



Environmental

The Earth is not only the home of mankind but also our responsibility to future generations. Hyundai has a clear understanding of its role and responsibility in reducing GHG emissions, thereby taking active parts in contributing to the global trend of achieving carbon neutrality. In particular, we are doing our best to protect the blue light of Earth with distinctive approach to climate change based on our own sustainable technology.

2.1	Environmental Management
2.2	Response to Climate Change
2.3	Establishment of a Circular Economy
2.4	Reduction of Environmental Impact
2.5	Protection of Biodiversity

Environmental Management

Hyundai faithfully practices environmental management governance with the participation of its highest decision-making body. We have also put in place an environmental management system for sustainable business operations, including management and supervision of environmental management at the company level based on our environmental rules and policies. We have acquired the ISO 14001 certification for each of our production plants and, in addition to ISO certification audits, we identify environmental impacts and risks in advance through annual environmental assessments and due diligence at the headquarters level. In the case of negative impacts and risk factors, we effectively mitigate and prevent them by taking the appropriate improvement measures. In particular, we are strengthening our response to global environmental issues such as climate change, the circular economy, and biodiversity.

Environmental Management System

ENVIRONMENTAL MANAGEMENT GOVERNANCE

Roles of the BOD The BOD and its subcommittee, Sustainability Management Committee oversee environmental management by regularly approving and reviewing Hyundai's environmental performance, major risks, and improvement activities. In 2023, the Committee approved new carbon neutrality tasks such as domestic sites' RE100 and blue carbon to achieve the goal of carbon neutrality by 2045. To improve water usage and waste management performance, we have included key environmental initiative to establish company-wide improvement goals for water and waste in our 2023 ESG direction, reported it to the Committee meeting held in March, 2023.

Roles of the Management The Business Strategy Committee, in which the CEO and C-suite managements participate, meets every month for Business Strategy Meeting and examines major company-wide environmental management plans and implementation status, including strategies for EV expansion and carbon neutrality; reviews improvement performance; discusses countermeasures for major risks; and manages other matters required to spread and disseminate environmental management. Environment-related issues that are expected to have a major impact on execution of business strategies, among matters reported to the Business Strategy Meeting, are included as agenda items for the BOD and Sustainability Management Committee. In 2022, we appointed a Chief Safety Officer (CSO) who oversees the safety, environment, and health management of our business sites, thereby strengthening our environmental management governance framework.

Roles of the Dedicated Environmental Organization Hyundai has a company-wide supervising organization under the CEO and CSO's responsibility and an operating organization by business site in order to implement environmental management, and have two-way discussion on a regular basis for more efficient environmental management.

Company-Wide Supervising Organization Hyundai Headquarters' supervising organization plays a pivotal role in global environmental management governance by implementing sustainable practices and enhancing the company's environmental management systems at home and abroad. It undertakes various responsibilities, including establishing an environmental accident risk response system, developing and managing environmental management KPIs, addressing regulatory improvements, and implementing internal audit and due diligence on global sites. These efforts are central to achieving our environmental vision and goals and reinforcing environmental management framework.

Business Site Management Organization The environmental management organization at each business site is in charge of such roles as establishing and operating an environmental management system; enhancing business site environmental efficiency; and operating facilities to manage and reduce pollutants that occurs in the business operation process. It also implements environmental policy; identifies and addresses environmental risks; spreads and disseminates environmental management; and receives and handles environment-related grievance reports.

R&D Organization The R&D Center is in charge of conducting R&D on environmental technology, developing low carbon products such as EVs, and carrying out other environmental improvement activities related to product.

IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT

Environmental Management Policy Recognizing the environment as a core element of its business, Hyundai has established the Hyundai Motor Company Environmental Management Policy to conduct environmental management in a proactive manner and periodically updates it (last revised in 2022) to reflect both internal and external environmental regulations and recent issues. The Policy is organized into seven sections, each focusing on a key management area, including the response to climate change, reduction of pollutants, protection of biodiversity, conservation of natural capital, and support for suppliers' environmental management. We declare our commitment to these areas through the policy. In accordance with the Policy, Hyundai, along with all its subsidiaries and business units, is committed to continuously improving its environmental performance and minimizing negative impacts across all its business activities and value chains.

Furthermore, we encourage all suppliers, contract partners, and other stakeholders in our supply chain to adhere to the Environmental Management Policy, as well as providing necessary support to facilitate their compliance. We comply with the environmental laws and regulations of each country in which we run our businesses, and also adhere to this policy in situations that are not covered by local regulations or where special provisions do not exist. We periodically update our environmental management policy to reflect changes in the relevant laws and regulations, external market conditions, and business circumstances.

Environmental Management Execution Our environmental management is implemented based on the "plan-do-check-action" process that includes 1) Comply with laws and regulations; 2) Declare the environmental management policy; 3) Establish an environmental management system and adopt internal management standards; 4) Monitor and analyze environmental performance and data; 5) Identify risks and implement improvement activities; and 6) Continually improve environmental performance.

Composition of Environmental Management Policy

1. Overview	2. Basic principles	3. Execution system
<ul style="list-style-type: none"> A. Purpose of establishment B. Application scope C. Implementation measure 	<ul style="list-style-type: none"> A. Raw and subsidiary materials B. Energy C. Water D. Greenhouse gas E. Waste F. Waste product G. Pollutants and hazardous materials H. Local community 	<ul style="list-style-type: none"> A. Governance B. Training and dissemination C. Stakeholders communication D. Performance management

 [Hyundai Motor Company Environmental Management Policy](#)

Establishment of an Environmental Management System All Hyundai's domestic and overseas production plants have established an Environmental Management System (EMS) in line with international standards such as ISO 14001, and have been certified by third-party organizations to ensure reliability and credibility. Notably, our domestic plants have unified their EMS through the integrated ISO 14001 certification, thereby enhancing their environmental management and work efficiency. Plants which have acquired the ISO 14001 certification undergo annual audits by certification bodies, with renewal audits every three years, and implement improvement measures based on the results of the audits. In addition to obtaining certifications, our internal auditors ensure the correct operation of the EMS, which undergoes continuous improvements based on the results of reviews by external specialized organizations (such as TÜV NORD). Moreover, improvement of the EMS at individual sites is promoted through internal inspections and evaluations using the Hyundai Environmental Assessment Tool (HEAT) developed by the headquarters' supervising organization.

Response System to Business Site Environmental Accidents and Regulations Hyundai has set in place an emergency response system to take immediate measures in the event of an environmental accident, such as air/water/waste and chemical substance leakage, based on international safety, health & environment (SH&E) standards. Its headquarters and each business site have an emergency response organization and emergency contact system, and also have an emergency response manual that includes the status of disaster prevention facilities and equipment aimed at responding to environmental accidents and have all employees familiarize themselves with the manual. In addition, we create an alternative scenario for environmental accidents and continually conduct an emergency response drill at each department. In particular, we estimate environmental accident cases that may occur at business sites, based on which departments disseminate and provide training on actually applicable response measures. We also operate the Hyundai/Kia Environmental Council, which is composed of automobile manufacturers and parts companies from Hyundai Motor Group, Korea Automobile & Mobility Association (KAMA), Korea Enterprises Federation, and Environmental Preservation Advisory Committee. This Council meets on a quarterly basis to provide a communication channel for environmental managers from each company and business site, and to discuss environmental regulations and devise effective countermeasures.

Environmental Investment Plan and Execution Hyundai established a plan to invest a total of KRW 109.4 trillion (KRW 47.4 trillion in R&D, KRW 47.1 trillion in facility investment, KRW 14.9 trillion in strategic investment) by 2032 to achieve its mid-to long-term electrification strategy. In addition, we established a mid- to long-term investment plan that additionally invests KRW 24 trillion by 2030 to strengthen the upstream and downstream EV industry ecosystem, such as building EV-dedicated production facilities in Korea and expanding EV charging infrastructure, at the Group level. Our environmental investment budget in 2023 was KRW 716.4 billion, of which KRW 861.1 billion was executed. A total of KRW 42.5 billion was executed in 2023 as environmental facility investments to reduce emissions of environmental pollutants at domestic sites.

Environmental Management

MANAGEMENT OF ENVIRONMENTAL PERFORMANCE

Management of Environmental Goals Through our environmental management implementation system, we set mid- to long-term performance goals for environmental factors that have a considerable environmental impact due to business operations, such as carbon emissions. Mid- to long-term performance goals are set in consideration of business as usual (BAU) as well as external economic circumstances, government policy direction, and internal business strategies. To respond to climate change, we set the goal to achieve carbon neutrality by 2045 throughout the entire life cycle. To achieve the goal, we are implementing such strategic tasks as a strategy to transition to EVs, achieving RE100 at business sites, and reduction of supply chain carbon emissions. For quantitative improvements to environmental indexes, excluding carbon, we set improvement goals for water and wastes based on the direction of suppressing increases in water consumption and waste generation that are on the rise in connection with production that is increasing after COVID-19. Additionally, we manage pollutant emissions at each business site – air (dust, NOx, SOx, THC) and water (TOC, TP, BOD, SS) – to stricter standards than the legal requirements, thereby strengthening our environmental pollutant management. We have also set an upper limit of 5% for the three-year average for pollutant emissions and established specific emission targets for each business site within this limit, and we aim to reduce emissions by evaluating performance against these targets.

Evaluation of Environmental Management Performance To improve business site environmental performance, we are reflecting and managing operational efficiency improvements, energy reduction activities, adoption of renewable energy, other GHG reduction performance, and internal goals on environmental pollutants in business site KPIs. In case of business site environmental pollutants, we examine monthly emission indicators. For business sites in excess, we analyze the cause and implement improvement measures. In the area of products, we set and manage our fleet average fuel economy or CO₂ emissions, EV sales goal achievement rate, and others as KPIs.

Environmental Management Goals and Implementation Status

Classification	Mid- to long-term goal	Performance in 2023
Transition to electric vehicles	Plan to sell 940,000 EVs by 2026, 2 million EVs by 2030	<ul style="list-style-type: none"> Sold a total of 695,382 units of eco-friendly vehicles Sold a total of 268,785 units of EVs
	Sell only EVs in Europe by 2035	
	Sell only EVs in main markets by 2040	
Hydrogen business synergy	Expand hydrogen mobility sales	<ul style="list-style-type: none"> Sold a total of 5,048 units of FCEVs Collaborated with H2Pro to develop high-efficiency hydrogen production technology Collaborated with NextHydrogen to develop a green hydrogen water electrolysis system
	Produce and supply green hydrogen	
Carbon neutrality in our factories	Achieve RE100 by 2045	<ul style="list-style-type: none"> Renewable energy accounted for 12.7% of total electricity consumption in 2023 (HMMC and HMMI 100%, HAOS 68%)
Carbon neutrality in our supply chain	Encourage to achieve carbon neutrality by 2045	<ul style="list-style-type: none"> Participated in CDP Supply Chain and provided related training and customized consulting to suppliers Operated a program to help suppliers calculate LCA of their part products Helped suppliers build carbon reduction management system and purchase facilities

Environmental Risks, Opportunities, and Financial Impact Assessment Based on the annual materiality assessment, we identify impacts, risks, and opportunities related to climate change, the circular economy, pollutants, water and marine resource usage, and biodiversity issues. We also evaluate the mid- to long-term financial impacts of these material issues. In addition, we regularly conduct in-depth inspections and assessment to identify negative environmental impacts and risks at our domestic and overseas business sites, as well as within the supply chain. This assessment is conducted using the headquarters-level ESG environmental management assessment tool and the business site and supply chain ESG due diligence system. Based on the results of these inspections and assessment, we implement improvement measures to rectify any violations of the laws and regulations, as well as for deficiencies compared to our internal standards.

ENVIRONMENTAL MANAGEMENT COMMUNICATION

Training to Raise Environmental Management Awareness Hyundai annually updates its environmental training courses to reflect changes in environmental laws and regulations, company-wide environmental management goals and plans, best practices in environmental management, key duties, and the results of benchmarking of other companies. We also operate and support environmental education to enhance the capabilities of environmental managers, integrating global ESG responses through various opportunities such as participation in overseas forums and seminars. Furthermore, we provide support for ISO auditor training for professional environmental technicians to systematically manage and enhance environmental practice skills and legal environmental education. In 2023, a total of 40,524 employees completed the environmental education, for an accumulated total of 75,711 hours of training. In addition to our employees, we provide environment-related training programs to suppliers. Through an online platform's ESG training course, we are communicating the need for environmental management and suppliers' roles. In addition, a group course and seminars are provided to offer in-depth environmental training.

Water Opportunity/Risk Factor Analysis and Financial Impact

Classification	Key Contents	Financial Impact	Detailed Response Strategy
Risk Factors (Physical Risk)	According to the World Resources Institute (WRI), 17 countries in North Africa, the Middle East, and West Asia – including India, Iran, Pakistan, and Israel – home to about one quarter of the world's population, face the risk of depleting water resources in the medium to long term. This risk is primarily due to increasing water scarcity exacerbated by climate change. The automobile manufacturing process, which utilizes a substantial amount of industrial water for cooling, washing, and painting purposes, could face significant disruptions and shutdowns if the water supply becomes unstable.	Hyundai has analyzed the potential financial impact of water scarcity due to changes in the physical environment over the mid- to long-term. We have considered the potential risk of halting car production due to water scarcity in the worst-case scenario. Specifically, we focused on the Indian production subsidiary (HMI), which has an extremely high water stress risk level and is likely to experience material risks due to water scarcity in the future. We calculated the potential financial impacts on HMI's production stoppage due to water scarcity. We selected the Venue as a representative vehicle produced by the HMI, applying the 2023 sales volume (555,178 units) and vehicle price (KRW 21,700,000). The potential financial loss was estimated at KRW 1,204,736,260,000. * Financial Impact Calculation: Number of vehicles sold in India in 2023 (555,178) × Damage (10%) × Vehicle price (KRW 21,700,000) = KRW 1,204,736,260,000	The India Plant implements a zero-wastewater discharge system, recycling 100% of its water. We are actively addressing the risk of water shortages in Chennai, where our Indian subsidiary is located. To improve our water storage capacity, we operate a total of six reservoirs with a combined volume of 335,000 tons. Additionally, we have invested in infrastructure to maximize the collection and utilization of rainfall, including the integration of drainage connections and the installation of extra-large pumps.
Opportunities	Hyundai operates 15 production plants in countries including the U.S., China, India, and Korea. These facilities extensively use water in the cooling, washing, and painting processes of vehicle production. Ensuring a stable water supply and efficient use of water within these processes is crucial for sustainable business activities.	To reduce the amount of industrial water used in the automotive production process, Hyundai focuses on expanding its water recycling. As a result, we have recycled a total of 2,631,445 tons of water as of the end of 2023, thereby saving KRW 1,968,320,860 in operating costs. * Financial Impact Calculation: Total amount of water recycled in 2023 (2,631,445 tons) × Cost per ton of water (KRW 748, based on 2023 rates in Korea) = KRW 1,968,320,860	Our Asan Plant and India Plant, located in water-stressed areas, utilize a zero wastewater discharge system and recycle all processed water. At the Ulsan Plant, we are developing a wastewater recycling system that includes a water transfer pipeline. This system will repurpose water discharged from the wastewater treatment plant as circulating water for cleaning dust collectors in the paint booths. By implementing such systems, we are reducing water-related costs by enhancing water recycling across all our major business sites.

Stakeholder Engagement In 2023, Hyundai conducted the double materiality assessment to identify material sustainability issues from stakeholders' point of view. We regularly host ESG Non-Deal Roadshows (NDRs) for domestic and international investors to enhance communication regarding ESG matters. Furthermore, we collaborate with industry associations such as the Korea Automobile Manufacturers Association and the European Automobile Manufacturers Association, environmental organizations such as Healthy Seas and the Korea Forest Service, and government agencies so as to align our environmental protection activities with government policies and improve our environmental strategies.

Grievance Handling Channel We maintain a channel through which we receive and address the environment-related grievances of our stakeholders, including employees. These grievances are managed and resolved in accordance with established procedures and standards. Particularly sensitive grievances, including those likely to violate laws and regulations or potentially disrupt business operations or negatively impact the local environment, are discussed with the Legal Division. Environmental grievances can be submitted through the dedicated organization at each business site or via our representative grievance channel – ESG@hyundai.com.

Response to Climate Change

Hyundai responds to climate change at a company level by identifying, assessing, and managing related risks and opportunities on a constant basis. We also have set major climate strategies through our climate change governance to analyze the potential impact of climate change on our business and respond to macroscopic changes in the business environment due to changes in laws and regulations. We identify various climate risk and opportunity factors, and preemptively respond to changing market demands through the development of eco-friendly mobility and various mobility solution technologies.

Governance

RESPONSIBILITIES AND ROLES OF THE HIGHEST DECISION-MAKING BODY

Sustainability Management Committee The Sustainability Management Committee, Hyundai's supreme decision-making body, is responsible for overseeing climate-related risks and opportunities, operating under the governance of the Board of Directors. According to Article 3 of the "Sustainability Management Committee Regulations" and Section 3 of the "Environmental Management Policy Execution System," the committee is responsible for deliberating and deciding on ESG policies, plans, and major activities. It reviews significant ESG issues, including climate change, semi-annually, and formulates and oversees strategic approaches to key issues, mid- to long-term plans, and improvement initiatives focusing on priority areas such as carbon reduction, climate change response, eco-friendliness throughout the product lifecycle, and supply chain ESG management.

RESPONSIBILITIES AND ROLES OF MANAGEMENT

ESG Committee The ESG Committee, a subcommittee within the Hyundai Business Strategy Meeting chaired by the CEO and attended by division heads or their equivalents, oversees risk management and performance improvement activities in various ESG areas, including carbon neutrality. The committee addresses major risks that require immediate attention, issues related to performance improvements aligned with mid- and long-term business strategies, and other matters that necessitate its review and approval.

ROLES OF COMMITTEE AND DEDICATED TEAMS

Carbon Neutrality Committee Hyundai is committed to tackling climate change and achieving carbon neutrality targets in the mid-to long-term by forming a Carbon Neutrality Committee, and does its utmost to improve energy efficiency at its business sites, expand the use of renewable energy, and enhance working environment.

Company-wide Planning Team In 2021, Hyundai established the Carbon Neutrality Execution Team, a dedicated organization within the Planning & Finance Division at the head office respond to climate change more actively. The team works with relevant organizations to establish implementation strategies in various areas such as product, business site, and supply chain.

Climate Change Governance

📄 Composition of the Sustainability Management Committee

📄 Board Member Training in 2023



Key Agenda Items from the Perspective of Climate-Related Risks and Opportunities in 2023

Date	Classification	Key Agenda Items	Considerations for Climate-Related Risks and Opportunities
Mar. 23	Reported	Direction of ESG in 2023	Establishment of carbon-neutral investment criteria, execution of blue carbon projects, participation in CDP Supply Chain initiatives, etc.
Oct. 24	Approved	Approval of Hyundai's core tasks for carbon neutrality	Plans to secure renewable energy for achieving RE100 at domestic business sites and early responses to carbon offsetting.
Oct. 24	Reported	Progress regarding acquisition of the hydrogen fuel cell business	Opportunities in the hydrogen business through building a hydrogen ecosystem.

Response to Climate Change

Strategy

CLIMATE-RELATED RISKS AND OPPORTUNITIES

Impact on Business Model and Value Chain

Types		Risk/Opportunity	Impact on Business Model and Value Chain	Expected Impact			
Transition	Risks	Current regulations	Policies and regulations for responding to climate change	<ul style="list-style-type: none"> Strengthening of national cap-and-trade regulations and rising carbon prices National net-zero targets in place Government investment and financial support for net-zero projects 	<input checked="" type="checkbox"/> Short-term	<input checked="" type="checkbox"/> Mid-term	<input checked="" type="checkbox"/> Long-term
		New regulations		<ul style="list-style-type: none"> Implementation of the EU Carbon Border Adjustment Mechanism (CBAM) Implementation of the U.S. Inflation Reduction Act (IRA) 	<input checked="" type="checkbox"/> Short-term	<input checked="" type="checkbox"/> Mid-term	<input checked="" type="checkbox"/> Long-term
		Technical	Acceleration of competition in developing eco-friendly vehicle technologies	<ul style="list-style-type: none"> Loss of market share in the event of failure to lead technological change 	<input checked="" type="checkbox"/> Short-term	<input checked="" type="checkbox"/> Mid-term	<input checked="" type="checkbox"/> Long-term
		Legal	Tightening of fuel efficiency regulations for internal combustion engine vehicles	<ul style="list-style-type: none"> Increased cost of the response to fines for non-compliance Brand damage, disinvestment, and customer exodus due to fuel economy-related lawsuits 	<input checked="" type="checkbox"/> Short-term	<input checked="" type="checkbox"/> Mid-term	<input checked="" type="checkbox"/> Long-term
		Market	Instability of raw material prices	<ul style="list-style-type: none"> Rising procurement costs for raw materials (lithium, cobalt, nickel) due to supply limits caused by increasing demand for EV batteries Sales decline if profitability of fuel cell electric vehicles (FCEVs) is not secured 	<input checked="" type="checkbox"/> Short-term	<input checked="" type="checkbox"/> Mid-term	<input checked="" type="checkbox"/> Long-term
		Reputation	Increased demand from investors and stakeholders for climate change action	<ul style="list-style-type: none"> Brand damage, investment withdrawal, and customer disengagement in the event of failure to disclose and respond to climate change information 	<input checked="" type="checkbox"/> Short-term	<input checked="" type="checkbox"/> Mid-term	<input checked="" type="checkbox"/> Long-term
	Opportunities	Products and services	Acceleration of the transition to electrification	<ul style="list-style-type: none"> Increase in EV sales due to the expansion of the electric vehicle market 	<input checked="" type="checkbox"/> Short-term	<input checked="" type="checkbox"/> Mid-term	<input checked="" type="checkbox"/> Long-term
		Markets	Spread of technological innovations for responding to climate change	<ul style="list-style-type: none"> Acceleration in achieving price parity for electric vehicles through technological innovation, leading to market expansion Revitalization of the hydrogen market due to climate tech R&D Acceleration of electrification via the spread of autonomous driving technologies based on AI 	<input type="checkbox"/> Short-term	<input checked="" type="checkbox"/> Mid-term	<input checked="" type="checkbox"/> Long-term
		Energy sources		<ul style="list-style-type: none"> Reduction in energy costs through the transition to renewable energy (RE100), as the costs of renewable energy decrease due to technological advances 	<input type="checkbox"/> Short-term	<input checked="" type="checkbox"/> Mid-term	<input checked="" type="checkbox"/> Long-term
		Resource efficiency		<ul style="list-style-type: none"> Improvement in material efficiency and expansion of recycling 	<input type="checkbox"/> Short-term	<input checked="" type="checkbox"/> Mid-term	<input checked="" type="checkbox"/> Long-term
Physical	Acute risks	Extreme wind speed, wildfire, flood, hail/thunderstorms, precipitation	<ul style="list-style-type: none"> Damage to asset values (buildings, equipment, inventory) and reduced revenue due to production interruptions caused by climate disasters 	<input checked="" type="checkbox"/> Short-term	<input checked="" type="checkbox"/> Mid-term	<input checked="" type="checkbox"/> Long-term	
	Chronic risks	Heat, droughts, cold waves	<ul style="list-style-type: none"> Decrease in productivity due to chronic changes in climate patterns, resulting in reduced revenue 	<input type="checkbox"/> Short-term	<input checked="" type="checkbox"/> Mid-term	<input checked="" type="checkbox"/> Long-term	

Scope and Period of Application of Climate Risk and Opportunity Management The period and scope applied to the identification, assessment, and management of climate-related risks and opportunities at Hyundai are as follows:

Application timelines	Application scope
<input checked="" type="checkbox"/> Short-term (0-3 years)	<input checked="" type="checkbox"/> Business sites: All global operations (including new ones, expected facility life-cycle considered)
<input checked="" type="checkbox"/> Mid-term (3-10 years)	<input checked="" type="checkbox"/> Upstream activities: Purchased goods and services, capital goods, upstream distribution, etc.
<input checked="" type="checkbox"/> Long-term (10-25 years)	<input checked="" type="checkbox"/> Downstream activities: Transportation, use (customers), end-of-life treatment and recycling, etc.

