reporting and certification under the GHG emissions trading system.		

List of subsidiaries included in the organizational boundar

No.	Subsidiaries
1	Hanwha Compound Co., Ltd.
2	Hanwha Chemical (Thailand) Co., Ltd.
3	Hanwha Chemical (Ningbo) Co., Ltd.
4	Hanwha Cimarron LLC
5	Hanwha Advanced Materials America LLC
6	Hanwha Advanced Materials Beijing Co., Ltd.
7	Hanwha Advanced Materials Chongqing Co., Ltd.
8	Hanwha Advanced Materials Europe, s.r.o.
9	Hanwha Advanced Materials Mexico S. De R.L. De C.V.
10	Hanwha Advanced Materials Shanghai Co., Ltd.
11	Hanwha AZDEL, Inc.
12	Hanwha Q CELLS (Qidong) Co., Ltd.
13	Hanwha Q CELLS USA, INC.
14	Hanwha Q CELLS Malaysia Sdn. Bhd.
15	Hanwha Q CELLS GmbH

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Third-Party Assurance Statement

To readers of Hanwha Solutions Sustainability Report 2023

Introduction

Korea Management Registrar inc. (KMR) was commissioned by Hanwha Solutions to conduct an independent assurance of its Sustainability Report 2023 (the “Report”). The data and its presentation in the Report is the sole responsibility of the management of Hanwha Solutions. KMR’s responsibility is to perform an assurance engagement as agreed upon in our agreement with Hanwha Solutions and issue an assurance statement.

Scope and Standards

Hanwha Solutions described its sustainability performance and activities in the Report. Our Assurance Team carried out an assurance engagement in accordance with the AA1000AS v3 and KMR’s assurance standard SRV1000. We are providing a Type 2, moderate level assurance. We evaluated the adherence to the AA1000AP (2018) principles of inclusivity, materiality, responsiveness and impact, and the reliability of the information and data provided using the Global Reporting Initiative (GRI) Index provided below. The opinion expressed in the Assurance Statement has been formed at the materiality of the professional judgment of our Assurance T

Confirmation that the Report was prepared in accordance with the GRI standards 2021 was included in the scope of the assurance. We have reviewed the topic-specific disclosures of standards which were identified in the materiality assessment process

- GRI Sustainability Reporting Standards 2021
- Universal standards
- Material Topic standards
 - GRI 205 : Anti-corruption
 - GRI 302 : Energy
 - GRI 305 : Emissions
 - GRI 401 : Employment
 - GRI 403 : Occupational Health and Safety

As for the reporting boundary, the engagement excludes the data and information of Hanwha Solutions’ partners, suppliers and any third parties.

KMR’s Approach

To perform an assurance engagement within an agreed scope of assessment using the standards outlined above, our Assurance Team undertook the following activities as part of the engagement:

- reviewed the overall Report;
- reviewed materiality assessment methodology and the assessment report;
- evaluated sustainability strategies, performance data management system, and processes;
- interviewed people in charge of preparing the Report;
- reviewed the reliability of the Report’s performance data and conducted data sampling;
- assessed the reliability of information using independent external sources such as Financial Supervisory Service’s DART and public databases.

Limitations and Recommendations

KMR’s assurance engagement is based on the assumption that the data and information provided by Hanwha Solutions to us as part of our review are provided in good faith. Limited depth of evidence gathering including inquiry and analytical procedures and limited sampling at lower levels in the organization were applied. To address this, we referred to independent external sources such as DART and National Greenhouse Gas Management System (NGMS) and public databases to challenge the quality and reliability of the information provided.

Third-Party Assurance Statement

Conclusion and Opinion

Based on the document reviews and interviews, we had several discussions with Hanwha Solutions on the revision of the Report. We reviewed the Report's final version in order to make sure that our recommendations for improvement and revision have been reflected. Based on the work performed, it is our opinion that the Report applied the GRI Standards 2021. Nothing comes to our attention to suggest that the Report was not prepared in accordance with the AA1000AP (2018) principles.

Inclusivity

Hanwha Solutions has developed and maintained different stakeholder communication channels at all levels to announce and fulfill its responsibilities to the stakeholders. Nothing comes to our attention to suggest that there is a key stakeholder group left out in the process. The organization makes efforts to properly reflect opinions and expectations into its strategies.

