HD HYUNDAI XITESOLUTION

TCFD REPORT 2022

Task Force on Climate-related Financial Disclosures Report

ABOUT THIS REPORT

OVERVIEW

Companies confront new challenges and opportunities in response to climate change, changes in laws and regulations, and the reinforcement of social responsibility. HD HYUNDAI Construction Machinery Sector(HD HYUNDAI XITESOLUTION, HD HYUNDAI INFRACORE, HD HYUNDAI CONSTRUCTION EQUIPMENT) believe that identifying the financial implications stemming from risks and opportunities associated with climate change and transparently disclosing climate-related mitigation strategies contribute significantly to the transition towards a carbon-neutral society by facilitating informed decision-making among relevant stakeholders.

In light of this, we constructed this report in accordance with the TCFD (Task Force on Climate-related Financial Disclosures) guidelines, thereby elevating the level of information disclosure pertaining to climate change. This report comprehensively encompasses our commitment and efforts concerning climate-related response initiatives.

The report diligently adheres to the TCFD recommendations framework and encompasses a detailed account of HD HYUNDAI Construction Machinery Sector's net zero objectives and strategies. The activities, events, and phenomena predicted within this report are based on anticipatory information regarding planned activities and financial performance at the time of report authorship, predicated upon various assumptions pertaining to future business environments. While we have meticulously formulated plans and assumptions based on meticulous analysis of external circumstances and internal strategies, it is essential to acknowledge the possibility of fluctuating outcomes resulting from changes in the surrounding environment. Additionally, this report incorporates potential risks, uncertainties, and other factors that may give rise to significant disparities between projected and actual results, to be taken into consideration as a point of reference.

REPORTING SCOPE

HD HYUNDAI XITESOLUTION : Korean worksites
HD HYUNDAI INFRACORE: Korean and overseas worksites
HD HYUNDAI CONSTRUCTION EQUIPMENT: Korean and overseas worksites

PUBLICATION DATE

July 2023

REPORT INQUIRIES

• HD HYUNDAI XITESOLUTION ESG Team hg.esg@hyundai-genuine.com
• HD HYUNDAI INFRACORE ESG/Shared Growth Team hdi.esg@hyundai-di.com
• HD HYUNDAI CONSTRUCTION EQUIPMENT ESG Business Ennovation Team sustainability@hyundai-ce.com

INTERACTIVE GUIDE

The 2022 HD HYUNDAI XITESOLUTION TCFD report has been designed as an Interactive PDF to enhance reader convenience and provide various information. Through the Interactive PDF, readers can easily navigate between desired pages and access additional information through features such as direct links to related web pages.

Go to Cover Page
Go to Table of Contents
Return
Go to Previous Page
Go to Next Page

CONTENTS

CEO MESSAGE

By integrating our climate change response strategy within our overall business strategy, we not only commit to taking our part in resolving the climate crisis but also to create a sustainable competitive edge.

We express our heartfelt gratitude to our customers and stakeholders who continue to trust and support HD HYUNDAI Construction Machinery Sector.

As a global leader in various business sectors, including construction machinery, engines, industrial vehicles, and hydraulic parts, HD HYUNDAI Construction Machinery Sector, with HD HYUNDAI XITESOLUTION at its core with its subsidiaries HD HYUNDAI CONSTRUCTION EQUIPMENT and HD HYUNDAI INFRACORE, has firmly established itself as a leading global company.

As a responsible global corporate citizen, HD HYUNDAI Construction Machinery Sector deeply empathizes with the global climate crisis and strives to generate sustainable value through continuous innovation.

As part of our efforts, we have declared the achievement of 'Net zero' across all domestic and international worksites by 2050. Furthermore, we have set a goal to reduce carbon emissions during the product use phase (based on one year of use) by 25% by 2040 and have formulated various implementation plans to achieve this goal.

With the publication of our first Task Force on Climate-related Financial Disclosures (TCFD) report, we have further solidified our commitment to realizing a sustainable future. Our commitments are as follows:

First, we will restructure our business portfolio with a focus on environmentally friendly solutions such as hydrogen engines and electrification, leading the next generation of the construction machinery market.

Second, we will actively participate in resolving the global climate crisis by achieving net zero at our worksites by 2050.

Third, we will lead the development of people-centric technologies by combining unmanned construction machinery and digital site management solutions, enhancing industrial productivity, economic efficiency, and safety.

Fourth, we will strengthen communication with stakeholders to actively share our climate change response journey.

This TCFD report introduces HD HYUNDAI Construction Machinery Sector's climate-related response strategies and transparently presents key indicators and targets. We strive to accelerate greenhouse gas reduction synergies for a sustainable future and contribute to the transition to a carbon-neutral society. We kindly request your continued interest and support.

Thank you.

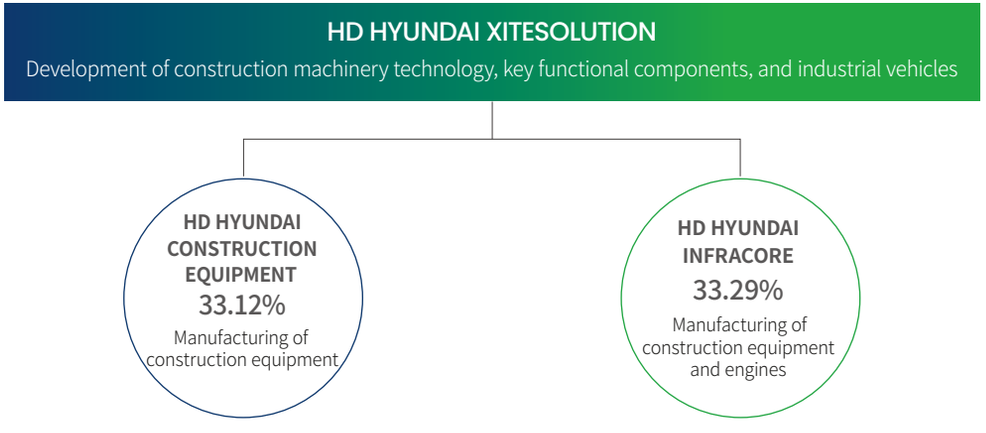
CEO **Young Cheul Cho, Dong Wook Lee**

COMPANY OVERVIEW

Introduction to HD HYUNDAI Construction Machinery Sector

The HD HYUNDAI Construction Machinery Sector consists of its subsidiary, HD HYUNDAI XITESOLUTION, which serves as an intermediate holding company, as well as HD HYUNDAI CONSTRUCTION EQUIPMENT and HD HYUNDAI INFRACORE as affiliated companies. The Construction Machinery Sector has established a product portfolio encompassing excavators and loaders, special equipment, and industrial vehicles. It also engages in the engine, parts and services, and solutions businesses that support these products. HD HYUNDAI XITESOLUTION oversees the development of solutions and technologies required for construction machinery. It standardizes components necessary for various construction equipment and enhances operational efficiency through integrated procurement. On the other hand, HD HYUNDAI INFRACORE and HD HYUNDAI CONSTRUCTION EQUIPMENT have established complementary product lineups and optimize global production and distribution systems tailored to diverse market environments in a global setting, thereby improving operational efficiency.

Ownership Structure of HD HYUNDAI Construction Machinery Sector



Financial Performance

(Unit: Million KRW)

Category	Sales	Operating Profit
HD HYUNDAI XITESOLUTION	768,682	33,379
HD HYUNDAI INFRACORE	4,756,114	332,547
HD HYUNDAI CONSTRUCTION EQUIPMENT	3,515,612	170,610

* HD HYUNDAI XITESOLUTION includes the financial performance of Sangju Hydraulic Corporation
* HD HYUNDAI INFRACORE and HD HYUNDAI CONSTRUCTION EQUIPMENT are based on consolidated financial statements

HD HYUNDAI VALUE SYSTEM

Mission

We bring the future closer to humanity by steering innovation and defying our limits

Core Values

Innovation to lead

- Transform the way we work with creative mindset.
- Shape the future of our industry through innovative and disruptive technology.

Challenge without fear

- Challenge ourselves relentlessly to create new values.
- Foster a culture of challenging without fear by embracing failure.

Care with respect

- Respect diversity and encourage open communication.
- Care for our people's personal and professional growth.
- Make a better world by upholding social responsiblity.

Safety for us and for all

- Pursue the highest safety standards for our people and workplace.
- Contribute to the safety of customers, society and humanity with our products and services.

HD HYUNDAI XITESOLUTION

HD HYUNDAI XITESOLUTION was established in February 2021 with the objective to create a synergy effect among the subsidiaries of HD Hyundai Construction Machinery Sector and to advance toward its goal of becoming a comprehensive solution provider for the construction, industrial, and logistics sites. In March 2023, it underwent a name change from HYUNDAI GENUINE to HD HYUNDAI XITESOLUTION. As a distinguished business entity, HD HYUNDAI XITESOLUTION assumes the pivotal role of overseeing the research and development, sustainable procurement, and sales activities of the HD HYUNDAI Construction Machinery Sector. Furthermore, it engages in the autonomous operation of the industrial vehicles and construction machinery functional component business, solidifying its position as a business holding company. By virtue of its role, HD HYUNDAI XITESOLUTION assumes paramount importance in driving the development and production of core components for its subsidiary companies, namely HD HYUNDAI CONSTRUCTION EQUIPMENT and HD HYUNDAI INFRACORE. Simultaneously, it fortifies its capacity to provide optimized solutions that generate synergies across various domains, including development, sales, procurement, and international operations.

Key Roles

Solutions and Advanced Technology Development

HD HYUNDAI XITESOLUTION is dedicated to enhancing its capabilities in developing advanced technologies and solutions for the Construction Machinery Sector, leveraging ICT-based automation and environmentally friendly solutions. In conjunction, HD HYUNDAI INFRACORE and HD HYUNDAI CONSTRUCTION EQUIPMENT oversee product technology development, production, and sales.

Integration and Localization of Core Components

HD HYUNDAI XITESOLUTION plays a pivotal role in producing functional and core components for various construction equipment and industrial vehicles. Furthermore, it generates synergies by integrating the procurement of key components, thus increasing operational efficiency within the Construction Machinery Sector.

Production and Sales of Industrial Vehicles

HD HYUNDAI XITESOLUTION engages in the production and sales of industrial vehicles such as forklifts and skid loaders. It also establishes a product portfolio that complements HD HYUNDAI INFRACORE and HD HYUNDAI CONSTRUCTION EQUIPMENT, ensuring a comprehensive range of products that cater to diverse demands in the construction machinery sector. Overall, HD HYUNDAI Construction Machinery Sector offers a wide portfolio of construction equipment and focuses on specialized industrial vehicles, creating a synergy effect that meets the varied demands of the construction equipment market.

HD HYUNDAI INFRACORE

Powered by **Innovation**

"We create infinite business opportunities based on ceaseless innovation."

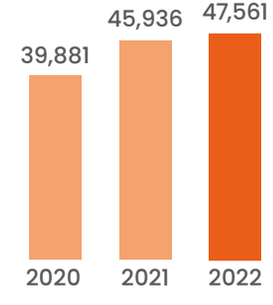
HD HYUNDAI INFRACORE, established in 1937, has built an unparalleled position in various business sectors through continuous growth, such as construction machinery, engines, attachments, and utility equipment. It is recognized as the leading construction machinery company in Korea. In 2021, it was incorporated into HD HYUNDAI Construction Machinery Sector, and in 2023, it was renamed to HD HYUNDAI INFRACORE. The core businesses of HD HYUNDAI INFRACORE include construction machinery and engine operations. The Construction Machinery business possesses a comprehensive lineup encompassing excavators, wheel loaders, and articulated dump trucks, securing production, sales, and distribution networks worldwide. The Engine Division provides a full line-up of high-quality, high-specification engines that comply with increasingly stringent environmental regulations, offering a total solution.