Response to Climate Change

STRATEGY AND DECISION-MAKING

Efforts to Mitigate and Adapt to Climate Change

Significant Risks and Opportunities	Direct and Indirect Mitigation and Adaptation Measures	Key Contents
Policies and regulations for responding to climate change	① Process and facility change at business sites	Introduction of high-efficiency equipment to reduce GHG emissions
	Facility relocation	Establishment of a new plant in Georgia, USA, to meet IRA requirements
	④ Changes in product specifications	Improvements in fuel efficiency and transition to electrification in response to the EU's Fit-for-55 and North America's GHG regulations
	⑤ Life cycle assessment (LCA)	Execution of Full-LCA (Life Cycle Assessment)
	⑥ Supply chain and stakeholder collaboration	Management of supply chain risks in response to IRA and CBAM regulations
Acceleration of the transition to electrification	Process and facility changes	Application of the dedicated electric vehicle platform E-GMP
	Facility relocation	Establishment of a new plant in Georgia, USA in order to target the North American electric vehicle market; construction of a new EV-exclusive plant in Ulsan, Korea
	③ Changes in product specifications	Improvement of electric vehicle charging times and reduction of production costs through expanded R&D
	Supply chain and stakeholder collaboration	Demands for increased supply chain R&D for battery capacity improvement to reduce production costs
Technological innovations for responding to climate change	② Transition to renewable energy	Implementation of RE100 through the construction of photovoltaic infrastructure and electricity supply contracts
	Changes in product specifications	Expansion of R&D aimed at improving the fuel efficiency of internal combustion engine vehicles and enhancing EV charging time and range
	⑥ Supply chain and stakeholder collaboration	Establishment of a low-carbon logistics and transportation ecosystem
	⑦ Social carbon reduction	Industry-academic research on atmospheric carbon capture and utilization, led by Hyundai Motor Group, and execution of blue carbon projects

① Process and Facility Change at Business Sites

Enhancing Energy Efficiency;

Hyundai identifies opportunities for improvement through analysis and diagnostics of energy usage at each business site, and implements the solutions thus derived. Through energy diagnostics and audits, improvement themes are identified, and investment plans are formulated by analyzing the characteristics of each process and facility. Additionally, the extent of losses due to energy usage, breakdown rates, and the age of equipment, as well as the savings expected relative to the amount of investment, are analyzed to determine areas of high energy consumption and priorities for improvement. After identifying the improvement areas, solutions such as the application of high-efficiency motors, inverters, and power regeneration devices, the development of low-temperature curing paint, and waste heat recovery are implemented. Related to these energy-saving and efficiency solutions, an investment of KRW 111.2 billion has been planned for the period 2021-2030 to achieve a reduction target of 250,412 MWh of electricity and 48,880,000 Nm³ of LNG. After completing the energy-saving investment, a results report comparing the before and after performance is prepared to evaluate the progress and performance of the savings continuously. Furthermore, at each business site, employees receive education on energy-saving activities, technology, and facilities, as well as training on heating and cooling standards and energy waste prevention, in order to encourage energy-saving practices.

In addition, Hyundai has developed a low-temperature curing painting technique that reduces energy consumption and carbon dioxide emissions in the painting process, which accounts for about 43% of the energy used in the entire automobile manufacturing process. This technology maintains the same paint quality while reducing the curing process from 140°C for 20 minutes to 90°C for 20 minutes, potentially reducing energy consumption by around 40%. In 2023, Hyundai Assan Otomotiv Sanayi (HAOS) invested KRW 130 million in applying this low-temperature curing painting technique, and we plan to invest KRW 2.6 billion by 2030 in order to expand this method to all its global manufacturing plants. This initiative is expected to reduce annual LNG consumption by 6,161,000 Nm³ and GHG emissions by 14,000 tCO₂-eq.

GHG Reduction and Energy Saving Activities at Major Business Sites

R&D Sites Recycled waste heat and steam from facilities and equipment are reused in boilers, while waste heat generated during waste disposal is also utilized. Additionally, the annual introduction of high-efficiency lighting, activation of energy-saving systems, removal of boiler scale, and efficient operation of condensing heat transformers collectively contribute to reducing Hyundai's GHG emissions by approximately 8,138 tCO₂ per year.

Ulsan Plant The Ulsan Plant aims to reduce its energy usage per unit by 1% per year through such measures as replacing existing pumps with energy-efficient ones, configuring the power-saving circuits in the engine plant, installing inverters to reduce electricity usage, and extending the pre-heating zone of the electrocoating oven to lower gas consumption, thereby continuously advancing its GHG reduction initiatives.

Asan Plant To improve the efficiency of its facility operations, ultra-energy-saving circuits have been established for the plant's engine machining equipment, and they have been expanded to about 350 machines. In addition, not only its production facilities but also its employee welfare facilities have specified energy-saving targets, analyzed operating hours, and identified and implemented energy efficiency improvements.

Jeonju Plant The Jeonju Plant aims to improve the energy efficiency of its production facilities via the integrated operation of painting process booths and the configuration of power-saving circuits in the engine plant, and to reduce GHG emissions through the installation of high-efficiency heating and cooling systems and premium motors.

Korea Customer Service Sub-Division Hyundai's service centers and offices are saving energy by installing LED lighting and re-setting hot water boiler temperatures. Additionally, it is conducting campaigns aimed at employees and education on the reduction of GHG emissions in order to foster a culture of energy saving.

Hyundai Motor Manufacturing Czech (HMMC) An internal Energy Cross Functional Team (CFT) is operated to continuously invest in energy-efficient equipment and facilities. Based on the gas monitoring system at the painting plant, the Eco Smart VEC (Vapor Emission Control) system has been introduced, and energy is saved by adjusting the supply of compressed air and LED lighting replacement.

Hyundai Assan Otomotiv Sanayi (HAOS) In 2023, an RTO waste heat recovery system was installed to reduce natural gas usage in the painting plant, which is expected to reduce the annual consumption of natural gas by 12.2% and the Scope 1 GHG emissions by 11.9%.

Beijing Hyundai Motor Company (BHMC) Energy waste during non-production times is strictly managed, and facilities and equipment that consume excessive energy are closely monitored. Additionally, the energy supply for key facilities such as heating, cooling, lighting, steam, and compressors is optimized, and various energy-saving activities are carried out, including controlling the temperature of the painting oven.

Hyundai de Mexico Energy-saving measures are being implemented by optimizing the operational rates of air compressors in order to align them with the weekday and weekend schedules, and by minimizing the unnecessary use of daytime lighting. As a result, power consumption has been reduced by approximately 611 MWh, leading to a total GHG reduction of 268 tCO₂.

Response to Climate Change

2 Transition to Renewable Energy

RE100 Implementation Plan

Hyundai, along with other major Group affiliates of Kia, Hyundai MOBIS, and Hyundai WIA, declared our commitment to the global initiative RE100 in July 2021, aiming for 100% renewable energy usage. In April 2022, this commitment was approved. Hyundai now aims to achieve 100% renewable energy transition by 2045, ahead of the RE100's target year, 2050. To achieve this goal, we take into account the renewable energy supply environment, government policies and regulations, and plant-specific conditions in each country. We plan to install solar panels on the roofs of key production plants, purchase renewable energy certificates, and establish power purchase agreements (PPAs) with external renewable energy generators. The aim is to gradually expand the use of renewable energy until 2045 by applying optimal solutions. All of our business sites in the U.S., Europe, and India have set a target to achieve RE100 by 2025.

Adoption of Renewable Energy at Major Business Sites

Hyundai Motor Manufacturing Czech (HMMC) In 2022, HMMC transitioned to using 100% renewable energy for its factory electricity through the Guarantee of Origin (GO).

Hyundai Assan Otomotiv Sanayi (HAOS) Aiming to achieve RE100 by 2025, HAOS procured about 68% of its total electrical energy from renewable sources in 2023 through the purchase of Renewable Energy Certificates (RECs). It is also proceeding with the installation of its own solar power generation facilities.

Hyundai Motor India (HMI) To achieve the goal of using 100% renewable energy by 2025, HMI currently sources approximately 35% of its total electricity requirement through Power Purchase Agreements (PPAs) for green energy, and about 24% from Renewable Energy Certificates (RECs). In addition, HMI partly supplies its own renewable energy by operating a 690kW photovoltaic power facility.

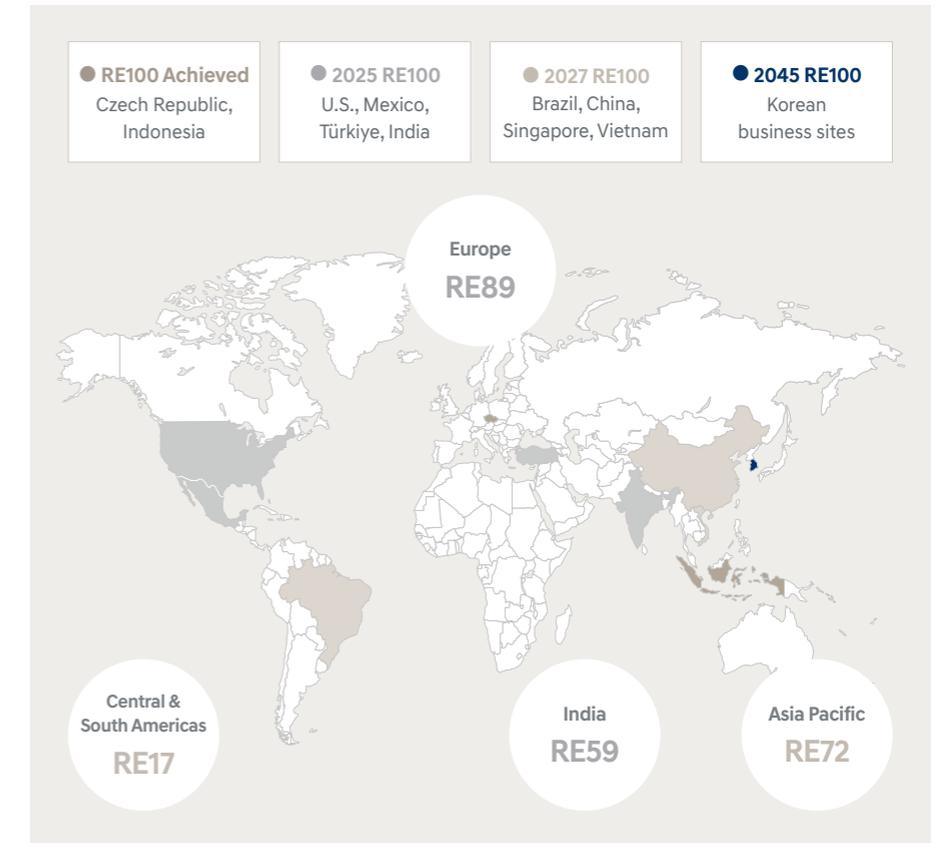
Hyundai Motor Central & South Americas (HMCSA) Our manufacturing plant in Brazil purchases about 41% of its total electricity consumption through RECs, and plans to achieve the RE100 target by 2030 by pursuing PPAs, local power investments, and self-generation.

Hyundai Motor Manufacturing Indonesia (HMMI) Since 2023, HMMI has been procuring renewable energy through a leading REC purchase contract and operating photovoltaic power generation facilities on-site to produce vehicles, using 100% renewable energy.

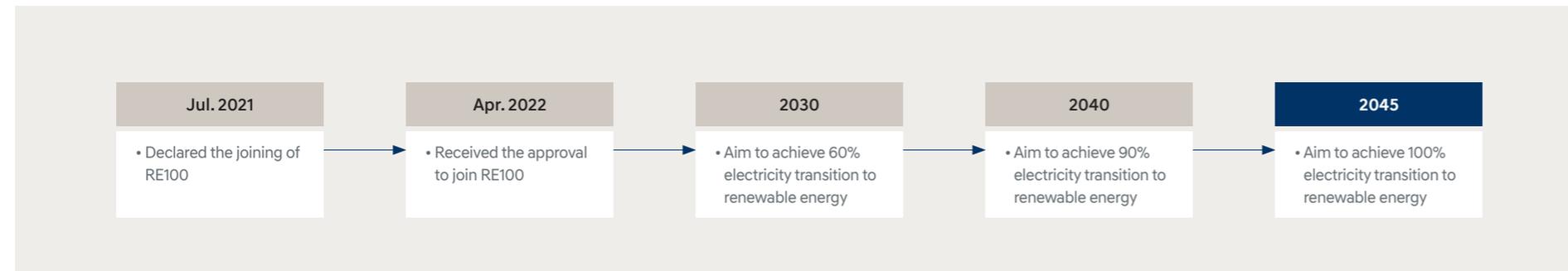
Plants in Korea Hyundai is installing photovoltaic power generation facilities with a capacity of approximately 15MW on employee parking lots, storage areas, and factory roofs within its Ulsan, Asan, and Jeonju plants, with the goal of completion by 2024.

R&D Sites R&D sites are operating a 602kW photovoltaic power generation facility and plan to expand the use of renewable energy by increasing the capacity to 10MW by 2025.

RE100 Implementation Status as of 2023



RE100 Roadmap



Business Sites	Renewable Energy Transition Rate	Proportion by Means of Implementation				
		Self-generation	On-site PPA	Off-site PPA	REC purchase	
Europe	HMMC	100%	-	-	-	100%
	HAOS	68%	-	-	-	68%
India	HMI	59%	-	4%	31%	24%
Central & South Americas	HMCSA	41%	-	-	-	41%
Asia Pacific	HMMI	100%	4%	-	-	96%
	HMGICS	9%	-	9%	-	-

Response to Climate Change

3 Transition to Electrification

Transition Direction of Electrification Hyundai does its utmost to achieve carbon neutrality by 2045 by promoting carbon reduction and zero-emission in our vehicle sales. To accomplish this, we are transitioning our business structure from internal combustion engine vehicles to an electrification-focused approach. Hyundai is continuously developing and producing not only hybrid and PHEVs but also EVs and FCEVs that have zero carbon emissions during operation. Hyundai is prioritizing the development of EV-focused technologies, such as the E-GMP (Electronic-Global Modular Platform), and enhancing the performance of hydrogen fuel cell systems that can be applied to a variety of types of vehicles, including passenger cars and commercial vehicles. Additionally, we are actively driving the expansion of electric and hydrogen infrastructure to ensure convenient and accessible charging and refueling facilities anytime and anywhere. As a Mobility Solution Provider, we are not only focused on improving the hardware performance of mobility devices but also on strengthening our software capabilities to consistently provide optimized services, generate revenue, and promote sustainable development.

Mid- to Long-Term Electrification Strategy for 2030 To achieve the goals of the 2030 electrification strategy, we are implementing a comprehensive battery strategy that includes expanding production in regions with high demand for electric vehicles, developing next-generation battery technologies, and modularizing batteries, as well as enhancing the marketability of EVs by integrating hardware and software. Specifically, to achieve carbon neutrality, we are accelerating the transition to electrification, with the goals of 100% electrification in the European market by 2035 and 100% electrification in major markets by 2040. The company's share of the global production of EVs is expected to increase from 8% in 2023 to 34% by 2030, in line with plans to expand regional production through line conversions and new factory establishments, moving away from production centered in Korea.

Transition to EV Production

Gaining EV Technology Competitiveness To expand EV sales, Hyundai is implementing a comprehensive battery strategy that combines three key strategies – stable battery supply, next-generation battery technology development, and modularization. To procure the required large-scale batteries for the sale of 2 million EVs by 2030, Hyundai is strengthening collaboration with global top-tier battery suppliers. In addition, we are pursuing local battery sourcing in key production regions and establishing a battery cell joint venture factory in Indonesia. We are focusing on maximizing the performance of existing lithium-ion batteries to achieve EV performance improvements and cost reductions. Simultaneously, we are also investing in the development of next-generation battery technologies such as all-solid-state batteries. Furthermore, Hyundai is working toward the standardization and modularization of key EV components like batteries and motors through the development of an integrated modular architecture (IMA) system, which is expected to be completed by 2025.

Development of Dedicated EV Platforms Hyundai's E-GMP is a vehicle chassis that encompasses the battery, motor, and power electronics system. It is a modularized and standardized integrated platform that allows for the configuration of a variety of types of vehicles, thanks to its expandable wheelbase. Additionally, Hyundai plans to introduce two dedicated EV platforms – the “eM” platform for passenger vehicles and the “eS” platform for PBVs. The eM platform features an expanded common range compared to E-GMP, and will be developed in a form that can be applied to all segments. eS will be developed with a flexible structure and will play a key role in responding to B2B demand such as delivery and car hailing. We are developing our next-generation EV-dedicated platforms with the goal of increasing battery capacity by 40% and motor output by 28%, while raising competitiveness by increasing the charging time following increased battery capacity. In addition, we are seeking to reduce the slow charging time by 50% compared to the current level. In terms of safety, we plan to introduce a new structure that will not be exposed to flames in the event of a battery fire, while maintaining the existing highest crash safety performance in all regions.

Standardization and Modularization of Core EV Components Hyundai aims to standardize a total of nine types of battery systems, allowing for easy response to battery demand based on vehicle class. Furthermore, we plan to transition from the current “cell-to-module” structure to a “cell-to-pack” approach by 2025, removing the module stage. This transition is intended to enhance energy density and improve overall battery performance.

Expanding EV Charging Infrastructure Hyundai is expanding the charging infrastructure for EVs and FCEVs to enhance the convenience of using eco-friendly vehicles and accelerate their adoption. In Korea, we have been expanding our service operations for the high-speed EV charging service known as “E-pit” ever since its launch in 2021. In Europe, we are expanding high-speed charging infrastructure through strategic investment in IONITY, an EV charging network company. In the U.S., we have entered into a business agreement with global energy company Shell to explore and review options for expanding EV charging infrastructure and enhancing charging convenience.

E-pit – Ultra-fast EV Charging Station E-pit provides the fastest charging speed in South Korea, allowing EVs to be charged in less than 18 minutes (based on the IONIQ 6, from 10% to 80% battery charge with a 350-kW ultra fast charger.) Furthermore, E-pit offers several services to its customers, including Digital Queue which provides estimated charging time and queue information to users; Plug & Charge Technology which enables users to automatically authenticate, charge, and make payments; Digital Wallet which allows users to authenticate and make charging payments even at other charging networks; and Route Recommendation which guides users to the nearest available charging station with the optimal route.

H Moving Station – Mobile Hydrogen Charging Station H Moving Station is a mobile charging station (truck) that can be easily moved to areas where hydrogen charging stations are not provided or are out of order. Hyundai's mobile hydrogen charging station, H Moving Station, can store 80 kg of hydrogen per unit and charge up to 25 FCEVs per day with a charging pressure of 350 bar. In particular, these charging pressure figures are in accordance with the international standard charging protocol (SAE J2601), and durability and safety for mobile facilities are also procured. Going forward, we will expand operations to enable the charging of a variety of mobilities such as heavy equipment and drones that use hydrogen fuel.

Increase the portion of EV production efficiently through transition to EV lines and addition of new dedicated EV plants by region

Increase the portion of EV production efficiently through transition to EV lines and addition of new dedicated EV plants by region

¹⁾ Major markets (Korea, U.S., Europe) 48%

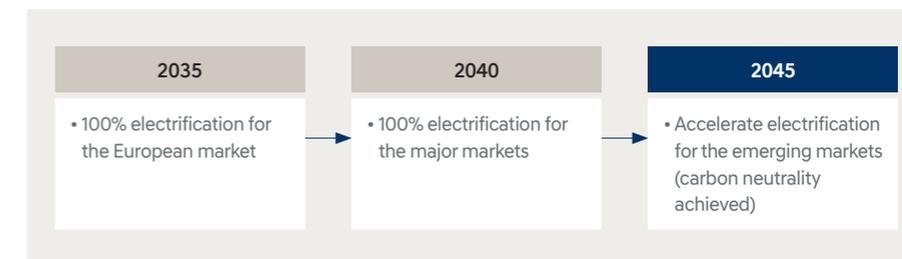
2023 2026 2030

Global EV production portion²⁾



²⁾ Based on the figures presented at the 2023 CEO Investor Day

Vehicle Electrification Roadmap by 2030



Response to Climate Change

Expanding Eco-friendly Vehicles

EV Hyundai launched the dedicated eco-friendly model of the IONIQ in 2016 and introduced the Kona EV, a compact SUV electric vehicle, in 2018. We then unveiled the IONIQ brand, based on the E-GMP platform, in 2020, followed by the release of the IONIQ 5 in 2021 and the IONIQ 6 in 2022. In 2023, Hyundai's global sales of electric vehicles reached 268,785 units, an increase of 27.8% from the previous year. In April 2024, we launched two logistics-specialized models, the "Cargo" and the "Cargo Refrigerated", on our new electrification business platform "ST1."

HEV and PHEV Hybrid models are available for all models except for large SUVs and small sedans such as IONIQ, Elantra (AVANTE), Kona, Sonata, Tucson, Santa Fe, and Grandeur. We are also offering a plug-in hybrid lineup in our IONIQ, Sonata, Tucson, and Santa Fe models. In 2023, Hyundai's global hybrid sales amounted to 373,941 units, while its plug-in hybrid sales amounted to 47,608 units, increases of 56.3% and 1.0%, respectively, from the previous year. By 2030, Hyundai aims to increase the sales of hybrids and plug-in hybrids to 910,000 units, targeting 15.6% of total sales.

FCEV The NEXO, launched by Hyundai in 2018, is a leading FCEV with a maximum driving range of 611 km (US certification) and a charging time of about 5 minutes (6.33 kg per charge). We are strengthening our FCEV lineup by strengthening our FCEV leadership and mass-producing the Elec-City fuel cell bus and the XCIENT fuel cell heavy-duty truck. In 2023, Hyundai's sales of FCEVs came to 5,048 units.

Alternative Fuel Vehicles Hyundai continuously releases regional specialty, alternative fuel models powered by bioethanol and compressed natural gas (CNG). In South America, we launched the HB20, a biofuel vehicle, to meet the demand for bioethanol, while in India we introduced the Aura CNG model to respond to the country's growing demand for CNG. Going forward, we aim to expand the total sales proportions of our flex-fuel vehicles and liquid petroleum gas (LPG) vehicles to 5.2% and 1.5%, respectively, by 2030.

EV Sales Performance and Expansion Plan

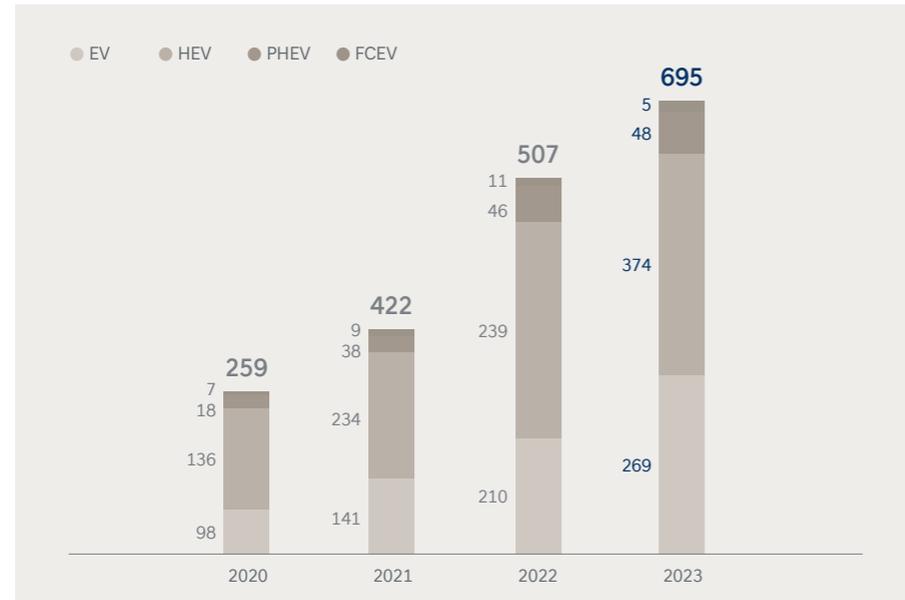
EV Sales Performance In 2023, Hyundai's EV sales amounted to 268,785 units, accounting for about 6.4% of all its vehicle sales. This represents an increase of approximately 27.8% from the 2022 figure of 210,352 units, with growth driven largely by models based on the dedicated electric vehicle platform E-GM, such as the IONIQ 5, IONIQ 6, and GV60.

