

C0. Introduction

C0.1

**(C0.1) Give a general description and introduction to your organization.**

Hyosung Heavy Industries Co. Ltd. began by acquisition of Han Young Industrial Co., Ltd. In 1975. After merged into Hyosung Co. Ltd. In 1998, the construction / heavy industry division was spun off Hyosung Co., and newly established as Hyosung Heavy Industries Co., Ltd., on June 1st 2018. The headquarter is located in Seoul and the local workplaces consist of Hyosung R&D Labs under Hyosung Co. and a total of 5 plants.

Hyosung Heavy Industries is mainly involved in the heavy industries and the construction divisions.

The heavy industry division has manufactured important power sources for electrical power systems such as electric motors, generators, and gears as well as crucial equipment such as extra-high transformers, breakers and low and medium voltage switchers supplied for building electrical power systems in the electric power industry and SOC projects. UHV, Circuit breakers and low and medium volage switchers, major products in the heavy industries, have continued a moderate rise depending on the global demand of replacing the old facilities and are expected to grow steadily as the demand of new renewable energy like solar and wind energy increases due to the development of new energy sources and the enhancement of environmental policies to respond to climate change in the globe. The construction division is the expansive key industry involving in the house construction which national life bases on and the building infrastructure facilities like roads and is expected to change into the developed one focusing on maintenance as the infrastructure completes and the housing supply rate improves. Considering the convergence with ICT high technology, the base of the fourth industrial revolution, and sustainable reconstruction of national land, its potential growth is expected. As the usage of communication data grows, the demand for DB center increases. Therefore, it plans to foster the construction of DB center as a new growth engine.

Hyosung Heavy Industries is a subject company to the allocation of ETS, the government GHG regulation and has the obligation to report its emissions every year. According to the "Framework Act On Carbon Neutrality And Green Growth For Coping With Climate Crisis" enacted in 2022, the government has set a national reduction target for 2030 to 40% reduction of total national greenhouse gas emissions compared to 2018. Among the NDC's various sectors, the Industrial sector to which Hyosung Heavy Industries belongs is aims to reduce 14.5% in 2030 (222.6 million tons) compared to 2018(260.5 million tons). In 2021, Hyosung Heavy Industries set emission targets equivalent to NDC (Nationally Determined Contribution). Hyosung Heavy Industries set '14.5 % reduction by 2030 compared to the total of the national GHG emissions of 2018 as the final emissions reduction target. In addition, Hyosung Heavy Industries established the green management vision 'realization of an eco-friendly company that leads a better life for mankind' and the 4 strategies 'reduction of greenhouse gas emissions, commercialization of low-carbon technology through development of eco-friendly technology, creation of an eco-friendly corporate culture, and establishment of stakeholder trust through environmental information disclosure' to implement green management activities for all domestic business sites. The detailed promotion work is like the following, 'contribution to GHG emission reduction when using products, decline in subsidiary materials usage including water, utility, et cetera and expansion of recycling and reuse.' In August 2021, Hyosung Heavy Industries established the ESG Management Promotion Committee by integrating the EHS Committee and the CSR Committee, and established the ESG Management Team as a dedicated management team under the ESG Management Promotion Committee. The team manages the environment on climate change and check for safety management companywide. As of 2021, the safety environment team monitors every year, and internal ISO review is also conducted for 42 departments.

C0.2

**(C0.2) State the start and end date of the year for which you are reporting data.**

	Start date	End date	Indicate if you are providing emissions data for past reporting years	Select the number of past reporting years you will be providing emissions data for
Reporting year	January 1 2021	December 31 2021	No	<Not Applicable>

C0.3

**(C0.3) Select the countries/areas in which you operate.**

Republic of Korea

C0.4

**(C0.4) Select the currency used for all financial information disclosed throughout your response.**

KRW

C0.5

**(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your chosen approach for consolidating your GHG inventory.**

Operational control

**(C-CN0.7/C-RE0.7) Which real estate and/or construction activities does your organization engage in?**

Please select

C0.8

**(C0.8) Does your organization have an ISIN code or another unique identifier (e.g., Ticker, CUSIP, etc.)?**

Indicate whether you are able to provide a unique identifier for your organization	Provide your unique identifier
Yes, an ISIN code	KR729804007

C1. Governance

C1.1

**(C1.1) Is there board-level oversight of climate-related issues within your organization?**

Yes

C1.1a

**(C1.1a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.**

Position of individual(s)	Please explain
Chief Executive Officer (CEO)	[Individual responsibility] Hyosung Heavy Industries established the ESG Management Promotion Committee by integrating the EHS Committee and the CSR Committee With the aim of strengthening ESG management, including the climate change sector under the direct control of the CEO and held the ESG management promotion committee for the first time in August 2021. The CEO is chairman of this promotion committee and attended as chief decision maker as to receive a report and evaluate the overall performance of ESG management, including the current status of greenhouse gas emission rights, greenhouse gas reduction goals, and selection of excellent partners. The chief responsibility for responding to CC is assigned to the CEO of the Board of Directors. The chief responsibility is assigned to the CEO who is at the top position in the firm's management to connect CC issues to enterprise-wide business strategies and ensure that response plans are implemented efficiently in accordance with the top-down method. [The cases of decision making related to climate] Representative examples of climate-related decision making can explain the response to the Emission Trading System. Emission Trading System is not only a mandatory regulation, but also hugely impactful in financial terms, so Emission Trading System is classified as a significant risk as a result of the assessment. According to the guidelines of the ESG Management Promotion Committee, the management team reports the current status of greenhouse gas emission rights to the CEO and the board of directors. Key matters reported in 2021 included the current state of emissions and responses to the Emission Trading System, amount of estimated greenhouse gas emissions, projected financial profits, plans for the next year, etc. Once the review and decision-making of reported matters is made, they are reflected in the business plan and the financial plan for 2021.

C1.1b

**(C1.1b) Provide further details on the board's oversight of climate-related issues.**

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Scope of board-level oversight	Please explain
Scheduled – some meetings	<ul style="list-style-type: none"> <li>Reviewing and guiding strategy</li> <li>Reviewing and guiding major plans of action</li> <li>Reviewing and guiding annual budgets</li> <li>Reviewing and guiding business plans</li> <li>Overseeing major capital expenditures, acquisitions and divestitures</li> <li>Monitoring and overseeing progress against goals and targets for addressing climate-related issues</li> </ul>	<Not Applicable>	The CEO is the chief decision maker of ESG Management Promotion Committee and chairman of the board of directors. The ESG Management Promotion Committee reports on climate change issues (such as sustainable management vision, strategic establishment, and setting the greenhouse gas reduction targets), and the board finally approves activities such as business investment plans and budgeting. In 2021, the ESG Management Promotion Committee was held twice and the board of directors was held four times.

C1.1d

**(C1.1d) Does your organization have at least one board member with competence on climate-related issues?**

	Board member(s) have competence on climate-related issues	Criteria used to assess competence of board member(s) on climate-related issues	Primary reason for no board-level competence on climate-related issues	Explain why your organization does not have at least one board member with competence on climate-related issues and any plans to address board-level competence in the future
Row 1	No, but we plan to address this within the next two years	<Not Applicable>	Important but not an immediate priority	In August 2021, Hyosung Heavy Industries established the ESG Management Promotion Committee to strengthen ESG management, and held the first meeting. At this meeting, the CEO is in charge of the chairman, and C-Level and executives in charge of each department are participating as members. But as of now, there are no members of the board of directors with expertise. However, within the next two years, it plans to form additional board members with expertise to set climate change targets for preemptive response to ESG and better performance.

**C1.2**

**(C1.2) Provide the highest management-level position(s) or committee(s) with responsibility for climate-related issues.**

Name of the position(s) and/or committee(s)	Reporting line	Responsibility	Coverage of responsibility	Frequency of reporting to the board on climate-related issues
Chief Executive Officer (CEO)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	Quarterly

**C1.2a**

**(C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored (do not include the names of individuals).**

Hyosung Heavy Industries operates the ESG Management Promotion Committee by integrating the EHS Committee and the CSR Committee as a management organization to systematically promote "green management" including responding to climate change at home and abroad, participating in greenhouse gas emission trading systems, and developing eco-friendly technologies etc. The ESG Management Promotion Committee, headed by the CEO, is operated for the purpose of making decisions to implement green management that complies with internal and external laws, identifies environmental issues, and responds to climate environmental risks. Hyosung Heavy Industries' green management includes responding to climate change and developing eco-friendly technologies, including the greenhouse gas emission trading system. The ESG Management Promotion Committee for Green Management is held semi-annually, and detailed operational matters are operated as follows. Climate change issues identified by the safety environment team by factory and the green management team of the headquarters are reported to ESG management executives, and decisions that need to be made are reported to ESG Management Promotion Committee, the top green management decision consultative body below the board level. After reviewing, the major agenda items that need to be reflected in management plans, such as company R&D strategies and policy decisions, considering the importance of each issue are finally approved through the board of directors. The ESG Management Team as a dedicated management team under the ESG Management Promotion Committee manages the environment on climate change and check for safety management companywide. As of 2021, the safety environment team monitors every year, and internal ISO review is also conducted for 42 departments. The ESG Management Promotion Committee conducts management checks for climate change, environment, and safety companywide and collects climate change and safety management agendas from each plant's environmental safety managers and appoints "C-level" grade and ESG-related executives as members to strengthen the operation effect of the ESG Management Committee. In 2021, Hyosung Heavy Industries selected 'leading the top products through rigid management of HSE risk and strengthening executive ability of HSE management system on the global level' in the decision of the environmental budget and made the final decision on the investment budget of KRW 7,151 million in the environmental safety sector in 2022.

**C1.3**

**(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?**

	Provide incentives for the management of climate-related issues	Comment
Row 1	Yes	Financial incentives are provided to Environmental/Sustainability Managers by reflecting whether Hyosung Heavy Industries achieves its greenhouse gas reduction goals and energy reduction goals as performance goals (hereinafter referred to as KPIs).

**C1.3a**

**(C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).**

Entitled to incentive	Type of incentive	Activity incentivized	Comment
Chief Financial Officer (CFO)	Monetary reward	Emissions reduction target	Hyosung Heavy Industries has set goal to reduce greenhouse gas emissions as a mid-to long-term greenhouse gas reduction plan. Hyosung Heavy Industries evaluates the CFO's goal achievement every year and provides it as a financial incentive. Hyosung Heavy Industries aims to reduce 14.5% in 2030 compared to 2018.
Environment/Sustainability manager	Monetary reward	Efficiency project	The KPI of technology manager (CTO) in the factory located Changwon includes annual energy efficiency targets, and Hyosung Heavy Industries reflects them in salaries and pays incentives according to performance.

**C2. Risks and opportunities**

## C2.1

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### (C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?

Yes

## C2.1a

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### (C2.1a) How does your organization define short-, medium- and long-term time horizons?

	From (years)	To (years)	Comment
Short-term	1	3	Hyosung Heavy Industries considers 1-3 years as 'short-term'.
Medium-term	3	5	Hyosung Heavy Industries considers 3-5 years as 'medium-term'.
Long-term	5	10	Hyosung Heavy Industries considers 5-10 years as 'long-term'.

## C2.1b

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### (C2.1b) How does your organization define substantive financial or strategic impact on your business?

In August 2021, Hyosung Heavy Industries established an ESG management team for the purpose of clear maintenance and dedicated management of business R&R for ESG management with the aim of strengthening ESG management. The ESG management team conducted R&R maintenance for each department to manage environmental management, safety management, enterprise risk management, and employee capabilities. Major tasks such as environmental management are assigned to management team, safety environment team, and design team to manage risk and opportunity factors due to climate change. Each major department associated with environmental management conducts assessment of the significance of the identified climate change risks and opportunity factors, and major risk and opportunity factors are reported to CEO, ESG management committee, and board of directors, and then decisions are made by them. Especially Hyosung Heavy Industries operates the company-wide delegation rule by granting responsibility and authority according to the financial impact of each project for significant risks and opportunity factors. In the case of Hyosung Heavy Industries, financial impacts are used as criteria for identifying and evaluating climate change risks. And definition of financial impact, that is, the scope of the business affected by the transcription, a decline in profit may be a factor that may significantly affect the scope of business affected by the company. Hyosung Heavy Industries uses revenue or operating profit from its respective department responsible for risk management as a quantitative indicator used to define these significant financial or strategic impacts. The occurrence of such a "change of more than 50% of sales or operating profit" is used as an indicator of significant financial or strategic impact and is reported to the ESG Management Promotion Committee and the Board of Directors. A representative example of the decline in profit may be the purchase of emission rights. For example, in 2025, Hyosung Heavy Industries' estimated emissions of 71,126 tons, but its pre-allocation was 68,288 tons, and in the absence of reduction activities, an additional 2,838 tons of emissions rights must be purchased. In this case, a profit loss of KRW 87,978,000 (based on the internal carbon price of KRW 31,000) may occur. Therefore, Hyosung Heavy Industries holds a semi-annual ESG management promotion committee every year to understand the issue of purchasing emission permits and conducts a status report. In addition, it annually plans the budget and investment activities including physical and transition risks and opportunities caused by climate change and holds the Investment Review Subcommittee or the Investment Review Committee for a certain amount or more of budget at each PU (Performance Unit) and PG (Performance Group). In the case of intra-budget investment, if it is more than KRW 1 billion per case, decision of the board of directors is required. In the case of non-budget investment, KRW 500 million to KRW 1 billion is handled at the CEO level, and if it is more than KRW 1 billion, it is handled at the board level. Considering the best decision-making stage, Hyosung Heavy Industries is defined as a significant financial impact if it is more than KRW 500 million, which corresponds to all projects including climate change.