Company Overview Based on business report

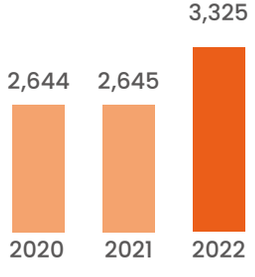
CEO	Young Cheul Cho, Seung Hyun Oh
Business overview	Excavators & loaders, engines, generators, and A/S parts
Number of employees	2,815
Business locations	Production facilities (Korea (Incheon, Gunsan), China, Norway)
Production capacity	Over 30,000 units of construction machinery, and 150,000 units of engines annually

Financial Performance (Unit: 100 million KRW) 2020 2021 2022

Sales revenue



Operating profit



HD HYUNDAI CONSTRUCTION EQUIPMENT

building a comfortable tomorrow

"We are the foundation of a more comfortable tomorrow for everyone."

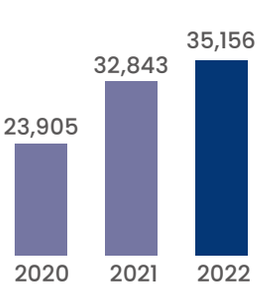
HD HYUNDAI CONSTRUCTION EQUIPMENT, a comprehensive specialist in construction machinery, began its journey in 1985 as the mid-sized machinery division of Hyundai Heavy Industries. In 2017, it was established as a separate entity through a personnel division from the HD HYUNDAI Group, and in 2023, its name was changed to HD HYUNDAI CONSTRUCTION EQUIPMENT. The main business consists of construction special equipment, parts, and services. The company strives to achieve the highest level of construction equipment development, focusing on product advancement. In the field of environmentally friendly products, HD HYUNDAI CONSTRUCTION EQUIPMENT is dedicated to the development of electric and hydrogen-powered products. Starting with the upcoming mass production of a 1.9-ton electric mini excavator in 2024, the company is committed to advancing the development of electric and hydrogen-powered solutions.

Company Overview Based on business report

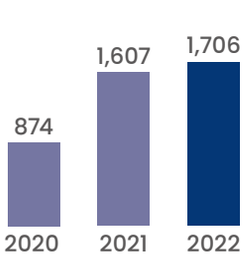
CEO	Cheol Gon Choi
Business overview	Excavators & loaders, engines, generators, and A/S parts
Number of employees	1,357
Business locations	Production facilities (Korea (Ulsan)), China, India, Brazil)
Production capacity	Over 50,000 units of construction equipment annually

Financial Performance (Unit: 100 million KRW) 2020 2021 2022

Sales revenue



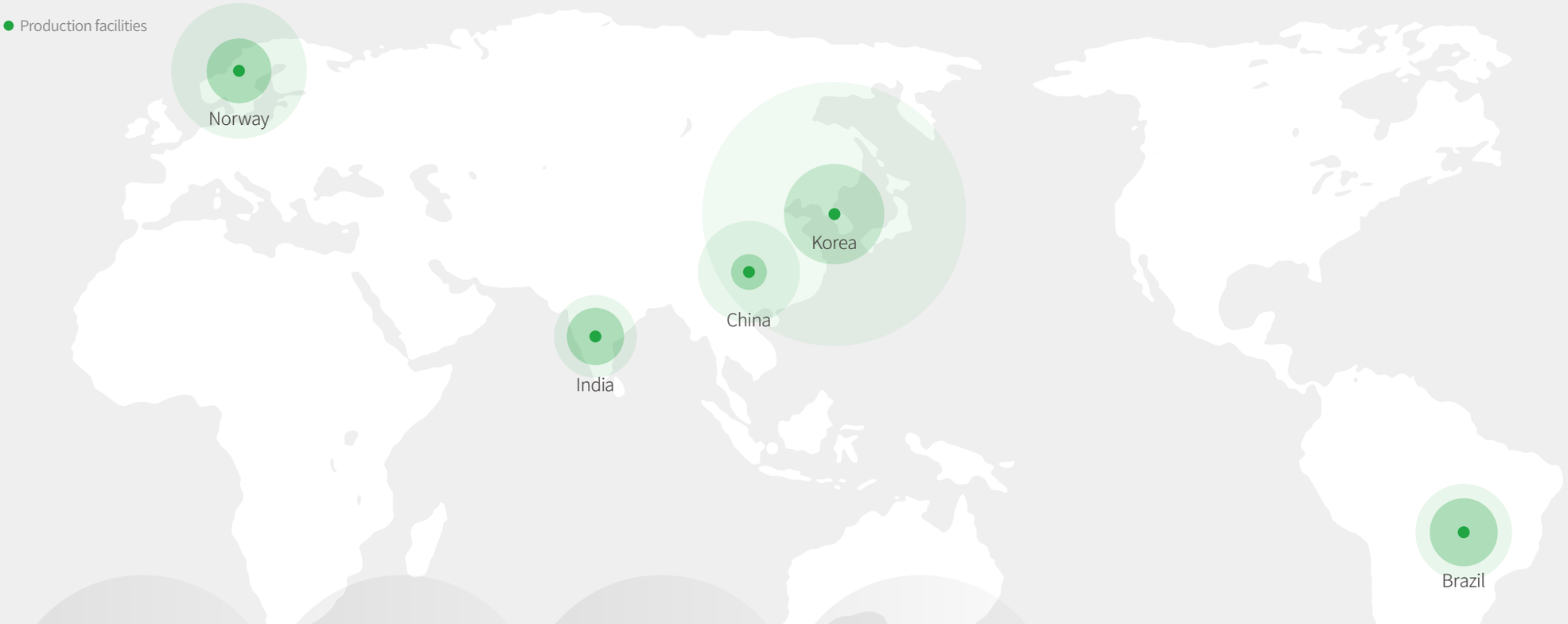
Operating profit



Global Network

HD HYUNDAI Construction Machinery Sector has established a global dealer network in over 140 countries and has been recognized for its excellence in the global market by supplying high-quality products through production facilities in Europe, China, India and Brazil. In addition to domestic-focused production, the sector is strengthening its global flexible production[1)] hubs, maximizing global production efficiency by standardizing manufacturing technologies and operational systems across each factory.

1) Flexible production: The concept of producing products in overseas factories with the same appearance, performance, and quality as those produced at the headquarters.



Overall production capacity of construction equipment

95,840 units annually

HD HYUNDAI XITESOLUTION

Production facilities

2 countries

(Korea, China)

HD HYUNDAI CONSTRUCTION EQUIPMENT

Production facilities

4 countries

(Korea, China, India, Brazil)

HD HYUNDAI INFRACORE

Production facilities

3 countries

(Korea, China, Norway)

Our Journey for Climate Action

2022

HD HYUNDAI XITESOLUTION
HD HYUNDAI INFRACORE
HD HYUNDAI CONSTRUCTION EQUIPMENT

The construction machinery sector aim to achieve net zero across all their worksites by 2050.

Establishments of targets to reduce the carbon emissions in the use phase

HD HYUNDAI INFRACORE

The business site in Gunsan, South Korea, has entered a power purchase agreement (PPA)

HD HYUNDAI CONSTRUCTION EQUIPMENT

MOU with a robust small China subsidiary on solar power generation

MOU with an Indian subsidiary on solar power generation on unused land

2025

HD HYUNDAI CONSTRUCTION EQUIPMENT

The worksites in Korea to achieve RE100

2030

HD HYUNDAI CONSTRUCTION EQUIPMENT

The worksites in Korea to achieve net zero

HD HYUNDAI XITESOLUTION
HD HYUNDAI INFRACORE
HD HYUNDAI CONSTRUCTION EQUIPMENT

The greenhouse gas emissions from worksites are to be reduced by 42% compared to 2021(Scope 1, 2)

The carbon emissions during the product use phase are to be reduced by 12.3% compared to 2021

The target is to achieve an 83% sales share of green product portfolios

2035

HD HYUNDAI INFRACORE

The overseas worksites to achieve RE100

2040

HD HYUNDAI XITESOLUTION
HD HYUNDAI INFRACORE
HD HYUNDAI CONSTRUCTION EQUIPMENT

The worksites in Korea and overseas to achieve RE100

HD HYUNDAI XITESOLUTION
HD HYUNDAI INFRACORE
HD HYUNDAI CONSTRUCTION EQUIPMENT

The greenhouse gas emissions from worksites are to be reduced by 71% compared to 2021(Scope 1, 2)

The carbon emissions during the product use phase are to be reduced by 25% compared to 2021

The target is to achieve a 95% sales share of environmentally friendly product portfolios

2045

HD HYUNDAI CONSTRUCTION EQUIPMENT

The overseas worksites to achieve RE100

2050

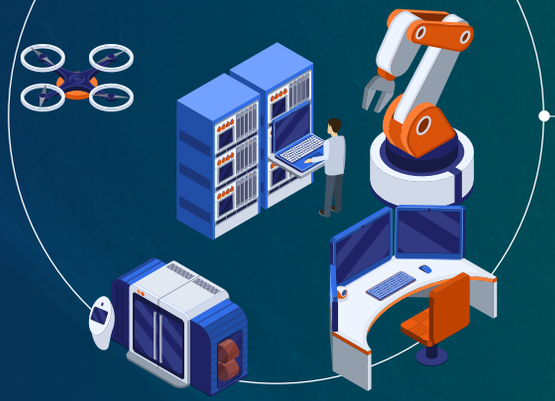
HD HYUNDAI XITESOLUTION
HD HYUNDAI INFRACORE
HD HYUNDAI CONSTRUCTION EQUIPMENT

To achieve net zero across all worksites of the three construction machinery companies by 2050

OUR 2050 FUTURE

HD HYUNDAI Construction Machinery Sector is transforming from an industrial hardware manufacturer to an environmentally friendly and advanced digital technology-based provider of construction machinery and industrial solutions. We are committed to actively participating in addressing the global climate crisis through continuous challenges and innovations, and we strive to create sustainable value and maintain a competitive edge.

Digital & Unmanned Solutions



- Led the efficiency of construction sites by combining digital site management solutions with unmanned construction machinery
- Strengthening equipment durability and supporting user operational efficiency through analysis of equipment use patterns using big data

Environmentally Friendly Products

- Development of eco-friendly technologies and products
  - Electric excavators, hydrogen excavators
  - Battery packs
  - Hydrogen combustion engines

Establishment of a Global Carbon-neutral Production System

- Transitioning to renewable energy sources
- Replacing outdated equipment with the latest facilities
- Improving energy efficiency through restructuring manufacturing processes
- Supporting the installation of solar panels on partner company roofs
- Establishing an integrated energy and greenhouse gas data management system for monitoring

Introduction

Understanding TCFD recommendations

What are TCFD recommendations?

The Task Force on Climate-related Financial Disclosures (TCFD) is an esteemed consortium that endeavors to furnish standardized climate-related information to esteemed investors and diverse stakeholders. Its primary objective is to ensure that organizations effectively incorporate climate-related risks and opportunities into their esteemed risk management frameworks and informed decision-making processes. The TCFD recommendations are comprehensively structured into four pivotal thematic areas: governance, strategy, risk management, and metrics and targets, all focused on climate-related financial impacts.