EV Sales Goal As global EV demand grows faster than market forecasts, we have raised the 2030 sales target that we announced at the 2022 CEO Investor Day from 1.87 million to 2 million units. We have also raised our sales targets for each of our major regions, and are prepared to flexibly adjust those sales targets according to regional market demand.

Expansion of Models Based on EV-dedicated Platform Hyundai plans to launch the IONIQ 7 in 2024 following the release of the IONIQ 5 and the GV60 in 2021, based on the first EV-dedicated platform E-GMP, and the IONIQ 6 in 2022. Based on the next-generation EV-dedicated platform, which will inherit the original features of, and further develop, the E-GMP, we plan to expand our EV lineup significantly by launching nine new models (four Hyundai and five Genesis models) from 2025 to 2030.

Global Sales of Eco-friendly Vehicles

(Unit: 1,000 vehicles)



Sales of Alternative Fuel Vehicles

(Unit: Vehicles)

	2020	2021	2022	2023
Flex-fuel vehicles (Bio-ethanol/Bi-fuel)	152,977	186,573	195,485	191,348
CNG vehicles	1,352	1,489	1,581	1,180
LPG vehicles	53,953	48,851	42,803	41,495
Total	208,282	236,913	239,869	234,023

EV Sales Goal for 2030¹⁾

(Unit: 10,000 vehicles)

	2023	2026	2030
Korea 🇰🇷	10	15	24
Europe 🇪🇺	10	30	51
U.S. 🇺🇸	7	23	66
Others 🌐	6	26	59
Total	33 (8% of total sales)	94 (18% of total sales)	200 (34% of total sales)

¹⁾ Based on the figures presented at the 2023 CEO Investor Day

Response to Climate Change

Development of EV Battery Efficiency Improvement Technology Hyundai continues to research and develop “thermal management technology” to minimize the waste heat in EVs and increase battery efficiency. To minimize the energy supplied from the battery for heating, Hyundai has developed “radiant heat warmer” technology, which raises the temperature of the heating element based on radiant heat. We have also developed the “heated glass defrost system” technology, which uses heated glass to remove snow and ice from the front windshield, rather than using hot air. Hyundai’s dedicated EV batteries are designed to provide a maximum driving range of 250,000 to 300,000 kilometers when reaching 70-80% of battery performance. This translates to a cumulative usage of 12 to 15 years when assuming an annual driving distance of 20,000 kilometers. Furthermore, to maintain optimal charging speed and efficiency under a variety of weather conditions, Hyundai is developing an “external thermal management station”. This system injects cooling water of the required temperature from the outside during charging to optimize the battery temperature.

Battery Management Based on Digital Twin Hyundai is implementing digital twin technology to manage the performance of a key component of EVs – batteries. The battery life prediction technology, utilizing digital twin, analyzes a variety of factors based on the actual vehicle’s driving history to continuously re-evaluate the battery life, enabling more accurate battery life predictions. By creating a virtual EV in the digital world based on a variety of driving data collected from real-world driving of EVs (such as the IONIQ 5), Hyundai predicts the battery life for each vehicle. The integration of AI, machine learning, and physics models is utilized in a sophisticated data analysis model to comprehensively analyze vehicle-specific information, including charging/discharging, driving habits, parking, and driving conditions, which can impact EV battery performance. This approach aims to increase the accuracy of battery life predictions.

Certified Energy Efficiency by EV Model

Model	Korea (Combined) ¹⁾	Europe (WLTP) ²⁾	U.S. (EPA) ²⁾
Electrified G80	4.3 km/kWh	19.1 kWh/100km	97 MPGe
Electrified GV70	4.6 km/kWh	19.2 kWh/100km	91 MPGe
Electrified GV60	5.1 km/kWh	17.0 kWh/100km	112 MPGe
Kona Electric	5.5 km/kWh	14.7 kWh/100km	120 MPGe
IONIQ 5	5.2 km/kWh	17.0 kWh/100km	114 MPGe
IONIQ 6	6.0 km/kWh	14.3 kWh/100km	140 MPGe
IONIQ Electric	6.3 km/kWh	13.8 kWh/100km	133 MPGe

¹⁾ Electrified G80 (19-inch, 2,265 kg), Electrified GV70 (19-inch, 2,230 kg), GV60 (standard 2WD), Kona Electric (long range, 1,720kg), IONIQ 5 (long-range 2WD exclusive, without built-in cam), IONIQ 6 (long-range 2WD, 18-inch)

²⁾ Europe and the USA make distinctions based on the representative TRIM standards for each model

FCEV Battery Performance

Vehicle	Fuel tank capacity	Fuel economy (combined)	Driving distance per charge	Warranty period for separately guaranteed parts
NEXO	6.33 kg / 156.6 Liter	96.2 km/kg	609 km	10 years, 160,000 kilometers
Based on Modern I 17-inch tire				

4 Improving Fuel Economy

Improvement of Vehicle Fuel Economy Hyundai is aiming for a long-term transition to EVs while also making efforts to minimize greenhouse gas emissions from ICEVs which take large portion of our total sales volume as of current. Through continuous research and development of powertrain efficiency improvement, we are adapting to country-specific fuel economy and emission regulations while achieving greenhouse gas reduction during vehicle operation. Furthermore, we are focusing on R&D aimed at making vehicles more lightweight, enhancing aerodynamics, and other measures to improve fuel economy, thus enhancing both environmental and economic benefits.

Technologies to Enhance Vehicle Fuel Economy From an aerodynamic perspective, we are developing and applying technologies across all areas of design and engineering. This includes optimizing the shapes of bumpers, trunks, roofs, and full undercovers, as well as developing technologies like Air Guards (for ICE) and Active Air Flaps (for HEVs) to reduce cooling resistance. Furthermore, we have developed the third-generation powertrain (Smartstream), which combines the advantages of both MPI and GDI, to realize the optimal injection method for vehicle driving conditions. Additionally, we are striving to reduce GHG emissions by developing and implementing various fuel economy technologies, including an integrated flow control valve for optimized coolant temperature control based on driving conditions, a Continuous Variable Valve Duration (CVVD) system, and a Low Pressure Exhaust Gas Recirculation (LP-EGR) system.

Enhancing the Public Confidence in Fuel Economy Testing Hyundai complies with the fuel economy regulations of key markets such as Korea, North America, Europe, China, and India. To obtain fuel economy certification, we conduct tests according to the standards of each country. To enhance the reliability of fuel economy and emission measurements conducted in controlled conditions (on-cycle), Hyundai undergoes inspections of fuel economy measuring equipment by external specialized organizations such as the Korea Laboratory Accreditation Scheme (KOLAS) and the Korea Automotive Technology Institute (KATECH). Furthermore, Hyundai collaborates with a variety of government research institutes and conducts fuel economy tests jointly to ensure public confidence in the accuracy of the fuel economy measurement results. The results of on-cycle and off-cycle test comparative analysis are reported to the executive in charge of R&D at least once a year.

Real-Road (Off-Cycle) Fuel Economy Test The vehicle fuel economy is influenced by a variety of factors, including internal factors such as gear shifting, vehicle weight, and air conditioning, as well as external factors like road conditions and traffic congestion. In light of this, Hyundai conducts fuel economy tests not only in controlled conditions (on-cycle) considering a variety of factors but also performs off-cycle tests that simulate real-world driving profiles.

Collaboration with Third-Party Agencies Hyundai conducts correlation analysis between the fuel economy test results obtained from real-world (off-cycle) tests and those of other organizations. In the US market, we compare our fuel economy data with those published by third-party organizations such as the EPA, J.D. Power, and Consumer Reports. In the European market, comparisons are made with data from third-party organizations such as Green NCAP, Auto Bild, and Spritmonitor. By comparing the fuel economy measurement results with those of third-party organizations in each country, we enhance the credibility of our own fuel economy test results.

Responding to Fleet average CO₂ standards (Fuel Economy) in Major Markets The fleet average CO₂ standards or corporate average fuel economy regulations, implemented in major countries, are continuously being strengthened to achieve their carbon reduction targets. In the EU, regulatory targets have been adopted to reduce passenger car CO₂ emissions by 55% by 2030 compared to 2021 and achieve complete decarbonization of vehicle CO₂ emissions by 2035. The US government has announced regulations starting in 2023 to progressively increase fuel economy standards by 5-10% annually, aiming to reach 55 miles per gallon by 2026. They have also set a target to replace 50% of new vehicle sales with electrified vehicles (including EVs, PHEVs, and FCEVs) by 2030. The government of California in the U.S. plans to replace 35% of new vehicle sales with zero-emission vehicles (including EVs) starting from 2026, increasing to 68% by 2030, and has set plans to prohibit the sale of new internal combustion engine vehicles starting from 2035.

Hyundai is expanding the sales of electrified vehicles in response to the strengthening of CO₂ regulations in major regions until 2030, aiming to reduce the average carbon emissions of our fleet in each region. We have a long-term target of achieving zero fleet carbon emissions, and to minimize regulatory risks, we at Hyundai are calculating and incorporating the regulatory compliance volume, including the volume of EVs, into our annual sales volume plan. We also monitor and evaluate regulatory compliance based on monthly sales performance. To prepare for the possibility of not meeting regulations, we adjust our sales volume and utilizes a variety of measures such as the use of accumulated credits to mitigate regulatory risks in advance.

Response to Climate Change

Responding to Fleet average CO₂ standards (Fuel Economy) in Major Markets

Korea

South Korea has strengthened its automotive GHG regulations, requiring a reduction in vehicle emissions from 97g/km in 2020 to 89g/km in 2025 and 70g/km by 2030. Exceeding the emission standards results in a fine of KRW 50,000 per gram. In addition, the Korean government has presented a basic plan to reduce emissions by 24% by distributing 2.83 million eco-friendly vehicles, including electric and hydrogen vehicles and hybrids, by 2025, and 7.85 million vehicles by 2030.

EU

The EU has finalized its goals through a resolution by the European Parliament, with an aim to achieve a 15% reduction by 2025 and a 55% by 2030 compared to the levels in 2021. In addition, the EU has set a goal to achieve a 100% reduction in emissions from passenger cars by 2035. As a result of these regulations, starting from 2035, the sale of new ICEVs in the EU market will be practically impossible. Furthermore, countries like Norway, the Netherlands, and Germany are even pursuing individual national policies to prohibit the sale of new internal combustion engine vehicles earlier than 2035.

Average CO₂ Emissions in the EU

(Unit: g/km)



* 2021/2022 performance is not able to be compared with the performance of prior years for the EU Commission (EC) changed the CO₂ emission standard from NEDC to WLTP; and the regulatory value was also from 95 g/km (2020) based on NEDC to 112.5 g/km (2021) based on WLTP according to the change of methodology.

** The figure for 2021 has been revised from our internal estimate (109.7 g) to the officially announced figure by the European Commission (107.1 g).

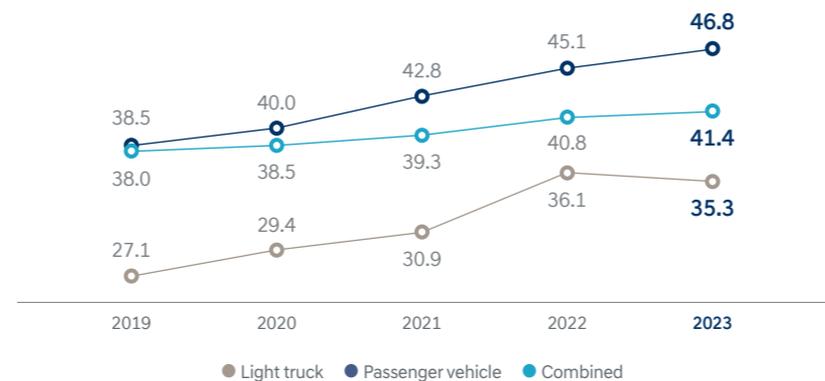
*** The input figure for 2023 is based on our sales performance and is our own estimate. Going forward the final confirmation of the figures by the EC will be necessary.

U.S.

The US government has increased their average fuel economy target from 40 miles (64.4 km) per gallon to 55 miles (88.5 km) per gallon by 2026. They have also set a goal to reduce greenhouse gas emissions from 224 grams per mile to 161 grams per mile by 2026. Furthermore, both the federal and state governments are expanding incentives for the transition to eco-friendly vehicles through increased purchase subsidies. The federal government has set a goal to transition 50% of all vehicles, including electric vehicles (EVs), to zero-emission vehicles by 2030. Additionally, the California state government is pursuing a policy to ban the sale of internal combustion engine vehicles starting in 2035.

Average Fuel Economy in the U.S.

(Unit: mpg)



* The average fuel economy in the U.S. and China is determined annually based on the average fuel economy performance of individual car brands as disclosed by the respective government agencies (NHTSA) in the U.S. and the Ministry of State Security in China.

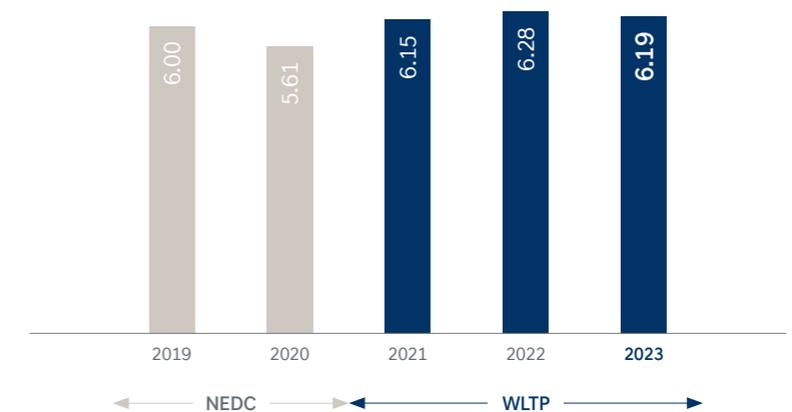
** The input figure for 2023 is based on our sales performance and is our own estimate. Going forward the final confirmation of the figures by the NHTSA will be necessary.

China

The Chinese government is also continuously strengthening fuel efficiency regulations and enhancing the mandatory sales requirements for new energy vehicles (NEVs), including EVs. In particular, they aim to progressively increase the mandatory sales share of NEVs, reaching 20% by 2025, 40% by 2030, and 50% by 2035. Additionally, they have set a target for EVs to account for over 95% of NEV sales by 2035.

Average Fuel Economy in China

(Unit: L/100km)



* 2021 performance is not able to be compared with the performance of prior years for the Chinese government changed the fuel economy certification standard from NEDC to WLTP.

** The input figure for 2023 is based on our sales performance and is our own estimate. Going forward the final confirmation of the figures by the Ministry of State Security in China will be necessary.

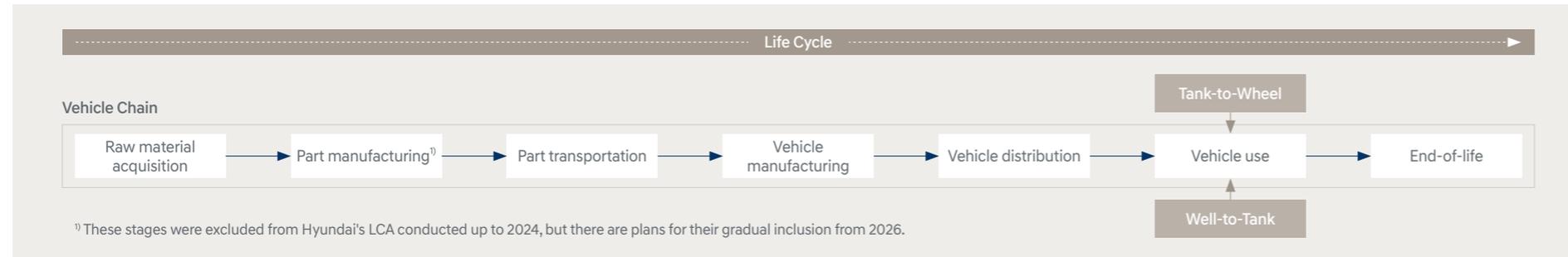
Response to Climate Change

5 Life Cycle Assessment (LCA)

LCA Methodology Hyundai conducts life cycle assessments (LCA) based on ISO 14040 and 14044 international standards to assess the environmental impacts throughout the entire process of vehicle production, including raw material extraction, component manufacturing, component transportation, vehicle manufacturing, vehicle distribution, vehicle operation, and end-of life treatment. As of 2023, the proportion of vehicle models that underwent LCA was 40.90%. The LCA was conducted using the full-LCA methodology for all vehicle models.

LCA uses the CML (Centrum voor Milieukunde Leiden) methodology to assess Global Warming Potential (GWP), Abiotic Depletion Potential (ADP), Acidification Potential (AP), Eutrophication Potential (EP), Ozone Depletion Potential (ODP), and Photochemical Oxidant Creation Potential (POCP). Additionally, those indicators that are not covered by CML, such as land use and ionizing radiation, are further monitored using the Environmental Footprint (EF) 3.0 methodology. While the environmental impacts of suppliers' component manufacturing are not currently included, assessments of specific components, such as battery cells, are conducted using commercial databases. Actual data measured at business sites, including energy used for vehicle transportation and distribution, power consumption, and pollutant emissions, are applied. Furthermore, the operational phase of electric vehicles (EVs) has been projected based on the anticipated impact of future power production according to the "Basic Plan for Power Supply and Demand."

Life Cycle Stages Covered by LCA



Impacts Covered by LCA

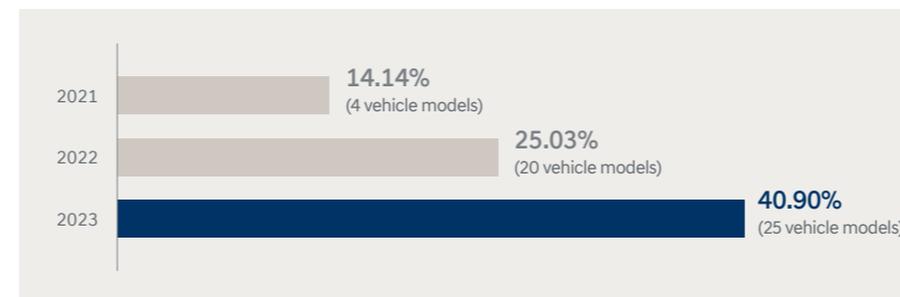
Ecological consequences					Resource use			Human health	
Acidification (AP)	Dust and particulate matter	Eutrophication (EP)	Global warming (GWP)	Ozone depletion (ODP)	Photo-chemical ozone formation (POCP)	Abiotic depletion (minerals)	Land use	Water depletion	Ionizing radiation

LCA Expansion Based on the LCA process established until 2021, an LCA was conducted on five passenger car models in 2023.

Use of LCA Hyundai comprehensively analyzes the environmental impacts at each stage of the entire process based on the results of LCA. Using this information, we identify and promote activities to improve the environmental aspects of our vehicles. In the raw material acquisition stage, we are expanding the use of low-carbon steel and aluminum materials. In the part-manufacturing and vehicle-manufacturing stages, we are committed to carbon neutrality through initiatives like RE100 and resource circulation. When developing new models, we aim to minimize environmental impacts by considering LCA.

LCA Results In 2023, additional LCA were completed for five models, bringing the cumulative total of vehicles assessed by LCA up to that year to 25 models. The part manufacturing stage that are not currently included will be further refined and supplemented using advanced LCA methodologies.

Cumulative Vehicle Models and Ratio of Sales by Model in 3-year Full-LCA



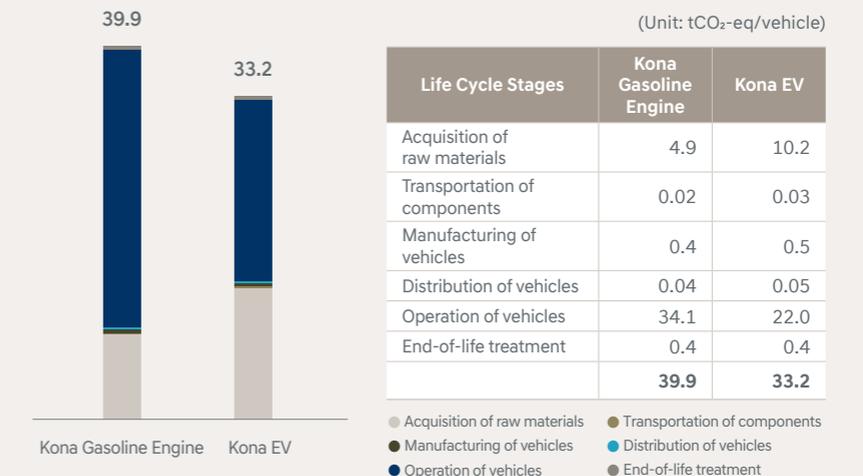
BUSINESS CASE



2023 LCA of Kona Gasoline Engine and EV Models

Hyundai quantitatively assesses the potential environmental impacts of vehicles through LCA and uses this information to identify specific areas of improvement and enhance the overall environmental performance of its vehicles. In 2023, we conducted LCAs for the newly released Kona model and the representative model from previously released vehicles, the Elantra.

Comparing the global warming potential (tCO₂-eq) of Kona's gasoline engine and EV models, it is evident that the EV model has about 17% lower impact on global warming. This is because EVs, which use electricity as an energy source, do not emit greenhouse gases during operation, and even considering the environmental impact of electricity production, the results confirm a clear environmental advantage for EVs. However, the manufacturing of EVs involves a substantial use of materials not typically used in internal combustion engine vehicles, leading to a relatively high environmental impact at the raw material extraction stage. Given the expected gradual decrease in the environmental impact of electricity production due to the introduction of renewable energy, the environmental impact at the raw material extraction stage will become increasingly significant. We are focused on improving this by developing and applying alternative parts and eco-friendly recycled materials.



Response to Climate Change

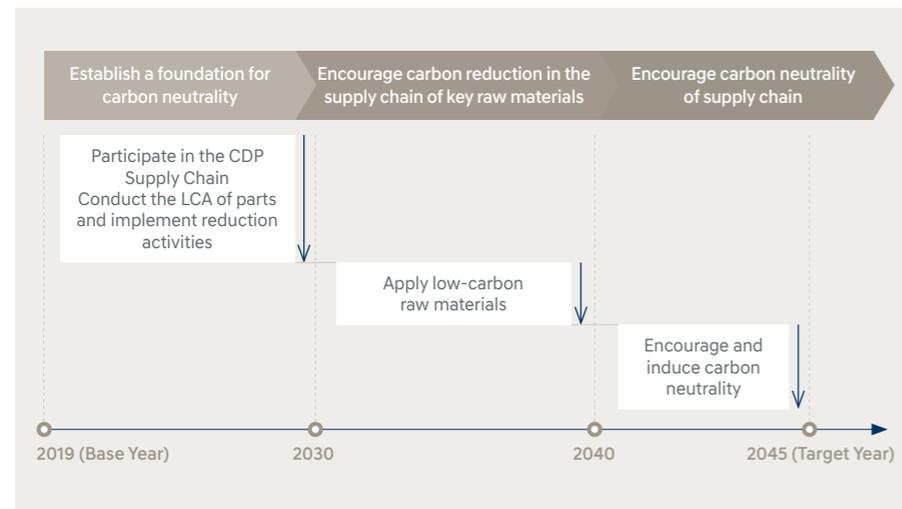
6 Carbon Reduction in The Supply Chain

Supplier Carbon Neutrality Hyundai has established a monitoring and management system for tracking carbon emissions from suppliers to support their carbon neutrality. In the long term, the company aims to reduce carbon emissions in the supply chain by implementing eco-design and using low-carbon materials. Additionally, in 2022, Hyundai established and distributed the “Hyundai Motor Company Supplier Carbon Neutrality Guide,” and since 2023, has been collaborating with suppliers to enhance carbon neutrality efforts through the CDP Supply Chain program. Since the latter half of 2023, the company has initiated a project to conduct the life cycle assessment (LCA) of parts to aid suppliers in calculating and reducing the carbon emissions of their products. Moreover, Hyundai is laying the groundwork to build a carbon neutrality response system for suppliers through systematic training programs and support for high-efficiency equipment. Through these initiatives, Hyundai is dedicated to significantly reducing GHG emissions in the supply chain and supporting supplier carbon neutrality efforts throughout the entire vehicle life cycle.