## C2.2

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**(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.**

**Value chain stage(s) covered**

Direct operations

**Risk management process**

Integrated into multi-disciplinary company-wide risk management process

**Frequency of assessment**

More than once a year

**Time horizon(s) covered**

Short-term

Medium-term

Long-term

**Description of process**

[Process used to identify, assessment and respond to risks and opportunities that may have substantial financial impact] Hyosung Heavy Industries listens to VOC (Voice of Customer) to reflect customers' opinions in all areas of business such as sales, marketing, quality, R&D, and establishes a strategy by identifying risks and opportunities for financial impact by identifying market trends such as demand for eco-friendly materials and low-carbon product development, identifying customer core needs, and market trends. Hyosung Heavy Industries has set strategies for risk and opportunity with information registered in the G-VOC (Global Voice of Customer) system through C-Cube activities (VOC) to reflect customer orientation. The C-Cube activities are carried out in five stages: data collection, analysis, sharing, execution, and result management, and Customer Contact Department registers the customer opinion in system. Then all collected information can be voluntarily checked by the associated department. In other words, the G-VOC system collects and shares analyzed information on issues for each enterprise project, including risks and opportunity factors caused by climate change. And then the decision which based on the contents reported by each business sector is made by reporting to the CEO and the board of directors more than twice a year after evaluating the importance. If a budget is required at the implementation and outcome stage in response to crises and opportunities, the required budget is reflected in the annual financial plan. If an additional budget is required, it is approved separately through arbitrary resolution in accordance with the internal decision-making entrustment regulations, and it is determined according to the size of the required budget. After a resolution by the Performance Unit (PU) and the Performance Group (PG), KRW 1 to 500 million is decided by the CEO and more than KRW 1 billion is decided by the board of directors. The process of identification and evaluation is common to both short, medium and long term. As a short-term use of the corresponding process, there is a case of checking customer feedback in real time by sharing the information collected by the operation of the G-VOC system to the company. As the market demand for eco-friendly devices increases, 170kV eco-friendly GIS (gas Insulated switchgear) was developed independently to replace SF6 gas used in the switchgear with eco-friendly Novec Mixture in 2021. It is expected that there will be a reduction effect of about 98% of greenhouse gas generation (23,900kgCO2/kgSF6 → 500kgCO2/kg-Novec Mixture). In addition, 57 remote tests were conducted in 2021 when customer visits were restricted due to COVID-19 by conducting a remote factory acceptance test (RFAT) in which customers can directly check the process and result of test. In addition, as a mid- to long-term example of creating opportunity factors using customer VOC, Hyosung Heavy Industries is creating new demand in the market by developing differentiated products that can meet customer needs through systematic VOC management. In particular, as the existing carbon-centered economic structure is transformed into a hydrogen-centered economy in the future, Hyosung Heavy Industries is pushing to develop technologies to build a value chain that covers the installation and operation of liquefied hydrogen production, transportation, and charging facilities. Accordingly, it is in charge of hydrogen production infrastructure among value chains and is promoting it as one of Hyosung Heavy Industries' new growth engines from 2020, such as supplying gaseous hydrogen charging systems to expand supply of hydrogen fuel cell vehicles and commercial hydrogen vehicles. With hydrogen cars attracting attention as future eco-friendly cars, the hydrogen charging station market is expected to grow high and is expected to grow to 2.5 trillion dollars (KRW 2,940 trillion) in 2050 global standards.

**C2.2a**

**(C2.2a) Which risk types are considered in your organization's climate-related risk assessments?**

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	[Explanation of current regulation-Emissions Trading System] Hyosung Co. has been participating in Korea ETS since 2015 and is subject to mandatory reporting of its GHGs emissions each year. As Hyosung Corporation's group division proceeded in 2018, Hyosung Heavy Industries was launched and began to be operated separately. Accordingly, emissions included only to Hyosung Heavy Industries from 2014 to 2017 were separately reported to the government, and emission permits are currently managed according to the allocation for the third commitment period (2021-2025). Green management policy of Hyosung Heavy Industries considers GHGs regulation and emissions reduction as top priority. Complying with the government's GHGs regulations, Hyosung Heavy Industries has reported the emissions after external third party verification, managed allowances, implanted implemented reduction activities and purchased emissions allowances accordingly. And the operation costs of such management are included in the annual budget. The government currently is discussing allocation criteria for the third commitment period (2021-2025) and requires continued reduction of GHGs in the industrial sector. As the management over GHGs regulations is intensifies, the operating costs will increase, which may be a financial risk for Hyosung Heavy Industries. To minimize risks from the ETS system, Hyosung Heavy Industries calculated expected emissions during the third commitment period and analyzed the surplus or deficient amount each year and the financial impacts thereof. In the pursuit of continuous emissions reduction and response to the regulations, the company is discovering and implementing various internal and external reduction activities, while applying for additional allocation, if necessary, in accordance with the requirements for changes in our production sites.
Emerging regulation	Relevant, sometimes included	[Explanation of Emerging regulation - Requirements for environment-related product certification from major customers] As the problem of climate change becomes visible, environmental regulations in the global market are gradually strengthening. Power devices exported by Hyosung Heavy Industries are necessary products for substations or power plants, and operators will be selected through PQ(Pre-Qualification) when winning overseas projects. Recently, as countries such as Europe and the United States have added climate change to their PQ evaluation items, demands for disclosure of climate change information such as CDP, carbon footprint certification, and Ecovadis are increasing. In particular, state-owned petrochemical companies such as the Power Authority, National Grid, UAE Atomic Energy Agency, Oil Gas Market, SHELL in the UK, TOTAL in France, AZPROM in Russia, and oil refineries are demanding carbon emissions, recycling ratios, and external HSE (health, safety, environment) activities. Hyosung Heavy Industries, which has a large proportion of overseas sales, can expect disadvantages in selecting bid participants and restrictions on bidding for large PJTs if it fails to respond appropriately to customer demands, which can cause a decrease in sales. As a result, as regulations such as the EU or customer's requirements increase, it can act as a new trade barrier, and if it is not properly responded, it can lead to a drop in sales. Therefore, Hyosung Heavy Industries is carrying out climate change response activities such as publishing CDP reports to respond to requests from customers to disclose climate change information.
Technology	Relevant, always included	[Explanation of technology - Green Products R&D] Customers' demand for eco-friendly products and eco-friendly materials is increasing worldwide, and interest in eco-friendly consumption and value-oriented consumption is also increasing. In order to respond to these market changes and satisfy of customer needs, it is necessary to change to eco-friendly products through continuous R&D. As the global market demands for eco-friendly devices capable of reducing harmful substances and biodegradable devices increase, Hyosung Heavy Industries is taking the lead in developing eco-friendly products that convert insulation of power devices such as transformers and breakers. Eco-friendly transformers use eco-friendly biodegradable ester oil instead of existing mineral oil, and we are responding to eco-friendly supply through the development of transformers and expansion of line-ups. As of 2021, two ester-filled transformers were ordered and sold, and research and development is continuously being promoted to stabilize and improve performance. In 2021, 170kV eco-friendly GIS (Gas Insulated Switchgear) was developed independently to replace SF6 gas used in the switchgear with eco-friendly Novec Mixture. It is expected that there will be a reduction effect of about 98% of greenhouse gas generation (23,900kgCO2/kgSF6 → 500kgCO2/kg-Novec Mixture). Hyosung Heavy Industries recorded KRW 723.1 billion in sales of eco-friendly products and services in 2021 and we are continuously conducting R&D to produce more environmentally friendly products through leading technology in the power device market such as eco-friendly transformers and breakers.

	Relevance & inclusion	Please explain
Legal	Relevant, always included	[Explanation of Legal -Emissions Trading System] The Korean GHG ETS (Emissions Trading System) has been implemented according to ' Act On The Allocation And Trading Of Greenhouse-gas Emission Permits' Hyosung Heavy Industries has been a subject company since 2018 and has an obligation to report annually its GHG emissions. A fine of more than KRW 10 million will be imposed depending on each case if the emissions report is omitted or not submitted, and problematic (Article 43 of Act On The Allocation And Trading Of Greenhouse-gas Emission Permits) and when calculating allocation, the competent authority may impose a penalty surcharge not exceeding three times the average market price of emission permits for the pertinent compliance year on the business entity within the maximum KRW 100,000 per ton of carbon dioxide for the shortfall. (Article 33 of Act On The Allocation And Trading Of Greenhouse-gas Emission Permits)). In addition, for all climate change related lawsuits, decision-making responsibilities and authorization are imposed in accordance with the internal decision-making delegation regulations. In particular, for cases that cost more than KRW 300 million or the compensation after agreement is more than KRW 100 million, the final approval will be made at the level of the CEO or higher. All types of climate change related lawsuits could directly cause financial losses, but also, they may lead to sales loss with new risks of increasingly negative reputation from stakeholders inside and outside Regarding major businesses of Hyosung Heavy Industries, risks are identified and evaluated in advance according to internal investment review procedures, and the Legal Compliance Team who conducts legal reviews if necessary.
Market	Relevant, sometimes included	[Explanation of market – A change in consumer preferences] Customers' behavior change may become a major risk factor to the market, while customer companies demand Hyosung Heavy Industries, an end product manufacturer, for using eco-friendly equipment, hazardous substance reduction in the product production and low carbon products according to market trends. Therefore, in order to specify changing market situations and needs, Hyosung Heavy Industries does systemic management of VOC and various communication activities. Internally, a regular meeting runs to discuss VOC professionally, and it creates new demands reflecting customers' needs through this. A development and introduction of eco-friendly electric power equipment and hydrogen charging station is the case using the customer's VOC in the development of a new product. This is one of the new growth engines of Hyosung Heavy Industries and the demands increase due to the demand for eco-friendly materials in the market, growth in the number of hydrogen cars, and the prospect for hydrogen energy conversion. Hyosung Heavy Industries is in charge of the supply infrastructure for hydrogen charging and implements it as one of the new growth engines. As the hydrogen fueled car engages the attention as an eco-friendly one in the future, the market for hydrogen charging is expected to grow highly and the volume is prospected to be US\$ 2.5 trillion (KRW 2,940 trillion) in the world. As of the end of May 2022, Hyosung Heavy Industries supplied 23 of the 104 hydrogen charging stations operating nationwide, and it is expected that additional orders such as gas and liquefied hydrogen charging stations will be active in the future as the government plans to expand the hydrogen charging station infrastructure. In addition, Hyosung Heavy Industries, along with Linde Korea, is building the world's largest liquefied hydrogen plant at 13,000 tons per year on the site of Ulsan's Yongyeon plant with the goal of full-scale operation in May 2023. In time for the completion of the liquefied hydrogen plant, it is also planning to build liquefied hydrogen charging stations for large commercial hydrogen vehicles at about 30 locations nationwide in time for the completion of the liquefied hydrogen plant.
Reputation	Relevant, sometimes included	[Explanation of reputation – Stakeholders' Demand for Climate Change Information] Hyosung Heavy Industries mostly deals with large global companies as the major customers, and they require the information disclosure on sustainability management as well as on climate change in accordance with international standards. Hyosung Heavy Industries annually identifies the issues of increasing request for information on responses to climate change and supply of eco-friendly products and conducts response activities not to bring about negative risks on its reputation through active measures. As the responses to global customer companies' request grow, the request for checking the entire CSR assessment items as well as the information about the responses to climate change increases. Hyosung Heavy Industries has calculated carbon LCA for UHV Transformer and GIS(Gas Insulated Switchgear) in 2021 and disclosed carbon information in 2022. In addition, as National Grid, a major customer company, asked Hyosung Heavy Industries to participate in the CDP supply chain program and it began to respond to the program from the CDP report 2021, this report. Hyosung Heavy Industries annually publishes the sustainability report while voluntarily participating in the CDP CC program.
Acute physical	Relevant, sometimes included	[Explanation of acute physical - Physical risks such as precipitation, typhoons, etc] As the frequency of heavy rainfall and typhoon increases due to the accelerating climate change, Hyosung Heavy Industries considers the possibility of losses to physical assets in local workplaces as risks. Loss in production facilities may bring about certain problems to their operation and could cause losses in assets due to decrease in sales from lower production efficiency. In addition, in case of breakers with plenty exports, the delay in production or production suspension due to inundation may cause additional loss in revenue of products. With the increasing frequency of heavy rainfall and typhoon due to climate change, Hyosung Heavy Industries annually conducts the regular preliminary facility inspection in Changwon Plant to minimize the impact on its asset loss. In 2017, Changwon Plant partially experienced flood damage to the plant. Then Changwon Plant analyzed the localized heavy rainfall to be a physical risk factor needing preemptive responses so that it invested approximately KRW 111 million in the installation of water stops at the entrance, waterproof construction, bumpers to prevent the short-term inundation and emergent water pumps and completed them. Typhoon No. 12 "Omais" moved northward to South Korea in 2021, causing a lot of damage, including human casualties and flooding of agricultural land. Hyosung Heavy Industries also conducted inspections of factory rain drainage pipes, sewage pipes, and underground water tanks in 2021 in preparation for serious damage such as flooding of major facilities and construction sites in the factory by Typhoon "Omais." In addition, a water shield was installed to carry out preliminary simulation activities. Moreover, we conducted a safety inspection for safety in the factory and the stability verification of major facilities due to changes in the physical environment. In the construction sector, about 10 pumps(KRW 1.25M/unit) were installed each construction sites(total 30 construction sites in 2021) in order to prepare flooding and typhoon. The physical risk can cause enormous damage to the transcriptional business. In addition, Hyosung Heavy Industries inspects domestic factories three times a year in February and July and November every year and establishes and implements necessary measures according to the results of the inspection.
Chronic physical	Relevant, sometimes included	[Explanation of Chronic physical - Increased operating costs due to increased average temperature] The increase in the average temperature or cold waves is one of the change factors in the long-term physical environment, and it directly linked to heating and cooling systems, and it becomes the increasing factor in operating costs. In case of Hyosung Heavy Industries mainly manufacturing electric power equipment, it runs cooling or heating systems in the plants in order to maintain at a certain temperature of average 25 ~ 30°C to keep a desirable quality of product, so that outside situation as extraordinary cold weather and intense heat may directly lead to increase in the heating or cooling time. As the heating or cooling time increases, the cost of electricity and city gas increases. Especially in the summer season, when the power supply is cut off in the area where plants are located due to the increasing electricity usage, extra losses may occur due to production disruptions and product defects. In 2021, a record heat wave caused a prolonged high temperature phenomenon so Hyosung Heavy Industries spent about KRW 216,697 million equivalent to 7% of sales, for the total annual electricity use cost of all its businesses. In the future, if the average temperature changes due to climate change increase, operating costs are also expected to increase.

## C2.3

### (C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes

## C2.3a

### (C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.

#### Identifier

Risk 1

#### Where in the value chain does the risk driver occur?

Direct operations

#### Risk type & Primary climate-related risk driver

Current regulation	Carbon pricing mechanisms
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#### Primary potential financial impact

Increased direct costs

#### Climate risk type mapped to traditional financial services industry risk classification

<Not Applicable>

#### Company-specific description

Hyosung Heavy Industries' direct operation is located in Korea and has been incorporated into the business entities eligible for allocation of the emissions trading system since 2018 to achieve the national greenhouse gas reduction target (40% reduction from 2018). The emissions trading system is a system in which emissions are allocated and released within the allocated emissions every year, and there is a cost risk of purchasing additional GHG emissions right from the market if the emission exceeds the

allocated GHG emissions right. In addition, in the case of the third commitment period (2021-2025), the ratio allocated gratuitously is 90% and the burden of reducing greenhouse gases is increasing further as compared to the second commitment period (2018-2020), and the continuously increasing operating costs and liabilities also exist as climate change risk factors. Most of the total greenhouse gas emissions (83% of the total emissions) from the headquarters, Bangbae Building, Changwon 1-4 plants, Sejong Plant of Hyosung Heavy Industries, six business other than construction sites are generated from facilities in the plant. And because electricity is used, energy source reduction potential is lower than that of other industries. As we are conducting the active new business investment and development, our sales were increased slightly by 3.7% compared to 2020 to about KRW 1,800 billion (KRW 1,340 billion for power devices) for Heavy Industries and KRW 1,300 billion for construction. (increased from KRW 2,984 billion in 2020 to KRW 3,095 billion in 2021) In addition, sales are expected to increase to KRW 3,757 billion in 2023 due to continuous business development, which is expected to increase 22.6% compared to 2021, which could lead to serious financial debt in the worst case. Therefore, the emissions trading system is classified as a serious risk and reported to the ESG Management Promotion Committee through continuous monitoring every year.