Why is it of utmost significance?

The paramount importance of TCFD emanates from its profound capacity to identify and meticulously assess the inherent risks and untapped opportunities associated with the dynamic realm of climate-related matters for discerning enterprises. TCFD empowers businesses to evaluate the financial implications, enabling them to integrate these vital considerations into their esteemed management activities seamlessly and well-informed investment decision-making processes. Furthermore, TCFD facilitates proactive mitigation of climate-related risks and propitious transformation of challenges into unprecedented prospects, ultimately fostering heightened competitiveness and sustainable growth. The global recognition and widespread adoption of TCFD recommendations have impelled a sweeping movement toward bolstering climate-related information disclosure, embracing enhanced transparency, and even advocating for mandatory compliance worldwide. Consequently, investment decisions grounded in the TCFD recommendations continue to gain substantial momentum.

Governance
The organization's governance around climate-related risks and opportunities

Strategy
The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning

Risk Management
The processes used by the organization to identify, assess, and manage climate-related risks

Metrics and Targets
The metrics and targets used to assess and manage relevant climate-related risks and opportunities

GOVERNANCE

Board of Directors Oversight

HD HYUNDAI Construction Machinery Sector has established an ESG Committee under the purview of the Board of Directors to oversee key climate-related risks and opportunities. The ESG Committee holds the responsibility and authority to approve the company's climate change strategies and plans. HD HYUNDAI INFRACORE and HD HYUNDAI CONSTRUCTION EQUIPMENT each have their own ESG Committees, which receive reports on ESG matters, including climate change issues. After thorough review and discussion, the ESG Committees make final decisions on the discussed issues and policies. The ESG Committees convene at least once annually, with additional ad hoc meetings scheduled as needed. HD HYUNDAI XITESOLUTION oversees the ESG Committees of each subsidiary as well as the Product & Technology Strategy Committee, reporting key climate and environmentally friendly technology/product-related matters to the HD HYUNDAI ESG Committee.

Roles and Responsibilities of Management

HD HYUNDAI Construction Machinery Sector has established and operates an ESG Management Committee, with the CEO serving as the chairman. The ESG Management Committee holds quarterly meetings, with the active participation of key management members under the leadership of the CEO. The committee is responsible for selecting and implementing climate-related strategies and tasks, such as net zero strategies and RE100 initiatives. The results of the ESG Management Committee's activities are reported to the CEO of HD HYUNDAI XITESOLUTION for review and oversight.

Furthermore, the Product Strategy Committee and Technology Strategy Committee are established to review and approve medium- to long-term strategies for environmentally friendly technology and product development. The Product Strategy Committee and Technology Strategy Committee, with the participation of executives from all three companies within the HD HYUNDAI Construction Machinery Sector, hold annual meetings as a principle. They discuss matters related to environmentally friendly products and technology development, aiming to enhance synergy and collaboration among the three companies. HD HYUNDAI XITESOLUTION oversees the respective divisions for technology development within each company and reports on key matters regarding technology development and strategies to the boards of HD HYUNDAI INFRACORE and HD HYUNDAI CONSTRUCTION EQUIPMENT.

Governance Related to Climate Change

Board of Directors

Group ESG Committee

Board of Directors (HD HYUNDAI INFRACORE, HD HYUNDAI CONSTRUCTION EQUIPMENT)

ESG Committee

Composition
- Outside directors and CEO

Frequency
- Annual meetings (Additional meetings held as necessary)

Purpose and Roles
- Deliberation and decision-making on climate change response strategies and ESG promotion strategies and plans
- Managing key climate-related risks and opportunities

Management Council

ESG Management Committee

Composition
- CEO, key HQ/Division heads

Purpose and Roles
- Selecting climate and ESG strategic initiatives
- Monitoring the implementation of climate and ESG strategic initiatives (including reduction plans for climate change response, external ESG assessment compliance, and external information disclosure)

Frequency
- Quarterly meetings (Additional meetings held as necessary)

Product & Technology Strategy Committee

Composition
- CEOs of the three companies in the Construction Machinery Sector, key executives responsible for product and technology development

Purpose and Roles
- Approving product/technology portfolio and roadmap
- Formulating strategies for developing environmentally friendly products in response to net zero
- Developing integrated product/new technology strategies, digital technology development strategies, etc.

Frequency
- Annual meetings

Working Council

ESG Team
- Formulating climate and ESG strategic initiatives and collaboration with relevant departments
- Management and decision support for climate and ESG performance
- Stakeholder communication and response to ESG assessments

Environmental Division
- Managing corporate greenhouse gas emissions and energy

Product/Technology
- Managing environmentally friendly products and sales portfolio

Remuneration of Management

HD HYUNDAI Construction Machinery Sector sets the performance evaluation of the CEO and related executives, as well as the key performance indicators (KPIs) related to climate change response, at 5-20%. The KPIs are linked to the performance bonuses of the CEO, key executives, and relevant employees. Key performance indicators are established to evaluate performance related to significant roles, such as energy consumption, greenhouse gas emissions, revenue from environmentally friendly products, and developing environmentally friendly production technologies.

ESG Committee Agenda on Climate-related Matters

Division	Timeline	Key Content	Participation
HD HYUNDAI INFRACORE	1st quarter of 2022	[Approval] Reporting and approval of major ESG initiatives for 2022	100%
	4th quarter of 2022	[Reporting] Reporting of results from ESG initiatives in 2022	100%
	3rd quarter of 2022	[Approval] Approval of 2040 RE100 and carbon emissions management plan	100%
HD HYUNDAI CONSTRUCTION EQUIPMENT	3rd quarter of 2022	[Reporting] Reporting on climate change response strategy [Reporting] Reporting on ESG performance and publication of integrated reports	100%
	4th quarter of 2022	[Approval] Approval of the ESG plan for 2023 [Approval] Reporting on ESG performance in 2022	100%
	1st quarter of 2023	[Reporting] Reporting on the results of ESG materiality assessment	100%

Roles and Responsibilities of ESG Working Group

HD HYUNDAI Construction Machinery Sector, with the ESG team at its core, collaborates with its global business units to develop ESG implementation plans that encompass climate change and manages ESG improvement initiatives. In the environmental sector, it carries out tasks such as transitioning business units to RE100, monitoring overall energy use, and other related activities. In the product/technology sector, it conducts practical work such as predicting market trends for environmentally friendly equipment and formulating product sales plans considering market changes and progress in technology development. The implementation performance and key issues are reported to the ESG Committee, and there is an organic collaboration among departments to ensure effective cooperation.

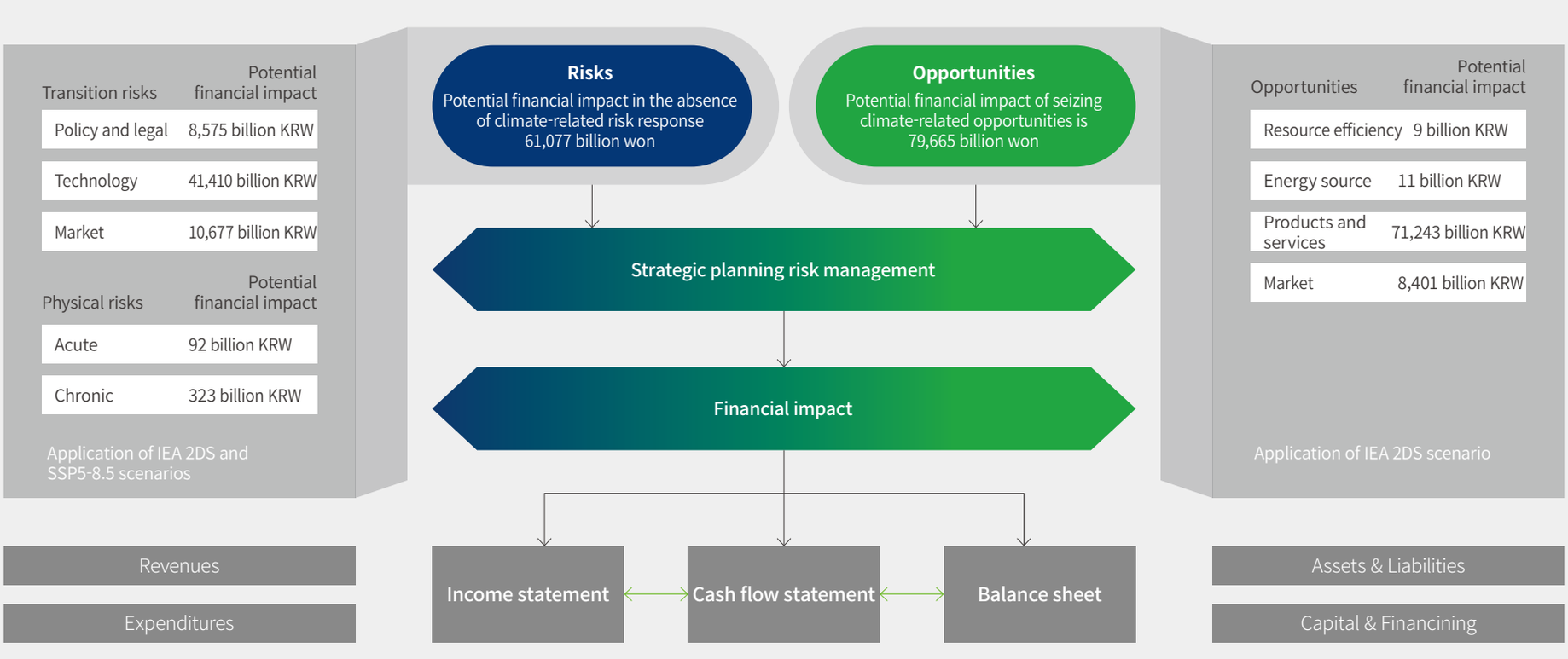
Key Agenda of the ESG Committee in HD HYUNDAI Construction Machinery Sector

- Expansion of low-carbon and alternative fuel products
- Acquisition of emerging electric vehicle technologies
- Development plans and performance management for future power equipment (hybrid powertrains, battery packs, etc.)
- Management of clean technology initiatives
- Promotion of RE100 pilot projects and management toward achieving net zero by 2050
- Long-term capital procurement through environmentally friendly projects
- Identification and expansion of greenhouse gas reduction activities at business sites
- Establishment of scope 3 management system and reduction activities
- Management of environmentally friendly revenue and investment expenditure

STRATEGY

Climate-related Risks and Opportunities

HD HYUNDAI Construction Machinery Sector has identified risks and opportunities associated with climate change through document analysis, peer analysis, and analysis of global initiatives. For the risk and opportunity factors with a high likelihood of occurrence and significant impact on revenue, the company has conducted a 10-year scenario analysis (until 2032) on potential financial impacts. The scenario analysis focused on transition risk and opportunity factors associated with transitioning to a low-carbon economy, using the IEA 2DS scenario, which assumes a 2°C increase in global temperature by 2100. The analysis of physical risks was conducted using the SSP5-8.5 scenario, considering HD HYUNDAI Construction Machinery Sector's domestic and international production facilities as well as its headquarter.



* Based on the changes in the business environment due to climate change and internal strategies, plans and assumptions have been made. However, there is a possibility that they may be uncertain due to various climate change factors, changes in business and market conditions, and associated uncertainties. Furthermore, please note that this information includes risks, uncertainties, and other factors that could lead to significant differences between expected and actual results.