Support for Suppliers' Carbon Reduction Efforts Hyundai conducts surveys on suppliers' carbon emissions and reduction plans, performing various tasks to support their carbon reduction. We implement projects to build GHG inventories and develop and implement carbon reduction roadmaps, especially focusing on key suppliers with high carbon emissions.

Once suppliers have internalized their carbon neutrality response systems, a transition to a carbon reduction management system certified by third-party organizations is planned for high-emission suppliers. Furthermore, Hyundai is supporting energy efficiency improvements and carbon reduction for mid-sized and small enterprises through the “Carbon Reduction Equipment Purchase Support Project.” This initiative contributes to reducing energy costs and carbon emissions for suppliers. We are also planning a program to assist suppliers in procuring renewable energy.

Roadmap for Supply Chain Carbon Neutrality



Participating in the CDP Supply Chain Hyundai joined the CDP Supply Chain in 2023. This program, part of CDP's environmental disclosure projects, enables the assessment of suppliers' carbon-related information, including climate change issues, strategies, and carbon emissions. To facilitate smooth participation by suppliers in the CDP Supply Chain, Hyundai has conducted both online and offline training covering a variety of topics, such as carbon neutrality overview, emission calculation methods, and questionnaire items, for approximately 360 domestic tier-1 suppliers. The company also provides ongoing support through the operation of a Help Desk. We also run a one-on-one tailored consulting program for under-assessed suppliers, aimed at enhancing carbon neutrality awareness and introducing carbon reduction methodologies, as a way to support the advancement of more sophisticated carbon neutrality activities.

Support for Parts LCA The parts LCA support program calculates the carbon emissions generated throughout the entire process, from raw material extraction to parts manufacturing and transportation at the supplier's facilities. It supports the objective verification of high-emission processes and facilitates reduction activities. Hyundai is collaborating with external expert organizations to enhance suppliers' capabilities in conducting comprehensive LCAs of parts. This three-year support initiative, scheduled from 2023 to 2025 and divided into three phases, aims to lay a structured groundwork for advancing vehicle-level carbon reduction efforts through LCA.



Activities for Supporting Suppliers' Carbon Reduction Efforts

Activity	Description
Training for and raising awareness of suppliers	<ul style="list-style-type: none"> CEOs: Hosting the Partnership Day for suppliers and introduce Hyundai's carbon neutrality strategies Employees: Offering training on the enhancement of suppliers' capabilities of carbon neutrality (Global Partnership Center)
Participating in the CDP Supply Chain	<ul style="list-style-type: none"> Training and consulting programs for suppliers (emission calculation, inquiry guidance, etc.) One-on-one tailored consulting program for under-assessed suppliers to improve competence
Helping suppliers calculate LCAs of parts	<ul style="list-style-type: none"> Support for calculating carbon emissions from raw material extraction to component manufacturing and transportation stages Support for reduction activities by identifying high carbon emission manufacturing processes
Helping suppliers building carbon reduction management system	<ul style="list-style-type: none"> Establishment and provision of a computerized management system for systematic monitoring of carbon emissions (July 2023) Support for the establishment of carbon emission inventories and the development of carbon reduction roadmap for high carbon emission suppliers
Support project for the purchase of carbon reduction equipment for suppliers	<ul style="list-style-type: none"> Inducing suppliers (MEs and SMEs) to implement energy cost and carbon reduction activities by helping them replace with high-efficiency equipment

Creating an Ecosystem for Low Carbon Logistics and Transportation Hyundai strives to reduce carbon emissions from the “first mile” stage, where freight moves from production plants to logistics warehouses, to the “middle mile” and “last mile” stages, where it moves from warehouses to a variety of hubs. In the first mile stage, hydrogen-powered electric trailers suitable for long-distance driving are being deployed. In the middle mile and last mile stages, electric trucks and other innovative technologies such as EVs, FCEVs, urban air mobility, and robotics are being utilized to lead the reduction of carbon emissions in the logistics and transportation service ecosystem. Furthermore, Hyundai has signed a multi-stakeholder agreement with Hyundai GLOVIS, the Ministry of Land, Infrastructure and Transport, the Ministry of Trade, Industry and Energy, and the Ministry of Environment to expand the electrification of the logistics and transportation sector by 2030. Hyundai is striving to distribute 10,000 hydrogen-powered trucks in the logistics field by 2030.

Supply Chain Carbon Information Disclosure & Services for Logistics/Transportation Energy Efficiency

Disclosure of carbon information of the supply chain	Goal	<ul style="list-style-type: none"> Establishing a plan to specify and support our supply chain carbon reduction strategy by disclosing information on carbon emissions of suppliers
	Efforts for education and support	<ul style="list-style-type: none"> Conducting on/offline education related to CDP Supply Chain (carbon neutrality overview and emission calculation, guidance on questionnaire items, etc.) Offering educational videos, operating a Help Desk, and providing a customized consulting program to enhance the capabilities of underperforming suppliers
	Future utilization measures	<ul style="list-style-type: none"> Systematization of supplier site carbon emission calculations (Scope 3, Category 1) using CDP Supply Chain is planned Planning a review to reflect CDP supply chain results in purchase policy
Services for enhancing the efficiency in logistics and transportation	Achievement of packaging efficiency	<ul style="list-style-type: none"> Reducing the amount of energy used for collecting packing materials through the development of foldable plastic boxes¹⁾ Pursuing packaging efficiency through cooperation with suppliers and expand logistics energy efficiency
	Transitioning to eco-friendly transportation means	<ul style="list-style-type: none"> Enhancing energy efficiency and reduce GHG emissions through coastal shipping
	Eco-driving of cargo vehicles	<ul style="list-style-type: none"> Enhancing the integrated transportation management system within the logistics business and improve the fuel efficiency of cargo vehicles Monitoring of fuel economy improvement activities through real-time data analysis enabled by equipping all vehicles with Digital Tachographs (DTG)

¹⁾ When used as a packaging material for automobile parts, foldable plastic boxes can be recovered and folded up to a fifth of their size, greatly increasing the amount of boxes that can fit into a collection container.

Response to Climate Change

7 Social Carbon Reduction

Carbon Capture Utilization and Storage To achieve carbon neutrality, it is necessary to cease the use of fossil fuels in the automotive manufacturing process. However, reaching the target point for energy transition requires a significant amount of time. During this transitional period, carbon capture utilization and storage (CCUS) technology, which involves capturing and processing CO₂ emitted from fossil fuel combustion, is being recognized as a practical solution and a high-potential means for carbon neutrality. Hyundai's research institute is conducting CCUS pilot studies to commercialize the technology, aiming to extend its application beyond the automotive industry to other business sectors. Continuous market monitoring is also being carried out to stay updated on the latest developments in CCUS technology.

According to the Ministry of Science and ICT, the project "High-efficiency CO₂ Capture Demonstration Development for Blue Hydrogen Production Sites" is underway. This includes assessing the application of carbon capture plants targeting LNG boiler combustion gases at automotive plants. Plans are also being formulated to evaluate commercialization once the enforcement decree for the law on carbon dioxide capture, transport, storage, and utilization, as well as the 4th Emission Trading Scheme Basic Plan, are finalized. Additionally, in the field of Carbon Dioxide Removal (CDR), prominent for its CO₂ removal technologies including Direct Air Capture (DAC), collaborative research on carbon neutrality is being conducted. This research also involves developing technologies aimed at preventing ocean acidification and enhancing the natural carbon absorption capacity of the oceans through the removal of dissolved CO₂.

BUSINESS CASE

Blue Carbon Acquisition through the East Sea Seaweed Forest Creation Project

Hyundai is advancing ocean ecosystem restoration projects as part of its carbon offset strategy to address climate change. On May 10, 2023, Hyundai signed an MOU with the Ministry of Oceans and Fisheries and the Korea Fisheries Resources Agency to develop blue carbon from seaweed. This effort was followed by another MOU on January 31, 2024, with Ulsan Metropolitan City and the Korea Fisheries Resources Agency to promote a seaweed forest creation project.

A "ocean forest" refers to areas along the coast where seaweeds grow densely, forming a forest-like structure that serves as a habitat for various marine life and contributes to the expansion of "blue carbon," which represents the carbon absorbed by marine ecosystems. According to the Korea Fisheries Resources Agency's "Seaweed Forest Project Performance," a seaweed forest of 1 km² can absorb approximately 337 tons of carbon dioxide annually. Hyundai plans to create a total of 3.96 km² of seaweed forests in two sea areas in Jujeon-dong, Jung-gu, and Dangsa-dong, Buk-gu, Ulsan, from 2024 to 2027.

In 2024, measures will be implemented to facilitate the spread of seaweed seeds using underwater low-lying facilities and artificial sporophyte release inducers to quickly cultivate large quantities of seaweed spores. Efforts are also underway to improve habitat environments suitable for the target species to regenerate and enhance biodiversity, including saving invertebrate grazers and improving attachment substrates. By restoring coastal ecosystems and improving the habitat base for marine resources, Hyundai aims to secure the sustainability of these resources and ultimately contribute to the local fishing community. Additionally, by enhancing blue carbon, the company seeks to reduce greenhouse gases and mitigate climate change. Hyundai plans to participate in measuring the amount of blue carbon resources obtained and explore the utilization of carbon credits acquired through seaweed forest creation.

Previously, in July 2023, Hyundai joined the seaweed forest blue carbon council, comprising the Ministry of Oceans and Fisheries, the Korea Fisheries Resources Agency, academia, and NGOs. The council aims to register seaweed as an official blue carbon absorption source with the IPCC (Intergovernmental Panel on Climate Change), shares research data, and produces results. As a member of the council, Hyundai is evaluating methodology registration and supporting R&D research, performing its role as a potential demand source for blue carbon credits towards achieving carbon neutrality.

Atmospheric Carbon Capture and Utilization Academic Research

In July 2023, Hyundai Motor Group established the "Joint Research Lab for Carbon Neutrality" in collaboration with five domestic universities to develop technologies for capturing carbon from the atmosphere and converting it into energy. By 2026, the Group and the participating universities plan to jointly research technologies to capture carbon from the air and convert it into materials or energy.

The Joint Research Lab is divided into two sections – DAC (Direct Air Capture) Section and CO₂ Utilization Section. The DAC Section will research technologies to efficiently capture CO₂, while the CO₂ Utilization Section will focus on converting captured CO₂ into methanol, methane, carbon materials, and other synthetic fuels and battery materials. Following the establishment of these basic technologies, the goal is to develop business models, including portable carbon capture devices for vehicles and large fixed module systems for use in business sites and buildings.

Through this industry-academic collaboration, we are developing key technologies for carbon neutrality that actively capture carbon from the atmosphere and convert it into useful energy, thereby contributing to climate change mitigation



1 Hyundai signed an MOU with Ulsan City and FIRA East Sea Headquarters
2 Held a kick-off ceremony to open a Joint Research Lab for Carbon Neutrality

Response to Climate Change

Climate-Related Transition Plan

Carbon Neutrality Execution Hyundai has instituted the Integrated Solutions to Climate Change to achieve carbon neutrality by 2045 at IAA Mobility in September 2021 as part of its efforts to pass on a sustainable global environment to future generations and do the right thing for humanity. With Clean Mobility, Next-Generation Platform, and Green Energy at its core, we will establish a sustainable operating system for future generations by expanding our electrification capabilities and transitioning to renewable energy. Additionally, we will continue to strive to build a circular economy ecosystem with the goal of achieving carbon neutrality across the entire mobility value chain.

Carbon Neutrality Targets Hyundai's carbon neutrality targets are not only focused on reducing GHG emitted from their facilities but also on completely eliminating and offsetting the GHG produced during the operation of customers' vehicles (Tank to Wheel) through electrification. Hyundai aims to achieve 100% electrification in the European market by 2035 and in major markets by 2040. To reduce GHG emissions during vehicle manufacturing, the company is planning to establish a cooperative system among its affiliates and to directly produce renewable energy using solar panels, among other sources. Furthermore, we plan to achieve RE100 by 2045 through renewable energy power purchase agreements (PPA), Renewable Energy Certificates (REC), and purchasing green premium electricity. In the supply chain, we will promote carbon neutrality by 2045 through collaborations on energy transition with key suppliers and carbon reduction initiatives within the core raw material supply chain.

To deal with residual carbon emissions, Hyundai will invest in CCUS and will continue to pursue offsetting activities such as recycling second life batteries for ESS and restoring marine ecosystems. In addition, we plan to maximize the synergy between the hydrogen business and carbon neutrality through hydrogen power generation and processes by using the electrification process based on the hydrogen fuel cell system.

Plans to Achieve Climate-Related Targets (Carbon Neutrality Targets)

Reducing Our Carbon Emissions at Work Hyundai is a supporter for the Paris Agreement and recognizes its corporate role and responsibility to reduce global GHG emissions. In this regard, we strive to achieve carbon neutrality at our business sites by 2045 by switching to renewable energy, improving the energy efficiency of production processes through the introduction of high-efficiency motors and inverters, and utilizing hydrogen energy. In the short term, in conjunction with the RE100 roadmap, we plan to promote the transition from electric energy used in the manufacturing process to renewable energy first. In the long term, our goal is to achieve carbon neutrality by 2045 by expanding the application of green hydrogen and the use of renewable energy in conjunction with the realization of a hydrogen society.

¹⁾ Vehicle Operation Emissions: These are the carbon emissions from the customer's vehicle operation process (=Tank to Wheel). The change in the base year's emission amount is due to the adjustment of the "per vehicle mileage" used in the calculation formula from 150,000 km to 200,000 km.

²⁾ Supply Chain: These are carbon emissions from raw materials, with the goal being to collaborate with partners to induce a reduction in carbon emissions (towards carbon neutrality).

³⁾ Business sites emissions (plants/buildings): Sum of Scope 1 + Scope 2 emissions

Electrification Hyundai is aiming to 100% electrification for its new vehicle sales by 2040 in major markets, with the European market achieving this goal by 2035. For commercial vehicles, such as large trucks and buses, the company not only aims to expand electrification but also to secure global leadership in the era of electrification by enhancing the technology and appeal of its products. We continue to invest in research and development for hydrogen fuel cell commercial vehicles. In 2023, we launched the UNIVERSE Fuel Cell Bus in Korea and introduced the Xcient Fuel Cell Tractor in North America.

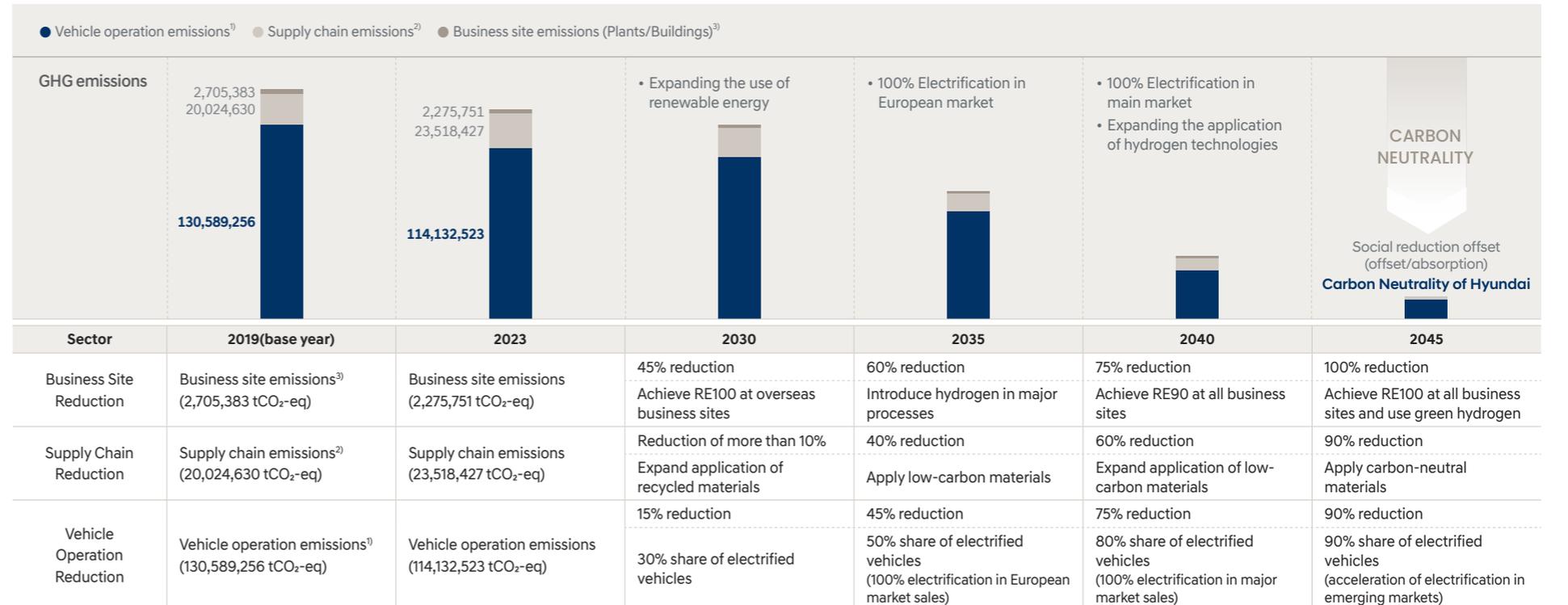
Support for Carbon Neutrality in the Supply Chain Hyundai aligns with global trends such as climate change, carbon neutrality, and ESG management, not only improving the quality and technical capabilities of its suppliers but also encouraging and supporting their carbon neutrality. To this end, we will check the carbon emission status of key suppliers, select core management suppliers, and provide guidelines. We also plan to organize reduction activities tailored to the grouped characteristics of suppliers and prepare supply chain collaboration programs, including carbon neutrality education and awareness enhancement. Particularly for suppliers of raw materials where carbon emissions are high, there will be a collaborative response linked to automotive design technologies, focusing on material recycling and the expanded use of new materials.

Social Activities for Reducing Carbon Emissions (treatment of residual emissions) In addition to reducing carbon emissions, Hyundai is strengthening its activities such as carbon absorption and removal and resource recycling. We developed CCUS technology in 2012 and has since applied it in Korea while continuously pursuing designs that can recycle waste batteries and maximize recycling at the scrap vehicle stage. We apply recycled plastic materials to wheel guards, under covers, and battery trays while actively utilizing eco-friendly materials in the production of the IONIQ 6.

Hydrogen Business Synergy Effects Hyundai announced its hydrogen business vision of "2040, The Completion of Hydrogen Energy Shift" in 2021, based on which we are striving to increase the popularity of the hydrogen business by focusing on three primary areas (scalability, economic feasibility, and eco-friendliness) so that hydrogen energy could be used widely in all areas of human life and industry, beyond the means of mobility, by 2040. To achieve this vision, we will continue to grow and develop both our hydrogen energy system-related business and technology use endeavors. We will supply hydrogen energy systems at competitive prices and contribute to carbon neutrality and environmental improvement through the transition to hydrogen energy.

2045 Carbon Neutrality Roadmap

(Unit: tCO₂-eq)



* GHG reduction targets were established based on the "Science-based Target", and the reduction targets were calculated for 100% of the base year's emissions.

** The reduction percentages for 2030, 2035, 2040, and 2045 refer to the reduction rates compared to the base year of 2019.

Response to Climate Change

FINANCIAL POSITION, FINANCIAL PERFORMANCE, AND CASH FLOW

Method and Timing of Climate-Related Scenario Analysis

[Information about the Scenarios Used by the Company](#) Hyundai is conducting transition and physical scenario analyses using qualitative and quantitative methodologies to systematically address the risks and opportunities that may arise from climate change. The sources used in the scenario are primarily from the IEA and IPCC, with some information derived from internal analysis.

Scenario	Definition	Time range	Source	Business scope
Transition	NZE (1.4°C)	-2050	IEA World Energy Outlook	Entire automotive sector of Hyundai
	APS (1.7°C)			
	STEPS (2.4°C)			
Physical	SSP1-2.6 (Below 2°C)	-2050	IPCC	32 business sites of Hyundai's automotive sector
	SSP2-4.5 (2~3°C)			
	SSP5-8.5 (Above 4°C)			

Financial Impact Analysis through Transition Scenario Analysis

TRANSITION RISK ANALYSIS



Tightening of Automobile Fuel Efficiency Regulations



Risk Factors

CO₂ emission regulations are continuously being strengthened in major regulatory areas. Both advanced regions (domestic, EU, USA, Canada) and emerging regions (China, India, Brazil, Saudi Arabia) face penalties if they exceed regulatory standards. In advanced regions, a cumulative financial impact of approximately KRW 2 trillion is expected by 2032. In Saudi Arabia, among the emerging regions, cumulative penalties exceeding KRW 120 billion are anticipated by 2028. Consequently, proactive strategies for improving fuel efficiency are required.

Countermeasures

To address fuel efficiency regulations, Hyundai's Product Division continuously monitors regulatory trends and regularly analyzes fuel efficiency performance, systematically reporting these findings. Particularly, the division estimates potential costs based on medium- and long-term regulatory forecasts and performance predictions, which are then incorporated into business plans. The company will establish and maintain a continuous monitoring and strategic decision-making system to respond promptly to changes in the regulatory environment.

EU Carbon Border Adjustment Mechanism (CBAM)



Risk Factors

From 2026, under the EU CBAM regulations, importers will be required to pay a carbon price for importing designated items into the EU. Consequently, Hyundai Motor Manufacturing Czech (HMMC) may face additional costs due to the purchase of carbon pricing certificates for some parts. Based on emission trading price forecasts for various scenarios, an annual financial impact ranging from a minimum of KRW 1.5 billion to a maximum of KRW 1.8 billion is anticipated as of 2030. During the CBAM transition period, it is crucial to monitor related regulations and consider mid-to-long-term emission trading price forecasts in order to estimate our financial risks and develop appropriate response strategies.

Countermeasures

While closely monitoring future trends of the CBAM policy, we plan to progressively reduce the volume of imports that require CBAM certificates over the long term. Through these efforts, we aim to minimize the financial burden that CBAM might cause. Additionally, we will flexibly respond to policy changes and proactively manage related risks.

Strengthening Emissions Trading Scheme Regulations



Risk Factors

The Emissions Trading Scheme allocates annual emission allowances to greenhouse gas emitting business sites, allowing the sale of surplus and the purchase of shortfall according to actual emissions. Hyundai is also subject to this scheme; if emissions exceed the allowance, costs for purchasing the necessary allowances will be incurred. Depending on future price forecasts for emissions allowances, maintaining current emission levels could lead to an emissions liability of at least KRW 66 billion to a maximum of KRW 219 billion as of 2030 (based on 80% free allocation of emission allowances).

Countermeasures

Hyundai established the 2045 Carbon Neutrality Roadmap to reduce carbon emissions. Through various reduction activities such as increasing the use of renewable energy and reducing emissions at business sites, the company aims to minimize the purchase of emissions allowances and enhance climate resilience. Based on the 2045 Carbon Neutrality Roadmap, the cost of purchasing emissions allowances compared to the 2030 BAU could decrease to a minimum of KRW 16 billion to a maximum of KRW 55 billion, based on which we plan to minimize risks while actively leveraging new opportunities.