Materiality

Hanwha Solutions has a unique materiality assessment process to decide the impact of issues identified on its sustainability performance. We have not found any material topics left out in the process.

Responsiveness

Hanwha Solutions prioritized material issues to provide a comprehensive, balanced report of performance, responses, and future plans regarding them. We did not find anything to suggest that data and information disclosed in the Report do not give a fair representation of Hanwha Solutions' actions.

Impact

Hanwha Solutions identifies and monitors the direct and indirect impacts of material topics found through the materiality assessment, and quantifies such impacts as much as possible.

Reliability of Specific Sustainability Performance Information

In addition to the adherence to AA1000AP (2018) principles, we have assessed the reliability of economic, environmental, and social performance data related to sustainability performance. We interviewed the in-charge persons and reviewed information on a sampling basis and supporting documents as well as external sources and public databases to confirm that the disclosed data is reliable. Any intentional error or misstatement is not noted from the data and information disclosed in the Report.

Competence and Independence

KMR maintains a comprehensive system of quality control including documented policies and procedures in accordance with ISO/IEC 17021:2015 – Requirements for bodies providing audit and certification of management systems. This engagement was carried out by an independent team of sustainability assurance professionals. KMR has no other contract with Hanwha Solutions and did not provide any services to Hanwha Solutions that could compromise the independence of our work.



May 2023 Seoul, Korea



CEO *E. J. Hwang*



Awards and Memberships

Awards (January 2022 – June 2023)

Division	Award	Organization
The Company	Carbon Management Sector Honors for the Carbon Disclosure Project (CDP)	CDP Korea
	The 59th Trade Day Ceremony 2 Billion Dollar Export Tower Award	South Korean Ministry of Trade, Industry and Energy
	3rd National Park Day Chairman's Appreciation Plaque	Korea National Park Service
Chemical	IR52 Jang Young-Sil Award	Maeil Business Newspaper Korea Industrial Technology Association (KOITA)
	2022 World-Class Product Selection Company Certificate Award Ceremony Won 3 world-class product certificates	South Korean Ministry of Trade, Industry and Energy
	2022 Labor-Management Culture and Merit Government Award Industrial Packaging Award	Ministry of Employment and Labor
Qcells	2023 Solar Top Brand PV for the 10th consecutive year in Europe for the 2nd consecutive year in the U.S.	EUPD Research
	2023 PV Module Reliability Scorecard Top Performer for the 8th consecutive year	PVEL
	Selected as the Global Best Company in the 2022 Korea Consumer Awards for the 5th consecutive year	Korea National Council of Consumer Organizations
	1st place in the photovoltaic category of the 2022 German Life and Living Awards 2022 for the 3rd consecutive year	Das Deutsche Institut für Service-Qualität (DISQ)n-tv

Memberships

Construction Guarantee	Construction Association of Korea	Korea Chamber of Commerce and Industry
Korea Electric Association	Korea Housing Construction Association	Korea Developer Association
Hydrogen Convergence Alliance (H2KOREA)	The Korean Society for New and Renewable Energy	Energy Transition Forum Korea
The Korean Society for Energy	The Federation of Korea Industries	Electric Contractors' Financial Cooperative
Korea Emissions Market Association	Korea Photovoltaic Society	Korea Economic Research Institute
The Korean Solar Energy Society	Korea Construction Engineers Association	Korea International Trade Association
Korea Golf Course Business Association (Gangwon Local Council)	Korea Fair Competition Federation	Korea Industrial Technology Association (KOITA)
Korea Vinyl Environmental Council	Korea Department Store Association	The Korean Society for New and Renewable Energy
Korea Listed Companies Association	Korea Petrochemical Industry Association	Korea Electric Engineers Association
The Korean Society of Safety	Korea Electrical Contractors Association	Korea Plastic Industry Cooperative
Korea Chlor Alkali Industry Association	Korea Photovoltaic Society	International Isocyanate Institute
Korea Chemical Industry Council	Korea Smart Grid Association	Korea Fire Facility Association
Fire Industry Guarantee Union	Korea Business Council for Sustainable Development	The American Chamber of Commerce in Korea
Korea-US Economic Council		