* The financial impact analysis of physical risks is conducted using the MSCI Climate Value-At-Risk Tool

Climate-related Risk Analysis

Area		Definition	Impact	Likelihood of Occurrence	Impact on Sales	Timeframe[1] of Impact	Potential Financial Impact (Unit: KRW billion)	Key Response Measures
Transition Risk	Market	Changes in market conditions by country, leading to shifts in consumer demand and purchasing patterns for internal combustion engines and environmentally friendly products	Decreased sales of internal combustion engine products in advanced markets	High	High	Short- to mid-term	10,677	• Develop differentiated product sales strategies for advanced and emerging markets
	Technology	Weakening of competitiveness due to widening technology gap compared to competitors	Decreased sales of environmentally friendly products	High	High	Short- to mid-term	41,410	• Expand R&D on environmentally friendly products/technologies such as electric excavators and hydrogen excavators
		Decreased market share resulting from the transition from conventional internal combustion engine products to low-carbon internal combustion engine products	Decreased sales of internal combustion engine products	High	Medium to high			• Release products that meet emission regulations • Develop electric and hydrogen-powered products
	Policy and legal	Decreased product sales due to stricter new emission regulations in advanced markets	Decreased sales due to strengthened emission regulations	High	Low to medium	Mid-term	8,575	
Physical Risk	Acute	Increased risk of flooding and typhoons due to rising sea levels	Asset damage and reduced production due to coastal flooding, typhoons, and other climate-related events	Medium	Low to medium	Mid- to long-term	92	• Establish emergency plans for natural disaster response • Establish a natural disaster alert system
	Chronic	Changes in climate patterns and an increase in average temperature	Decreased production efficiency due to extreme heat and other climate pattern changes	Medium	Low to medium	Mid- to long-term	323	• Enhance facility maintenance through the modernization of the Ulsan Campus • Establish energy/environmental monitoring and predictive maintenance systems

1) Timeframe classification: Short-term: 0-5 years, Mid-term: 6-10 years, Long-term: 10-20 years.

Climate-related Opportunities Analysis

Area		Definition	Impact	Likelihood of Occurrence	Impact on Sales	Timeframe[1] of Impact	Potential Financial Impact (Unit: KRW billion)	Key Response Measures
Opportunity	Market	Expanding the market for environmentally friendly power products due to strengthened regulations prohibiting the sale of internal combustion engine vehicles in advanced markets.	Increased revenue through entry into new markets	High	Low to medium	Short- to mid-term	8,401	• Commence mass production of electric excavators in 2023 and gradually introduce electric and hydrogen models until 2026 • Expand the range of electrical products, such as hydrogen engines and e-powerpacks
	Product and services	Increased demand for FCEVs and BEVs, leading to the expansion of low-carbon technology application models	Increased sales of low-carbon products	High	High			
		Securing competitive advantage through the development and investment in automation and autonomous technology	Increased revenue from the sale of products incorporating ICT technology	High	High	Short- to mid-term	71,243	• Enhance quality management through smart construction solutions,, including XiteCloud, Smart Maintenance, Hi Assist, and Hi Detect, enabling equipment fault diagnosis and prediction • Expand the development and synergy of automation and autonomous technologies through HD HYUNDAI XITESOLUTION
	Energy source	Cost reduction in operating expenses using low-carbon energy sources	Reduced costs associated with purchasing emission allowances	Medium to high	High	Short- to mid-term	11	• Transition to renewable energy through rooftop solar power generation, PPAs, and other means
	Resource efficiency	Cost reduction through increased resource efficiency in production processes	Energy cost savings	High	High	Short- to mid-term	9	• Improve efficiency by modernizing production facilities (implementing environmentally friendly painting facilities at the Ulsan plant) • Invest in energy efficiency measures (building insulation and introducing air circulation-based heating and cooling systems)

1) Timeframe classification: Short-term: 0-5 years, Mid-term: 6-10 years, Long-term: 10-20 years.

OUR STRATEGIC APPROACH

Within the greenhouse gas emissions of HD HYUNDAI Construction Machinery Sector, approximately 88% of the emissions occur during the use phase of construction machinery products. Recognizing the need to reduce greenhouse gas emissions throughout the value chain, it is evident that developing environmentally friendly construction machinery technologies and products is essential. HD HYUNDAI Construction Machinery Sector has established strategies to reduce carbon emissions not only during the operational phase but also during the product use phase. The reduction of the emissions during product use phase strategy aims to achieve a significant shift towards environmentally friendly construction machinery as part of the portfolio. This entails a reduction of product carbon emissions by 12.3% by 2030 and 25% by 2040 compared to the emissions in 2021. To achieve this, the portfolio of construction machinery is being restructured under climate change policies and market conditions in various countries. This involves incorporating electrification, hydrogen fuel cells, and construction machinery HVO (Hydrotreated Vegetable Oil). The plan is to expand the proportion of environmentally friendly construction machinery products to reach approximately 95% of total sales by 2040. Additionally, efforts are being made to reduce carbon emissions during the operational phase by promoting the transition to renewable energy, fuel conversion, and energy efficiency. Carbon offsetting will be utilized for residual emissions, aiming to achieve net zero across all operations by 2050.

Net Zero Strategy at Worksites

To achieve a **42%** reduction in carbon emissions by 2030 compared to 2021 levels

To achieve **Net Zero** for domestic and overseas worksites by 2050 (Scope 1, 2)

Transition to Renewable Energy

Transition to renewable energy at domestic and overseas worksites (through PPA, green premiums, and self-generation)

Fuel transition

Fuel transition (transition of diesel construction machinery used in pilot tests to electric models)

Energy efficiency

Energy efficiency and reduction of energy consumption at worksites

Carbon offset

Carbon offset for residual emissions (e.g., K-EV100)

Strategy for Reducing Carbon Emissions in the Product Use Phase

To reach reduction target of **25%** in carbon emissions from the product use phase by 2040 compared to 2021

To reach target share of **95%** for green product sales out of total sales by 2040

Development of environmentally friendly technologies and products

Achieving a 95% share of green products in the sales portfolio

Improvement of fuel efficiency and transition to alternative fuels

Using fuel-efficient model

Transitioning fuel for construction machinery sold to developing countries and emerging economies to hydrotreated vegetable oil (HVO)

Development of hydrogen engine model

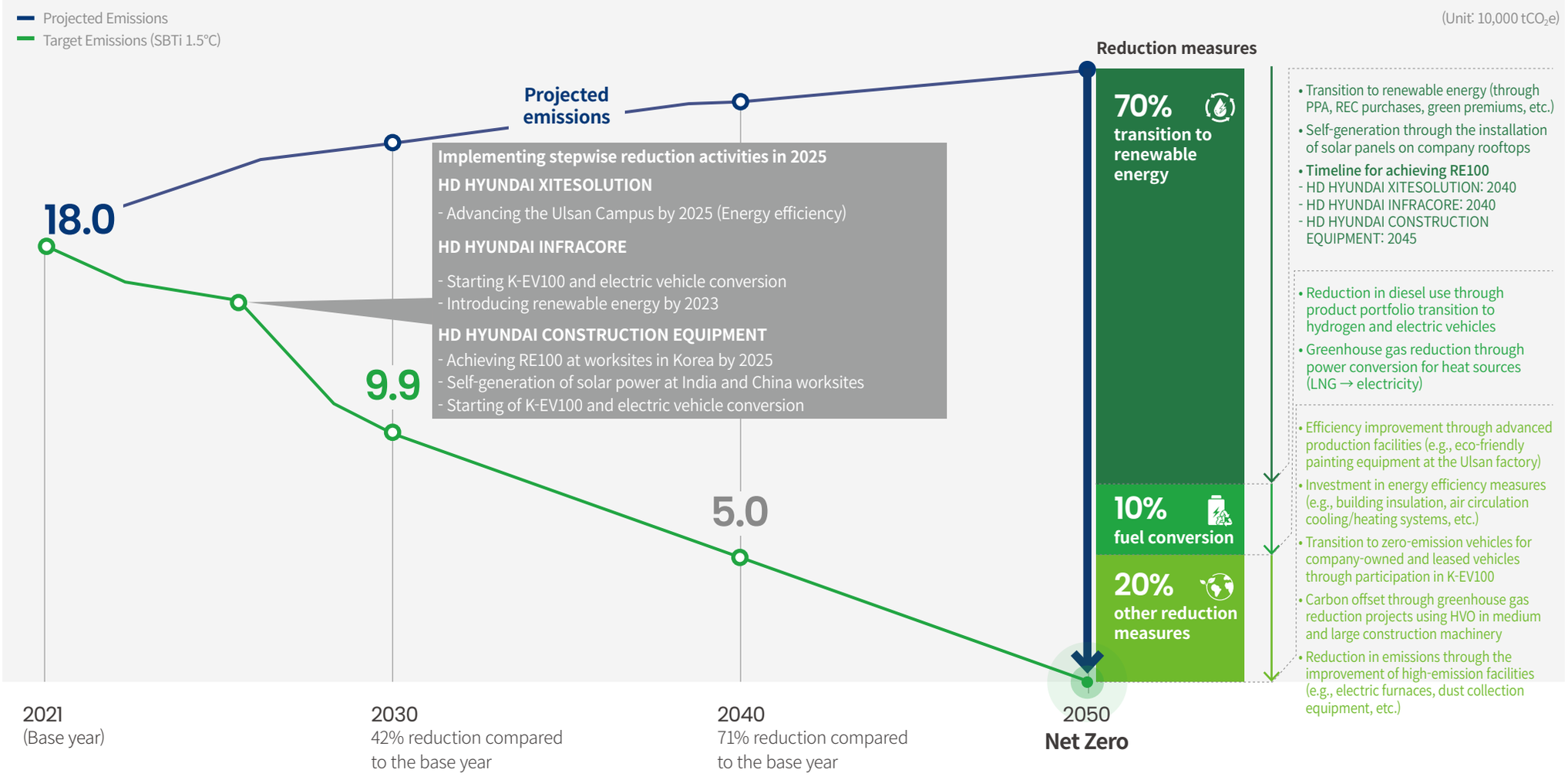
Electrification and hydrogen fuel cell technology

Electrification of small-scale models

Transitioning large-scale construction machinery to fuel cell electric vehicles(FCEV)

Roadmap to Net Zero 2050

HD HYUNDAI Construction Machinery Sector has declared its commitment to achieving net zero in domestic and overseas worksites by 2050, aligning with the Paris Agreement and following the 1.5°C scenario of the Science Based Targets initiative (SBTi). Net zero strategy has been developed based on these principles. To achieve net zero in domestic and international worksites, efforts are being made to promote the transition to renewable energy, fuel conversion, and energy efficiency. Residual emissions will be offset to achieve net zero in both domestic and overseas worksites by 2050. The transition to renewable energy is being implemented by considering the energy characteristics and production plans of each worksite, as well as economic feasibility and reduction feasibility. Starting with self-generation, worksites in Korea are exploring the optimal scenarios for adopting renewable energy and planning to achieve the transition to renewable energy in both domestic and overseas worksites by 2045. Additionally, fuel conversion, the K-EV100 initiative, and energy efficiency measures are being pursued to gradually implement the roadmap towards net zero in all domestic and overseas worksites by 2050.