U.S. Inflation Reduction Act (IRA)



Risk Factors

The U.S. IRA provides a tax credit of USD 3,750 for EVs if more than 40% of the critical minerals used in their batteries are sourced from the U.S. or FTA partner countries. If more than 50% of the total value of the battery components is produced or assembled in North America, another \$3,750 tax credit is granted, potentially totaling up to USD 3,750 per vehicle. Currently, Hyundai is not subject to the IRA benefits, and thus in order to maintain price competitiveness, the company is temporarily offering a cash discount of up to USD 7,500 to each new EV buyer in the U.S.

Countermeasures

Hyundai is actively responding to the IRA with various initiatives, including the construction of a dedicated EV plant in Georgia and the establishment of joint ventures in North America based on its localization strategies. Through these initiatives, we expect to meet the local production requirements in North America and become eligible for future subsidy benefits. We are also flexibly and promptly responding to changing situations by closely analyzing policy trends and preparing for various scenarios in advance.

Response to Climate Change



Acceleration of Electrification



Opportunity Factors

The transition to electrification presents new growth opportunities for Hyundai. Particularly, as price parity between EVs and ICEVs is achieved and the pace of market electrification accelerates due to environmentally friendly policies, an increase in EV demand is expected. Scenario analysis predicts that Hyundai's revenue for 2030 will rise from a minimum of KRW 41 trillion to a maximum of KRW 58 trillion in response to growing EV demand.

Countermeasures

Hyundai plans to continue its proactive efforts to capture growth opportunities in the EV market. We intend to increase the production and sales of EVs and have established a strategy to convert 100% of all vehicles sold in major markets to electric by 2040. Considering this mid-to long-term business plan, our 2030 EV sales are expected to increase further, from a minimum of KRW 28 trillion to a maximum of KRW 41 trillion.

Energy Transition



Opportunity Factors

Amidst the continuous rise in electricity costs, transitioning to renewable energy could present opportunities for reducing carbon emissions as well as energy costs. Hyundai aims to use 100% renewable energy (RE100) by 2045. Based on the comparison of the expected electricity unit cost by energy source, maintaining the current ratio of renewable energy usage is expected to result in annual cost savings of approximately KRW 60 billion as of 2030.

Countermeasures

Hyundai plans to implement optimal solutions aimed at gradually expanding the use of renewable energy, including the installation of solar panels and the signing of PPA, to achieve RE100 by 2045. Reflecting this renewable energy transition plan, additional cost saving of KRW 235 billion is anticipated as of 2030. By actively expanding the use of renewable energy, Hyundai expects to achieve positive effects in both environmental sustainability and cost efficiency.

ClimateTech (Hydrogen) R&D Investment



Opportunity Factors

Hydrogen is a crucial area within ClimateTech, and the hydrogen market is expected to become more active with increased R&D investment. Particularly as the transition to a low-carbon society accelerates, hydrogen is increasingly recognized as a key energy source for decarbonization. Hyundai plans to develop hydrogen-related business strategies that reflect these market trends.

Countermeasures

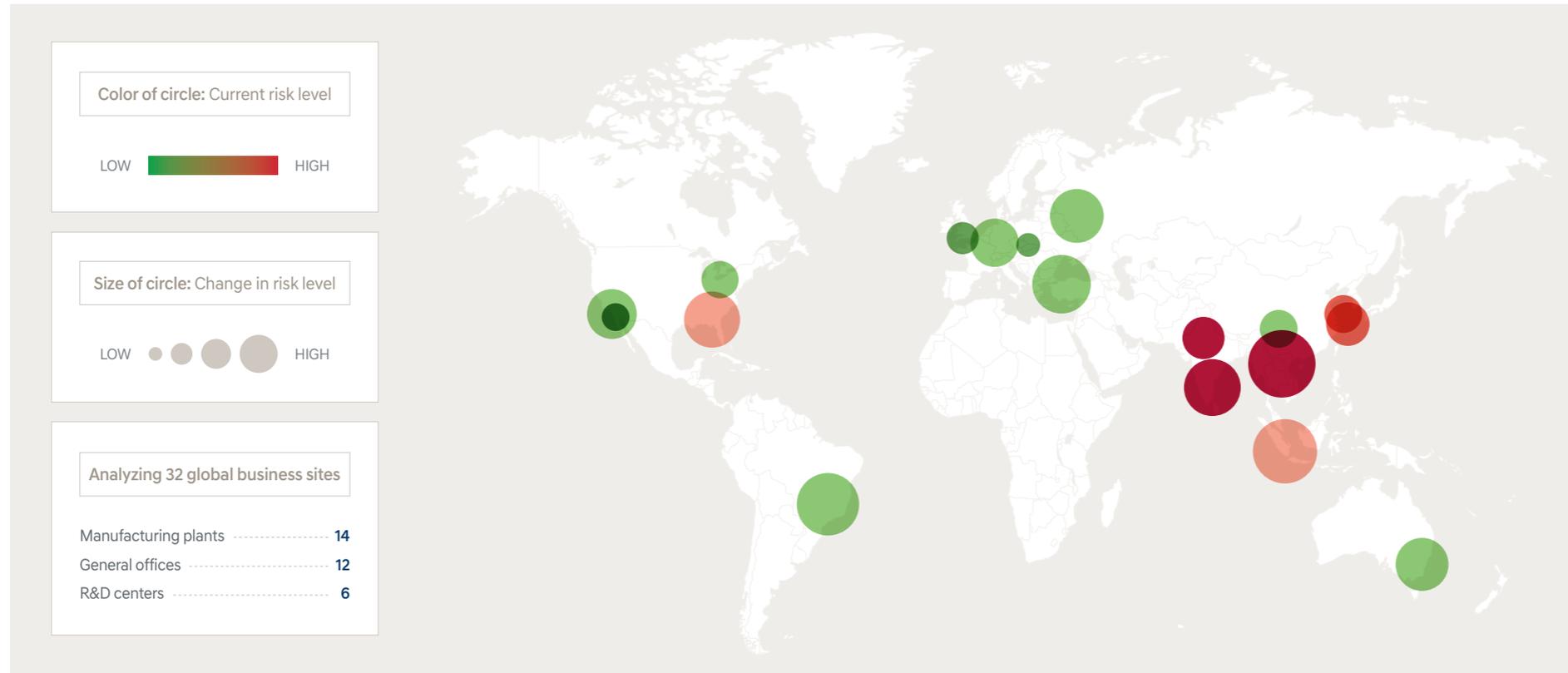
Hyundai will realize a sustainable future that includes a hydrogen society and smart cities, based on its proprietary hydrogen energy production technology and integrated solutions that span entire cities. We plan to expand its hydrogen business, which will include not only developing a lineup of passenger and commercial hydrogen electric vehicles but also overseeing the storage, transportation, and production of hydrogen energy. Through these initiatives, we aim to secure a leading position in the future hydrogen energy market and leverage the transition to a low-carbon energy paradigm as a new opportunity for growth.

Response to Climate Change

Financial Impact Analysis Through Physical Scenario Analysis Hyundai has utilized the low-carbon scenario (SSP1-2.6) and high-carbon scenario (SSP5-8.5) from the IPCC's Sixth Assessment Report to analyze the financial impacts of physical risks. For scientific analysis, Hyundai employed the climate risk analysis tool, Jupiter Intelligence, which is based on climate modeling. In some cases, the analysis granularity was refined to intervals as close as 90 meters for more precise, high-resolution analysis. The company analyzed risks associated with eight types of disasters, including acute risks (extreme wind, flood, wildfire, hail/thunderstorms, precipitation) and chronic risks (heat, droughts, cold waves). Quantitative financial impacts were specifically derived for extreme wind, flood, wildfire, and heat. Acute climate disasters such as extreme wind, flooding, and wildfires can damage Hyundai's assets, including buildings, equipment, and inventory, potentially leading to production halts and a decrease in sales. Moreover, chronic climate pattern changes, such as those brought on by heatwaves, can decrease employee productivity and further lead to sales reductions. These physical risks predominantly impact the "product manufacturing" phase of Hyundai's business model.

For the quantitative financial impact analysis of Hyundai's 32 global sites – including 14 manufacturing plants, 12 general offices, and 6 R&D centers – 2023 data on tangible assets (buildings, machinery, etc.) and inventory, along with average site sales over three years, were utilized. The analysis projected that by 2050, the total cumulative expected damage to assets and sales could range from approximately KRW 2.2 trillion (low-emission scenario) to KRW 3.8 trillion (high-emission scenario). Based on these findings, we strive to enhance resilience through continuous monitoring and the development of response strategies for high-risk areas.

Results of 2050 Physical Risk Analysis based on the SSP5-8.5 Scenario



Analysis Results of Financial Impact by Region

Legend: Very Low (Green), Low (Light Orange), Moderate (Orange), High (Dark Orange), Very High (Dark Red)

Region	Scenario	Extent of financial impact of climate disasters											
		Heat			Extreme Wind Speed			Wildfire			Flood		
		2030	2040	2050	2030	2040	2050	2030	2040	2050	2030	2040	2050
Northeast Asia (Korea, China)	SSP1-2.6	Very Low	Very Low	Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	SSP5-8.5	Very Low	Low	Moderate	Very Low	Low	Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Southeast Asia (3 countries including Vietnam)	SSP1-2.6	Moderate	High	Very High	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	SSP5-8.5	High	Very High	Very High	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Oceania (Australia)	SSP1-2.6	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	SSP5-8.5	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Americas (3 countries including the U.S.)	SSP1-2.6	Very Low	Low	Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	SSP1-8.5	Very Low	Moderate	High	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Europe (5 countries including Germany)	SSP1-2.6	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	SSP5-8.5	Very Low	Low	Moderate	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

Analysis Results of Financial Impact by Type of Business Site

Legend: Very Low (Green), Low (Light Orange), Moderate (Orange), High (Dark Orange), Very High (Dark Red)

Region	Scenario	Extent of financial impact of climate disasters											
		Heat			Extreme Wind Speed			Wildfire			Flood		
		2030	2040	2050	2030	2040	2050	2030	2040	2050	2030	2040	2050
Manufacturing plants (14 including Ulsan Plant)	SSP1-2.6	Very Low	Low	Moderate	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	SSP5-8.5	Low	Moderate	High	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
General offices (12 including Yangjae Headquarters)	SSP1-2.6	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	SSP5-8.5	Very Low	Low	Moderate	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Research centers (6 including Namyang R&D Center)	SSP1-2.6	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	SSP5-8.5	Very Low	Low	Moderate	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

Response to Climate Change

Risk Management

CLIMATE RISK AND OPPORTUNITY MANAGEMENT

Climate Risk and Opportunity Management Process Hyundai identifies, assesses, and manages risk and opportunity factors to respond to climate change issues at the company level. The climate change issues identified by each region/organization are submitted to the head office's Planning & Finance Division, which then figures out risk and opportunity factors for each issue, assesses the strategic and financial impacts of each factor on the company, and determines companywide response strategies.

Identification Stage In the identification stage, we figure out issues by region and team regarding risks and opportunities that may affect the company due to climate change at the Product Committee and the Hyundai Business Strategy Meeting.

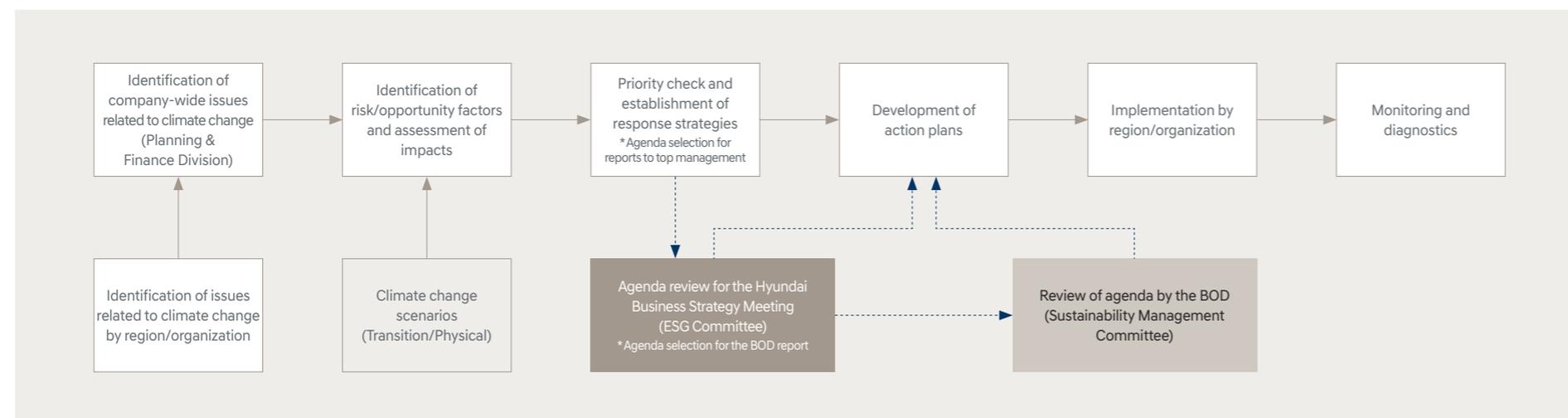
Assessment and Reporting Stage The Planning and Finance Division at the head office figures out the strategic and financial impact that factors and issues identified in the identification stage may have on the company, and depending on their materiality, reports them to the CEO or the BOD through the ESG Committee for decision-making.

Management Stage The decided climate change issues are proactively reflected in the KPIs of each working-level division of the relevant region or organization. The Carbon Neutrality Execution Team and related organizations join forces to systematically manage climate change factors in various areas.

Methods for Identifying and Assessing Risks and Opportunities Hyundai utilizes climate change scenario analysis to identify and assess climate-related risks and opportunities. Based on the TCFD recommendations, we have identified driving forces across STEEP (Social, Technology, Economic, Environmental, Political) categories to analyze the impact of climate change on the industry and on Hyundai itself. Among these, key driving factors were derived after evaluating their impact, uncertainty, and relevance. Impact was assessed based on effects on the company's business model and value chain (procurement, production, sales), as well as the company's resource allocation (budgeting, investments and R&D, business acquisitions and disposals, talent acquisition, etc.). Uncertainty was evaluated by the predictability of the impacts of driving factors on the company and the industry.

We have mapped the impact pathways of key factors on Hyundai's financial and business model to calculate the financial impacts of each transition risk and opportunity according to the IEA's NZE, APS, and STEPS scenarios and analyzed the intensity of these impacts. Through this process, Hyundai has identified significant risk and opportunity factors related to climate change, analyzed the impact of each according to different scenarios, and developed strategies to enhance climate resilience.

Identification, Assessment, and Management Process of Climate Risk/Opportunity



Metrics and Targets

CLIMATE-RELATED METRICS

Scope 1 and Scope 2 Emissions¹⁾

(Unit: tCO₂-eq)

Classification	2021	2022	2023
Scope 1	724,013	719,949 ²⁾	696,590
Scope 2 (location-based)	1,660,058	1,853,813	1,831,531
Scope 2 (market-based) ³⁾	-	1,684,120	1,579,161
Scope 1 + Scope 2 ⁴⁾	2,384,071	2,404,069	2,275,751
Scope 1 + Scope 2 Emission intensity (GHGs emissions per vehicle produced)	0.616	0.601	0.531

Scope 3 Emissions

(Unit: tCO₂-eq)

Classification	2021	2022	2023	
Up stream	Supply chain (purchase of raw materials and parts)	18,359,619	19,852,763	23,518,427
	Capital goods (purchase of furnishings and equipment) ⁵⁾	139	326	134
	Other energy-related activities (excluding Scope 1 and 2) ^{5) 6)}	149,556	145,177	189,512
	Waste generated in operation ⁷⁾	1,911	1,978	217,737
	Employee business trip ⁵⁾	7,069	21,370	26,994
	Employee commuting (commuting buses) ⁵⁾	5,911	6,617	8,895
Down stream	Transportation and distribution (by sea and land) ⁵⁾	838,575	964,206	981,549
	Use of sold vehicles (Tank to Wheel) ⁸⁾	107,850,017	109,278,795	114,132,523
	End-of-life treatment of sold vehicles (recovery, disassembly, disposal) ⁹⁾	810,794	2,133,743	2,323,327
	Leased assets (headquarters and leased office buildings) ⁵⁾	804	539	1,447
	Investments ¹⁰⁾	728,902	704,970	556,331
Scope 3	128,753,297	133,110,484	141,956,876	

¹⁾ The scope of calculation for overseas business sites is manufacturing subsidiary, and from 2023, additional business sites (HMGICS, HTWO) are included in the calculation. Excluding the newly added business sites, the total Scope 1 + Scope 2 emissions for 2023 amount to 2,268,998 tCO₂-eq.

²⁾ Corrections made to calculation errors in HYMEX, with adjustments to the 2022 data.

³⁾ Scope 2 emissions: Addition of market-based emissions from 2022

⁴⁾ to calculate the sum of Scope 1 and 2 emissions (market-based) from 2022

⁵⁾ Based on the country where the Headquarters is located

⁶⁾ Upstream emissions of fuel consumed at business sites (excluding electricity and steam)

⁷⁾ increases due to the expansion of the calculation scope to include waste from overseas business sites starting in 2023.

⁸⁾ Emissions from the energy that powers vehicles at the pre-fueling/charging stage (Well to Tank) are excluded. The data was updated due to a change in the "per vehicle mileage" standard used in the calculations from 150,000 km to 200,000 km

⁹⁾ Emissions produced at the end-of-life treatment stage was increased due to the addition of emissions from 2022 produced during the recycling process

¹⁰⁾ Scope 1 and Scope 2 GHG emissions from six of the listed investee companies in which Hyundai owns more than 20% of the shares.

Response to Climate Change

Approach for Measuring Emissions The guidelines applied for measuring GHG emissions are as follows, using Operational Control under the Control Approach.

Measurement Approach

Classification	Guideline
Scope 1, 2	<ul style="list-style-type: none"> The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition) The Greenhouse Gas Protocol: Scope 2 Guidance Framework Act on Carbon Neutrality and Green Growth (Guidelines for Reporting and Certification of GHG Emissions Trading Scheme) IPCC Guidelines for National Greenhouse Gas Protocol and Accounting Tool Standards for calculating GHG emissions required by other regulatory authorities and stock exchanges
Scope 3	<ul style="list-style-type: none"> GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard (2011)

* Uses the Global Warming Potential (GWP) values based on the 100-year timeframe from IPCC (Intergovernmental Panel on Climate Change) Second Assessment Report (IPCC Second Assessment Report) to convert six types of greenhouse gases (CO₂, CH₄, N₂O, HFCs, PFCs, SF₆) into carbon dioxide equivalents.

Input Variables and Assumptions

Classification		Input Variables	
		Activity Data	Emission Factor
Scope 1	Process combustion	Consumption of city gas (LNG), diesel, kerosene, propane	Basic emission factors from the 2006 IPCC national inventory guidelines
	Mobile combustion	Consumption of gasoline, diesel, LPG	Basic emission factors by fuel type and GHG for mobile combustion (road)
Scope 2	External electricity	Electricity consumption for 2023	Application of national specific power emission factors
	External steam	Steam consumption for 2023	Application of 2023 supplier steam emission factors and national steam emission factors
Scope 3	Supply chain (raw materials and parts purchase)	Production volume by vehicle type in 2023	Manufacturing stage emission factors
	Capital goods (purchases of fixtures and equipment)	Equipment purchase volume	Average emission factors for equipment (LCI DB)
	Other energy-related activities (excluding scope 1/2)	Fuel usage	Production-based emission factors
	Waste management from operations	Amount processed by waste management standard	Emission factors by treatment standard
	Employee business travel	Overseas trips (air travel distance), domestic trips (distance by mode of transport)	Overseas travel (air emission factors), domestic travel (emission factors by mode of transport)
	Employee commuting (commuter bus)	Annual fuel usage of all commuter vehicles (Number of vehicles × Average speed × Operating hours ÷ Average fuel economy)	Transport (diesel) emission factors
	Transportation of manufactured vehicles (maritime and land)	Emission data for vehicle transportation by Hyundai GLOVIS	N/A
	Use of sold vehicles (Tank to Wheel)	Sales volume by vehicle type in 2023	Emission factors per vehicle type at the usage stage (gCO ₂ /km) × 200,000 km
	Disposal of sold vehicles (collection, dismantling, processing)	Sales volume by vehicle type in 2023	Emission factors per vehicle type at the disposal stage
	Leased assets (Headquarters and leased buildings)	Total building usage × leasing ratio	GHG emission factors
Investments	Emission volumes of investment companies	Equity share	

Capital Allocation For the transition to electrification, a mid-to-long-term investment plan totaling 35.8 trillion KRW for the period 2023 to 2032 has been established. This plan includes setting up EV factories, establishing battery joint ventures, securing materials, funding R&D, and constructing charging station infrastructures. Additionally, approximately KRW 700 billion will be invested by 2032 in projects aimed at achieving carbon neutrality at business sites, including photovoltaic power generation.

Classification	2023-2032	Details
Electrification R&D investment	KRW 35.8 trillion	Development of electrification-related products, advanced technology development for electrification components
Capex investment		Capital investments such as new factories and production line expansions, construction of electric charging stations
Strategic investment		Strategic investments for strategic alliances and equity acquisitions with partners and other companies
Business site carbon neutrality investment	KRW 0.7 trillion	Low-carbon manufacturing processes, investments in photovoltaic self-generation

Compensation Hyundai operates an incentive system for managing climate change. The performance evaluation items (KPIs) for the CEO, COO, regional directors, plant managers (Heads of manufacturing corporations) and employees (related organizations) include climate change-related metrics. The results of these evaluations are integrated with the incentive and salary systems. By incorporating goals related to GHG reduction and the expansion of renewable energy into the management's KPIs, we ensure that these objectives and their implementation are managed at an executive level. Additionally, employees in related organizations are assigned specific targets for reducing GHG emissions, which are reflected in their personal performance evaluations. Annually, a certain percentage of their salary is allocated as a monetary incentive based on the achievement and assessment of these key indicators.

Target	Incentive	KPIs	KPI Details
CEO	Financial rewards (Included in bonus)	Carbon neutrality & Energy transition	1) Accomplishment rate to carbon neutrality target 2) Level of carbon neutrality implementation system
COO and regional directors		Carbon Neutrality	1) Achievement rate of the RE100 target 2) Level of management of Scope 3 data
Plant Manager (Heads of manufacturing corporations)			1) Achievement rate of the RE100 goal 2) Emissions per unit 3) Total emissions
Employees (Related teams)			Set targets related to GHG emissions reduction for staff at related teams and use them for performance evaluation

Industry-based metrics

Refer to the industry-based metrics for the Automobiles industry in the annexed guidance "Industry-based Guidance on Implementing IFRS S2"

Response to Climate Change

CLIMATE-RELATED TARGETS

Target Review Process

Third-Party Verification of Set Targets Hyundai has established mid-to-long-term reduction targets referring the guidelines of the global Science Based Targets initiative (SBTi) to reduce GHG emissions.

Target Review Process Hyundai’s Board of Directors reviews and approves items essential for the implementation of business strategies and management activities, including the establishment of mid-to-long-term environmental management strategies that encompass carbon neutrality and environmental investments. The management, including the CEO, participates in business strategy meetings (or ESG Committees) to oversee company-wide major environmental management implementation plans. These include strategies for expanding EVs and achieving carbon neutrality, monitoring and reviewing implementation status, evaluating improvement outcomes, discussing responses to major risks, and managing matters deemed necessary for promoting and propagating environmental operations.

We regularly monitor and review the implementation and performance of the targets set for achieving “Carbon Neutrality by 2045” annually in the third quarter. In October 2023, through the “approval of Hyundai’s key tasks for carbon neutrality,” a roadmap for early response and securing renewable energy to achieve RE100 at domestic sites was presented, and key issues were reported to the Sustainability Management Committee.

Information Related to GHG Emission Reduction Targets

Scope of GHG Emissions Included in the Target The scope of GHG emissions related to Hyundai’s climate targets includes Scope 1, 2, and part of Scope 3.