**Time horizon**

Long-term

**Likelihood**

Virtually certain

**Magnitude of impact**

High

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

4375030000

**Potential financial impact figure – minimum (currency)**

<Not Applicable>

**Potential financial impact figure – maximum (currency)**

<Not Applicable>

**Explanation of financial impact figure**

In 2018, Hyosung Heavy Industries was divided from Hyosung Co., Ltd and then allocated in second commitment period. After it was allocated based on the base year (2014-2016), 58,345 tons of emission permits were allocated to entire business during the second commitment period, in 2018. The criteria for business entities eligible for allocation of the emissions trading system were changed in 2019 and 2020. Accordingly, since the allocation of business with greenhouse gas emissions of less than 15,000 tons was canceled (28,663 tons), only Changwon 1 plant was classified as business entities eligible for allocation. However, all Hyosung Heavy Industries' business were included in business entities eligible for allocation due to changes in the allocation criteria during the third commitment period, and emission permits are expected to be insufficient due to the expectation of increased emissions according to business progress such as eco-friendly transformers and expansion of SGM test facilities (KRW 3.5 billion in investment). Currently, Hyosung Heavy Industries is implementing the emissions trading system during the third commitment period, but if growth and development continue, a shortage of emission permits is expected during the fourth commitment period (2026-2030). The expected gratuitous allocation for emission permits during the fourth commitment period is 245,980 tons, but the expected emission for the same period is 387,110 tons, so if there is no reduction activity, the insufficient emission is expected to be a total of 141,130 tons. In this case, it is estimated that the internal debt cost of purchasing emission permits during the entire fourth commitment period is about KRW4,375,030,000(141,130 tons\* KRW 31,000(based on the internal carbon price)).

**Cost of response to risk**

22953000

**Description of response and explanation of cost calculation**

Hyosung Heavy Industries is a participant of the emissions trading system and spends annual membership fees on the Korea Exchange for emissions trading every year. And also, we conduct consulting on applications for greenhouse gas emission allocation on the third commitment period (2021-2025) and submits them to the government after third party verification to clearly identify and manage crises related to greenhouse gas emission permits. '2020 Greenhouse Gas Inventory Report' was prepared by consulting for emissions trading system during the period from February to December 2021, and a total of 57,458 tons of emissions were reported to the government after being verified by a third party. - Consulting for emissions trading system (February to December 2021): KRW 5,100,000 - Third Party Verification of Emission Report (February to April 2021): KRW 17,353,000 - Annual Fee of Korea Exchange: KRW 500,000

**Comment**

**Identifier**

Risk 2

**Where in the value chain does the risk driver occur?**

Downstream

**Risk type & Primary climate-related risk driver**

Emerging regulation	Mandates on and regulation of existing products and services
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**Primary potential financial impact**

Decreased revenues due to reduced demand for products and services

**Climate risk type mapped to traditional financial services industry risk classification**

<Not Applicable>

**Company-specific description**

As of the fourth quarter of 2021, products that account for an important portion of Hyosung Heavy Industries' overseas sales are Circuit breakers and transformers(major products) in the heavy industry business sector, accounting for 88% of the total overseas orders. The electric power equipment is necessary for substations and power plants and mainly national institutes or corporates companies give the bidding chance of project to only the companies passed PQ(pre-qualification) the project choose business operators through the prequalification (PQ) when winning a contract of overseas projects. Recently, as the relevant country such as EU and UAS USA add the climate change content (detailed descriptions required) in the assessment items of PQ, the request for the information disclosure on such as CDP, carbon footprint certification and EcoVadis increasingly grows. In particular, state-owned petrochemical companies such as UK's SHELL, France's TOTAL and Russia's GAZPROM demand for carbon emission, recycling rate, and external HSE (health, safety, environment) activities are becoming more active.

**Time horizon**

Medium-term

**Likelihood**



Virtually certain

**Magnitude of impact**

High

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

99840000000

**Potential financial impact figure – minimum (currency)**

<Not Applicable>

**Potential financial impact figure – maximum (currency)**

<Not Applicable>

**Explanation of financial impact figure**

As of the fourth quarter of 2021, value of orders of Hyosung Heavy Industries was KRW 590 billion, of which electricity devices accounted for 83% of the total orders with KRW 440 billion. The proportion of overseas exports out of our total value of orders was about KRW 260 billion, and the proportion of power devices was very high at 71%, with KRW 150 billion for breakers, KRW 80 billion for ESS, and KRW 35 billion for static synchronous compensators (STATCOM). When classified by region, it was identified as KRW 100 billion in Europe, KRW 60 billion in the Middle East, and KRW 100 billion in other regions. If it does not cope properly with the qualifications for PQ of globally major customer companies, it considers that leads to decline in sales due to the limit on qualification for participation in overseas bids. In 2021, the EU sales of electric power equipment was KRW 100 billion in Europe and that accounts for approximately 38.4% in overseas sales. If it does not cope with PQ, the sales from the overseas supply of electric power equipment are expected to decline by 38.4% more, and it specified that the potential financial impacts based on 2021 is ranging from KRW 99,840,000,000 (260 billion X 38.4%). Therefore, Hyosung Heavy Industries considers the request for the information disclosure on responses to climate change added to PQ from globally major customer companies a crucial issue so that it copes with it with first priority.

**Cost of response to risk**

41000000

**Description of response and explanation of cost calculation**

Hyosung Heavy Industries is responding to the needs of major customers as a top priority. Hyosung Heavy Industries conducted the consulting for CDP participating to respond to customer requests for disclosure of climate change information from April to July 2021 and Scope 3 third-party verification was also conducted when preparing the data. From January to December 2021, consulting (discovering improvement tasks, enhancing external evaluations and responding to customers, collecting, verifying and publishing report data) was conducted. The 2021 CDP report was submitted in July 2021, and the voluntary sustainability report was published in June 2021. CDP Participation and Consulting (April-July 2021): KRW 20,000,000 Scope 3 3rd party verification cost (June-July 2021): KRW 3,000,000 Sustainable management reporting and verification (January to December 2021): KRW 18,000,000

**Comment**

**Identifier**

Risk 3

**Where in the value chain does the risk driver occur?**

Direct operations

**Risk type & Primary climate-related risk driver**

Acute physical	Other, please specify (Increased severity and frequency of extreme weather events such as cyclones and floods)
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**Primary potential financial impact**

Increased indirect (operating) costs

**Climate risk type mapped to traditional financial services industry risk classification**

<Not Applicable>

**Company-specific description**

The frequency of torrential rains and typhoons is increasing around the summer season due to the influence of climate change. Hyosung Heavy Industries, which has a business in Korea, can cause facility loss and product flooding due to flooding of power devices such as transformers and Circuit breakers, which are the main products of the heavy industry, and can cause damage to facility operation, and this can lead to additional sales loss. Hyosung Heavy Industries' headquarters, Changwon Plant, and all other workplaces minimize the impact that can cause losses on assets through preliminary facility inspections every year. In particular, the Changwon plant analyzed torrential rain as a physical risk factor that needed priority response in 2021 and completed the construction by investing about KRW 375 million in installing and waterproofing at the entrance barrier, bump for preventing flooding of breakers, and introducing emergency water pumps. According to the inspection results, we are establishing and implementing the necessary measures such as water leakage supplementation.

**Time horizon**

Short-term

**Likelihood**

Very likely

**Magnitude of impact**

High

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

28301000000

**Potential financial impact figure – minimum (currency)**

<Not Applicable>

**Potential financial impact figure – maximum (currency)**

<Not Applicable>



**Explanation of financial impact figure**

If the typhoon "Omais," which moved north in August 2021, fails to respond properly, there is a risk of damage or loss of major power devices and construction site materials installed at the site of Hyosung Heavy Industries' plant. In addition, there is a risk of losing customers due to instability in product quality. Therefore, Hyosung Heavy Industries conducts regular inspections three times a year in February, July, and November (wintering season) to prevent damage caused by climate change abnormalities in all domestic business in Korea. However, if it is not properly responded, the heavy industry sector is expected to lose more than KRW 26,301 million based on product sales of KRW 1,3150,067 million in 2021 assuming that 2% of major facilities are damaged. In the case of construction sites, each site has insurance, which pay the max KRW 30 million for self-burden and receives 100% of the remaining damage when occurs the event of natural disasters such as floods and typhoons. The amount of damage caused by past typhoons (Typhoon Maemi) is set as the expected amount of damage for insurance application, which is set at KRW 2,000 million. As such, the occurrence of changes in the physical environment can cause enormous financial damage within the company. As a result, a total of KRW 28,301,000,000 (KRW 26,301 million + KRW 2,000 million) in relation to the expected damage in the heavy industry and the maximum damage in the construction sector is expected.

**Cost of response to risk**

572430000

**Description of response and explanation of cost calculation**

Hyosung Heavy Industries conducts regular inspections three times a year in February, July, and November every year to prevent damage caused by climate change abnormalities (rainstorms, heat waves, and heavy snow). In the case of the heavy industry business sector, safety inspections are conducted once/two years by specialized institutions to verify the stability of major facilities due to changes in the physical environment, and safety inspections are conducted using external specialized institutions for safety in the factory. Accordingly, a water shield was installed in preparation for typhoons and floods to prepare through preliminary simulation activities and installation of water shield. Facilities of Heavy Industries such as excellent pipelines, sewage pipes, and underground water tanks were inspected and managed in preparation for typhoons and floods in 2021. And an average of 10 pumps were installed at 30 construction sites in preparation for summer monsoon or flooding in the construction sector for same period. Major Facility Stability Verification (one-time per 2 year): KRW 5,430,000 Safety inspection through external specialized institutions (one-time per 1 year): KRW 120,000,000 Inspection and management of excellent pipes, sewage pipes, and underground water reservoirs (January to December 2021): KRW 72,000,000 Installation cost of 10 water pumps in 30 construction sites (January to December 2021): KRW 375,000,000 (average unit price of KRW 1,250,000\*30units)

**Comment****C2.4****(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?**

Yes

**C2.4a****(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.****Identifier**

Opp1

**Where in the value chain does the opportunity occur?**

Direct operations

**Opportunity type**

Products and services

**Primary climate-related opportunity driver**

Development and/or expansion of low emission goods and services

**Primary potential financial impact**

Increased revenues resulting from increased demand for products and services

**Company-specific description**

Major advanced countries and corporates participates in so-called Net Zero Alliance and Carbon Neutrality Alliance in order to respond to global climate change crisis. Carbon neutrality needs the development of electrical grid system to link the development of the new renewable energy industry and the existing energy industry. Heavy Industries sector is the leading company of electric power equipment such as transformers and breakers which are key devices in the power transmission and distribution networks and leads the development and supply of eco-friendly products using eco-friendly materials as the insulators of electric power equipment. In case of transformers, they are filled with Ester Oil instead of the existing Mineral Oil to eliminate the risk of environmental pollution (biodegradability) and have some characteristics like the following: safety against fire, moisture proof, and excellent degradation. Hyosung Heavy Industries supplies the eco-friendly insulating oil transformers with those characteristics all over the world including Europe and the Middle East. Hyosung Heavy Industries has also completed its independent development of 170KV eco-friendly GIS (Gas Insulated Switchgear) replacing SF6 gas used in the switchgear with eco-friendly Novec Mixture in 2021. And we expect about 98% of greenhouse gas generation reduction effect (23,900kgCO2/kg SF6 → 500kgCO2/kg-Novec Mixture). As GIS is an eco-friendly product, it is expected to have a positive impact on sales by selling it to global markets.

**Time horizon**

Medium-term

**Likelihood**

Virtually certain

**Magnitude of impact**

High

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

6510000000

**Potential financial impact figure – minimum (currency)**

&lt;Not Applicable&gt;

**Potential financial impact figure – maximum (currency)**

<Not Applicable>

**Explanation of financial impact figure**

Hyosung Heavy Industries signed a long-term contract with the British Electric Power Agency to supply the plant-based transformers in 2019, and we will deliver 40 units of 33kv 60MVA plant-based transformers by 2025. The supplied transformers will be used for ESS and electric vehicle charging stations. In addition, the independent development of 170kV eco-friendly GIS (Gas Insulated Switchgear) that replaces SF6 gas used in the breaker process with eco-friendly Novec Mixture was completed in 2021. As GIS is an eco-friendly product, it is expected to have a positive impact on sales by selling it to global markets. And also as the performance of operating units suitable for eco-friendly products is improved, it is expected to lead greenhouse gas reduction activities in the domestic market. In addition, we plan to develop 145kV eco-friendly gas insulated devices for the global market by utilizing vacuum interrupter (VI) + Dry Air, which does not emit any greenhouse gas by 2022, and expect to expand its eco-friendly portfolio. Hyosung Heavy Industries is continuously carrying out R&D of eco-friendly products internally and is striving to increase the production of eco-friendly products. As sales of eco-friendly transformer products are steadily increasing, we expect to increase by more than 86% every year, so sales of eco-friendly transformer products are expected to increase to about KRW 29,000 million in 2026, compared to KRW 1,300 million in 2021. Sales of eco-friendly GIS products was KRW 700 million in 2021, but as it is expected to continue to rise more than 452% every year, a total of KRW 36,100 million in sales is expected by 2026 at home and abroad as well. Therefore, it is expected that a total of KRW 65,100,000,000(KRW 29,000 million + KRW 36,100 million) will be generated.

**Cost to realize opportunity**

9121000000

**Strategy to realize opportunity and explanation of cost calculation**

A total of KRW 2,146 million was invested in the cost of R&D for Eco-friendly insulating oil transformer and KRW 6,945 million was spent on eco-friendly GIS R&D in 2021. Hyosung Heavy Industries plans to build additional facilities in the future when production increases due to an increase in demand for ester-filled transformers. We invested KRW 30 million during the period from August to December 2021 to calculate the total carbon emission(LCA, Life Cycle Assessment) for transformer and GIS. The energy usage and greenhouse gas emissions of the product could be quantified to evaluate their potential impact on the environment through the LCA and quantitative confirmation of greenhouse gas emissions through such LCA is acting as a driving force to accelerate customer attraction by disclosing transparent greenhouse gas emissions. Hyosung Heavy Industries plans to expand the number of carbon footprint products in the future, and furthermore, it plans to consider promoting certification for products that have already been developed with carbon footprint in the future. - Eco-friendly insulating R&D cost (January to December 2021): KRW 2,146,000,000 - Eco-friendly GIS R&D costs (January to December 2021): KRW 6,945,000,000 - Eco-friendly insulating & GIS LCA Consulting Costs (August to December 2021): KRW 30,000,000

**Comment****Identifier**

Opp2

**Where in the value chain does the opportunity occur?**

Direct operations

**Opportunity type**

Markets

**Primary climate-related opportunity driver**

Other, please specify (Creating surplus profit by participating in ETS)

**Primary potential financial impact**

Other, please specify (Creating surplus profit by participating in ETS)

**Company-specific description**

Hyosung Heavy Industries' direct operation is located in Korea and has been incorporated into the business entities eligible for allocation of the emissions trading system since 2018 to achieve the national greenhouse gas reduction target (40% reduction from 2018). Business entities eligible for allocation participating in the emissions trading system are allocated with emission permits annually. And they have financial risks if they are allocated and over-emissions of greenhouse gases relative to the allocated emissions, however on the contrary, there are opportunities to sell those emissions and generate additional profits as well. Heavy industry and construction sector in Hyosung Heavy Industries are expected to increase greenhouse gas emissions due to continuous business development. However, as we have the goal of reducing greenhouse gas emissions by 14.5% in 2018 by 2030," emissions are expected to decrease if active greenhouse gas reduction projects are carried out in the future. Assuming that the reduction target is successfully achieved, additional profits from the sale of emission permits of remaining allocation can also be expected if the reduction amount increases further compared to greenhouse gas emissions from 2022 to 2030. In fact, the greenhouse gas emissions from Changwon Plant 1 of Heavy Industries sector from 2019 to 2020 were less than the allocated emissions, so there was no shortage of emission permits within the second commitment period. In fact, we have case that 25,000 tons of residual emission permits (KAU19) were sold at a price of KRW 17,100 per ton, generating a total surplus of about KRW 427.5 million in 2020.