Activities for reducing greenhouse gas emissions at worksites

Ulsan Campus Reformation Project

HD HYUNDAI Construction Machinery Sector is actively pursuing the modernization of its primary production hub, Ulsan Campus, to reduce greenhouse gas emissions and enhance competitiveness in the construction equipment market.

With an investment of approximately 200 billion KRW, the outdated production lines at the factory have been reconfigured and optimized to maximize efficiency. This initiative aims to expand the production capacity of construction equipment such as excavators and wheel loaders.

It is expected that Ulsan Campus will establish a global top-tier production system. By the first half of 2025, the production capacity is projected to grow by approximately 50% compared to the previous level, resulting in an annual production volume of around 15,000 units, up from the previous scale of 9,600 units.

Furthermore, the manufacturing processes are being streamlined to reduce energy consumption fundamentally. The implementation of energy monitoring, integrated data management facilities, and systems will be carried out to enhance the analysis and prediction of carbon emissions.

A conceptual overview of the Ulsan Campus reformation project

Transition to Renewable Energy

HD HYUNDAI CONSTRUCTION EQUIPMENT's subsidiary in China is actively expanding solar power generation. We have installed 4 MW solar panels on the roof of a 77,000 square meter facility, enabling the self-generation of approximately 3,800 MWh of electricity annually, which accounts for half of their total power consumption. We also analyze power use patterns to explore more efficient electricity utilization.

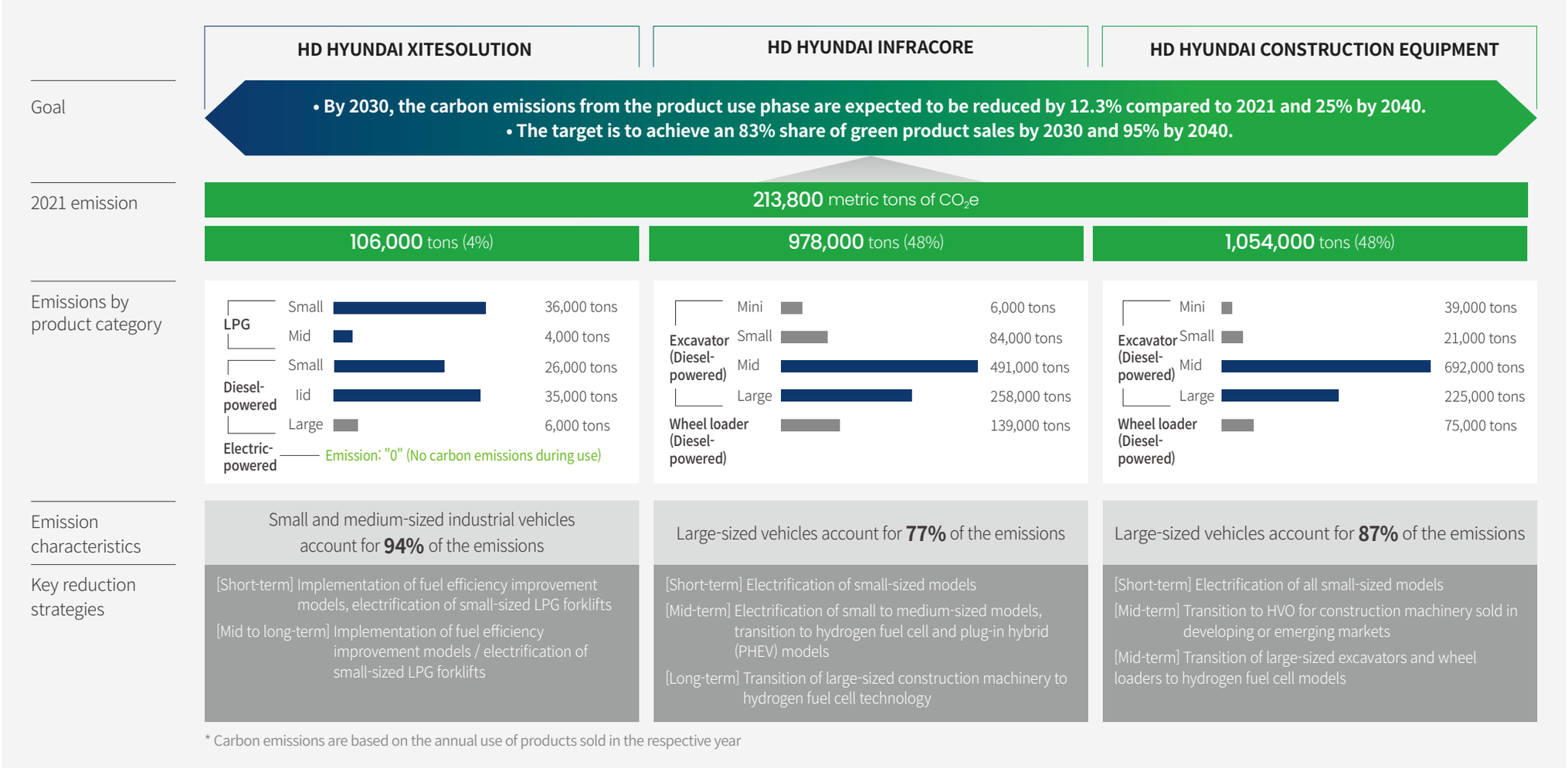
Additionally, the subsidiary in India, located near a 40,000 square meter idle land, is constructing a solar power generation facility along with an Energy Management System (EMS) to maximize generation efficiency. Through this solar installation, we aim to achieve self-generation of 70% of the annual electricity consumption at the production facility in India.

HD HYUNDAI INFRACORE plans to introduce renewable energy at its Gwangju plant in South Korea as part of the RE100 pilot project in 2023. By adopting renewable energy sources, we anticipate sourcing approximately 40% of the plant's electricity consumption from renewable energy.

4MW rooftop solar installation at the subsidiary in China

Strategies to Reduce Carbon Emissions During the Product Use Phase

The greenhouse gas emissions of HD HYUNDAI Construction Machinery Sector are primarily derived from the use phase of construction machinery, accounting for approximately 88% of the total emissions. This underscores the essentiality of developing environmentally friendly construction machinery technologies and products to reduce carbon emissions for the HD HYUNDAI Construction Machinery Sector. In the short term, we will actively promote the transition to small-sized electric models (BEV: Battery Electric Vehicle) and adopt HVO (Hydrotreated Vegetable Oil) to mitigate carbon emissions in the use phase. In the mid to long term, the focus will be on transitioning to hydrogen fuel cell models (FCEV: Fuel Cell Electric Vehicle) in the large-sized construction machinery, aiming to achieve a 25% reduction in carbon emissions from the use phase by 2040 compared to 2021. To accomplish this, we plan to expand the proportion of environmentally friendly product sales to 95% by 2040.



* Carbon emissions are based on the annual use of products sold in the respective year

Restructuring of Product Portfolio

HD HYUNDAI Construction Machinery Sector aims to reduce carbon emissions from the product use phase by 12.3% by 2030 and by 25% by 2040 and plans to reorganize the construction machinery portfolio to achieve the goal.

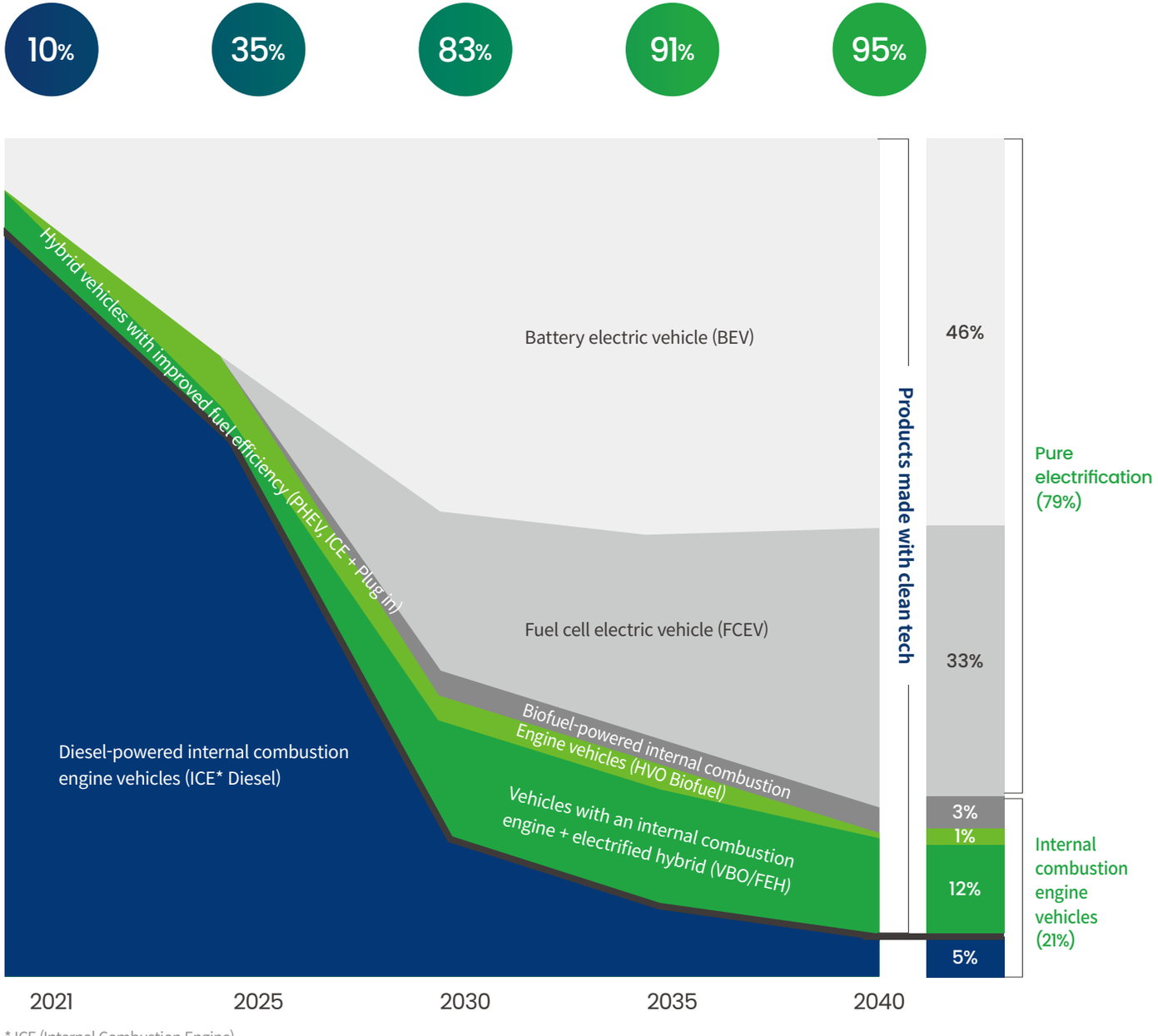
We actively monitor not only the green equipment market trends but also legal and regulatory developments, adding flexible adjustments to our strategy according to the market conditions. To reduce carbon emissions in the product use stage and to restructure our portfolio with eco-friendly construction machinery, we are accelerating the development of technologies and products such as fuel-efficiency technology, electrification and hydrogen tech, unmanned and automation system roll-out. Our goal is to expand the share of eco-friendly product sales to 95% by 2040.

HD HYUNDAI Construction Machinery Sector has established its criteria for eco-friendly products based on the EU Green Taxonomy and K-Taxonomy standards to manage the sales proportion of our products. We classify our products and services according to the established internal product classification system and manage our sales performance accordingly. This allows us to differentiate and track our eco-friendly offerings in alignment with industry standards.