Description of the Target Hyundai’s climate-related targets pertain to the total volume of emissions.

Use of Sector-specific Decarbonization Approach When Setting Targets Hyundai is currently not using a sector-specific decarbonization approach for the GHG emission reduction targets as of the end of the reporting period, but is considering employing sector-specific decarbonization approaches in the future to effectively reduce emissions.

Performance Analysis Relative to Targets

The current period's performance relative to Hyundai’s climate-related targets is as follows:

Metrics for targets and progress monitoring	Unit	2021 Performance	2022 Performance	2023 Performance
Scope 1 emissions	tCO ₂ -eq	724,013	719,949	696,590
Scope 2 emissions	tCO ₂ -eq	1,660,058	1,684,120	1,579,162
Renewable energy transition rate (electricity)	%	3.5	7.7	12.8
Scope 3 emissions	tCO ₂ -eq	128,753,297	133,110,484	141,956,876
EV sales	Vehicle	141,622	210,352	268,785

Establishment of a Circular Economy

Hyundai complies with the end-of-life vehicle (ELV) recovery and disposal regulations in countries where it sells its vehicles, while also implementing extended producer responsibility (EPR) to increase the recovery, disposal, and recycling of ELVs. [Re-think] We continue look for materials that minimize negative impact on the environment and human health starting from the vehicle design phase. [Reduce] While reducing the use of one-time raw materials, such as plastics, we are increasing the application of sustainable materials. [Recycle] In addition, we are shifting our business operation method from a linear structure to be circular so that recyclable materials can be recycled. To increase the recovery, disposal, and recycling of ELVs, we are intensifying the process internally while also strengthening cooperation with outsourced companies.

Extended Producer Responsibility

EXPANDING THE USE OF RECYCLED MATERIALS

Strengthening the Recycling Material Application System The proliferation of waste is an increasingly serious global issue, particularly with regard to plastic waste, with over 200 million tons generated annually and the amount of waste generated rising by more than 10% each year. An even more serious issue is that more than 90% of this waste ends up in landfills or remains unattended, directly affecting the ecosystems and biodiversity. To decrease raw material related carbon emissions, transitioning to a circular economy, which includes the increased use of recycled materials, is a prerequisite. To reduce global waste and realize carbon neutrality, the shift toward a circular economy in major countries such as EU is accelerating, which results in new legal requirements, thereby increasing corporate risks. In the EU, the “End-of-Life Vehicles Regulation” has been amended to a significant extent and now mandates that at least 25% of plastic used to build a vehicle comes from recycling (of which 25% from recycled ELVs) from 2030. Additionally, producers are now responsible for the collection and treatment of end-of-life vehicles, similar to the requirements for electrical and electronic products. Other countries, such as South Korea and India, are also enforcing regulations that mandate the use of recycled materials in vehicles.

Hyundai recognizes the essential role played by the transition to a circular economy in achieving zero waste, counteracting the shortage of raw materials, and attaining carbon neutrality across the value chain in the medium to long term. In response to recent regulations in major countries that mandate the use of recycled materials in vehicles, Hyundai is continuously developing and intensifying its internal and external vehicle recycling material technology and its application systems for new models. In particular, to respond preemptively to the revised EU ELVR (End-of-Life Vehicle Regulation), Hyundai has established specific plan for the application of recycled plastics, focusing on European vehicle models, and is building a system of continuous monitoring of the implementation of these targets. A company-wide council has also been established to strengthen the development of plastic recycling technologies, formation of the supply chain, and revitalization of the plastic recycling ecosystem in accordance with the need to upgrade the system for applying recycled plastics to new vehicles in line with our 2045 Carbon Neutrality Roadmap and strategic direction.

Moreover, Hyundai has set targets for improving the plastic recycling rate based on an analysis of the company's waste plastic amount from its end life of vehicles, chosen vehicle models and parts to which we will apply recycled plastic in order to achieve this goal, and is strengthening the alliance and implementation of joint projects with various partners, such as suppliers, raw material companies and the recycling sector to establish the closed-loop circulation system of plastic. The pilot project to build the scrapped vehicle network in order / and to internalize core technologies for building a circular economy and demonstrate how to recycle vehicle waste parts is being carried out continuously, and, as a result, we are steadily expanding the number of vehicle parts made from scrapped vehicle-based recycled plastics, by including the addition of mass- production applications of plastics recycled from interior to exterior parts. Externally, we are establishing a joint response network for diverse activities,

such as recycling projects and technology development projects that are being promoted sporadically by the petrochemical industry, by forming mutual collaborative relationships, increasing exchanges of information and resources, and providing a systematic direction for joint achievements.

Designing for Recycling Throughout the design, planning, and development stages of new vehicles, Hyundai considers the recovery, treatment, and recycling of waste generated during the scrapping process to ensure that they can be dismantled and recycled easily based on the concept of DfR (Design for Recycling). At the design stage, we are particularly focused on expanding the use of recyclable materials based on the principle of recycling by design. For non-metallic materials that are difficult to recycle at the disposal stage, such as plastics and glass, we are enhancing the recyclability and renewability of our vehicles by utilizing recycled materials and alternative bio-based materials. The recyclability rate of Hyundai's vehicles currently stands at 85% without heat energy recovery, and at 95% with heat energy recovery from waste treatment. Notably, ferrous and non-ferrous metal materials, which account for about 70% of vehicle materials, are predominantly reused and recycled.

Application of Sustainable Materials in New Vehicles Each year Hyundai aims to further enhance the use of recycled and renewable materials in its new EV models. For example, in the IONIQ 5, recycled PET processed yarn is used in the armrests and seat coverings, equivalent to the recycling of up to 32 PET bottles per vehicle. Meanwhile, the fabric materials used for the seats, headliner, and carpeting include bio-based components derived from sugarcane and corn. The leather in the interior is dyed using flaxseed oil instead of animal oil. The doors are also made from 100% renewable paperette, while the paint applied to the doors and crash pad is a bio-paint derived from plants such as rapeseed and corn.

Sustainable Materials by EV Model

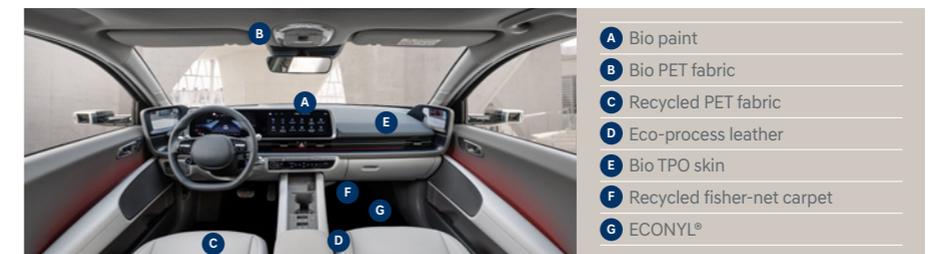
IONIQ 5	Rapeseed/corn-derived bio-paint, flaxseed oil, sugar cane/corn-derived bio-yarn, recycled PET processed yarn.
IONIQ 5 N	Rapeseed/corn-derived bio-paint, paperette material, recycled paint, Alcantara from recycled polyester.
IONIQ 6	Waste tire recycled paint, vegetable-based paint, sugarcane/corn-derived bio yarn, recycled PET processed yarn.
GV60	Bio-polyol derived from corn and sugar cane, processed yarn from recycled PET bottles
Electrified GV70	Renewable fabric containing 30% wool, processed yarn from recycled PET bottles
Electrified G80	Renewable dye, processed yarn from recycled PET bottles, forged wood made of recycled leftover pieces of wood

As for the IONIQ 6, it also features sustainable materials such as recycled PET processed yarn, bio yarn, and bio TPO skin. Recycled and bio-based materials are used in the headliner, pillar trim, sun visor, and package trays of the GV60, Electrified GV70, and Electrified G80. Additionally, ECONYL®, a recycled material made from discarded fishing nets, is used in the floor mats of both the IONIQ 5 and the IONIQ 6. Furthermore, the fronts of the headrests and the seat sides of the Electrified GV70 are made from natural fabrics containing 30% wool, while the Electrified G80 features upholstery made from Forged Wood, which is produced using scrap wood.

The interior of the IONIQ 5 N features a variety of sustainable materials. The door trims and console cover are painted with bio-oil derived from plants such as rapeseed and corn, and renewable paperette material is used for the door garnishes. Additionally, recycled paint made from waste tires is used on the door handles and switches, while Alcantara made from recycled polyester is utilized for the seats. The KONA Electric includes a headliner and floor mats made from recycled materials.



Sustainable materials applied to IONIQ 5



Sustainable materials applied to IONIQ 6

Establishment of a Circular Economy

ESTABLISHING THE ELV RESOURCE CIRCULATION SYSTEM

ELV Service for Customers To meet the needs of customers who want to scrap their vehicles, in Korea we provide a one-stop service that assists our customers through the vehicle recovery, dismantling, and recycling processes. Customers can apply for the service at Hyundai's website. We pick up the scrapping vehicle at the time and place desired by the customer, after which the vehicle is sent to an eco-friendly junkyard for eco-friendly dismantling and recycling based on the principle of indoor storage of recovered materials and recycling of all recovered parts and materials.

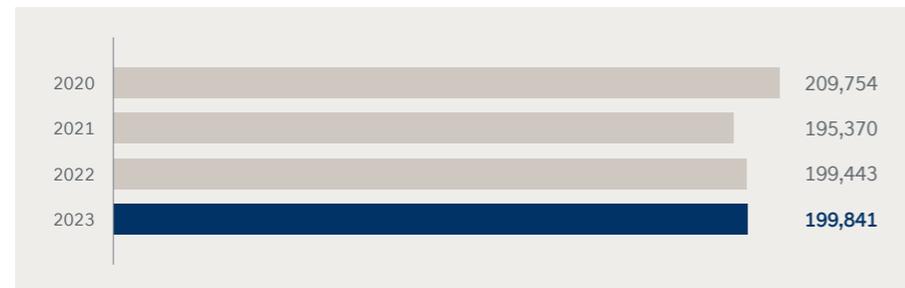
Recovering and Recycling ELVs To demonstrate the feasibility of applying the Extended Producer Responsibility (EPR) recycling system—already implemented in the packaging and electronics sectors – to the automotive sector, Hyundai signed an agreement with the Ministry of Environment in 2011 to execute a pilot project aimed at advancing the resource circulation system for end-of-life vehicles. To that end, we have facilitated recycling by providing vehicle dismantling manuals and training to scrap car companies, as this helps them to differentiate between economically viable and non-viable resources, guiding them on proper handling techniques. We are also strengthening our collaborative relationships with scrap car processors by supporting the collection and treatment of environmentally-harmful substances such as waste refrigerants, iron scrap from vehicle shredding, and scrap metal, as well as subsidizing the cost of treating materials that are difficult to recycle. Approximately 199,841 tons of resources were recovered from scrapped vehicles in 2023, with a recycling rate of 82.4% without heat recovery and 91.0% with heat recovery. In the meanwhile, Hyundai does not have a financial benefit from the end-of-life vehicles' take back programs, but it supports recycling companies to enhance the recycling rate.

Eco-friendly ELV Principles



Resources Recovered from ELVs

(Unit: Tons)



UPCYCLING PROJECTS

Hyundai goes beyond the reuse and recycling of wastes and continues with upcycling projects that create new value based on wastes, such as fashion accessories, new materials, and renewable energy. We will make continued efforts to conduct various upcycling projects, thereby creating new value of waste resources in the automotive industry as well as other industries.



Re:Style

Hyundai unveiled "Re:Style," a sustainable upcycled fashion platform, in 2019 in collaboration with designer Maria Cornejo to combine leftover leather and fabric from car seats that are discarded in the automobile manufacturing process with Maria Cornejo's signature pieces to be reborn as 15 innovative pieces of clothing. For the second project of Re:Style, we took a step further from the 2019 project to use various waste materials, such as vehicles' glass, carpet, and airbag that are discarded in the automobile manufacturing process, and create a collection that reflects the philosophies of six sustainable designers.

In early 2023, we joined hands with the world-renowned fashion designer Jeremy Scott and unveiled a collection that used bio plastic skin (fabric containing a bio-material extracted from sugar cane), a sustainable material that was applied to the IONIQ 6, as well as wipers, tail lights, and seat belts used for EVs. In addition, the "parametric pixel," which gives a geometric form to pixel, the smallest unit to constitute an image, was used to produce various accessories for sale, including micro mini bags, notes, and keyrings.



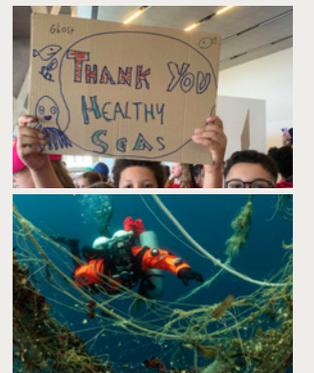
Producing clean hydrogen using biogas based on organic waste resources

Hyundai is moving forward with a business that produces and supplies clean hydrogen by using biogas (methane) generated at public sewage treatment plants in collaboration with the Ministry of Environment, Cheongju City in North Chungcheong Province, and Institute for Advanced Engineering, through which we seek to contribute to reducing carbon and vitalizing the hydrogen ecosystem. We plan to complete construction of a hydrogen production facility in a public sewage treatment plant in 2024 after commencing construction in 2023 in partnership with Cheongju City, with an aim to begin operations in 2025. Once the hydrogen production facility goes into operation, 500 kg of hydrogen is planned to be produced a day. The facility will later be extended to increase daily hydrogen production to 1,000 kg in 2027. Hydrogen produced at the facility will also be supplied to hydrogen charging stations in the local community to supply local residents with clean hydrogen at reasonable prices compared to byproduct hydrogen. Its areas of use will be expanded to include mobility for public services, such as hydrogen buses and hydrogen cleaning trucks. Overseas, we are running a business of producing electricity by converting livestock excretions into biogas in Lampung, located on the island of Sumatra, Indonesia, through which we are contributing to reduction of GHG emissions and job creation for the local community.

Applying renewed materials based on marine waste

Hyundai is collaborating with Healthy Seas, a European marine conservation organization, to implement the Eco Cycle Project – a marine ecosystem restoration program – and to promote education and prevention activities concerning marine pollution. In 2022, we conducted a large-scale marine cleanup and education activity in Ithaca, Greece, collecting 18.5 tons of discarded fishing nets and 5 tons of other types of marine waste. These were then transformed into eco-nylon, a material made by upcycling nets, rags, and such like that is widely used in both fashion products and the vehicle floor mats of the IONIQ 5 and IONIQ 6 models.

In addition to its activities in Europe, Hyundai promotes eco-cycling activities in Ulsan, Korea. This project involves collaboration with the Ulsan Buk-gu Office, Ulsan Fisheries Cooperative, Netspa—a social venture company that upcycles discarded fishing nets—and Blue Siren, a non-profit marine restoration organization, to build a resource recycling system for discarded fishing nets at Jeongja Port in Ulsan. Located in the northern district of Ulsan and known to be the largest breeding ground of red sea bream in Korea, Jeongja Port discharges about 130 tons of discarded fishing nets annually. Under this project, the construction of a 110m² waste fishing net collection site has been completed at Jeongja Port. As for the respective roles of the project participants, Blue Siren manages the collection site and collects waste fishing nets, Netspa will be responsible for recycling the collected nets, and Hyundai supports the project's operation and promotes the transformation of the re-materialized waste fishing nets into automotive parts. The project is scheduled to run from 2024 to 2026.



Establishment of a Circular Economy

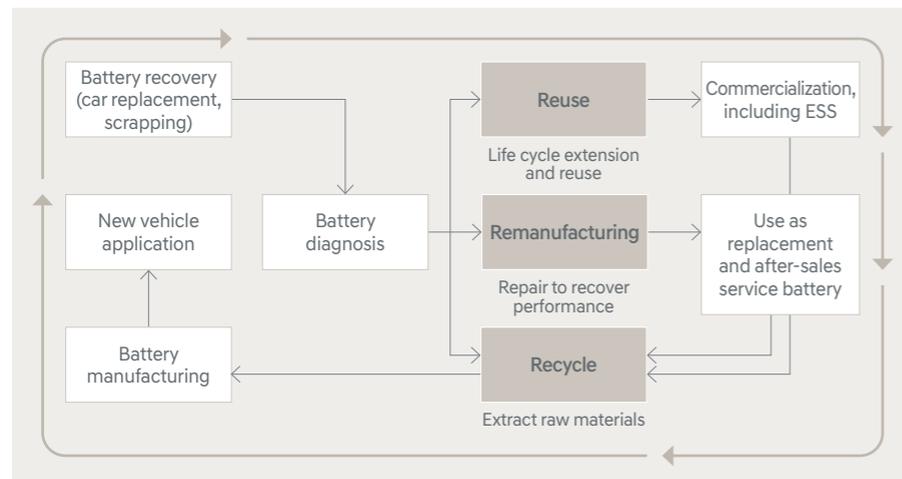
Establishment of a Virtuous Circulation System for Batteries

Establishment of Cooperative System for Battery Circulation Based on the battery life cycle, Hyundai is establishing a battery circulation system that aims for sustainability through the recycling and reuse of second-life batteries generated from end-of-life EVs. The battery life cycle consists of a sustainable virtuous cycle encompassing manufacturing of battery cells using raw materials to production of battery systems for electric vehicles, reuse of batteries after use, extraction of materials from finally discarded batteries, and application of the extracted materials to battery manufacturing. We formed a taskforce team in 2022 to establish a group-wide cooperative system throughout the battery life cycle, while exploring sustainable business models and developing relevant competencies.

In building a cooperative system for battery circulation among Hyundai Motor Group affiliates, Hyundai Motor Company will be in charge of creating a system that enables us to obtain large amounts of second-life batteries through our global sales and service network. We will also establish a virtuous circulation system for batteries through which we extract such key battery materials as cobalt, lithium, and nickel, from second-life batteries that cannot be recycled or remanufactured, and then use them for battery-manufacturing process.

Hyundai GLOVIS plans to use its global logistics network to conduct a business that recovers second-life batteries through ground/marine transportation and then links them to recycling operations. It will also reuse the collected second-life batteries for energy storage system (ESS). Hyundai MOBIS is planning a remanufacturing business that prolongs the life of batteries by means of new packaging, such as sorting out collected batteries and restoring performance, and inputs them for use. Remanufactured batteries will be used for old electric vehicles and repair (after-sales service).

Virtuous Battery Circulation System



Recovery of Second-Life Batteries Hyundai is collaborating with Hyundai GLOVIS, a group company, to establish a global network and transportation control system that systematically collects and transports waste batteries from various locations around the world, including scrapyards, dealerships, after-sales service centers, and Battery-as-a-Service (BaaS) sites. We are also building an integrated diagnostic and pre-treatment system for recovered batteries in collaboration with Hyundai Glovis. In particular, Hyundai GLOVIS has developed and patented a dedicated platform container that can transport used batteries, which are difficult to handle, safely and effectively. It is also collaborating with ER (Environment Recycling), a company possessing pretreatment technology for waste batteries, in the construction of a system that will enable easy transportation and in securing a black powder that can extract valuable metals.

Additionally, we have secured a logistics system that complies with the complex and diverse regulations of each country. Hyundai will use Hyundai GLOVIS' logistics expertise and network to build a foundation for the recovery, diagnosis, and pre-treatment of waste batteries throughout their entire lifecycle, thereby strengthening the reuse and recycling system.

Reuse of Second-Life Batteries Hyundai has been conducting pilot projects to reuse second-life EV batteries for ESS. In December 2020, we became the first company in Korea to obtain approval to give a special regulatory sandbox demonstration of an energy storage device for reusing second-life batteries. Having built a 2 MWh ESS and a 300 kWh ESS, respectively, at our Ulsan Plant and the Gongju plant of OCI Specialty, our demonstration partner, we began commercial operations using photovoltaic power in January 2021.

In April 2022, in cooperation with the Korea Water Resources Corporation, we built a new 400 kWh ESS in Busan Eco Delta Smart City, which will be used in the P2P-based power transaction pilot project. Since 2023, Hyundai's various ESS pilot projects based on second-life batteries have been led by Hyundai GLOVIS. We will also strengthen the ESS business based on waste batteries through a unified pipeline ranging from Hyundai GLOVIS' second-life battery recovery/diagnosis/pre-treatment system to the reuse business.

Remanufacturing of Second-Life Batteries Among second-life batteries generated from our battery life cycle, top-quality second-life batteries with high residual value will be linked to remanufacturing business according to our own classification criteria. We will work together with Hyundai MOBIS to establish a collection system and a remanufacturing base by using the domestic and global after-sales parts supply chains of Hyundai MOBIS. We then remanufacture purchased/collected second-life batteries into batteries for old vehicles and after-sales service, thereby prolonging the service life of batteries.

Recycling of Raw Materials from Second-life Batteries Second-life batteries that cannot be remanufactured or recycled via Hyundai's battery circulation system are broken into pieces and sent to a recycling business that extracts from them valuable metals such as lithium, cobalt, and nickel. Hyundai is concentrating on securing technology that can recycle a large amount of second-life batteries in a sustainable, safe way. By linking the raw materials that are secured as a result with battery manufacturing processes, we will complete the virtuous circulation system of batteries. We plan to build a stable electric vehicle ecosystem by strengthening our battery raw material supply capabilities in the region through the virtuous battery circulation system.

Responding to the EU Battery Regulation As the demand for core battery materials such as lithium, cobalt, and nickel increases with the increasingly widespread adoption of electric vehicles, it is becoming more important to secure a stable supply and price competitiveness for these materials. Additionally, a significant surge in waste batteries from electric vehicles is expected within the next 8-10 years. As a response to the risks of supply and price fluctuations of battery core materials, the recycling industry for materials derived from waste batteries is also attracting attention.

Reflecting this trend, battery-related regulations have been tightened recently, especially in the EU. The EU adopted the new EU Batteries Regulation in 2023 and enforced it in February 2024. This regulation mandates environmental and safety credentials for batteries distributed in the region. All batteries distributed in Europe must declare their carbon footprint, including the amount of emissions generated over their entire lifecycle. Also, EV and industrial batteries must use a certain percentage of recycled materials for key raw materials such as cobalt, lead, lithium, and nickel starting in 2030. Moreover, due diligence on the supply chain of electric vehicle and industrial batteries and the digital disclosure of battery-related information (Digital Battery Passport) will be required. Battery companies will be legally obligated to collectively and individually take back all waste batteries. This regulation affects not only battery manufacturers but also the entire value chain, including automobile manufacturers that receive batteries for electric vehicles, produce electric vehicles, and collect, reuse, remanufacture, and recycle waste batteries.

In anticipation of the global expansion of regulations mandating the use of recycled materials for core battery materials, Hyundai is collaborating with Hyundai GLOVIS and other Group affiliates in the establishment of a value chain for urban mining based on waste batteries in Europe. In the first place, we are establishing upstream sides of this urban mining value chain, including creating a dealer program to recover customer-owned waste batteries and establishing an integrated recovery and pretreatment center.

Hyundai also plans to stabilize the supply and demand of core battery materials and reduce costs in the mid- to long-term perspective, while responding to the EU's mandatory application of recycled materials for core battery materials based on the European urban mining value chain. In addition to the mandatory application of recycled materials for batteries, we are building a regulatory response system in collaboration with battery companies in response to the Digital Battery Passport – a regulation requiring the digital disclosure of battery-related information, including the carbon footprint, and due diligence. Regarding the digital battery passport, we are considering establishing a digital disclosure system for battery information, including the carbon footprint, in collaboration with the Global Battery Alliance (GBA). We will also work with battery companies to establish a due diligence system for the battery supply chain.

Reduction of Environmental Impact

Companies have the responsibility to meet the needs of the present without compromising the ability of future generations to meet their own needs. In addition, there are rapid changes in the internal and external environment that surrounds companies, while water shortage grows in severity due to climate change and reckless corporate activities, and such environmental issues as air and water pollution cause negative impacts to all life on Earth. There is also increasing raw material risk, which was triggered by war and inflation. Amid stricter regulations of environmental authorities, sustainable use of natural resources has become an important issue more than ever. Hyundai therefore strives to restrain increases of resource use and waste discharge that are connected to the rise in production, which has been increasing after COVID-19.