**Time horizon**

Medium-term

**Likelihood**

Very likely

**Magnitude of impact**

Medium-high

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

724718000

**Potential financial impact figure – minimum (currency)**

<Not Applicable>

**Potential financial impact figure – maximum (currency)**

<Not Applicable>

**Explanation of financial impact figure**

Currently, Hyosung Heavy Industries has calculated expected emissions reflecting the third commitment period allocation result and target reduction rate to achieve the greenhouse gas reduction target, and residual emissions are expected to occur if the greenhouse gas reduction target is achieved by 2030. The estimated emission amount not reflected in the reduction rate of target from 2021 to 2025 is 304,308 tons, but the expected emission amount reflected in the target reduction rate is 285,285 tons, which is expected to be reduced by a total of 19,023 tons. In addition, the Gratuitous Allocation from 2021 to 2025 is a total of 308,663 tons, which is expected to generate 23,378 tons of remaining emissions compared to the target emission. Therefore, the generated internally expected revenue during the third commitment period is expected to be KRW 724,718,000 (23,378 tons\*KRW31,000) under the assumption that continuous greenhouse gas reduction activities are achieved. (KRW31,000 is the internal carbon price of Hyosung Heavy Industries)

**Cost to realize opportunity**

342953000

**Strategy to realize opportunity and explanation of cost calculation**

Hyosung Heavy Industries considers responding to greenhouse gas regulations and implementing reduction in green management as major considerations. Hyosung Heavy Industries is a participant of the emissions trading system and spends annual membership fees on the Korea Exchange for emissions trading every year. And also, we conduct consulting on applications for greenhouse gas emission allocation during the third commitment period (2021-2025) and submits them to the government after external verification. '2020 Greenhouse Gas Inventory Report' was prepared by consulting for emissions trading system during the period from February to December 2021, and a total of 57,458 tons of emissions were reported to the government after being verified by a third party. Hyosung Heavy Industries will invest KRW 320 million between 2022 and 2023 with replacing old air conditioners and heaters, low-NOx burners at Changwon 3 plant, switching to 200 ton die-casting furnace, replacing casting process(7,111 tons), belt optimization design (48.7 tons) and installing heat exchangers in low-pressure motors(125.4 tons). We expect to save more than 7,285.1 tons of greenhouse gas through these savings measures. - Consulting for emissions trading system (February to December 2021): KRW 5,100,000 - Third Party Verification of Emission Report (February to April 2021): KRW 17,353,000 - Annual Fee of Korea Exchange: KRW 500,000 - Estimated cost of greenhouse gas reduction activities (2022, 2023\_planned): KRW 320,000,000

**Comment****Identifier**

Opp3

**Where in the value chain does the opportunity occur?**

Direct operations

**Opportunity type**

Markets

**Primary climate-related opportunity driver**

Access to new markets

**Primary potential financial impact**

Increased revenues through access to new and emerging markets

**Company-specific description**

Major advanced countries and corporates participates in so-called Net Zero Alliance and Carbon Neutrality Alliance in order to respond to global climate change crisis. It is also expected that the ESS market grows speedily through the systematic linkage of various renewable power sources by trends of energy conversion and the enhancement of carbon neutrality alliance and the reinforcement of electrical grid stability by the expansion of small distributed power. Heavy industry business sector in Hyosung Heavy Industries is also actively responding to market changes caused by the climate crisis in line with this market trend. We have not only strengthened its position as the No. 1 company in the domestic market share of existing Power Transformers and circuit breakers, but has also been continuously pushing for development of ESS since 2013. As the leading ESS company, it supplies versatile ESS like the following: linkage of new renewable energy, amplitude modulation, peak power reduction and independent microgrid. ESS of Hyosung Heavy Industries consists of ES PCS with high efficiency and high reliability, PMS applicable to various applications, and batteries with the optimal capacity and performance and provides customized ESS consulting and system construction. It also provides solutions through the self-produced Stacom (Static Synchronous Compensator) and solution provider, a new renewable power system using ESS. The order amount in the U.S. market in 2021 is expected to increase from KRW 24.1 billion won to KRW 65 billion from 2021 to 2026, and in the case of the British ESS market, it is expected to increase from KRW 36.4 billion to KRW 77.6 billion from 2021 to 2026.

**Time horizon**

Medium-term

**Likelihood**

Virtually certain

**Magnitude of impact**

High

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

67800000000

**Potential financial impact figure – minimum (currency)**

&lt;Not Applicable&gt;

**Potential financial impact figure – maximum (currency)**

&lt;Not Applicable&gt;

**Explanation of financial impact figure**

The European ESS market is expected to grow by more than 50% every year to a total of KRW 720 billion as of last year, while the British and German ESS markets account for 60% of the European market. In particular, the UK is expected to implement a policy aimed at zero carbon emissions by 2050, further increasing renewable energy generation and ESS supply. Hyosung Heavy Industries won an order for KRW 18 billion to build a 50MW ESS in Southampton, England in September 2020, and began operation in August 2021 to enter the ESS European market in earnest. Accordingly, if Hyosung Heavy Industries applies the expected growth rate of 50%/yr in the European ESS market based on the KRW18 billion this time, we expect sales to increase by KRW 27 billion in 2022. Hyosung Heavy Industries is carrying out ESS business not only in Europe but also in the U.S. market. According to Wood Mackenzie, the size of the U.S. ESS market in 2021 was \$5.5 billion, more than tripled from 2020. Hyosung Heavy Industries achieved KRW 13.6 billion in sales in 2019, including delivery of 10MW ESS to the U.S. market, and assuming that the U.S. ESS market has grown at least three times in 2021, sales of KRW 40.8 billion are expected compared to 2019. As a result, Hyosung Heavy Industries is expected to increase its sales by a total of KRW 67,800,000,000 (KRW 27 billion + KRW 40.8 billion) due to its entry into the European and U.S. ESS markets.

**Cost to realize opportunity**

5134000000

**Strategy to realize opportunity and explanation of cost calculation**

Hyosung Heavy Industries is continuously conducting research and development to improve the quality of ESS services and continue to export to the U.S. and Europe markets and conducted ESS R&D for one year in 2021 such as "development and demonstration to PNNL hybrid ESS in North America." - R&D Cost for ESS in 2021: KRW 5,314,000,000

**Comment**

### C3. Business Strategy

#### C3.1

##### (C3.1) Does your organization's strategy include a transition plan that aligns with a 1.5°C world?

###### Row 1

###### Transition plan

No, but our strategy has been influenced by climate-related risks and opportunities, and we are developing a transition plan within two years

###### Publicly available transition plan

<Not Applicable>

###### Mechanism by which feedback is collected from shareholders on your transition plan

<Not Applicable>

###### Description of feedback mechanism

<Not Applicable>

###### Frequency of feedback collection

<Not Applicable>

###### Attach any relevant documents which detail your transition plan (optional)

<Not Applicable>

###### Explain why your organization does not have a transition plan that aligns with a 1.5°C world and any plans to develop one in the future

Hyosung Heavy Industries conducts a semi-annual ESG management promotion committee every year to improve ESG expertise and plans to introduce the low-carbon conversion plan as a resolution at the annual shareholders' meeting within two years. Hyosung Heavy Industries has no conversion plan yet that meets the 1.5°C scenario within the current two years. However, when we establish a management strategy, we use NDCs analysis of the climate change scenario of sincerity. The conversion plan that meets the 1.5°C scenario will be additionally introduced by utilizing with quantitative analysis and qualitative scenario analysis within two years.

###### Explain why climate-related risks and opportunities have not influenced your strategy

<Not Applicable>

#### C3.2

##### (C3.2) Does your organization use climate-related scenario analysis to inform its strategy?

	Use of climate-related scenario analysis to inform strategy	Primary reason why your organization does not use climate-related scenario analysis to inform its strategy	Explain why your organization does not use climate-related scenario analysis to inform its strategy and any plans to use it in the future
Row 1	Yes, quantitative	<Not Applicable>	<Not Applicable>

#### C3.2a

##### (C3.2a) Provide details of your organization's use of climate-related scenario analysis.

Climate-related scenario	Scenario analysis coverage	Temperature alignment of scenario	Parameters, assumptions, analytical choices		
<table border="1"> <tr> <td>Transition scenarios</td> <td>Customized publicly available transition scenario</td> </tr> </table>	Transition scenarios	Customized publicly available transition scenario	Company-wide	1.6°C – 2°C	<p>[Parameter] Hyosung Heavy Industries is divided into heavy industry and construction. The heavy industry sector was divided into 'power systems' and 'industrial machinery' and the construction sector was divided into construction, and the reduction target was established by calculating the expected reduction. In the case of heavy industry and the building sector, it was confirmed that the correlation with sales was high as a result of analyzing the correlation between greenhouse gas emissions. In fact, both business sectors set goals for reducing greenhouse gas emissions by using sales data. [Assumptions] In December 2021, the government submitted Korea's upgraded "2030 NDC" to the UNFCCC to comply with the Paris Agreement. The goal was established by 40% in 2018 by 2030, and the target emissions for each industry are set as well. In the case of the industrial sector to which Hyosung Heavy Industries' business division belongs, the goal was to reduce 14.5% in 2030 compared to 2018. Therefore, we have set a green management strategy system to accord with the national NDC target level and to accord with the achievement of the target value. The goal of reducing greenhouse gas emissions was established with the goal of reducing the target by 14.5% compared to 2018. [Analytical] In December 2021, the government submitted Korea's upgraded "2030 Nationally Determined Contributions (NDC+)" to the UN Climate Change Convention Secretariat to comply with the Paris Climate Agreement. The higher goal was established to reduce the total national greenhouse gas emissions by 40% in 2018 by 2030, and the target emissions for each industry are set to achieve the goal. In the case of the industrial sector to which Hyosung Heavy Industries' business division belongs, the goal was to reduce 14.5% in 2030 (222.6 million tons) compared to 2018 (260.5 million tons). Therefore, Hyosung Heavy Industries have set a green management strategy system to accord with the national NDC target level and to accord with the achievement of the target value. The goal of reducing greenhouse gas emissions was established with the goal of reducing the target by 14.5% compared to 2018.</p>
Transition scenarios	Customized publicly available transition scenario				

#### C3.2b

**(C3.2b) Provide details of the focal questions your organization seeks to address by using climate-related scenario analysis, and summarize the results with respect to these questions.**

Row 1

**Focal questions**

[Focal Issues that have directed the analysis of climate change scenarios] In line with the international community's response to climate change, the Korean government first announced "2050 Carbon Neutral" in October 2020, and later declared the "2050 Carbon Neutral Vision" in December 2020. Since then, in December 2021, the government has submitted Korea's raised "2030 National Greenhouse Gas Reduction Goals (NDC)" to the secretariat of the United Nations Framework Convention on Climate Change. Regarding the establishment of the government's greenhouse gas reduction target, the government-operated emission trading system is expected to be able to directly link to the 2050 carbon neutral target and be an effective means of implementation in achieving the national greenhouse gas reduction target. Accordingly, Hyosung Heavy Industries has established a 2030 greenhouse gas reduction target (a 14.5% reduction in greenhouse gas reduction by 2030 compared to 2018) to respond to the 2030 greenhouse gas reduction target and emission trading system. [Reasons for scenario selection to address focal questions] Hyosung Heavy Industries is obligated to report emissions every year as it has been incorporated as a company subject to the allocation of the emission trading system since 2018. However, the emissions trading system is a system in which emissions are allocated every year, and there is a cost risk of purchasing additional GHG emission permits for shortfalls if Hyosung Heavy Industries has more greenhouse gas emissions than the allocated emission rights. The government is concerned to continuously increase the paid allocation ratio (3% for the second commitment period and 10% for the third commitment period) to achieve the raised national NDC target (14.5% reduction in 2030 compared to 2018). Therefore, it is expected that Hyosung Heavy Industries will need to solve the problem of insufficient emission permits by achieving the greenhouse gas reduction target through low-carbon product development, etc. as it establishes a reduction target in line with the national NDC goal.

**Results of the climate-related scenario analysis with respect to the focal questions**

Hyosung Heavy Industries' direct operation workplace is located in South Korea and has the obligation to report and reduce emissions as a company subject to the allocation of the emission trading system since 2018. Currently, Hyosung Heavy Industries is implementing the emission trading system during the third commitment period, but if continuous growth and development proceeds, a shortage of emission permits is expected during the fourth commitment period (2026-2030). The Gratuitous Allocation for emission permits during the fourth planned period is 245,980 tons, but the expected emission for the same period is 387,110 tons, and if there is no reduction activity, the insufficient emission is expected to be a total of 141,130 tons. In this case, it is estimated that the internal debt cost of purchasing emission permits during the entire fourth commitment period is about 141,130 tons\*KRW 31,000 won (based on the internal carbon price), estimated that a total of KRW 4,375,030,000 will be added. Therefore, Hyosung Heavy Industries has established a goal to reduce greenhouse gas in the company at the national NDC target level and is carrying out greenhouse gas reduction activities to achieve 14.5% reduction compared to 2018 by 2030 and plans to continue its activities in the from now on. In the first half of 2022, it plans to implement a plan to reduce power usage due to the conversion of casting processes among casting facilities in the heavy industry business division. In the future, by June 2023, it is planned to method reduce power consumption through belts of dust collecting facilities and optimized design of poly. It is planned to method reduce power consumption through measures to reduce power consumption through waste heat recovery by attaching a heat exchanger in a catalytic combustion facility for a low-pressure medium-sized impregnated drying related to a low-voltage motor as well.