Internal product classification system

Product classification system		
Construction machinery built with clean tech		
Power conversion	Electrification	
	Energy recovery	
	Clean energy	
Fuel efficiency	Fuel efficiency improvement/prevention of fuel efficiency inefficiency	

Product Portfolio Restructuring Plan



* ICE (Internal Combustion Engine)

CASE STUDY

Electric Mini Excavator of HD HYUNDAI INFRACORE

With the acceleration of climate change and the transition to a low-carbon economy to mitigate its impacts, related laws and regulations have strengthened, leading to the expansion of the eco-friendly construction machinery market. In Europe, for example, legislation prohibiting the entry of diesel vehicles into major urban areas was enacted under the Stage V[1] regulations in 2019. As a result, there has been an increased demand for small-sized electric excavator models.

After the development of the 1.7-ton electric excavator prototype in 2020, HD HYUNDAI INFRACORE has successfully commercialized electric excavators starting in the second half of 2023. The electric excavators utilize an electric powerpack, replacing the conventional diesel engine, resulting in zero fossil fuel consumption and no particulate matter or carbon dioxide emission during operation. Moreover, electric excavators generate less vibration and noise than diesel engines, thereby minimizing negative impacts during construction activities. Using PwC's 'TIMM' methodology in 2021, the model's tangible and intangible values affecting the economy, society, and environment were quantified in monetary terms. The analysis revealed that each 3.5-ton electric excavator generates an Impact Value equivalent to approximately 27.46 million KRW. HD HYUNDAI INFRACORE plans to introduce environmentally friendly products such as hydrogen engines and EV battery packs in the future as part of its commercialization strategy.

HD HYUNDAI INFRACORE Electric Excavator Valuation Report

1.7-ton electric mini excavator (DX20ZE)

1) Exhaust Gas Regulations enacted by the European Union (EU) in 2019 to limit diesel engines from emitting particulate matter (PM)

CASE STUDY

Hydrogen Model Impact Valuation of HD HYUNDAI Construction Machinery Sector

"In the coming 50 years, we will create new growth momentum different from what we have seen."

HD HYUNDAI Group, in March 2021, declared its commitment to leading the hydrogen market by leveraging the capabilities of its group affiliates across the entire hydrogen value chain, from production to transportation/storage and utilization, through the 'Hydrogen Dream 2030 Roadmap'. Within HD HYUNDAI Construction Machinery Sector, we will take on the role of utilizing the hydrogen value chain by developing and commercializing fuel cell-based construction machinery such as hydrogen excavators and hydrogen forklifts, as well as hydrogen combustion engines.

Hydrogen forklift
- Production of a 1.8-ton prototype in 2021
- Production of a 3.5-ton prototype and performance evaluation in 2022

Hydrogen engine
- Targeting mass production by 2025

Hydrogen excavator
- Development of a beta version prototype in 2023
- Commercialization target set for 2026

Social Value Estimation*

HD HYUNDAI XITESOLUTION recognizes the importance of non-financial value and has measured the value delivered by hydrogen forklifts, hydrogen excavators, and hydrogen engines to stakeholders using the EY Long-term value approach, converted into monetary value. Through this process, we aim to understand the tangible and intangible value inherent in our products, maximize positive impacts, and create a sustainable competitive advantage.

Social values generated
880 million KRW

	Customer Value	People Value	Societal Value	Financial Value
Hydrogen forklifts	78 million KRW	21 million KRW	39 million KRW	22 million KRW
Hydrogen engines	20 million KRW	43 million KRW	81 million KRW	253 million KRW
Hydrogen excavators	135 million KRW	68 million KRW	88 million KRW	32 million KRW
Estimated value	• Estimated fuel cost savings • Estimated reduction in Scope 3 emissions for customers	• Estimated improvement in health benefits from reducing fine particulate matter emissions • Estimated cost savings from reducing noise pollution	• Estimated reduction in greenhouse gas emissions • Estimated reduction in emissions of air pollutants	• Estimated increase in company profits through the sale of hydrogen products

* Please refer to the forthcoming impact valuation report for detailed value recognition
* This assessment was conducted based on data managed by the entity and utilizing national statistics, research findings, and other relevant sources. The monetary values used in the assessment may be subject to change according to new research results. As the completeness of the measurement results cannot be fully verified, they cannot be considered part of financial disclosure.

RISK MANAGEMENT

Climate Change-Related Risk and Opportunity Assessment

HD HYUNDAI Construction Machinery Sector has established a climate change-related risk and opportunity assessment process to identify the risks and opportunities that impact the company due to climate change. The assessment of climate change-related risks and opportunities is based on a pool of 20 identified risks and opportunities derived from industry analysis, global initiatives, and literature analysis. It involves comprehensive evaluations of the likelihood of occurrence and the impact on sales for each identified risk and opportunity factor through departmental interviews, expert analysis, and product portfolio analysis.

Risk and opportunity assessment process

Identification of climate-related risks and opportunities
- Analysis of literature and global initiatives
- Benchmarking within the industry

Assessment of the likelihood of occurrence and impact on sales
- Assessment of the likelihood of occurrence through departmental interviews and expert analysis
- Calculation of impact on sales

Prioritization of risks and opportunities
- Prioritization of climate risks and opportunities
- Identification of key risk and opportunity factors
- Formulation of response strategies and identification of areas for improvement

The criteria used for risk and opportunity assessment

Setting short-term/mid-term/long-term periods

Climate-related risks and opportunities are managed based on the timeframes of short-term, mid-term, and long-term, aligned with the achievement timeline of greenhouse gas reduction targets

The criteria for setting the timeframe

Short-term
- Period: 0~5years
- Target year: 2025

Mid-term
- Period: 6~10years
- Target year: 2030

Long-term
- Period: 11~20years
- Target year: 2040

Assessment of impact on sales

To evaluate the impact of climate-related risks and opportunities on product sales, the degree of exposure to potential damages was taken into consideration.

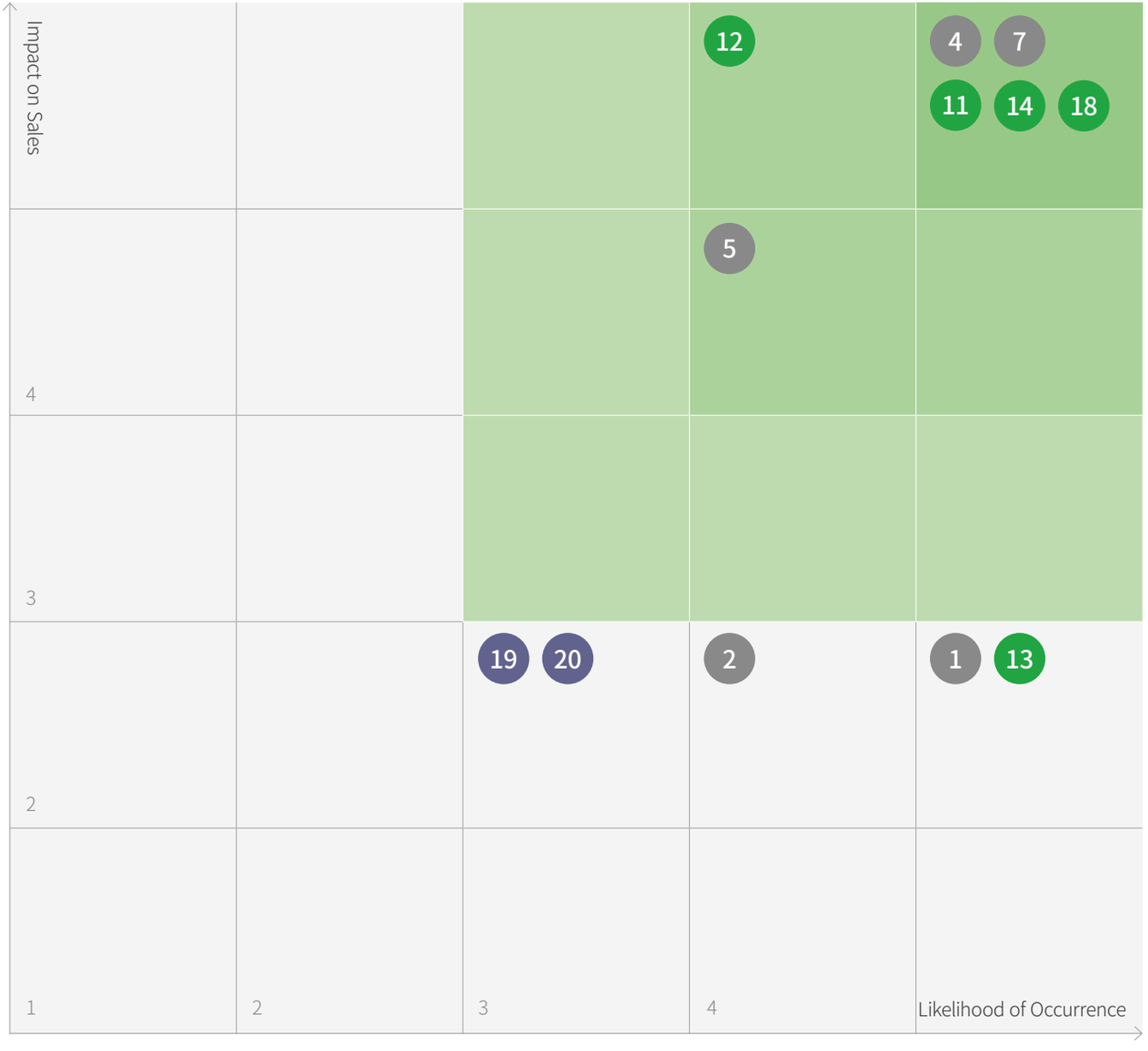
The criteria for assessing sales impact

Sales impact analysis	Impact intensity
80% or higher	High
60~80%	Medium-high
40~60%	Medium
20~40%	Medium-Low
0~20%	Low

Climate change factors

Transition risks		
Policy and legal	1	**Emission regulations**
	2	**Carbon regulations**
	3	Strengthened emission reporting obligations
Technology	4	**Weakening of technical competitiveness**
	5	**Replacement of existing products**
	6	Uncertainty in technology commercialization
Market	7	**Changes in consumer purchasing patterns**
	8	Market uncertainty
	9	Increase in raw material prices
Reputation	10	Deterioration of stakeholder reputation
Opportunities		
Products and services	11	**Expansion of low-carbon products**
	12	**Development/investment in innovative technologies**
Market	13	**The emergence of new markets**
	14	**Increased production efficiency**
Resource efficiency	15	High-efficiency buildings
	16	Expansion of recycling
	17	Water conservation
Energy sources	18	**Expansion of renewable energy**
Physical risks		
Acute	19	**Flooding and typhoon occurrences**
Chronic	20	**Changes in climate patterns, increasing average temperatures**

Results of climate risk/opportunity assessment



* The analyzed risks and opportunities are disclosed on pages 14-16

Climate-Related Risk Management System

HD HYUNDAI Construction Machinery Sector recognizes climate change risks as significant issues and has established an integrated climate-related risk management system to manage them throughout the organization. By analyzing the potential financial impacts based on climate risk and opportunity assessments, efforts are made to minimize risks and develop strategies for product and technology development to capitalize on opportunities, integrating them into business decision-making. According to the established strategies, each relevant department executes strategic tasks, and major risks and opportunities are evaluated at the Board of Directors and management levels.