Sustainable Use of Resources

RESOURCES INFLOWS

Increased Efficiency of Raw Material Input Volatility of raw material prices is rising, mainly attributable to global inflation, supply chain conditions, and wars. Raw material price volatility is a factor that directly affects finance. Hyundai is therefore striving to minimize internal and external risks that can be triggered by raw materials, including a rise in costs, instability in supply and demand, and depletion of natural capital, by enhancing raw material usage efficiency and promoting recycling.

The primary raw materials used at Hyundai's production plants include steel (iron), aluminum, paint, thinner, and casting yarn. Steel sheets and aluminum are predominantly used in the body shop, while scraps from the pressing process are fully recycled through external sales. In 2023, these scraps accounted for 32.4% of the total amount of raw materials used. We are working to reduce the amount of iron and aluminum used at each production plant.

Raw Material Use¹⁾ (Unit: Tons, Tons/Vehicle)

Classification	2021	2022	2023
Steel/aluminum use	1,195,358	1,297,894	1,388,888
Use per vehicle produced	0.31	0.33	0.32
Steel/aluminum scrap	423,617	435,192	449,781

¹⁾ Raw material data of the Hyundai de Mexico (HYMEX), which were previously omitted from past performance calculations, have been incorporated, resulting in revised figures for raw material quantities for the period 2021 to 2022 compared to the previously disclosed figures.

Ratio of scrap amount in 2023



In 2023, despite the year-on-year increase of the production volume, the amount of iron and aluminum used by each unit showed a slight decrease. Meanwhile, efforts to minimize the use of raw materials at individual production facilities are ongoing. For instance, our Brazil plant reduced the amount of iron input by approximately 8% by adjusting the thickness of the fenders, while our India plant cut its use of iron by 161 tons by reducing the pitch of the blanks.

Water Management Programs Hyundai monitors trends of water usage, recycling, and pollutant discharge at each of its production plants on a monthly basis, and manages its wastewater systems through regular inspections. Internally, we regularly assess and conduct due diligence on water efficiency and water pollutant management at each production plant using the Hyundai Environmental Assessment Tool (HEAT), which was developed by our headquarters' environmental organization. Externally, we undergo annual ISO 14001 certification audits by third-party organizations, such as TÜV NORD and DNV, to assess our water efficiency, recycling, and treatment management practices. Based on the results of both our own internal management and the internal and external environmental assessments, we identify and implement improvements in water efficiency and wastewater quality.

We are improving water efficiency to ensure that our water usage does not increase in conjunction with our production growth, and we are working hard to expand our water recycling initiatives. Hyundai also assesses water risks at each business site using the WRI Aqueduct Water Risk Atlas Tool. These assessments have identified extremely high water risks at our HMI, HAOS, HMMA, BHMC and HMMI sites, and we are now committed to enhancing water efficiency and increasing the volume of water recycled at these high-risk sites.

In 2023, Hyundai recycled 2,631,445 tons of water, a year-on-year increase of 15.2%, with the recycling rate also rising slightly to 23.8%. Our water use target for 2023 was set at 11,099,702 tons, aiming for a reduction of 4% compared to the business as usual (BAU) calculated based on the year's production plan. We accomplished this goal, using 11,060,941 tons of water, while our water intensity was 2.58 tons, representing a decrease of 4% from the previous year.

Each Hyundai production plant is actively working to reduce its water usage while expanding its recycling efforts. The plant in Chennai, India (HMI), nearing "day-zero" status, and the Asan plant in Korea, have established a zero liquid discharge that recycles 100% of water, thereby eliminating the discharge of wastewater.

Meanwhile, the Ulsan plant is constructing a wastewater recycling system that includes a water transfer pipeline. This system will recycle water from the wastewater treatment plant into circulating water for the cleaning dust collector in the painting booth, and is expected to recycle 52,000 tons of water annually.

Water Use¹⁾ (Unit: Tons, Tons/Vehicle)

Classification	2021	2022	2023
Total use ²⁾	10,360,025	10,602,057	11,060,941
Use per vehicle produced	2.66	2.69	2.58
Recycling	2,179,600	2,284,154	2,631,445
Recycling rate	21.0%	21.5%	23.8%

¹⁾ Water data of the Hyundai de Mexico (HYMEX) and Hyundai Thanh Cong Vietnam (HMTV), which were previously omitted from past water data calculations, have been incorporated, resulting in revised figures for the period 2021 to 2022 compared to the previously disclosed figures. Water data of Hyundai Motor Group Innovation Center Singapore (HMGICS) and HTWO Guangzhou, which commenced operations in 2023, are included in the performance figures for the year 2023.

²⁾ Excluding water discharge from the sum of urban (industrial) water, surface current, groundwater, and seawater fresh water intake quantities

Water recycling rate in 2023



Reduction of Environmental Impact

In 2023, our Czech plant (HMMC) optimized its reverse osmosis (RO) system, saving 17,280 tons of water. It has also set a mid- to long-term goal to reduce its water use by 30% by 2029, compared to 2022. To meet this target, the Czech plant is considering the introduction of nano filters to recycle wastewater from the paint shop's RO system, enhancing degreasing and skid purification, promoting the recycling of previously challenging wastewater such as anode solution, installing additional flow meters, and strengthening its internal audit of water consumption. As for the Brazil plant (HMCSA), it is reducing its water consumption by improving its RO system, recycling backflow from the carbon filter system, and adjusting the water pressure in restroom sinks.

Furthermore, Hyundai conducts annual environmental education for its employees based on its environmental policy for fostering water conservation and recycling initiatives. More specifically, on World Water Day (March 22, 2023), designated by the United Nations, the Mexico plant (HYMEX) provided education to raise its employees' awareness of the paramount importance of water conservation. Meanwhile, the Vietnam plant (HMTV) engaged employees in a 'turn off unused water' campaign in a drive to further reduce its water usage.

In terms of measures to improve wastewater quality, Hyundai complies with local and regional standards for wastewater pollutants before discharging wastewater from each plant. We manage these pollutants to levels that are generally below the legal requirements through advanced treatment processes. Our wastewater treatment involves not only physical and chemical processes but also advanced tertiary treatment techniques. Furthermore, we monitor water pollutants, including biological oxygen demand (BOD), total organic carbon (TOC), and suspended solids (SS), at each production plant. We also measure and manage specific pollutants – such as nitrate (T-N) and phosphate (T-P) - that are generated by our automobile painting and washing operations. Water quality tests of these major pollutants are conducted each month by nationally accredited water quality measurement organizations.

RESOURCES OUTFLOWS

Waste Management Programs Hyundai monitors and manages the amounts and types of waste discharged and recycled at each production plant on a monthly basis. Internally, our headquarters' environmental organization conducts audits and due diligence on waste management using the Hyundai Environmental Assessment Tool (HEAT), developed in-house. Externally, we undergo annual ISO 14001 audits to assess our waste management practices. Based on the results of our self-management, as well as internal and external waste, we identify and act upon opportunities to reduce waste and enhance recycling efforts.

Hyundai is committed to reducing waste and expanding recycling initiatives to ensure that our waste generation do not rise in parallel with our production volumes. In our automobile production process, we successfully recycle 100% of metal wastes and are actively working to broaden recycling efforts to include waste paint, waste thinner, packaging materials, and sludge waste. In 2023, Hyundai Motor's total waste discharge (excluding recycling amount) amounted to 66,692 tons, a decrease of 1.5% from the previous year. The amount of waste per vehicle also saw a slight reduction, coming in at just 0.0155 tons. Conversely, our recycling volumes saw a significant year-on-year increase due to a temporary surge in recycled construction waste, associated with the construction of the new electric vehicle factory in Ulsan. Consequently, the recycling rate climbed to 93.5%. We set our waste generation target for 2023 at 70,262 tons, aiming for a 5% reduction compared to the business as usual (BAU) calculated based on the year's production plan. Ultimately, we generated 66,692 tons of waste, successfully meeting our 2023 waste target.

Each production plant is actively working to reduce its waste, expand its recycling initiatives, and minimize its landfill use. The U.S. plant (HMMA) has developed and is implementing a plan to reduce its waste generation by 420 tons per year. This initiative includes changing the unit of waste disposal from volume to weight and compressing the drums that hold waste, as identified in its waste minimization study. The India plant (HMI) has decreased the amount of scrap it generates by altering the grade of coil packing scrap, separating it, and reusing it. In Korea, the Jeonju plant now recycles waste synthetic resin, which was previously incinerated, and avoids landfill disposal of waste casting yarn. The Asan plant and Brazil plant (HMCSA) have been certified as "zero waste to landfill" plants. The Asan plant, due to its high recycling rate and landfill minimization performance, has achieved the 'Platinum' level (100% recycling rate) in the Zero-Waste-To-Landfill (ZWTL) certification of UL Solutions, an international safety and science certification organization. As for the Brazil plant, it has earned the highest level of the "Responsible Company Seal" for its waste management, Diamond, which is awarded by the Brazilian certification bodies PCN Do Brasil, the National Institute of Metrology Standardization and Industrial Quality (INMETRO), and the Zero Waste Institute from the Instituto Lixo Zero Brasil (ILZB).

Hyundai also conducts annual environmental education for its employees based on its environmental policy to promote waste reduction and recycling. During Environmental Week (June 20-23, 2023) at the Brazilian plant, education was held on the theme of 'The Circular Economy and Solutions to Plastic Pollution.' This event aimed to increase employees' awareness of the importance of reducing waste and enhancing recycling efforts. Similarly, the headquarters launched a campaign encouraging the use of multi-use cups to decrease reliance on disposable paper cups. Additionally, we invest heavily in waste and recycling facilities, allocating a total of KRW 1.24 billion to improve the waste and recycling infrastructure of our domestic plants in 2023 alone.

Reducing Pollutant Emissions To minimize air and water pollutants, Hyundai enforces internal management standards that exceed the legal requirements of the countries in which it operates. We are committed to reducing pollutant emissions by actively replacing equipment and investing in new facilities. In 2023, the Ulsan plant allocated KRW 44.6 billion in operating expenses in order to enhance its air pollution control facilities, and spent approximately KRW 6.65 billion on renovating the prevention facilities and odor fields, including the replacement of RTO activated carbon systems. The Jeonju plant invested around KRW 590 million in the installation of new dust collectors and the replacement of dust shields and bag filter fillers. The Czech Republic (HMMC) and India plants (HMI) are working to reduce pollutants through the implementation of waste heat recovery systems, fuel switching, and optimization activities. Both the Ulsan and Jeonju plants manage the concentration of water pollutants by analyzing monthly discharge data. They also invest in facility upgrades to prevent environmental accidents and enhance the efficiency of water treatment, focusing on the continuous improvement of existing equipment.

Waste¹⁾ (Unit: Tons, Tons/Vehicle)

Classification	2021	2022	2023
Total waste ²⁾	60,371	67,694	66,692
Waste per vehicle produced	0.0155	0.0172	0.0155
Total recycling	505,770	561,670	957,463
Recycling rate	89.3%	89.2%	93.5%

¹⁾ Waste data of the Hyundai de Mexico (HYMEX) and Hyundai Thanh Cong Vietnam (HMTV), which were previously omitted from past performance calculations, have been incorporated, resulting in revised figures for the period 2021 to 2022 compared to the previously disclosed figures. Waste data of Hyundai Motor Group Innovation Center in Singapore (HMGICS) and HTWO Guangzhou, which commenced operations in 2023, are included in the performance figures for the year 2023.

²⁾ Excluding recycled amount

Waste recycling rate in 2023



Reduction of Environmental Impact

Management of Harmful Substances

HARMFUL SUBSTANCE MANAGEMENT SYSTEM

Harmful Substance Management Standard Hyundai classifies and manages harmful substances in three stages – prohibition of use, limited use, strengthened management – according to international standards and initiatives. Substances classified as “prohibition of use” are banned from use as high-risk regulated substances for which substitutes must be found, while substances falling into the category of “limited use” can only be used for purposes specified in the exception article, and those falling into the category of “strengthened management” can only be used under constant monitoring and systematic management.

Although we strive to minimize harmful substances under internal standards, it is difficult to completely block harmful substances from products because automobiles consist of many thousands of parts. We therefore apply the same management standards for harmful substances to our supply chain in order to ensure that the products that are delivered to us do not contain any regulated substances.

Inspection and Analysis of Harmful Substances Hyundai has adopted the International Material Data System (IMDS), jointly operated by global automobile manufacturers, to systematically manage information on harmful substances. We also apply the Material Analysis Management System (MAMS), developed in-house, to conduct risk assessments based on substance information on parts collected from the development/design stage of a new vehicle, thereby blocking the use of high-risk substances from the outset. Moreover, we investigate the inclusion of regulated substances during the new car development stage in order to preemptively respond to newly regulated substances. Hyundai also checks information on substances that are liable to change during the mass production processes through parts and material analysis and inspections during regular supplier site inspections.

Management of Harmful Substance Information Hyundai does its utmost to prevent accidents by preemptively reviewing new high-risk substances and replacing them with alternative substances. Upon handling hazardous chemicals, we are striving to maintain a safer working environment by utilizing the integrated monitoring system of environmental facilities to check for leakages of hazardous chemicals in real time. Since 2003, we have been sharing information on domestic and international harmful substance regulations and response requirements with our suppliers, as well as strictly managing harmful substances in the supply chain by helping suppliers set up their own systems of response to harmful substance regulations, whenever necessary, in addition to running annual IMDS user trainings to improve the consistency of IMDS data.

Preemptive Response to Regulation and Initiatives Hyundai supports international regulations, standards, and initiatives concerning harmful substances. We strive to preemptively develop and apply alternatives even before finalization of regulations that prohibit/restrict the use of harmful substances in Korea and abroad. In response to amendment and/or strengthening of End-of-Life Vehicles Regulation (ELVR) and Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) of EU, a leader of governing harmful substances, we work on replacing high-risk substances. In addition, anticipating the global discussions on the comprehensive regulation of persistent organic pollutants (POPs), known to have adverse effects on ecosystems and human health by not decomposing in the natural environment or accumulating in the food chain, leading to central nervous system damage and immune system disruption, Hyundai has formulated preemptive measures to address the issue.

With perfluorinated compounds (PFAS) currently under regulatory scrutiny in Europe and the U.S., we are actively reviewing our use of these substances and their substitutes, targeting a ban before the anticipated European regulation in 2027. In the U.S.A., Alabama, the location of our plant, has announced PFAS regulations for workplaces, including the mandatory requirement to submit emissions data. In response, we are intensifying our research into PFAS generation factors, which includes analyzing all the constituent substances of paints.

Focused Management of Four Major Heavy Metals Hyundai prohibits use of the four major heavy metals – lead, cadmium, hexavalent chromium, mercury – that are prohibited from use in the EU market in accordance with the Directive on end-of-life vehicles (ELV Directive), a new regulation proposed by the EU Commission in July 2023, and that can accumulate in the human body and cause heavy metal poisoning. In addition, we strictly prohibit the use of high-risk substances such as brominated flame retardants. We manage such harmful substances in accordance with the harmful substance management standards established in December 2002.

Ulsan Plant's commitment to zero hazardous chemicals

Hyundai's Ulsan Plant is striving to reduce hazardous chemicals themselves with a goal of reducing chemical accidents. It has been making continuous plant facility improvements since 2014, while developing alternatives together with suppliers. As a result, it achieved a 90% reduction in hazardous chemicals and plans to become a zero hazardous chemicals business site by 2030.



Reduction of Environmental Impact

BUSINESS CASE



Environment Enhancement Activities by Sites

Hyundai is improving quantitative environmental indicators for each business site in Korea and overseas. Our business sites also have been taking active part in environmental enhancement activities and initiatives. These qualitative activities are included in business sites' performance indicators, along with quantitative indicators, and reflected in their environmental performance evaluations. Based on this performance system, we are strengthening the environment enhancement activities of each business site and leveling up the company's environmental management based on the horizontal development of excellent environmental activities.

Business Sites in Korea

Ulsan Plant As the largest single plant in Korea, the Ulsan Plant undertakes various environmental improvement initiatives across its unit plants. According to its target of “zero serious environmental incidents” and its aim of preventing environmental accidents and carrying out immediate responses, the Ulsan Plant has equipped a total of 808 high-risk facilities – including wastewater collection tanks, cutting oil concentrators, hazardous chemical handling facilities, atmospheric TMS (chimney automatic measuring devices), and odor meters – with an IoT system that enables real-time monitoring and swift action in the event of an accident.

At Plant 2, we hosted a joint labor-management ESG workshop to enhance corporate value and sustainable management. The workshop activities included environmental management resolutions and plogging. Additionally, Plant 2 issues its own environmental publications to ensure that all its employees adhere to the environmental management policies and ESG-related issues. It also fosters a commitment to environmental preservation by encouraging employees to participate in environmental competitions organized by the Ministry of Environment.

Asan Plant Thanks to its high recycling rate and landfill minimization efforts, the Asan Plant became the first Korean automaker to achieve the highest Platinum level (100% recycling rate) in the Zero-Waste-To -Landfill (ZWTL) external certification of UL Solutions, an international safety and science certification organization. This certification system grades workplaces based on their actual recycling rates. The Asan Plant achieved a 100% rate by recycling scrap metal from the automobile pressing process into steel products and transforming all waste casting yarn and waste aluminum from engine production into raw materials.

Korea Business Division The Korea Business Division conducts various activities to respond preemptively to environmental legal and regulatory risks at high-tech centers, with the aim of enhancing the environmental work capabilities of each center. It conducts semi-annual environmental audits, supports comprehensive environmental management at certified used car centers, and ensures compliance with the environmental laws. Additionally, to standardize and improve our environmental management tasks, we have produced a guidebook on environmental work practices, a standard timetable calendar for environmental work, and a secret notebook for environmental inspections, all of which are distributed to our high-tech centers.

Overseas Business Sites

Hyundai Motor Manufacturing Alabama (HMMA) With the initiation of the mass production of EV/HEV models, HMMA has established a process for recovering and recycling high-voltage waste batteries that are found to be defective during production. Through collaboration between departments (Production Management, Quality Management, Safety, etc.), waste batteries are sorted, transported, and 95% recycled by an external company to extract valuable materials like lithium carbonate and cobalt for reuse, while reducing waste disposal costs in the process.

Hyundai Motor Central & South Americas (HMCSA) Hyundai Motor Brasil is dedicated to realizing ESG values by acquiring various environmental certifications. It was the first automobile company in Brazil to receive the Responsible Company Certification for Waste Management from the Zero Waste Institute and PROCERT for Social and Environmental Corporate Responsibility. Additionally, it has consistently earned a “Gold” rating in the GHG Protocol and maintains the Environmental Management System (ISO 14001) certification.

Hyundai Motor Manufacturing Czech (HMMC) To reduce industrial water usage, HMMC recycles reverse osmosis (RO) water from its paint shop. By reusing the clean wastewater for high-pressure washing processes, the plant expects to save approximately 17.28 million liters of water and about 91,238 euros per year, thereby reducing its polluted water emissions and achieving positive environmental and economic impacts

Hyundai Motor Manufacturing Indonesia (HMMI) HMMI has signed a renewable energy supply agreement with Indonesia's state-owned electricity company (PLN) to realize RE100. This commitment ensures that from 2023, all electricity required to operate the plant will be sourced from renewable energy. Additionally, the effectiveness of the environmental management system has been externally validated through a BLUE rating from PROPER, an environmental management evaluation system operated by the Indonesian Ministry of Environment and Forestry. This rating signifies 100% compliance with the environmental laws and regulations.

HTWO Guangzhou HTWO Guangzhou received the highest grade of “GREEN” in the 2023 Corporate Environmental Credit Rating by the Guangzhou Municipal Ecological Environment Bureau. It was recognized as a sincere environmental protection company for fully complying with China's environmental legal obligations and proactively implementing six environmental improvement activities.

Hyundai de Mexico (HYMEX) In response to the increase in wastewater emissions due to the aging of existing facilities and the rise in trailer production, HYMEX enhanced the wastewater treatment facility at its paint shop to improve its treatment capacity. By replacing aging water treatment equipment, including pH meters and flow meters, and installing new automation technology such as PLCs and flow controllers, the plant is expected to save approximately USD 30,000 per year. These savings largely stem from its efforts to protecting nearby water supplies and recycle paint booth-treated water.

Hyundai Motor Group Innovation Center in Singapore (HMGICS) In alignment with the Singapore government's goal of achieving carbon neutrality by 2050, HMGICS installed solar panels on the rooftop of its facility to increase its use of green energy in 2023. Moreover, we are continuing to advance the paradigm of hydrogen production by collaborating with the Singaporean government on research into a natural hydrogen ecosystem.



1 Ulsan Plant Labor-management joint environmental (ESG) management workshop
 2 Responsible Company Certification granted to HMCSA
 3 Solar panels installed on HMGICS

Protection of Biodiversity

Biodiversity is essential for life on Earth, allowing humans, plants, and animals to live in harmony with nature. Recognizing that biodiversity has a significant impact on natural capital—including human food safety, health, air and water quality, and raw material supply—Hyundai strives to assess its impacts on, and risks to, biodiversity and to ameliorate any negative impacts based on this assessment. Furthermore, under the company-wide “Colorful Life” campaign, we aim to prevent further loss of biodiversity and turn it into a net gain by implementing various projects, such as protecting endangered species and preserving natural habitats within the communities near our sites and regenerating land and marine ecosystems while taking into account their natural characteristics.

Preservation, Restoration, Expansion of Biodiversity

BIODIVERSITY PROTECTION SYSTEM

 [Hyundai Motor Company Biodiversity Protection Policy](#)

Establishment of Biodiversity Protection Policy In 2022, Hyundai established the Biodiversity Protection Policy based on the Convention on Biological Diversity (CBD), Convention on International Trade in Endangered Species of Wild Fauna and Flora, and Guidelines for Applying Protected Area Management Categories. We are complying with laws and regulations on diversity promotion, wild fauna and flora management, natural habitat conservation, and use of forest/soil/water resources of countries where our business sites are located. Also implemented based on the biodiversity policy includes the assessment of environmental impact throughout our business operations and conservation/restoration activities. Implementation of our pledge on mid- to long-term biodiversity restoration and promotion, biodiversity policy declaration and establishment/amendment, assessment of biodiversity and setting of impact reduction activities, and forest destruction prevention and reforestation project is endorsed by BOD (Sustainability Management Committee) or management (C-level).

Biodiversity Assessment and Protection by Business Site Hyundai conducts an environmental impact assessment of its large business sites based on relevant laws and regulations in the respective country to forecast and analyze the impact on resident life and natural environment by environmental factors that arise in the process of newly building/extending business sites or operating business sites. The air environment, water environment, land environment, fauna and flora, and other factors are subject to environmental impact assessment. Based on assessment results, we identify major risk factors and establish mitigation measures. Some production subsidiaries additionally conduct a biodiversity risk assessment that identifies numbers of fauna and flora and ecosystem status, through which they forecast impact and risk factors on specific species and population and establish mitigation measures. In addition, each business site carries out biodiversity and habitat protection activities and collaborates with government and relevant organizations, non-profit groups, and professional organizations to raise the effectiveness of protection activities.

Biodiversity Assessment – Numbers of Fauna/Flora and Analysis of Impact

① Select species and individuals We select species and individuals that are subject to an assessment in a way that allows identification of fauna and flora as well as the ecosystem status in consideration of a business site’s operation method, operation size, and nearby local environment characteristics. In particular, we include endangered animals, protected wild animals, natural monuments, and species that are designated for preservation/protection by international agreements in assessment targets.

② Set the assessment area (range) The area that has the business site’s major axis length as the radius is used as the basis, but we set impacted neighboring areas from business site boundaries as the assessment range. If needed, we expand the assessment range in consideration of fauna and flora’s movement route, area of activity, and vegetation distribution. Also, in consideration of seasonal characteristics, we conduct an assessment at a different time.