C3.3

**(C3.3) Describe where and how climate-related risks and opportunities have influenced your strategy.**

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	As hydrogen economy has globally become the important axis in the Green New Deal, Hyosung Heavy Industries has continued the key value chain of the hydrogen economy from 'production to storage, transportation, supply, and use' through the synergy effects mutually created by 4 Hyosung companies. Among them, Hyosung Heavy Industries and Hyosung Chemical decided to construct newly a liquid hydrogen plant in Yongyeon Plant of Hyosung Chemical through the investment of KRW 300 billion by 2022 with cooperation with Linde, a global chemistry group, under the construction plan of a liquid hydrogen plant equivalent to 'production'. Hyosung Heavy Industries is in charge of the supply infrastructure for hydrogen charging and implements it as one of the new growth engines. As the hydrogen fueled car engages the attention as an eco-friendly one in the future, the market for hydrogen charging is expected to grow highly and the volume is prospected US\$ 2.5 trillion (KRW 2,940 trillion) in the world. Hyosung Heavy Industries was approved by the board and invests KRW 300 billion with Hyosung Chemical in constructing a liquid hydrogen plant with the capacity of 13,000 tons by 2023 and in building about 120 liquid hydrogen charging stations all over the country.
Supply chain and/or value chain	Yes	Hyosung Heavy Industries is an intermediate material manufacturer with a main product of electric power equipment and needs the joint risk management with subsidiary networks and end product sellers. Hyosung Heavy Industries annually checks the energy use management and reduction activities through the diagnose of social responsibility management of cooperative companies and gives extra points when assessing the excellent cooperative companies. It reflected the check and guidance of cooperative companies, product carbon certification and the information disclosure on climate change in the related department work and the budget and implements them. As part of green management, it expands the footprint calculation of major product by 2030. Meanwhile, Hyosung Heavy Industries calculated the certification of carbon emissions for 2 products applied to customer companies and release to provide the information from 2021. In addition, it has responded to CDP supply chain among the information disclosure on climate change requested by customer companies from 2021. In addition, from 2020, for sustainable development, ESG information disclosure has been voluntarily conducted by receiving ESG evaluation from the Korea Corporate Governance Service (KCGS). We actively respond to customers' requests for disclosure of ESG information, and are strengthening communication with stakeholders about improvements such as disclosure information and disclosure methods. We obtained an A grade in the Korea Corporate Governance Service (KCGS) '2020,2021 ESG Evaluation of Listed Companies', and from 2021, Hyosung Heavy Industries has been established further strengthen company-wide environmental management by establishing the ESG Committee.
Investment in R&D	Yes	Hyosung Heavy Industries consistently implements R&D to secure the new growth engine as well as to enhance the existing business. With the paradigm shift from the current carbon-centered economic structure to a hydrogen-centered economy in the future, Hyosung Heavy Industries is committed to develop the technology for establishing a value chain that encompasses the installation and operation of liquid hydrogen production, transportation and charging facilities for the development of hydrogen fuel technology, an eco-friendly energy. Hyosung Heavy Industries is in charge of hydrogen production infrastructure in the value chain and is promoting as one of the new growth engines of Hyosung Heavy Industries in 2020, such as supplying gaseous hydrogen charging system tailored to the expansion of hydrogen fuel cell vehicles and commercial hydrogen vehicles <sup>0</sup> and building liquid hydrogen charging infrastructure. In 2020, it invested KRW 510 million in the R&D cost to develop hydrogen charging and extracting technologies in accordance with market trends to expand continuously eco-friendly mobility as well as with the government roadmap to extending hydrogen use by invigorating the hydrogen economy in 2020. It approved the new establishment plan for a liquid hydrogen plant, with annual capabilities of 13,000 tons by 2023 (100,000 cars available), by investing a total of KRW 300 billion in Yongyeon Plant in 2020 and the construction began in June 2021. Hyosung Heavy Industries announced its ambitious goal in June 2021 to contribute to reducing about 10% of domestic carbon dioxide emissions by establishing a hydrogen economy. For the goal, it plans to invest 1 trillion won over the next five years (by 2026) to increase its liquefied hydrogen production capacity to 39,000 tons per year.
Operations	Yes	Every year Hyosung Heavy Industries practices the responding works to the ETS such as reporting emissions and submitting monitoring plans and submits them to the government after the verification from external expertise agencies. In addition, it annually establishes the investment budget of GHG reduction and energy efficiency. Changwon Plant increases the energy use with relatively low impact on the environment by replacing the existing bunker C oil with LPG / LNG. The emissions due to electricity use account for 83 % out of the GHG emissions and it implements mainly the activities of reducing electricity use. The just verification costs related to GHG emissions annually is more than KRW 10 million and was KRW 2,766 million to rationalization of GIS simplified synthesis test facilities. In 2022, Hyosung Heavy Industries plans to invest KRW 940 million in facilities rationalization including GIS gas confidential automation tester.

C3.4

**(C3.4) Describe where and how climate-related risks and opportunities have influenced your financial planning.**

	Financial planning elements that have been influenced	Description of influence
Row 1	Revenues Indirect costs Capital expenditures Capital allocation Acquisitions and divestments Access to capital	<p>1) Revenues: Eco-friendly electric power equipment and hydrogen stations are one of the new growth engines and the demands increase due to the demand for eco-friendly materials in the market, the growth in the number of hydrogen cars and the prospect for hydrogen energy conversion. If the demand for hydrogen facilities explosively grows in the future, Hyosung Heavy Industries plans to expand the production capacity through additional facilities, centrally in Changwon Plant. Sales of eco-friendly power devices are around KRW 90,700 million in 2021. But the need for eco-friendly and low-carbon is steadily occurring in the domestic market in Korea as well as in the European and North American markets. Considering the expansion of business related to new and renewable energy, sales of eco-friendly power devices are expected to increase by about 300% to KRW 278,000 million by 2026. 2) Indirect costs : Of the indirect costs, the energy costs for Hyosung Heavy Industries' product production are KRW 25,511 million occupying 1 % of the total operating costs. Due to the climate change, globally the average temperature gets higher, and the days of heat and cold waves increase. Those situations may directly lead to the increase in heating and cooling costs because it needs to manage the temperature within the certain range to manufacture products with the constant quality in workplaces. Hyosung Heavy Industries manages the electricity use not to exceed the certain level by monitoring electric power peak and establishes the financial plan and the annual budget considering energy costs due to heat and cold waves. 3) Capital expenditures / Capital allocation : Hyosung Heavy Industries strengthens the existing business's ability and plans to build production facilities in order to secure the new growth engine. Hyosung Heavy Industries says announces that it has a plan to invest KRW 300 billion in constructing a liquid hydrogen plant with the capacity of 13,000 tons per year and to build about 120 liquid hydrogen stations in all parts of the country. Therefore, Furthermore Hyosung Heavy Industries planned to invest KRW 3.5 billion in additionally building test facilities line for axial generator motor system in Changwon Plant. 4) Acquisitions and divestments : Hyosung Heavy Industries was spun off from Hyosung Co. in 2018 and currently has no plan for acquisitions or divestments. If acquisitions or divestments occur in the future, it will review the risk due to climate change from the opportunity perspective from the initial phase. The critical decision about investments and divestment will be made in the board. 5) Access to capital : Under the ETS system, if Hyosung Heavy Industries has problems in emission reports or passively copes with the GHG emissions target (14.5 % reduction by 2030 compared to 2018) externally disclosed, the reputation risk would negatively affect the enterprise value. If so, it would suffer from accessing to capital to expand its climate change related investment in the future. However, its possibility is supposed to be so low. Hyosung Heavy Industries has no plan of financial plan for access to capital to cope with climate change risks or for using opportunities and plans to establish it, if necessary.</p>

**C4. Targets and performance**

**C4.1**

**(C4.1) Did you have an emissions target that was active in the reporting year?**

Absolute target

**C4.1a**

**(C4.1a) Provide details of your absolute emissions target(s) and progress made against those targets.**

**Target reference number**

Abs 1

**Year target was set**

2021

**Target coverage**

Company-wide

**Scope(s)**

Scope 1

Scope 2

**Scope 2 accounting method**

Location-based

**Scope 3 category(ies)**

<Not Applicable>

**Base year**

2018

**Base year Scope 1 emissions covered by target (metric tons CO2e)**

13188.07

**Base year Scope 2 emissions covered by target (metric tons CO2e)**

61047

**Base year Scope 3 emissions covered by target (metric tons CO2e)**

<Not Applicable>

**Total base year emissions covered by target in all selected Scopes (metric tons CO2e)**

74235.07

**Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1**

100

**Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2**

100

**Base year Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)**

<Not Applicable>

**Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes**

100

**Target year**

2030

**Targeted reduction from base year (%)**

14.5

**Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]**

63470.98485

**Scope 1 emissions in reporting year covered by target (metric tons CO2e)**

9005.38

**Scope 2 emissions in reporting year covered by target (metric tons CO2e)**

45104.51

**Scope 3 emissions in reporting year covered by target (metric tons CO2e)**

<Not Applicable>

**Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)**

54109.89

**% of target achieved relative to base year [auto-calculated]**

186.966005188095

**Target status in reporting year**

New

**Is this a science-based target?**

No, but we anticipate setting one in the next 2 years

**Target ambition**

<Not Applicable>

**Please explain target coverage and identify any exclusions**

Hyosung Heavy Industries has set the company-wide target.

**Plan for achieving target, and progress made to the end of the reporting year**

In 2021, Hyosung Heavy Industries set the target of reducing GHG emissions by 14.5% and 2030 compared to 2018 to contribute to the achievement of the national NDC target and to meet the voluntary crisis awareness and requests of various stakeholders. In addition, when setting the target, we voluntarily calculated and verified the missing emissions as the base year emissions of the construction division were included in the domestic emission trading system. Accordingly, the base year emissions were applied based on 74,235 tons, the sum of 57,756 tons in the heavy industry and 16,479 tons in the construction division. Out of 15 sites reporting on Scope 1+2 of the company, Changwon 1-4 plants account for a high proportion of the total emissions in 2021. In addition, out of 54,109.890 tons of Scope 1+2 total emissions as of 2021, indirect emissions were 45,104.511 tons, accounting for 83.4% of the company. Accordingly, as a plan to achieve the GHG reduction target, the short-term (2023) and mid-term (2030) targets were set, and related power reduction measures such as dust collection facilities at Changwon Plant are planned to be introduced. 1. In the case of dust collection facilities, it is intended to reduce power consumption due to the optimization design replacement of belt and pulley. The expected introduction date of the reduction method is June 2023, and it is expected to save 48.7 tons when introduced. 2. In the case of a low-voltage electric motor, a heat exchanger is attached to a catalyst combustion facility by a low-pressure medium-sized impregnated drying method to reduce power consumption due to waste heat recovery. The facility is expected to be introduced in June 2023, and it is expected to save 125.4 tons when introduced. 3. In the case of casting facilities, a plan to reduce power consumption due to the conversion of the casting process business is to be introduced in the first half of 2022, and 7,111 tons are expected to be saved when introduced. Hyosung Heavy Industries is a core company in the power industry and has established and implemented the 2030 Green Management Strategy System to achieve the GHG reduction target. We invested KRW 212 million in 2021 to reduce power usage by replacing old air conditioners with high-efficiency air conditioners.

**List the emissions reduction initiatives which contributed most to achieving this target**

<Not Applicable>

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C4.2

**(C4.2) Did you have any other climate-related targets that were active in the reporting year?**

No other climate-related targets

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C4.3

**(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.**

Yes

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C4.3a



(C4.3a) Identify the total number of initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	0	0
To be implemented*	1	10
Implementation commenced*	1	15
Implemented*	1	56
Not to be implemented	0	0

#### C4.3b

(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.

**Initiative category & Initiative type**

Energy efficiency in production processes	Machine/equipment replacement
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**Estimated annual CO2e savings (metric tonnes CO2e)**

56

**Scope(s) or Scope 3 category(ies) where emissions savings occur**

Scope 2 (location-based)

**Voluntary/Mandatory**

Voluntary

**Annual monetary savings (unit currency – as specified in C0.4)**

13100000

**Investment required (unit currency – as specified in C0.4)**

97000000

**Payback period**

4-10 years

**Estimated lifetime of the initiative**

6-10 years

**Comment**

The Changwon plant replaced with high-efficiency LED lights to reduce energy savings of 111,142 kWh/year and 56 tons of greenhouse gas emissions (Scope2).

#### C4.3c

(C4.3c) What methods do you use to drive investment in emissions reduction activities?

Method	Comment
Dedicated budget for energy efficiency	Hyosung Heavy Industries establishes a budget for reducing greenhouse gas emissions and investing in energy efficiency every year. The budget includes all energy efficiency projects such as facility replacement, energy source change, and process improvement. Greenhouse gas emissions from electricity use account for 83% of the total emissions, especially focusing on activities to reduce electricity use.

#### C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products?

Yes

#### C4.5a

**(C4.5a) Provide details of your products and/or services that you classify as low-carbon products.**

**Level of aggregation**

Product or service

**Taxonomy used to classify product(s) or service(s) as low-carbon**

Climate Bonds Taxonomy

**Type of product(s) or service(s)**

Other	Other, please specify (Gas Insulated Switchgear)
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**Description of product(s) or service(s)**

Low-carbon products are Novec Mixture Gas Insulated Switchgear (hereinafter referred to as GIS), and it can be classified as 'Circuit breakers and switchgear' among 'Transmission & Distribution' in 'Climate Bonds Taxonomy'. The existing GIS is a switchgear for protecting power facilities, and internal insulation is performed using SF6 Gas. However, since the GWP (23,900) index of SF6 gas is high, we developed GIS using Novec Mixture Gas as a replacement gas. The GWP of Novec Mixture, which replaced SF6 gas, is less than 500, which is expected to contribute to a 98% reduction in warming effect compared to existing SF6 Gas.

**Have you estimated the avoided emissions of this low-carbon product(s) or service(s)**

Yes

**Methodology used to calculate avoided emissions**

Methodology for Environmental Life-Cycle Assessment of Information and Communication Technology Goods, Networks and Services (ITU-TL.1410)

**Life cycle stage(s) covered for the low-carbon product(s) or services(s)**

Use stage

**Functional unit used**

The functional unit is the comparison value of the emissions of '144kV SF6 Gas Insulated Switchgear' and '144kV Novec Mixture Gas Insulated Switchgear' in phase of use for 40 years of product life.

**Reference product/service or baseline scenario used**

The annual leak rate (0.1%) of SF6 Gas of GIS for one year was applied to the emission of '144kV SF6 Gas Insulated Switchgear' in the phase of use and the emission of the phase of use was calculated as BAU.

**Life cycle stage(s) covered for the reference product/service or baseline scenario**

Use stage

**Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario**

157.388

**Explain your calculation of avoided emissions, including any assumptions**

160.6 tCO2/unit \* 0.98 = 157.388 160 tCO2 is the greenhouse gas emission generated by applying a leak rate of 0.1% over the life (40 years) of 144 kV GIS. The avoidance emissions were calculated using the corresponding emissions and 98% of the warming effect compared to the existing SF6 gas.

**Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year**

0.01

**C5. Emissions methodology**

**C5.1**

**(C5.1) Is this your first year of reporting emissions data to CDP?**

No

**C5.1a**

**(C5.1a) Has your organization undergone any structural changes in the reporting year, or are any previous structural changes being accounted for in this disclosure of emissions data?**

**Row 1**

**Has there been a structural change?**

No

**Name of organization(s) acquired, divested from, or merged with**

<Not Applicable>

**Details of structural change(s), including completion dates**

<Not Applicable>

**C5.1b**

**(C5.1b) Has your emissions accounting methodology, boundary, and/or reporting year definition changed in the reporting year?**

	Change(s) in methodology, boundary, and/or reporting year definition?	Details of methodology, boundary, and/or reporting year definition change(s)
Row 1	Yes, a change in methodology Yes, a change in boundary	In the case of Category 7 (Employee commuting) emission calculation, the latest emission factors were applied using the latest data from 2021 compared to the WRI data in 2020 for the calculation of commuting emissions at the Changwon plant. The emission factor applied when calculating the Changwon plant's commuting emissions was 0.1041 kgCO2-eq/person.km in 2020, but in 2021 it was 0.0339 kgCO2-eq/person.km, which decreased compared to 2020. 16 products, including GAS-VT and support, were added to Category 1's emission calculation product compared to 2021 CDP, and soil-borne aggregate products and water usage were also added to the construction sector's emission calculation products. In addition, the rental vehicle details were additionally calculated. Category 4 calculated the transportation emission of products including additional items in Category 1, and Category 5 calculated by adding construction waste. Also, in the case of volume-based waste bags, those applied only to landfill were divided into landfill and incineration. In the case of Category 7, it was calculated by adding the commuting of the head office staff. The scope of calculating Scope3 emissions reported in Hyosung Heavy Industries' 2021 CDP was Category 1 to 7, but Category 9, 11, 12 (Downstream transportation, use, disposal) was additionally calculated as the life cycle assessment of transformers and breakers, which are major sales products in the heavy industry, was conducted in 2021. In the case of Category 15 (investment), emissions for corporate businesses in India, China, and the United States were additionally calculated.

**C5.1c**

**(C5.1c) Have your organization's base year emissions been recalculated as result of the changes or errors reported in C5.1a and C5.1b?**

	Base year recalculation	Base year emissions recalculation policy, including significance threshold
Row 1	Yes	Hyosung Heavy Industries' greenhouse gas reduction goal in relation to the significance criterion for re-calculation of emissions in the base year is to reduce 14.5% of greenhouse gas emissions in 2018 by 2030, and the target includes Scope 1 and 2 emissions. As a result, the boundary for calculating Scope3 emissions was changed in the reporting year, but Scope3 emissions were excluded from the scope of this recalculation because they do not fall within the scope of Hyosung Heavy Industries & Construction's GHG reduction target and are not subject to mandatory reporting of the emission trading system. However, as it was not changed during the reporting year, it was not reported in C5.1a and C5.1b, but in the case of base year emission scope 1,2, construction sector is not included in the domestic emission trading system target project in 2018, the base year, so the emissions from the construction sector were not calculated as obligations. However, as the construction sector was included in the project subject to the emission trading system from 2020, the construction sector emissions that were omitted in 2018 were voluntarily calculated and verified, so the corresponding emissions were added and calculated. In addition, the construction sector accounted for more than 20% of Hyosung Heavy Industries' total emissions and about 50% as of 2021 in terms of sales, so this was considered important and calculated by adding the sector's emissions to the base year's emissions.

**C5.2**

**(C5.2) Provide your base year and base year emissions.**

**Scope 1**

**Base year start**

January 1 2018

**Base year end**

December 31 2018

**Base year emissions (metric tons CO2e)**

13188.069

**Comment**

In 2018, Scope1 emissions in the heavy industry sector were 9,641.069 tons and 3,547.000 tons in the construction sector.

**Scope 2 (location-based)**

**Base year start**

January 1 2018

**Base year end**

December 31 2018

**Base year emissions (metric tons CO2e)**

61047.003

**Comment**

In 2018, Scope 2 emissions in the heavy industry sector were 48,115.003 tons and 12,932.000 tons in the construction sector.

**Scope 2 (market-based)**

**Base year start**

January 1 2018

**Base year end**

December 31 2018

**Base year emissions (metric tons CO2e)**

0

**Comment**

The Korean electricity market is a single regional-based market supplied by KEPCO, and there is no market-based electricity market.

Scope 3 category 1: Purchased goods and services

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 2: Capital goods

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 3: Fuel-and-energy-related activities (not included in Scope 1 or 2)

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 4: Upstream transportation and distribution

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 5: Waste generated in operations

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 6: Business travel

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 7: Employee commuting

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 8: Upstream leased assets

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 9: Downstream transportation and distribution

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 10: Processing of sold products

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 11: Use of sold products

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 12: End of life treatment of sold products

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 13: Downstream leased assets

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 14: Franchises

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 15: Investments

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3: Other (upstream)

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3: Other (downstream)

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

C5.3

---

**(C5.3) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.**

ISO 14064-1

Korea GHG and Energy Target Management System Operating Guidelines

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

C6. Emissions data

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C6.1

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**(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?**

**Reporting year**

**Gross global Scope 1 emissions (metric tons CO2e)**

9005.379

**Start date**

<Not Applicable>

**End date**

<Not Applicable>

**Comment**

C6.2

---

**(C6.2) Describe your organization's approach to reporting Scope 2 emissions.**

**Row 1**

**Scope 2, location-based**

We are reporting a Scope 2, location-based figure

**Scope 2, market-based**

We have no operations where we are able to access electricity supplier emission factors or residual emissions factors and are unable to report a Scope 2, market-based figure

**Comment**

The Korean power market is a single regional-based market supplied by KEPCO, and there is no private power market.

C6.3

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**(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?**

**Reporting year**

**Scope 2, location-based**

45104.511

**Scope 2, market-based (if applicable)**

<Not Applicable>

**Start date**

<Not Applicable>

**End date**

<Not Applicable>

**Comment**

C6.4

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**(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure?**

No

C6.5

---

**(C6.5) Account for your organization's gross global Scope 3 emissions, disclosing and explaining any exclusions.**

**Purchased goods and services**

**Evaluation status**

Relevant, calculated

**Emissions in reporting year (metric tons CO2e)**

385105

**Emissions calculation methodology**

Average data method

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

100

**Please explain**

The usage of heavy industry, construction raw materials, and water purchased in the reporting year (2021) was set as the scope of calculating emissions. Heavy industrial materials and construction subsidiary materials accounted for more than 98% of the total weight, and materials in the heavy industrial sector were calculated including OEM products. In addition, vehicles rented in 2021 were identified as Category 1 in the concept of service purchase to calculate the emission. Calculation of Emissions :

$\sum$  Amount of product purchased X Greenhouse gas emission factor (kgCO2-eq).

## Capital goods

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO<sub>2</sub>e)

34.66

### Emissions calculation methodology

Average data method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Please explain

The number of PCs, monitors, laptops and printers purchased in the reporting year (2021) was set as the range of emission calculation. As the emission factor, a value corresponding to the pre-manufacturing and manufacturing stages among the emissions of environmental performance label certified products was used. Calculation of Emissions :  $\sum(\text{Individual laptop \& monitor \& PC body purchased amount (ea)} \times \text{Individual greenhouse gas emission factor (kgCO}_2\text{/ea)})$ .

## Fuel-and-energy-related activities (not included in Scope 1 or 2)

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO<sub>2</sub>e)

4366

### Emissions calculation methodology

Fuel-based method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Please explain

In the reporting year (2021), the amount of greenhouse gas emissions generated during the mining, production, and transportation of fuels purchased and consumed by Hyosung Heavy Industries was set as the calculation range. The emission factor was the environmental performance label evaluation factor of the Ministry of Environment. Calculation of Emissions :  $\sum(\text{monthly consumption} \times \text{greenhouse gas emission factor (kgCO}_2\text{-eq)})$ .

## Upstream transportation and distribution

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO<sub>2</sub>e)

6155

### Emissions calculation methodology

Distance-based method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Please explain

In the reporting year (2021), all cases where Hyosung Heavy Industries paid and received transportation costs for raw materials transported from suppliers in the heavy industry and construction sector were included in the calculation scope. The emission factor was the environmental performance label evaluation factor of the Ministry of Environment. Calculation of Emission :  $\sum(\text{Monthly raw material transport distance (km)} \times \text{raw material weight (ton)} \times \text{individual greenhouse gas emission factor (kgCO}_2\text{/ton.km)})$ .

## Waste generated in operations

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO<sub>2</sub>e)

10922

### Emissions calculation methodology

Waste-type-specific method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Please explain

In the reporting year (2021), the amount of waste generated during the operation process and the amount of emissions generated during the waste treatment process were calculated. Activity data were based on the amount of waste reported through the system at all workplaces subject to environmental information disclosure, and the emission factor according to the waste type and disposal method was applied. Household waste was excluded if it was less than 5% of the total waste disposal at the workplace. The emission factor was the environmental performance label evaluation factor of the Ministry of Environment. Calculation of Emission:  $\sum(\text{Company-wide waste emission (kg)} \times \text{GHG emission factor by treatment method (kgCO}_2\text{/kg)})$ .



## Business travel

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO<sub>2</sub>e)

696

### Emissions calculation methodology

Distance-based method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Please explain

In the reporting year (2021), the amount of emissions generated from domestic and overseas business trips by full-time employees was calculated. Activity data were used for domestic and overseas business travel records (business trip personnel, travel destination, means of transportation) managed through the company-wide system, and the emission factor according to the means of transportation during the business trip (one person.km) applied. Calculation of emissions: ((Overseas/Domestic travel distance (km person) by employee) X Greenhouse gas emission factor by means of transportation (kg-CO<sub>2</sub>/in/km).

## Employee commuting

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO<sub>2</sub>e)

1074

### Emissions calculation methodology

Average data method  
Distance-based method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Please explain

In the reporting year (2021), the amount of emissions generated from the commuting of the headquarters staff and the operation of the Changwon plant commuter bus (when the transportation service of an external carrier was purchased) was calculated. The activity data were applied using the number of employees at the headquarters and the Seoul Metropolitan Government's statistics for commuting, in the case of the Changwon plant, data on the number of commuting buses (for 45 people) were used.km) was applied. Calculation of emissions: 1) Commuting to headquarters: ( (Greenhouse gas emission factor by transportation (kgCO<sub>2</sub>e/in).km) X Number of employees by means of transportation (in/day) X Number of working days (day/year) X commuting distance (km/day), 2) Factory commuter bus: ( (Monthly commuter bus operation X (distance of operation) X greenhouse gas emission coefficient (kgCO<sub>2</sub>e/km)).

## Upstream leased assets

### Evaluation status

Not relevant, explanation provided

### Emissions in reporting year (metric tons CO<sub>2</sub>e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

### Please explain

Hyosung Heavy Industries does not operate rental assets, so it is impossible to calculate emissions for the category.

## Downstream transportation and distribution

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO<sub>2</sub>e)

1896

### Emissions calculation methodology

Distance-based method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Please explain

In the reporting year (2021), Hyosung Heavy Industries set the calculation range for all cases in which it receives transportation costs and payment of transportation costs for products transported at the time of delivery to customer companies. The emission factor was the environmental performance label evaluation factor of the Ministry of Environment. Calculation of emission: 1)  $\sum$  Monthly raw material transport distance (km) X raw material weight (ton) X individual greenhouse gas emission factor (kgCO<sub>2</sub>/ton.km).

## Processing of sold products

### Evaluation status

Not relevant, explanation provided

### Emissions in reporting year (metric tons CO2e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

### Please explain

Hyosung Heavy Industries is a final goods producer and cannot calculate emissions for the category.

## Use of sold products

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO2e)

8566856

### Emissions calculation methodology

Average data method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Please explain

In the reporting year (2021), products sold by the heavy industry business sector were set as the calculation range. As the emission factor, the LCA calculation emission factor disclosed in the data of Hyosung Heavy Industries' Power Technology Magazine' in 2022 was used. Calculation of emission :  $\sum$  Monthly sold product weight (ton) X individual greenhouse gas emission factor (kgCO2/ton).

## End of life treatment of sold products

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO2e)

1374

### Emissions calculation methodology

Average data method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Please explain

In the reporting year (2021), the weight of discarded products after sales in the heavy industry business sector was set as the calculation range. As the emission factor, the LCA calculation emission factor disclosed in the data of Hyosung Heavy Industries' Power Technology Magazine' in 2022 was used. Calculation of emission :  $\sum$  Monthly product weight (ton) X individual greenhouse gas emission factor (kgCO2/ton).

## Downstream leased assets

### Evaluation status

Not relevant, explanation provided

### Emissions in reporting year (metric tons CO2e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

### Please explain

Hyosung Heavy Industries does not operate rental assets, so it is impossible to calculate emissions for the category.

## Franchises

### Evaluation status

Not relevant, explanation provided

### Emissions in reporting year (metric tons CO2e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

### Please explain

Due to the nature of the business, it is not a form of franchise business, so it is impossible to calculate emissions for the category.

**Investments**

**Evaluation status**

Relevant, calculated

**Emissions in reporting year (metric tons CO2e)**

14592

**Emissions calculation methodology**

Investment-specific method

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

100

**Please explain**

Among Hyosung Heavy Industries' corporations, it was calculated for US, Indian, and Chinese businesses among overseas businesses with a 100% stake. The amount of emissions from overseas workplaces has not undergone a separate verification procedure and is the result of self-calculation using internal data. Calculation of emission :  $\sum$  Each company's emissions (tCO2-eq) X stake (%)

**Other (upstream)**

**Evaluation status**

Not relevant, explanation provided

**Emissions in reporting year (metric tons CO2e)**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

All Scope 3 emissions were reported within the top 15 categories.

**Other (downstream)**

**Evaluation status**

Not relevant, explanation provided

**Emissions in reporting year (metric tons CO2e)**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

All Scope 3 emissions were reported within the top 15 categories.

**C-CG6.6**

**(C-CG6.6) Does your organization assess the life cycle emissions of any of its products or services?**

	Assessment of life cycle emissions	Comment
Row 1	Yes	At the end of 2021, to calculate and manage carbon footprint of major products, Hyosung Heavy Industries quantitatively evaluated the impact of the manufacturing process environment by calculating a Life Cycle Assessment (LCA) carbon emissions on each of one of the ultra-high voltage transformer three-phase 132kV 133MVA, eco-friendly insulating oil transformer, and 132Kv 40kA GIS 1 Bay. Hyosung Heavy Industries is planning to further increase the range and quantity of target products.

**C-CG6.6a**

**(C-CG6.6a) Provide details of how your organization assesses the life cycle emissions of its products or services.**

	Products/services assessed	Life cycle stage(s) most commonly covered	Methodologies/standards/tools applied	Comment
Row 1	Representative selection of products/services	Cradle-to-grave	ISO 14067 PAS 2050	It was calculated based on ISO 14067, an international standard, and PAS 2050, which is widely used around the world, to calculate the carbon footprint of each product of an UHV transformer three-phase 132kV 133MVA, one eco-friendly insulating oil transformer, and one 132Kv 40kA GIS 1 Bay. In addition, for the contents not specified in the guidelines, the contents of the 'Common Guidelines' on the Environmental Performance Mark of the Korea Institute of Environmental Industry were applied. As for the carbon emission factor, the national (Korea) LCI DB was first applied, and if the national LCI DB did not exist, Eco-Invent, an overseas LCI DB, was applied.