METRICS AND TARGETS

Greenhouse Gas Emissions Status

To set specific targets for net zero, it begins with calculating greenhouse gas emissions by emission sources. Analyzing the domestic and overseas greenhouse gas emissions by emission sources for the year 2022, it is found that the greenhouse gas emissions of the HD HYUNDAI Construction Machinery Sector account for approximately 8% at domestic and overseas sites, while about 88% is attributed to the use phase of construction machinery products. This indicates that developing environmentally friendly construction machinery technologies/products is a key issue in reducing the company's carbon emissions.

Scope 3 — Upstream emissions (4.2%) 90,000 tCO_2e

(Unit: tCO_2e)

Categories	Emissions	Ratio
Purchased goods and services	9,090	0.4%
Capital goods	1,983	0.1%
Fuel and energy-related activities	19,191	0.9%
Upstream transportation and distribution	50,465	2.4%
Waste generation in operations	737	0%
Business travel	1,984	0.1%
Employee commuting	7,731	0.4%

Scope 1, 2 — Direct and indirect emissions (8%) 170,000 tCO_2e

(Unit: tCO_2e)

Categories	Emissions	Ratio
Scope 1 (Korea)	37,145	1.7%
Scope 2 (Korea)	88,776	4.1%
Scope 1 (Overseas)	13,035	0.6%
Scope 2 (Overseas)	32,458	1.5%

Scope 3 — Downstream emissions (87.8%) 1,880,000 tCO_2e

(Unit: tCO_2e)

Categories	Emissions	Ratio
Downstream transportation and distribution	313	0.01%
Use of sold products	1,882,802	87.7%

Total greenhouse gas emissions — 2,150,000 tCO_2e

(Unit: tCO_2e)

Categories	Emissions	Ratio
Scope 1	50,180	2.3%
Scope 2	121,234	5.7%
Scope 3	1,974,296	92%

* The Base year is 2022

Greenhouse Gas Emissions and Energy Use

HD HYUNDAI Construction Machinery Sector is implementing measures to reduce Scope 1 and Scope 2 emissions by adopting renewable energy, energy efficiency initiatives, and fuel activities.

Energy Use

HD HYUNDAI Construction Machinery Sector has planned to introduce renewable energy in 2023 and aims to achieve RE100 by 2045. Additionally, we are replacing outdated equipment with modern machinery and reorganizing manufacturing processes to improve energy efficiency.

Scope1&2 emissions and energy use

(Unit : tCO_2e, tCO_2e/million KRW, TJ)

	Categories	2020	2021	2022
HD HYUNDAI XITESOLUTION[1]	Scope 1 (Korea)	-	1,700	1,045
	Scope 2 (Korea)	-	6,023	4,670
	Scope 1 (Overseas)	-	1,187	1,526
	Scope 2 (Overseas)	-	9,945	8,523
	Scope 1 + Scope 2 Intensity (Korea)[2]	-	0.075	0.007
	Scope 1 total	-	2,887	2,571
	Scope 2 total	-	15,968	13,193
	Energy use (Korea and overseas)	-	286	238
HD HYUNDAI INFRACORE	Scope 1 (Korea)	23,961	27,834	26,553
	Scope 2 (Korea)	66,486	77,184	77,715
	Scope 1 (Overseas)	9,044	7,617	5,001
	Scope 2 (Overseas)	24,398	18,819	10,768
	Scope 1 + Scope 2 Intensity (Korea)[2]	0.033	0.029	0.025
	Scope 1 total	33,005	35,451	31,554
	Scope 2 total	90,884	96,003	88,483
	Energy use (Korea and overseas)	1,983	2,246	2,191
HD HYUNDAI CONSTRUCTION EQUIPMENT	Scope 1 (Korea)	5,586	8,681	9,547
	Scope 2 (Korea)	6,825	6,405	6,391
	Scope 1 (Overseas)	7,046	9,328	6,508
	Scope 2 (Overseas)	13,750	16,377	13,167
	Scope 1 + Scope 2 Intensity (Korea)[2]	0.009	0.007	0.006
	Scope 1 total	12,632	18,009	16,055
	Scope 2 total	20,575	22,782	19,558
	Energy use (Korea and overseas)	282	238	237
Total	Scope 1	45,637	56,347	50,180
	Scope 2	111,459	134,753	121,234
	Scope 1+2	157,096	191,100	171,414

1) In February 2021, HD HYUNDAI XITESOLUTION was established, and from 2022 onwards, the industrial vehicles division operates under HD HYUNDAI XITESOLUTION
2) Greenhouse gas emissions are calculated based on separate financial statements using sales revenue as the basis.

Net zero goals at the worksites[1]

Categories	2021 (Base year)	2030 target reduction (%)	2040 target reduction (%)	2050 target reduction
Scope 1+2	180,000CO_2e	42%	71%	Achieving net zero

1) HD HYUNDAI XITESOLUTION overseas carbon emissions (11,132 tCO_2e) are excluded when formulating the net zero strategy for all facilities by 2050

Carbon Emissions in Product Use Phase

HD HYUNDAI Construction Machinery Sector is making efforts to reduce carbon emissions in the product use phase, in addition to managing greenhouse gas emissions within the greenhouse gas facility. To achieve this, we have set the goal of reducing carbon emissions in the product use phase based on SBTi 2°C criteria, aiming for a 12.3% reduction by 2030 and a 25% reduction by 2040 compared to 2021. To measure and manage the carbon emissions in the product use phase, we operate a system that utilizes telematics information integrated into the equipment, allowing real-time monitoring of the operational status and condition of equipment worldwide. The installation of the system is mandatory for large-scale equipment, and it is equipped with the functionality to calculate product carbon emissions, enabling the continuous implementation and management of strategies for reducing carbon emissions in product use. Furthermore, we plan to expand the management scope to include Scope 3 areas in the long term, aiming to enhance the level of greenhouse gas emission management.

Approach for Analyzing Carbon Emissions in the Product Use Phase

To calculate carbon emissions generated by the products, we rely on the annual usage hours and fuel efficiency of each product sold to derive the annual product emissions and manage them accordingly. The working hours and fuel efficiency are based on data collected from our equipment, equipped with DI 360, TMS, and Hi Mate, which aggregate information to minimize variations inherent to construction sites. Internal testing data is also utilized when necessary to supplement the information.

The formula for calculating carbon emissions in the product use phase

Working Hours (Hours/year) * Fuel Efficiency (Liters/year) * Emission Factor (tCO2e) * Annual Sales Quantity (Number of units)

Scope3 Emissions

(Unit: tCO_2e)

	Categories	2020	2021	2022
HD HYUNDAI INFRACORE	**Scope 3**	**1,051,369**	**1,010,170**	**977,905**
	① Purchased goods and services	4,766	5,913	8,415
	② Capital goods	-	-	1,983
	③ Fuel and energy-related activities	10,225	15,197	12,243
	④ Upstream transportation and distribution	-	-	35,275
	⑤ Waste generation in operations	710	824	592
	⑥ Business travel	505	3,523	1,557
	⑦ Employee commuting	7,193	6,829	7,539
	⑨ Downstream transportation and distribution	-	-	313
	⑪ Use of sold products[1)]	1,027,969	977,885	909,988
HD HYUNDAI CONSTRUCTION EQUIPMENT	**Scope 3**	**830,395**	**1,065,173**	**996,391**
	① Purchased goods and services	-	632	675
	③ Fuel and energy-related activities	-	9,661	6,948
	④ Upstream transportation and distribution	-	-	15,190
	⑤ Waste generation in operations	-	145	145
	⑥ Business travel	-	112	427
	⑦ Employee commuting	-	197	192
	⑪ Use of sold products[1)]	830,395	1,054,426	972,814
Scope 3 Total emissions		**1,881,764**	**2,075,343**	**1,974,296**
Total carbon emissions from the use[1)] of the sold products		**1,858,364**	**2,032,311**	**1,882,802**

1) Carbon emissions from product usage for one year of products sold in the current year

Carbon emission reduction goals in the product use phase

Categories	2021 (Base year)	2030 target reduction (%)	2040 target reduction (%)
Use of sold products	2,138,000 tCO_2e	12.3%	25%

Research and Development

We are actively pursuing the development of relevant technologies, such as hydrogen and electric models, to reduce carbon emissions in the product use phase. Our aim is to achieve a sales ratio of environmentally friendly construction machinery products that meet our internal standards, accounting for 95% of total sales by 2040.

Research and development expenditure and sales performance

(Unit : %, 100 million KRW)

Categories		2020	2021	2022
HD HYUNDAI XITESOLUTION[1]	R&D investment per sales[2]	-	2.8	1.8
	R&D investment	-	29	137
	Cleantech R&D investment	-	3	15
	Eco-friendly sales[3]	-	-	1,163
HD HYUNDAI INFRACORE	R&D investment per sales[2]	5.0	3.7	3.8
	R&D investment	1,362	1,356	1,612
	Cleantech R&D investment	-	-	131
	Eco-friendly sales[3]	-	-	15,637
HD HYUNDAI CONSTRUCTION EQUIPMENT	R&D investment per sales[2]	4.6	3.1	2.3
	R&D investment	615	672	592
	Cleantech R&D investment	36	55	52
	Eco-friendly sales[3]	-	774	1,550
Total	R&D investment	1,977	2,057	2,341
	Cleantech R&D investment	36	57	198
	Eco-friendly sales[3]	-	774	18,350

1) Establishment of HD HYUNDAI XITESOLUTION in February
2) Calculated based on separate financial statements for the respective year, using sales revenue as the basis
3) Based on our internal product classification system

APPENDIX

TCFD Index

TCFD Recommendations	Page
Governance	p.12~13
a) Describe the board's oversight of climate-related risks and opportunities.	p.12
b) Describe management's role in assessing and managing climate-related risks and opportunities.	p.13
Strategy	p.14~23
a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	p.14~16
b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	p.18~23
c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	p.18~23
Risk Management	p.24~26
a) Describe the organization's processes for identifying and assessing climate-related risks.	p.24~25
b) Describe the organization's processes for managing climate-related risks.	p.26
c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	p.26
Metrics & Targets	p.27~30
a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	p.27~30
b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	p.27~29
c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	p.27~30

Verification Statement on GHG Emissions

Verification Statement on 2022 Greenhouse Gas Emission Report

Verification Target
Creative Sustainable Register (hereinafter "CSR") has conducted the verification of "2022 Report on Quantity of emitted Greenhouse gas and Energy Consumption (hereinafter "Inventory Report") for Hundai Doosan Infracore (hereinafter "the Company")

Verification Scope
CSR's verification was focused on all the facilities which emitted the greenhouse gas during the year of 2022 under the Company's operational control and organizational boundary.

Verification Criteria
The Verification is based on 'Rule for emission reporting and certification of greenhouse gas emissions trading Scheme (Notification No. 2021-278 of Ministry of Environment)'

Verification Procedure
The Verification has been planned and conducted as the 'Rules for verification of operating the greenhouse gas emissions trading scheme(Notification No. 2021-112 of Ministry of Environment)', and the level of assurance for verification shall be satisfied as reasonable level of assurance. And it confirmed through the internal review whether the process before the verification conducted effectively.

Verification Limitation
The verification shall be contained the potential inherent limitation in the process of application of the verification criteria and methodology.