③ Define the assessment method (means) We carry out a basic survey of ecosystem geography and ecology, including an inquiry, documentary survey, and questionnaire. We identify the status of numbers of species through unaided eye observation, field inquiry, picture-taking, sound detection, spot survey, and trap installation, in consideration of fauna and flora’s area of activity, time, frequency, and other factors. Assessment results are managed as characteristics information, including method of confirming species per assessment spot, legally protected species, indigenous species, and observed and confirmed population.

④ Forecast and analyze impact We forecast and analyze the impact and risk factors of natural environment changes caused by business operations, air/water/soil pollution, and noise and vibration generation on changes in species and population. When forecasting impact, we refer to similar assessment cases, such as establishment of new business site, capacity expansion, and business operation. Based on assessment results, expected changes to species and population are described in quantitative or qualitative form. We forecast impact in detail for major species and individuals that are expected to be substantially impacted from business operations. Priority is placed on considering species that are sensitive to anthropogenic interference.

⑤ Establish mitigation measures Based on the results of forecasting and analyzing negative impact on species and population, we establish measures on mitigating negative impact on fauna and flora species and population. We change business site locations, adjust business operation schedules, and establish alternatives to avoid significant impact, and adopt environmental facilities to remove and minimize environmental pollution. In case of unavoidable damage to a major habitat, we establish alternative habitats and vegetation belts, and artificial space, including wildlife passage.

Biodiversity Risk Management

Based on the mid- to long-term goal of halting any further losses of biodiversity by 2020 and transitioning to a net gain from 2030, as outlined in the UN’s Kunming-Montreal Global Biodiversity Framework in 2022, many developed countries and major regions such as the EU have developed their own regional/national biodiversity strategies for 2030 in order to move beyond simply halting biodiversity loss to achieving a net gain at the regional/national level. Building on these strategies, they are earnestly beginning to regulate the industries that have the greatest negative impact on biodiversity.

First and foremost, the EU recognizes deforestation as a major driver of biodiversity loss and accordingly has enacted the EU Deforestation Regulation (EUDR), which will start to apply on 30 December 2024. The EUDR mandates that any operators or traders engaged in importing or exporting commodities including palm oil, cattle, coffee, wood, cocoa, rubber, and soybeans – along with relevant products such as leather, furniture and rubber tires, within the EU market must demonstrate that the products are not linked to deforestation or forest degradation. The relevant commodities and products covered by EUDR will be screened for links with deforestation and, if such links are confirmed, they will be banned from importation and distribution within the EU. Further additions to the list of covered commodities and relevant products are expected in the future.

Hyundai integrates biodiversity risks into its company-wide risk management system. Both the ESG Planning Team, which reports directly to the CEO and manages sustainability-related risks, and the Business Risks Management (BRM) Group, which is responsible for managing company-wide risks are responding to biodiversity-related risks. In particular, leather and rubber among commodities and relevant products covered by EUDR are used in vehicle interior parts including seats and tires, and the future use of rubber and leather raw materials linked to deforestation will be subject to an import ban in Europe. Such a ban could in turn lead to delays and disruptions in EU parts procurement. Hyundai therefore proactively prevents and mitigates potential risks arising from the EUDR through two main strategies – risk identification and risk prevention. As regards the first of these two strategies, risk identification, Hyundai requires the directive suppliers of parts made with leather and rubber to provide the origin information of material they use during the bidding process, and identifies high-risk sourcing based on this information. For risk prevention, the directive suppliers of parts made with leather are obligated to use LWG (Leather Working Group) certified leather. Hyundai is working on making our high-quality genuine leather even more sustainable with expanding the use of high-quality artificial and recycled leather. Regarding rubber, Hyundai works with tire companies to secure and utilize natural rubber that is not linked to deforestation. Moving forward, Hyundai will strengthen its due diligence on sourcing from countries designated as high-risk by the EU and continue to develop and apply sustainable materials, including recycled materials for leather and rubber parts, in the medium to Long term. On the other hand, Hyundai provided training sessions for its internal procurement staffs to explain EUDR’s requirements and guide on how to respond to EUDR and distributed the guidance material to them.



Methods for assessing the species and individual inhabitation status (picture-taking, spot survey, field inquiry)

Protection of Biodiversity

COMPANY-WIDE “COLORFUL LIFE” CAMPAIGN

Colorful Life – Environmental Contribution Campaign Hyundai provides guidelines on all CSV activities aligned with the company-wide CSV initiative. In 2023, we launched the company-wide biodiversity conservation campaign, “Colorful Life,” with biodiversity as the central theme of our environmental contribution activities, reflecting the critical loss of biodiversity on the global scale. Colorful Life highlights the significance of life’s diversity and suggests that the conservation of biodiversity can enhance and enrich our lives. Each domestic and overseas site has developed and implemented a CSV activity business plan centered on biodiversity.

MBTI-linked Endangered Species Exhibitions at Yangjae Headquarters, Namyang R&D Center, and Nambu High-tech Service Center The Yangjae Headquarters hosted an MBTI-linked exhibition of endangered plants and animals and a biodiversity-themed talk concert featuring the eco-conscious actress Jin-hie Park in a bid to raise awareness of the importance of biodiversity conservation among employees and the general public. Meanwhile, the Namyang R&D Center conducted the Colorful Life campaign internally, and the Nambu High-tech Service Center hosted the same MBTI-linked endangered species exhibition at the headquarters at Yeouido Hangang Park near its business site.

Ulsan Plant – Publishing the Ulsan Protected Wildlife Leaflet To protect endangered animals and preserve biodiversity, the Ulsan plant published the Ulsan Protected Wildlife Leaflet in collaboration with the Taehwa River Conservation Association. This leaflet, which introduces 57 species designated as protected wildlife by the city of Ulsan, has been distributed to the Biodiversity Center and the Ulsan City Office of Education as an educational material for local citizens and elementary school students.

Asan Plant – Planting Trees at Yeongsan Arboretum Since 2019, the Asan Plant has run a “one-company, one-mountain” partnership for the Yeongsan Recreational Forest in Asan City, and has allocated an annual budget of KRW 10 million to support the Hyundai Motor Forest program at Yeongsan Mountain. In 2024, Hyundai will continue making efforts to mitigate climate change and preserve biodiversity by planting Yoshino cherry trees, a species known to be highly effective in absorbing carbon, in collaboration with the Asan Facilities Corporation.

Jeonju Plant – Endangered Plant Conservation & Restoration Project The Jeonju Plant has signed an MOU with the Jeonbuk Regional Environmental Office and the Deogyusan National Park Management Office and the Plant Conservation Center of Korea National Park Service to conserve and restore several endangered plants of Deoyusna such as the *Cypripedium japonicum* (Gwangneung Yogang Flower: Class I Endangered Species) and the *Lilium tsingtauense* (Nalgae Haneulnari Flower: Class II Endangered Species). Based on the agreement, we have installed biodiversity observation cameras and protective fences, and implement conservation and restoration activities such as habitat surveys, seed collection, and seeding.

Hyundai’s Mitigation Measures

In order to directly and/or indirectly mitigate negative impacts on biodiversity identified through the biodiversity assessment, Hyundai takes follow-up measures based on mitigation hierarchy.

Mitigation Hierarchy	Hyundai’s Mitigation Measures																							
Avoid	<ul style="list-style-type: none"> Before establishing/changing/expanding a large business site, we pre-assess how the activity will impact the nature assets, including biodiversity (flora and fauna) and natural environment (air, water, soil), of the planned project site and surrounding area. According to assessment results, we decide on carrying out the project or restricting/putting off the project. 																							
Reduce	<ul style="list-style-type: none"> We adopt environmental facilities that can minimize discharge of air/water/soil pollutants of our business sites, such as use of the regenerative thermal oxidizer (RTO), dust collector, zero liquid discharge system, and waterborne-based paint. We conduct life cycle assessments (LCAs) in the areas of global warming, acidification, eutrophication, and photochemical oxidant generation to assess our vehicles’ potential impact on the environment, using CML (Centre of Environmental Science – Leiden University) methodology. LCA results indicated that EVs can reduce the carbon footprint as much as 67% compared to ICEVs, when using new and renewable energy-based electricity. Hyundai is therefore striving for 100% electrification by 2045. We apply exhaust gas-reducing technologies, such as the gasoline particulate filter (GPF) and diesel particulate filter (DPF), to reduce vehicle exhaust gas such as NOx and PM. 																							
Transform	<ul style="list-style-type: none"> We are establishing eco-friendly ecological parks based on private-government cooperation and developing/spreading new technologies that restore the ecosystem. <ul style="list-style-type: none"> We established the Yeouido Saetgang Ecological Park based on a three-party agreement among Hyundai Motor Company, Seoul Metropolitan City, and social cooperative Hangang, adopted non-point pollutant source reduction facilities, and conducted a planting project in the area. In partnership with The Nature Conservancy (TNC) in Brazil and Sao Paulo State University’s Department of Forest Science, we established a research forest to develop new technologies for forest restoration (Green Field, etc.) and are spreading new technologies. 																							
Restore	<ul style="list-style-type: none"> We restore endangered high-risk species and endangered species threatened by climate change. <ul style="list-style-type: none"> Animal restoration: We strive to preserve and restore species, such as by setting protection zones for the endangered long-billed ringed plover and eagle, which is a natural monument, living in the Taehwa River in collaboration with Ulsan Metropolitan City and East Asian-Australasian Flyway Partnership. Plant restoration: Following a project in the Hongcheon area to restore Korean fir and tulip tree, endangered species threatened by climate change, we collaborated with the Korea National Park Service and conducted a project on restoring plants on Mt. Deogyu that are categorized as endangered species, including <i>cypripedium japonicum</i> and <i>lilium cernuum</i>. 																							
Regenerate	<ul style="list-style-type: none"> We undertake regeneration projects for terrestrial, marine, and pond ecosystems. <ul style="list-style-type: none"> Terrestrial ecosystem: Through the IONIQ Forest project, we will regenerate forests by planting 1 million trees by 2025 across the globe, to provide sustainable habitats for both flora and fauna (Trees support over 80% of the world’s terrestrial biodiversity). Marine ecosystem: In collaboration with Healthy Seas, we will collect a total of 230 tons of ocean waste (waste fishing nets, etc.) in 10 European countries (Greece, France, etc.) and Korea by 2025 to increases in marine life population, including return of marine fish species. Pond ecosystem: We have promoted a project to regenerate two dried-out ponds in Chennai, where our Indian plant is located. This project has successfully restored and increased the populations of the species that inhabit the ponds, and revitalized their ecosystems as habitats for diverse organisms. 																							
	<table border="1"> <thead> <tr> <th>Classification</th> <th>Metrics</th> <th>Target</th> <th>Progress</th> <th>Detailed Strategies for Achieving Goals</th> </tr> </thead> <tbody> <tr> <td>Terrestrial ecosystem</td> <td> <ul style="list-style-type: none"> Area of regeneration No. of trees planted to build forests </td> <td> <ul style="list-style-type: none"> Area of regeneration: Regenerate a total of 650 ha of terrestrial ecosystem (forest, grassland) by 2025 Planting trees: Plant 1 million trees by 2025 </td> <td> <ul style="list-style-type: none"> Regenerated Area: From 2016 to 2023, a total of 588 ha of forest, grassland, and other terrestrial ecosystems were regenerated (achieving 90% of the target, with 309 ha regenerated in 2023) Tree Planting: Between 2016 and 2023, a total of 498,582 trees were planted (50% of the target achieved, with 268,319 trees planted in 2023) </td> <td> <ul style="list-style-type: none"> Aim to achieve the goal by expanding the global market for the IONIQ Forest, starting in Korea and then extending the scope of the projects to major countries with our production plants in the U.S., Brazil, and the Czech Republic </td> </tr> <tr> <td>Marine ecosystem</td> <td> <ul style="list-style-type: none"> Collected marine wastes, including waste fishing nets </td> <td> <ul style="list-style-type: none"> Collect 230 tons of marine wastes by 2025 </td> <td> <ul style="list-style-type: none"> From 2021 to 2023, a cumulative total of 106 tons of marine debris were collected on approximately 35 occasions in eight countries across Europe, Korea, and the U.S. (46% of the target achieved with 1.75 tons of waste fishing nets in 2023) </td> <td> <ul style="list-style-type: none"> Plan to expand the areas for marine debris collection, including Korea, in addition to 8 European countries, aimed at achieving the goal </td> </tr> <tr> <td>Pond ecosystem</td> <td> <ul style="list-style-type: none"> Number and area of regenerated ponds </td> <td> <ul style="list-style-type: none"> Regenerate 2 ponds with an area of a total of 1.4 ha by 2023 </td> <td> <ul style="list-style-type: none"> In 2023, the rehabilitation of two ponds covering a total area of 1.4 ha was completed, regenerating pond ecosystems and securing a water storage capacity of approximately 14 million liters (100% of the target achieved) </td> <td> <ul style="list-style-type: none"> Achieved the goal by expanding our pond revitalization projects in India, including the revitalization of three ponds in Hariahera, Palasoli, and Tajnagar in 2022, and the completion of two ponds in Chennai in 2023 </td> </tr> </tbody> </table>	Classification	Metrics	Target	Progress	Detailed Strategies for Achieving Goals	Terrestrial ecosystem	<ul style="list-style-type: none"> Area of regeneration No. of trees planted to build forests 	<ul style="list-style-type: none"> Area of regeneration: Regenerate a total of 650 ha of terrestrial ecosystem (forest, grassland) by 2025 Planting trees: Plant 1 million trees by 2025 	<ul style="list-style-type: none"> Regenerated Area: From 2016 to 2023, a total of 588 ha of forest, grassland, and other terrestrial ecosystems were regenerated (achieving 90% of the target, with 309 ha regenerated in 2023) Tree Planting: Between 2016 and 2023, a total of 498,582 trees were planted (50% of the target achieved, with 268,319 trees planted in 2023) 	<ul style="list-style-type: none"> Aim to achieve the goal by expanding the global market for the IONIQ Forest, starting in Korea and then extending the scope of the projects to major countries with our production plants in the U.S., Brazil, and the Czech Republic 	Marine ecosystem	<ul style="list-style-type: none"> Collected marine wastes, including waste fishing nets 	<ul style="list-style-type: none"> Collect 230 tons of marine wastes by 2025 	<ul style="list-style-type: none"> From 2021 to 2023, a cumulative total of 106 tons of marine debris were collected on approximately 35 occasions in eight countries across Europe, Korea, and the U.S. (46% of the target achieved with 1.75 tons of waste fishing nets in 2023) 	<ul style="list-style-type: none"> Plan to expand the areas for marine debris collection, including Korea, in addition to 8 European countries, aimed at achieving the goal 	Pond ecosystem	<ul style="list-style-type: none"> Number and area of regenerated ponds 	<ul style="list-style-type: none"> Regenerate 2 ponds with an area of a total of 1.4 ha by 2023 	<ul style="list-style-type: none"> In 2023, the rehabilitation of two ponds covering a total area of 1.4 ha was completed, regenerating pond ecosystems and securing a water storage capacity of approximately 14 million liters (100% of the target achieved) 	<ul style="list-style-type: none"> Achieved the goal by expanding our pond revitalization projects in India, including the revitalization of three ponds in Hariahera, Palasoli, and Tajnagar in 2022, and the completion of two ponds in Chennai in 2023 			
Classification	Metrics	Target	Progress	Detailed Strategies for Achieving Goals																				
Terrestrial ecosystem	<ul style="list-style-type: none"> Area of regeneration No. of trees planted to build forests 	<ul style="list-style-type: none"> Area of regeneration: Regenerate a total of 650 ha of terrestrial ecosystem (forest, grassland) by 2025 Planting trees: Plant 1 million trees by 2025 	<ul style="list-style-type: none"> Regenerated Area: From 2016 to 2023, a total of 588 ha of forest, grassland, and other terrestrial ecosystems were regenerated (achieving 90% of the target, with 309 ha regenerated in 2023) Tree Planting: Between 2016 and 2023, a total of 498,582 trees were planted (50% of the target achieved, with 268,319 trees planted in 2023) 	<ul style="list-style-type: none"> Aim to achieve the goal by expanding the global market for the IONIQ Forest, starting in Korea and then extending the scope of the projects to major countries with our production plants in the U.S., Brazil, and the Czech Republic 																				
Marine ecosystem	<ul style="list-style-type: none"> Collected marine wastes, including waste fishing nets 	<ul style="list-style-type: none"> Collect 230 tons of marine wastes by 2025 	<ul style="list-style-type: none"> From 2021 to 2023, a cumulative total of 106 tons of marine debris were collected on approximately 35 occasions in eight countries across Europe, Korea, and the U.S. (46% of the target achieved with 1.75 tons of waste fishing nets in 2023) 	<ul style="list-style-type: none"> Plan to expand the areas for marine debris collection, including Korea, in addition to 8 European countries, aimed at achieving the goal 																				
Pond ecosystem	<ul style="list-style-type: none"> Number and area of regenerated ponds 	<ul style="list-style-type: none"> Regenerate 2 ponds with an area of a total of 1.4 ha by 2023 	<ul style="list-style-type: none"> In 2023, the rehabilitation of two ponds covering a total area of 1.4 ha was completed, regenerating pond ecosystems and securing a water storage capacity of approximately 14 million liters (100% of the target achieved) 	<ul style="list-style-type: none"> Achieved the goal by expanding our pond revitalization projects in India, including the revitalization of three ponds in Hariahera, Palasoli, and Tajnagar in 2022, and the completion of two ponds in Chennai in 2023 																				



Colorful Life talk concert at the Yangjae Headquarters (featuring actress Jin-hee Park)



Colorful Life exhibition at the Yangjae Headquarters (featuring endangered plants and animals linked to MBTI)

Protection of Biodiversity

BUSINESS CASE



Ulsan Plant – Conducting Biodiversity Impact Assessment

Overview of Biodiversity Assessment

Hyundai's Ulsan plant conducted an assessment of its impact on biodiversity in the area near the plant from February to May 2023, as the plant is building a new electric vehicle factory. The Ulsan Pant is located within a 0.07-kilometer radius of the Taehwa River, whose downstream area has been designated as an ecological landscape conservation area and a wildlife reserve in order to preserve the habitat of various wild animals and plants, including migratory birds. As for the upstream area of the Taehwa River, it is the main source of drinking and industrial water for the Ulsan area. The Ulsan plant, Hyundai's largest single factory in terms of production, uses a large amount of water for cooling, cleaning, and painting purposes. Through this biodiversity impact assessment, we investigated the habitats and presence of wildlife and plants in the Taehwa River, and assessed the impact of the new plant on biodiversity and ecosystems in the vicinity of the Ulsan Plant, including the Taehwa River, aimed at mitigating any negative impacts.

Description of the Assessment Area

The biodiversity assessment area covered approximately 2.2 kilometers around the Ulsan Plant, including the migratory bird migration area downstream of the Taehwa River and the ecological landscape conservation area and wildlife reserve located south of the Ulsan plant. We assessed the flora (vegetation) and fauna (birds and legally protected species) of the assessment area by conducting a combination of literature and field surveys.

This has enabled us to better understand the status and population distribution of plant and animal species around the Ulsan Plant, as well as to assess the impact on biodiversity of the environmental factors generated by the Ulsan Plant. For any anticipated negative impacts, we have been developing and implementing activities to mitigate (maintain-restore-enhance) them.

Biodiversity Assessment Methodology

Flora and Vegetation We conducted a literature review to ascertain the nature of the flora and fauna in the assessment area, and two field surveys using the quadrats we had installed there.

Birds Considering the radius of activity and ecological characteristics of the bird species that inhabit the assessment area, we employed the Line Census Method, which consists in identifying and recording all birds observed around the site with binoculars while walking at a speed of 1 km/30 min, in combination with the Spot Census Method, which consists in recording the species observed around the site while staying in one place for 10 minutes.

Species and Individual Inhabitation Status

The results of the biodiversity assessment show that plant life and vegetation are most prevalent in the water area (80%), with some 5,453 individuals belonging to 33 species of fauna (birds) identified there. In addition, one Eurasian goshawk was spotted just 38 meters away from the Ulsan Plant during the field survey, and seven legally protected species identified in the literature, including kestrels and Eurasian Scops owls, were observed there, possibly using the surrounding water system for foraging activities.

Area Distribution of Existing Vegetation

Vegetation Type	Survey Area	
	Area (m ²)	Percentage
Water body	1,899,253	80.20
Amur silver-grass community	153,026	6.46
Amur silver-grass and reed community	52,402	2.21
Shortgrass prairie	89,196	3.77
Roads, buildings, and bare ground	98,431	4.16
Others	75,606	3.20
Total	2,367,914	100.0

Status of Bird Appearances by Family

Family Type	No. of Species	Percentage
Anatidae	12	36.36
Laridae	3	9.09
Podicipedidae	2	6.06
Corvidae	2	6.06
Motacillidae	2	6.06
Ardeidae	2	6.06
Accipitridae	2	6.06
Others	8	24.25
Total	33	100.0

Results of the Biodiversity Assessment

Flora and Vegetation The site of the new EV factory within the Ulsan Plant is located in an area where natural vegetation is not distributed, so there should be no damage to flora and vegetation other than landscape trees, while the impact on flora and vegetation is expected to be minimal due to the nature of the surrounding area (urban center). However, localized sources of pollution such as fugitive dust and dust generated during excavation work may accumulate on the leaves of woody and herbaceous plants near the Ulsan Plant, affecting their photosynthesis and respiratory functions.

Terrestrial Fauna (Birds) Due to the highly mobile nature of the taxonomic group, when anthropogenic disturbances occur due to certain processes, direct impacts such as the loss of species and populations are not expected to be significant due to immediate migration and avoidance of the surrounding water system (Taehwa River) and streamside, grassland areas, forests, etc. However, it is difficult to completely exclude the possibility of impacts caused by fugitive dust or soil discharge into the nearby water system (Taehwa River) during rainfall.

Legally Protected Species (High-Risk Species) The possible presence of six legally protected species has been identified based on the literature review, including the Eurasian goshawk, which was confirmed during the field survey. Although the impacts of the construction of the new plant are expected to be insignificant, ongoing improvement activities are necessary for the Taehwa River riparian area, which serves as both a food source and a habitat for these six legally protected species.

Mitigation Measures

Based on the results of the biodiversity impact assessment, Hyundai has implemented a series of mitigation measures centered on the following three activities:

1) Minimizing Fugitive Dust Generation

- Operation of sprinkler vehicles and installation of wheel and car washing facilities
- Installation of covers for earth and sand transport vehicles, imposition of a limit on the speed of construction vehicles
- Prevention of soil spillage by using big bags and plastic when temporarily storing soil

2) Minimizing the Impact of Night Lighting

- Flexible adjustment of operating hours according to the purpose of use and situation
- Minimization of outdoor lighting and specification of distances from residential areas

3) Strengthening Activities to Protect the Long-billed Ringed Plover (Legally Protected Species)

- Promoting the Taehwa River Conservation Project: Conservation of the Taehwa River, a habitat for various bird species including the long-billed ringed plover, has been supported by Hyundai since March 2023. We have established a cooperation system with the Taehwa River Conservation Association to preserve the river's environment, and has also donated KRW 60 million as a sponsorship fund. The fund is used to support the Association's regular water quality surveys, ecosystem monitoring, environmental pollution monitoring, and environmental cleanup activities.
- Participating in Ulsan City's Migratory Bird Protection Program: Hyundai has participated in the Ulsan Migratory Bird Protection Platform Construction Project for three years, starting in 2021, in collaboration with the city of Ulsan and the East Asia-Oceania Flyway Partnership (EAAFP). We have designated the long-billed ringed plover as a protected species and carried out a number of conservation campaigns and habitat cleanup and protection activities.

- 1 Biodiversity assessment fieldwork
- 2 Bird presence in the assessment area – Eurasian goshawk (Endangered Wildlife, Natural Monument)
- 3 The long-billed ringed plover, a legally protected species