**C6.7**

(C6.7) Are carbon dioxide emissions from biogenic carbon relevant to your organization?

No

## C6.10

(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

**Intensity figure**

2.3e-8

**Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)**

54109.89

**Metric denominator**

unit total revenue

**Metric denominator: Unit total**

2355525000000

**Scope 2 figure used**

Location-based

**% change from previous year**

0.12

**Direction of change**

Increased

**Reason for change**

Hyosung Heavy Industries set 'emissions (numerator) and revenue (denominator)' as the factors to affect GHG intensity. The CO2e per unit currency total revenue decreased 0.12% from the previous year in 2021. (\*2021 intensity figure(tCO2e/total revenue(KRW)) = 54109.89/2355525000000= 0.00000022971, \*2020 intensity figure(tCO2e/total revenue(KRW)) = 57466.12/2504698000000 = 0.00000022943) due to additional manufacturing factory operation.

## C7. Emissions breakdowns

### C7.1

(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?

Yes

### C7.1a

(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	8967.56	IPCC Second Assessment Report (SAR - 100 year)
CH4	9.55	IPCC Second Assessment Report (SAR - 100 year)
N2O	28.27	IPCC Second Assessment Report (SAR - 100 year)

### C7.2

(C7.2) Break down your total gross global Scope 1 emissions by country/region.

Country/Region	Scope 1 emissions (metric tons CO2e)
Republic of Korea	9005.379

### C7.3

(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

By activity

### C7.3c

(C7.3c) Break down your total gross global Scope 1 emissions by business activity.

Activity	Scope 1 emissions (metric tons CO2e)
Stationary Sources	3121.96
Mobile Combustion	661.62
Processes Emissions	5221.8

### C7.5

(C7.5) Break down your total gross global Scope 2 emissions by country/region.

Country/Region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Republic of Korea	45104.51	0

### C7.6

(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.

By activity

### C7.6c

(C7.6c) Break down your total gross global Scope 2 emissions by business activity.

Activity	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Electricity	44441.74	0
Steam	662.77	0

### C7.9

(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Decreased

### C7.9a

**(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined), and for each of them specify how your emissions compare to the previous year.**

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	0	No change	0	Hyosung Heavy Industries has no renewable energy consumption, so there is no change.
Other emissions reduction activities	57	Decreased	0.097	Last year, Scope 1 and 2 emissions totaled 57,466.121 tons, and the greenhouse gas reduction project reduced 56 tons. Therefore, it was confirmed that the rate of change decreased by 0.097%. (56tons/57,466.121tons*100)
Divestment		<Not Applicable >		
Acquisitions		<Not Applicable >		
Mergers		<Not Applicable >		
Change in output		<Not Applicable >		
Change in methodology		<Not Applicable >		
Change in boundary		<Not Applicable >		
Change in physical operating conditions		<Not Applicable >		
Unidentified		<Not Applicable >		
Other		<Not Applicable >		

**C7.9b**

**(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?**

Location-based

**C-CG7.10**

**(C-CG7.10) How do your total Scope 3 emissions for the reporting year compare to those of the previous reporting year?**

Increased

**C-CG7.10a**

**(C-CG7.10a) For each Scope 3 category calculated in C6.5, specify how your emissions compare to the previous year and identify the reason for any change.**

**Purchased goods and services**

**Direction of change**

Increased

**Primary reason for change**

Change in boundary

**Change in emissions in this category (metric tons CO2e)**

68040.11

**% change in emissions in this category**

21.46

**Please explain**

Compared to 2020, 16 products such as GAS-VT and support were added to the heavy industry sector's emission calculation products, and soil-borne aggregate products and water usage were also added to the construction sector's emission calculation products. In addition, the rental vehicle details were additionally calculated. Therefore, the emissions have increased.

## Capital goods

### Direction of change

Increased

### Primary reason for change

Change in output

### Change in emissions in this category (metric tons CO2e)

33.66

### % change in emissions in this category

999

### Please explain

Although the items for calculating capital goods have not changed, the total number of calculated facilities has increased to 1,615 in 2021 compared to 43 in 2020, increasing emissions. The actual change rate is 3,362.11%, but since the range that can be written is 0-999, it is written as 999 in column 5.

## Fuel and energy-related activities (not included in Scopes 1 or 2)

### Direction of change

Decreased

### Primary reason for change

Change in output

### Change in emissions in this category (metric tons CO2e)

2526.89

### % change in emissions in this category

36.66

### Please explain

In the Scope 2 power sector, it was confirmed that emissions decreased in 2021 compared to 2020. It was confirmed to be a decrease in emissions due to a decrease in production at Changwon 3 Plant, Industrial Machinery PU production plant.

## Upstream transportation and distribution

### Direction of change

Increased

### Primary reason for change

Change in boundary

### Change in emissions in this category (metric tons CO2e)

3533.71

### % change in emissions in this category

134.82

### Please explain

Since the transportation emission of products including additional items in Category 1 was calculated, the emission increased.

## Waste generated in operations

### Direction of change

Increased

### Primary reason for change

Change in boundary

### Change in emissions in this category (metric tons CO2e)

10648.18

### % change in emissions in this category

999

### Please explain

It was calculated by adding construction waste. In addition, in the case of standard garbage bags among household wastes, those applied only to landfill were divided into landfill and incineration. Therefore, the emissions have increased. The actual change rate is 3,884.58%, but since the range that can be written is 0-999, it is written as 999 in column 5.

## Business travel

### Direction of change

Decreased

### Primary reason for change

Change in output

### Change in emissions in this category (metric tons CO2e)

949.22

### % change in emissions in this category

57.69

### Please explain

The number of overseas/domestic business trips and business trips decreased compared to 2020. There are 544 overseas business trips in 2020, 24,054 domestic business trips, 422 overseas business trips in 2021, and 22,060 domestic business trips. In 2020, the overseas business trip distance was 8,011,827km and the domestic business trip distance was 7,181,095km, but the overseas business trip distance in 2021 was 6,899,219km and the domestic business trip distance was 22,060km, which decreased compared to 2021 so the emission was decreased.



## Employee commuting

### Direction of change

Decreased

### Primary reason for change

Change in methodology

### Change in emissions in this category (metric tons CO2e)

901.18

### % change in emissions in this category

45.62

### Please explain

In 2021, the commuting emission of headquarters employees was additionally calculated compared to 2020, but the latest emission factor was applied using the latest data in 2021 compared to the data in WRI in 2020. The emission factor applied when calculating commuting emissions at Changwon plant was 0.1041 kgCO<sub>2</sub>-eq/in.km in 2020, but 0.0339 kgCO<sub>2</sub>-eq/in in 2021.km decreased compared to 2020, resulting in a decrease in emissions.

## Downstream transportation and distribution

### Direction of change

First year of reporting this category

### Primary reason for change

<Not Applicable>

### Change in emissions in this category (metric tons CO2e)

<Not Applicable>

### % change in emissions in this category

<Not Applicable>

### Please explain

<Not Applicable>

## Use of sold products

### Direction of change

First year of reporting this category

### Primary reason for change

<Not Applicable>

### Change in emissions in this category (metric tons CO2e)

<Not Applicable>

### % change in emissions in this category

<Not Applicable>

### Please explain

<Not Applicable>

## End-of-life treatment of sold products

### Direction of change

First year of reporting this category

### Primary reason for change

<Not Applicable>

### Change in emissions in this category (metric tons CO2e)

<Not Applicable>

### % change in emissions in this category

<Not Applicable>

### Please explain

<Not Applicable>

## Investments

### Direction of change

First year of reporting this category

### Primary reason for change

<Not Applicable>

### Change in emissions in this category (metric tons CO2e)

<Not Applicable>

### % change in emissions in this category

<Not Applicable>

### Please explain

<Not Applicable>

## C8. Energy

C8.1

**(C8.1) What percentage of your total operational spend in the reporting year was on energy?**

More than 0% but less than or equal to 5%

C8.2

**(C8.2) Select which energy-related activities your organization has undertaken.**

	Indicate whether your organization undertook this energy-related activity in the reporting year
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	No
Consumption of purchased or acquired steam	Yes
Consumption of purchased or acquired cooling	No
Generation of electricity, heat, steam, or cooling	No

C8.2a

**(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.**

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	HHV (higher heating value)	0	39276.11	39276.11
Consumption of purchased or acquired electricity	<Not Applicable>	0	96736.43	96736.43
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	0	19196.11	19196.11
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Total energy consumption	<Not Applicable>	0	155208.65	155208.65

C8.2b

**(C8.2b) Select the applications of your organization's consumption of fuel.**

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	No
Consumption of fuel for the generation of heat	Yes
Consumption of fuel for the generation of steam	No
Consumption of fuel for the generation of cooling	No
Consumption of fuel for co-generation or tri-generation	No

C8.2c

**(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.**

**Sustainable biomass**

**Heating value**

HHV

**Total fuel MWh consumed by the organization**

0

**MWh fuel consumed for self-generation of electricity**

<Not Applicable>

**MWh fuel consumed for self-generation of heat**

<Not Applicable>

**MWh fuel consumed for self-generation of steam**

<Not Applicable>

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

<Not Applicable>

**Comment**

**Other biomass**

**Heating value**

HHV

**Total fuel MWh consumed by the organization**

0

**MWh fuel consumed for self-generation of electricity**

<Not Applicable>

**MWh fuel consumed for self-generation of heat**

<Not Applicable>

**MWh fuel consumed for self-generation of steam**

<Not Applicable>

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

<Not Applicable>

**Comment**

**Other renewable fuels (e.g. renewable hydrogen)**

**Heating value**

HHV

**Total fuel MWh consumed by the organization**

0

**MWh fuel consumed for self-generation of electricity**

<Not Applicable>

**MWh fuel consumed for self-generation of heat**

<Not Applicable>

**MWh fuel consumed for self-generation of steam**

<Not Applicable>

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

<Not Applicable>

**Comment**

**Coal**

**Heating value**

HHV

**Total fuel MWh consumed by the organization**

2149.2

**MWh fuel consumed for self-generation of electricity**

<Not Applicable>

**MWh fuel consumed for self-generation of heat**

<Not Applicable>

**MWh fuel consumed for self-generation of steam**

<Not Applicable>

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

<Not Applicable>

**Comment**

Combustion of anthracite and other solid fuels.

**Oil**

**Heating value**

HHV

**Total fuel MWh consumed by the organization**

9316.23

**MWh fuel consumed for self-generation of electricity**

<Not Applicable>

**MWh fuel consumed for self-generation of heat**

<Not Applicable>

**MWh fuel consumed for self-generation of steam**

<Not Applicable>

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

<Not Applicable>

**Comment**

Total value of gasoline, diesel, and kerosene.

**Gas**

**Heating value**

HHV

**Total fuel MWh consumed by the organization**

27810.56

**MWh fuel consumed for self-generation of electricity**

<Not Applicable>

**MWh fuel consumed for self-generation of heat**

<Not Applicable>

**MWh fuel consumed for self-generation of steam**

<Not Applicable>

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

<Not Applicable>

**Comment**

Total value of LNG, LPG, propane

**Other non-renewable fuels (e.g. non-renewable hydrogen)**

**Heating value**

HHV

**Total fuel MWh consumed by the organization**

0

**MWh fuel consumed for self-generation of electricity**

<Not Applicable>

**MWh fuel consumed for self-generation of heat**

<Not Applicable>

**MWh fuel consumed for self-generation of steam**

<Not Applicable>

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

<Not Applicable>

**Comment**

**Total fuel**

**Heating value**

HHV

**Total fuel MWh consumed by the organization**

39275.99

**MWh fuel consumed for self-generation of electricity**

<Not Applicable>

**MWh fuel consumed for self-generation of heat**

<Not Applicable>

**MWh fuel consumed for self-generation of steam**

<Not Applicable>

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

<Not Applicable>

**Comment**

**C8.2g**

**(C8.2g) Provide a breakdown of your non-fuel energy consumption by country.**

**Country/area**

Republic of Korea

**Consumption of electricity (MWh)**

96736.43

**Consumption of heat, steam, and cooling (MWh)**

19196.11

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

115932.54

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

**C-CG8.5**

**(C-CG8.5) Does your organization measure the efficiency of any of its products or services?**

	Measurement of product/service efficiency	Comment
Row 1	Yes	Transformers manufactured by Hyosung Heavy Industries are designed and manufactured on an order basis, and each product measures the loss of the transformer itself and product efficiency according to the design value and specifies it in the specification.

**C-CG8.5a**

**(C-CG8.5a) Provide details of the metrics used to measure the efficiency of your organization's products or services.**

**Category of product or service**

Power transmission, transformation and distribution equipment

**Product or service (optional)**

**% of revenue from this product or service in the reporting year**

40

**Efficiency figure in the reporting year**

99.6

**Metric numerator**

%

**Metric denominator**

Not applicable

**Comment**

The transformer manufactured by Hyosung Heavy Industries has a molded transformer and an oil-immersed transformer. Based on oil-immersed TR for high voltage and large capacity, there are no-load loss caused by the resistance of the core in the transformer, load loss caused by the resistance of the coil, and loss caused by the cooling device of the transformer, which varies depending on the load of the transformer. In general, the efficiency is 99.7% or higher even at a 100% load and may vary depending on the design value.

**C9. Additional metrics**

**C9.1**

**(C9.1) Provide any additional climate-related metrics relevant to your business.**

**Description**

Please select

**Metric value**

**Metric numerator**

**Metric denominator (intensity metric only)**

**% change from previous year**

**Direction of change**

<Not Applicable>

**Please explain**

No, Hyosung Heavy Industries has no additional indicators.

**C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6**

**(C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6) Does your organization invest in research and development (R&D) of low-carbon products or services related to your sector activities?**

	Investment in low-carbon R&D	Comment
Row 1	Yes	In 2021, a total of KRW14,342,000,000 was invested in R&D expenses for circuit breaker, a low-carbon product.

**C-CG9.6a**

**(C-CG9.6a) Provide details of your organization's investments in low-carbon R&D for capital goods products and services over the last three years.**

**Technology area**

Other, please specify (Development of eco-friendly products)

**Stage of development in the reporting year**

Applied research and development

**Average % of total R&D investment over the last 3 years**

21 - 40%

**R&D investment figure in the reporting year (optional)**

14342000000

**Comment**

Hyosung Heavy Industries is continuously carrying out R&D projects to develop 145kV eco-friendly circuit breaker, design eco-friendly GIS, and secure ESS battery capacity technology. The average of the three-year ratio (33%, 30%, and 43%, respectively) of R&D costs for low-carbon products such as circuit breakers, ESS, and electric equipment through 2019 to 2021 was confirmed to 35%.