Verification Opinions
Regarding to the data of the Greenhouse Gas Emissions and Energy Consumption from the report through the verification, CSR provides our verification opinions as below ;

1) The Inventory Report has been stated in accordance with 'Rule for emission reporting and certification of greenhouse gas emissions trading Scheme'

2) The result of Material discrepancy satisfied the criteria for an organization that emits under than 500,000(tCO2-e) shall not exceed 5% from total emission as per "Rules for verification of operating the greenhouse gas emissions trading Scheme"

3) Thus, CSR conclude that the Greenhouse Gas Emissions and Energy Consumption of the Company in 2022 is correctly calculated and stated in accordance with 'Rules for verification of operating the greenhouse gas emissions trading Scheme'.

4) These GHG emissions are those before certification by the Ministry of Environment.

(unit : ton CO_2eq)

Report Year	Emission of Scope1	Emission of Scope2	Total Annual Emission
2022	26,552.682	77,718.519	104,268

May 10th, 2023

CEO **Chun-Seong Choi**
Creative Sustainable Registrar (CSR)

CSR Creative Sustainable Registrar
www.csrgroup.co.kr

Verification Statement on GHG Emissions

Introduction

DNV Business Assurance Korea Ltd. ("DNV") was commissioned by HD Hyundai Construction Equipment Co., Ltd. ("HD Hyundai Construction Equipment") to verify the HD Hyundai Construction Equipment's Greenhouse Gas Inventory Report for the calendar year 2022 ("the report") based upon a reasonable level of assurance. HD Hyundai Construction Equipment 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 HD Hyundai Construction Equipment 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 is set for 100% of HD Hyundai Construction Equipment's non-consolidated revenues under the GHG ETS and comprise Direct emissions (Scope 1 emissions) and Energy indirect emissions (Scope 2 emissions) from HD Hyundai Construction Equipment's Ulsan Campus boundary;

- Organizational boundary for reporting: Ulsan Campus of HD Hyundai Construction Equipment

Verification Approach

The verification has been conducted by DNV on 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 CO_2 equivalent. As part of the verification process;

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

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 HD Hyundai Construction Equipment's report are not fairly stated. The GHG emissions and energy consumption of HD Hyundai Construction Equipment for the year 2022 were confirmed as below;

GHG Emissions and Energy Consumption of HD Hyundai Construction Equipment for Yr 2022

Ulsan Campus of HD Hyundai Construction Equipment	GHG Emissions (ton-CO_2 equivalent)			Energy Consumption (Terajoule, TJ)		
	Direct emissions (Scope1)	Energy indirect emissions (Scope2)	Total emissions	Fuel	Electricity & Steam	Total
2022	9,546.962	6,390.65	15,937	104	134	237

* Total emissions is the sum of direct and indirect emissions.

* In order to report the GHG emissions and energy consumption as an integer, the rounded number on the statement might be different from the number on the system with ± 1 tCO_2-eq,

May 2023, Seoul, Korea

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

DNV

This Assurance Statement is valid as of the date of the issuance 9 May 2023. Please note that this Assurance statement would be revised if any material discrepancy which may impact on the Greenhouse Gas Emissions of HD Hyundai Construction Equipment is subsequently brought to our attention. In the event of ambiguity or contradiction in this statement between English version and Korean version, Korean shall be given precedent.

No.: PRJN-522650-2023-AST-KOR

Independent Assurance Report (Scope3)

To the management of HD Hyundai Infracore Co., Ltd.

We performed a limited assurance engagement on the following 2022 Greenhouse Gas Emissions (Scope 3) of HD Hyundai Infracore Co., Ltd. (the "Company") for the year ended December 31, 2022 (the "Scope 3 Emissions").

Scope and Subject matter information

For the year ended December 31, 2022, we provide a limited assurance on the following and our responsibility do not extend to any other information:

- Scope 3 Emissions (the "Subject matter information"), stated on 'Conclusion' of this report, is prepared in accordance with the Company's reporting criteria (the "Criteria").

Criteria

The Company prepared the Subject matter information in accordance with the Company's internal calculation criteria based on World Resource Institution & WBCSD (2013) "Technical Guideline for Calculating Scope 3 Emissions (Greenhouse Gas Protocol).

Scope 3 Category	Internal calculation criteria
Purchase goods and services	Based on energy and power usage of major partners
Capital goods	Based on office supply purchases
Fuel-and energy-related activities	Based on purchased energy on energy and greenhouse gas statements
Upstream transportation and distribution	Based on sea transportation to overseas sales subsidiary after production (the Company paid)
Waste generated in operations	Based on waste discharge for domestic operations
Business travel	Air travel (emission factor: Guideline for Low-carbon events by the Ministry of Environment of the Republic of Korea)
Employee commuting	Based on commuter bus activities
Downstream transportation and distribution	Based on sea transportation to overseas sales subsidiary after company production (the Company not cost)
Use of sold products	Based on the emissions from one year of use of the sold products

Inherent limitations

Non-financial information is subject to more inherent limitations than financial information, given the characteristics of the subject matter and the methods used for determining such information. Qualitative interpretations of relevance, materiality and the accuracy of data are subject to individual assumptions and judgments.

In particular:

- Our conclusion is based on our discussions with management and staff of the Company and our review of selected documents provided to us by the Company.
- The scope of our work was restricted to performance for the year ended December 31, 2022, only, as set out in the scope and subject matter section above. Information for the year ended December 31, 2021, and earlier periods have not been subject to assurance by us.

Responsibility of the management of the Company

The management of the Company is responsible for selecting and establishing suitable criteria for preparing the Subject matter information and the preparation of the Subject matter information in accordance with the Criteria.

Our responsibility

Our responsibility is for the following:

- Determining and performing the procedures to provide a limited assurance whether a material matter has come to our attention to cause us to believe the Subject matter information is materially misstated.
- Independently expressing a conclusion in accordance with provided evidence by the Company.

Because we engaged to form an independent conclusion on the Subject matter information prepared by the Company, our involvement may compromise our independence and is therefore not permitted. This report, including the conclusion, has been prepared for the Company's management as a body, to assist the management in reporting on the Company's Scope 3 Emissions. We do not accept or assume responsibility to anyone other than the Company's management as a body and the Company for our work or this report save where terms are expressly agreed and with our prior consent in writing.

Independent Assurance Report (Scope3)

Our independence and quality control

We have complied with the independence and other ethical requirements of the code of ethics issued by the Ethics Standards Board of the Korean Institute of Certified Public Accountant. We apply International Standard on Quality Control 1 and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards, and applicable legal and regulatory requirements.

The standard of assurance engagement

We performed a limited assurance engagement in accordance with Assurance Engagement other than Audits and Reviews of Historical Financial Information issued by the Korean Institute of Certified Public Accountants (International Standard on Assurance Engagements ("ISAE") 3000 (Revised) as adopted by the Republic of Korea) and with ISAE 3410 'Assurance Engagements on Greenhouse Gas Statements' issued by International Auditing and Assurance Standards Board.

Summary of the assurance work we performed.

Our work includes the following activities:

1. Interviews with the Company's personnel responsible for internal reporting and data collection
2. Understanding the Company's design and implementation of key processes and controls for managing and reporting the Subject matter information
3. Limited testing, through inquiry and analytical review procedures, of the preparation and collation of the Company's Subject matter information

A limited assurance engagement is less in scope than a reasonable assurance engagement. Consequently, the nature, timing, and extent of procedures for gathering sufficient, appropriate evidence are deliberately limited relative to a reasonable assurance engagement.

Conclusion

Based on the procedures we performed as described under the "Summary of the assurance work we performed" and the evidence we have been provided by the Company, nothing has come to our attention that causes us to believe that the Company's Subject matter information in the Report for the year ended December 31, 2022, is not prepared, in all material respects, in accordance with the Company's reporting criteria.

Scope 3 Category	Scope 3 배출량 (단위: $tonCO_2eq$)
Purchase goods and services	8,415
Capital goods	1,983
Fuel-and energy-related activities	12,243
Upstream transportation and distribution	35,275
Waste generated in operations	592
Business travel	1,557
Employee commuting	7,539
Downstream transportation and distribution	313
Use of sold products	909,988
Total	977,905

June 15, 2023
Shinhan Accounting Corporation
Seoul, Korea

Independent Assurance Report (Scope3)

To the management of HD Hyundai Construction Equipment Co., Ltd.

We performed a limited assurance engagement on the following 2022 Greenhouse Gas Emissions (Scope 3) of HD Hyundai Construction Equipment Co., Ltd. (the "Company") for the year ended December 31, 2022 (the "Scope 3 Emissions").

Scope and Subject matter information

For the year ended December 31, 2022, we provide a limited assurance on the following and our responsibility do not extend to any other information:

- Scope 3 Emissions (the "Subject matter information"), stated on 'Conclusion' of this report, is prepared in accordance with the Company's reporting criteria (the "Criteria").

Criteria

The Company prepared the Subject matter information in accordance with the Company's internal calculation criteria based on World Resource Institution & WBCSD (2013) "Technical Guideline for Calculating Scope 3 Emissions (Greenhouse Gas Protocol)".

Scope 3 Category	Internal calculation criteria
Purchase goods and services	Based on energy and power usage of major partners
Fuel-and energy-related activities	Based on purchased energy on energy and greenhouse gas statements
Upstream transportation and distribution	Based on sea transportation to overseas sales subsidiary after production (the Company paid)
Waste generated in operations	Based on waste discharge for domestic operat
Business travel	Air & train travel (air travel emission factor: ICAO Carbon Emission Calculator, train travel emission factor: Guideline for Low-carbon events by the Ministry of Environment of the Republic of Korea)
Employee commuting	Based on commuter bus activities
Use of sold products	Based on the emissions from one year of use of the sold products

Inherent limitations

Non-financial information is subject to more inherent limitations than financial information, given the characteristics of the subject matter and the methods used for determining such information. Qualitative interpretations of relevance, materiality and the accuracy of data are subject to individual assumptions and judgments.

In particular:

- Our conclusion is based on our discussions with management and staff of the Company and our review of selected documents provided to us by the Company.
- The scope of our work was restricted to performance for the year ended December 31, 2022, only, as set out in the scope and subject matter section above. Information for the year ended December 31, 2021, and earlier periods have not been subject to assurance by us.

Responsibility of the management of the Company

The management of the Company is responsible for selecting and establishing suitable criteria for preparing the Subject matter information and the preparation of the Subject matter information in accordance with the Criteria.

Our responsibility

Our responsibility is for the following:

- Determining and performing the procedures to provide a limited assurance whether a material matter has come to our attention to cause us to believe the Subject matter information is materially misstated.
- Independently expressing a conclusion in accordance with provided evidence by the Company.

Because we engaged to form an independent conclusion on the Subject matter information prepared by the Company, our involvement may compromise our independence and is therefore not permitted.
This report, including the conclusion, has been prepared for the Company's management as a body, to assist the management in reporting on the Company's Scope 3 Emissions. We do not accept or assume responsibility to anyone other than the Company's management as a body and the Company for our work or this report save where terms are expressly agreed and with our prior consent in writing.

Independent Assurance Report (Scope3)

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Conclusion

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Scope 3 Category	Scope 3 Emissions (Unit: tonCO_2eq)
Purchase goods and services	675
Fuel-and energy-related activities	6,947.7
Upstream transportation and distribution	15,190
Waste generated in operations	145.3
Business travel	427
Employee commuting	192
Use of sold products	972,814.4
Total	996,391.4

June 15, 2023
Shinhan Accounting Corporation
Seoul, Korea


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