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**C-CN9.6a/C-RE9.6a**

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**(C-CN9.6a/C-RE9.6a) Provide details of your organization's investments in low-carbon R&D for real estate and construction activities over the last three years.**

**Technology area**

Other, please specify (N/A)

**Stage of development in the reporting year**

Basic academic/theoretical research

**Average % of total R&D investment over the last 3 years**

0%

**R&D investment figure in the reporting year (optional)**

0

**Comment**

N/A

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**C10. Verification**

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**C10.1**

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**(C10.1) Indicate the verification/assurance status that applies to your reported emissions.**

	Verification/assurance status
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	Third-party verification or assurance process in place

**C10.1a**

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**(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 emissions, and attach the relevant statements.**

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Reasonable assurance

**Attach the statement**

1. 2021 GREENHOUSE GAS EMISSIONS ASSURANCE STATEMENT\_Hyosung Heavy Industries.pdf
3. 2018, 2019 GREENHOUSE GAS EMISSIONS ASSURANCE STATEMENT\_Hyosung Heavy Industries (Construction).pdf
2. 2018 Summary Verification Report on Greenhouse Gas Emissions\_Hyosung Heavy Industries\_Korean.pdf

**Page/ section reference**

1

**Relevant standard**

Korean GHG and energy target management system

**Proportion of reported emissions verified (%)**

100

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**C10.1b**

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**(C10.1b) Provide further details of the verification/assurance undertaken for your Scope 2 emissions and attach the relevant statements.**

**Scope 2 approach**

Scope 2 location-based

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Reasonable assurance

**Attach the statement**

1. 2021 GREENHOUSE GAS EMISSIONS ASSURANCE STATEMENT\_Hyosung Heavy Industries.pdf
3. 2018, 2019 GREENHOUSE GAS EMISSIONS ASSURANCE STATEMENT\_Hyosung Heavy Industries (Construction).pdf
2. 2018 Summary Verification Report on Greenhouse Gas Emissions\_Hyosung Heavy Industries\_Korean.pdf

**Page/ section reference**

1

**Relevant standard**

Korean GHG and energy target management system

**Proportion of reported emissions verified (%)**

100

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**C10.1c**

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**(C10.1c) Provide further details of the verification/assurance undertaken for your Scope 3 emissions and attach the relevant statements.**

**Scope 3 category**

- Scope 3: Purchased goods and services
- Scope 3: Capital goods
- Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2)
- Scope 3: Upstream transportation and distribution
- Scope 3: Waste generated in operations
- Scope 3: Business travel
- Scope 3: Employee commuting
- Scope 3: Investments
- Scope 3: Downstream transportation and distribution
- Scope 3: Use of sold products
- Scope 3: End-of-life treatment of sold products

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Limited assurance

**Attach the statement**

VERIFICATION STATEMENT GHG INVENTORY\_Hyosung Heavy Industries.pdf

**Page/section reference**

1,2

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

**C10.2**

**(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?**

Yes

**C10.2a**

**(C10.2a) Which data points within your CDP disclosure have been verified, and which verification standards were used?**

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C8. Energy	Energy consumption	Korean GHG and energy target management system	The Korean GHG and energy target management system, in which Hyosung Heavy Industries participates as a target company, is obliged to report greenhouse gas emissions, as well as energy consumption by business site and emission facility, and must be verified. This CDP Report's Scope 1 and Scope 2 energy data used in Module C8. Energy are values obtained from verified Greenhouse Gas Inventory Report, and the report is prepared and verified once a year. All of Hyosung Heavy Industries' business sites are included in the report.

**C11. Carbon pricing**

**C11.1**

**(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?**

Yes

**C11.1a**

**(C11.1a) Select the carbon pricing regulation(s) which impacts your operations.**

Korea ETS

**C11.1b**

**(C11.1b) Complete the following table for each of the emissions trading schemes you are regulated by.**

**Korea ETS**

**% of Scope 1 emissions covered by the ETS**

100

**% of Scope 2 emissions covered by the ETS**

100

**Period start date**

January 1 2021

**Period end date**

December 31 2021

**Allowances allocated**

54869

**Allowances purchased**

0

**Verified Scope 1 emissions in metric tons CO<sub>2</sub>e**

9005.38

**Verified Scope 2 emissions in metric tons CO<sub>2</sub>e**

45104.51

**Details of ownership**

Facilities we own and operate

**Comment**

Currently, Korea is operating the government's policy to achieve the national greenhouse gas reduction target (40% reduction compared to 2018), and Hyosung Heavy Industries is one of a company subject to the 'Greenhouse Gas Emission Trading Scheme' allocation company, implementing the emission trading system during the third commitment period (2021~2025). Hyosung Heavy Industries was allocated 54,869 tons of Gratuitous Allocation for all workplaces, and 356 tons were canceled, so the final Gratuitous Allocation was confirmed to be 54,513 tons in 2021. We should purchase external emissions if they exceed the greenhouse gas emission quota by the policy, but Hyosung Heavy Industries' total emissions in 2021 were "54,101 tons", which did not exceed the allocated emissions. Therefore, in 2021, no extra emission credits were purchased by emitting less than the allocated emission through greenhouse gas reduction activities. In 2021, Hyosung Heavy Industries' Scope 1, 2 emissions totaled 54,101 tons, which is the final emission after conformance evaluation and verification, so there is a slight difference from 54,109.89 tons, the sum of 9,005.379 and 45,104.511 reported as emissions, but the final verified data value was prepared after the conformity evaluation.(Reasons for the difference: Total emissions might be different from the sum of direct and indirect emissions by applying the rule that emissions should be summed after truncating decimal places at the business site level.)

**C11.1d**

**(C11.1d) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?**

Hyosung Heavy Industries' response strategy and results of actions (including the implementation period) for the Korea-ETS carbon price system are the 3 followings.

1) Response Strategies for Korea-ETS Carbon Price System - Establishing strategies for reducing greenhouse gases and strengthening governance

Hyosung Heavy Industries has established a green management strategy system to meet the national NDCs level in 2021. It aims to reduce greenhouse gas emissions by 14.5% compared to 2018 by 2030 and the strategic direction is 'reducing greenhouse gas emissions, commercializing low-carbon technologies through eco-friendly technology development, creating eco-friendly corporate culture, and establishing trust of stakeholders through environmental information disclosure' and implementing green management activities for all domestic businesses. Detailed objectives include contributing to the reduction of greenhouse gas emissions when using products, reducing the use of raw materials including water and utilities, and expanding recycling and reuse.

1-1) Result of actions(including the implementation period) - Monitoring and sharing of K-ETS policy trends

The Green Management Team regularly participates in government briefing sessions and meetings related to K-ETS every year, while expressing opinions through the trade association to ensure that the emission trading system can be operated well. The main contents related to K-ETS are shared with the environmental safety team of each plant and reported to the ESG management officer. Matters requiring decision-making are reported semi-annually to the ESG Management Promotion Committee, the top green management decision-making consultative body below the board level. According to the emission trading system, greenhouse gas emissions are reported every year while emission permits overs and shorts are analyzed and countermeasures are established accordingly. In addition, price trends in the emission permits market are periodically monitored to support purchases made if necessary. In order to respond to K-ETS, consulting on responding to the emission trading system and third-party verification were received in 2021, and emission permits price trends were monitored. As a result of this action, it was confirmed that there was no shortage of emission permits in 2021 by predicting emission permits shortfalls in advance.

1-2) Result of actions(including the implementation period) - Implementation of greenhouse gas reduction activities and performance measurement

Hyosung Heavy Industries is establishing a 2030 greenhouse gas reduction plan (a 14.5% reduction from 2018), and is implementing detailed reduction activities to achieve this. Each plant of Hyosung Heavy Industries is carrying out facility replacement, energy efficiency, and process improvement activities to reduce greenhouse gas. The necessary budget is reflected in the working-level department's annual financial plan, and in 2021, KRW 2,766,000,000 was invested in facility rationalization such as improving GIS simple synthesis test facilities, contributing to the reduction of greenhouse gases in Changwon plant in 2021. Hyosung Heavy Industries will invest KRW 320 million between 2022 and 2023 with replacing old e air conditioners and heaters, low-NOx burners at Changwon 3 plant, switching to 200 ton die-casting furnace, replacing casting process(7,111 tons), belt optimization design (48.7 tons) and installing heat exchangers in low-pressure motors(125.4 tons). We expect to save more than 7,285 tons of greenhouse gas through these savings measures.

**C11.2**

**(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?**

No

### C11.3

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**(C11.3) Does your organization use an internal price on carbon?**

Yes

### C11.3a

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**(C11.3a) Provide details of how your organization uses an internal price on carbon.**

**Objective for implementing an internal carbon price**

Drive low-carbon investment

Identify and seize low-carbon opportunities

**GHG Scope**

Scope 1

Scope 2

**Application**

Company-wide

**Actual price(s) used (Currency /metric ton)**

31000

**Variance of price(s) used**

The internal carbon price calculation set by Hyosung Heavy Industries Co. is based on the closing price of the first business day of the first week of October of the K-ETS, which can vary depending on the domestic carbon emission permits price. The same price of internal carbon set by Hyosung Heavy Industries is applied throughout the company.

**Type of internal carbon price**

Shadow price

**Impact & implication**

Hyosung Heavy Industries is divided into heavy industries and construction businesses, and its headquarters, Changwon 1-4 plants, Sejong plants, and construction sites are all located in Korea. All of its operations are included in the K-ETS project period (21-25) and are regulated. In the future, quotas are expected to be gradually deducted according to the national reduction goals, and the shortage of emission permits may increase. Therefore, as carbon emission management is very important, it is necessary to prepare and respond to related risks by setting the company's internal price for carbon emission. Apart from the existing economic analysis, Hyosung Heavy Industries aims to prepare for the demand for climate change risk management by adding internal carbon prices according to greenhouse gas emissions, and to seek risks and opportunities in the transition to a low-carbon economy by using them in strategic decisions such as business direction. In fact, the internal carbon price is reflected in the review of the replacement of old facilities, high-efficiency facility investment, fuel conversion, and new expansion investment in the heavy industry sector and is used as the basis for decision-making. Hyosung Heavy Industries will continue to distribute the carbon price including the internal carbon price in the management plan establishment guidelines, and the strategic headquarters will announce the carbon price every year. Equipment investment and fuel conversion product agreements or reports were circulated to the person in charge of green management so that greenhouse gas reduction and excess and shortage of emission permits can be managed.

## C12. Engagement

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### C12.1

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**(C12.1) Do you engage with your value chain on climate-related issues?**

Yes, our suppliers

Yes, our customers/clients

### C12.1a

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**(C12.1a) Provide details of your climate-related supplier engagement strategy.**

**Type of engagement**

Engagement & incentivization (changing supplier behavior)

**Details of engagement**

Climate change performance is featured in supplier awards scheme  
Offer financial incentives for suppliers who reduce your upstream emissions (Scopes 3)

**% of suppliers by number**

26.5

**% total procurement spend (direct and indirect)**

69.2

**% of supplier-related Scope 3 emissions as reported in C6.5**

4

**Rationale for the coverage of your engagement**

In order to achieve Hyosung Heavy Industries' effective GHG reduction target (14.5% GHG reduction in 2030 compared to 2018) and manage ESG management, suppliers subject to engagement are selected and managed. We maintain a stable supply chain by supporting sustainable growth of our engagement supplier. In 2021, the proportion of suppliers subject to engagement accounts for 69.2% of the total procurement cost and has completed assessments of our suppliers. We select suppliers subject to engagement among raw material suppliers in consideration of their purchase amount and impact. In case of heavy industry sector, suppliers with more than KRW 50 million in semi-annual purchases or more than 30 times warehousing are eligible for assessment. Hyosung Heavy Industries has established a Win-Win partnership for its suppliers' sustainability and supports various shared growth programs such as the Korea Energy Agency's 'Energy Companion Project', Korea Foundation for Cooperation of Large&Small Business, Rural Affairs's 'Innovation Partnership' and the Korea Chamber of Commerce and Industry's 'Industrial Innovation Movement'. In addition, through the diagnosis of social responsibility management of suppliers every year, the risk to suppliers is reduced and the opportunity to self-diagnose sustainability is provided by suppliers.

**Impact of engagement, including measures of success**

Hyosung Heavy Industries' annual assessment of its suppliers consists of four parts, and as a performance measurement method, the Environment Part checks whether energy sources and water are used for usage management and reduction activities. After the assessment of the survey, some suppliers are checked for facts, and additional points are given to the assessment of suppliers, and payment conditions are improved when selected as an excellent supplier through the assessment of the purchasing team, and prize money is provided to the best supplier. The heavy industry division divides the grades into S, A, B, C, and D through the assessment twice a year, and the construction division conducts an assessment once a year and evaluates the score with a maximum of 100%. Hyosung Heavy Industries' criteria of successful engagement for suppliers are the same in the heavy industry and construction divisions, in which engagement suppliers obtain more than 70% of the assessment. The Win-Win partnerships have been established for the sustainability of excellent suppliers in the assessment of companies, and various shared growth programs such as the Korea Energy Agency's 'Energy Companion Project', Korea Foundation for Cooperation of Large&Small Business, Rural Affairs's 'Innovation Partnership' and the Korea Chamber of Commerce and Industry's 'Industrial Innovation Movement' and Supplier ESG management consulting, etc. In 2021, a total of 70 companies were provided with energy reduction consulting equivalent, replacement of high-efficiency lighting facilities, ESG management consulting, dust collection facilities, and cleaning vehicles to a total cost of KRW 528.5 million.

**Comment**

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**C12.1b**

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**(C12.1b) Give details of your climate-related engagement strategy with your customers.**

**Type of engagement & Details of engagement**

Education/information sharing	Share information about your products and relevant certification schemes (i.e. Energy STAR)
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**% of customers by number**

0.1

**% of customer - related Scope 3 emissions as reported in C6.5**

0

**Please explain the rationale for selecting this group of customers and scope of engagement**

Hyosung Heavy Industries has been responding to CDP Supply since 2021 at the request of its customers. At the end of 2021, one carbon emission was calculated respectively for each of the major products supplied to the customer, circuit breaker and transformer, and carbon information was disclosed in the entire process of the product to lay the foundation for improving the product environment. 1) Participation in CDP Supply Chain: We are being asked to participate in the CDP Supply Chain by National Grid, a global customer. CDP Supply Chain has been actively carrying out reporting activities such as emissions every year by participating in this CDP response since 2021. 2) Providing carbon emission information: Global customers are demanding carbon emission calculations for the final products of Hyosung Heavy Industries' major projects, such as GIS and transformer, as well as carbon emission information in the entire process. Accordingly, we calculated carbon emissions for two products based on ISO 14067 and PAS2050 in 2021.

**Impact of engagement, including measures of success**

1) Hyosung Heavy Industries refers to the assessment result of the CDP report to measure the impact of engagement and its success. Hyosung Heavy Industries was requested to participate in the CDP Supply Chain program from one client company, and in 2021, the assessment response was completed. Hyosung Heavy Industries submitted achievements and results on the implementation of climate change through the CDP Supply Chain report in 2022 for continuous response activities. 2) The method used by Hyosung Heavy Industries to measure the impact of engagement is whether the product provided to a specific customer is a product with carbon footprint disclosed, and the measure of success is the reduction of greenhouse gas calculated when manufacturing the product supplied by request of the customer. In the case of transformers and circuit breakers, which are major products sold in the heavy industry, global customers demand information on calculating carbon emissions, and greenhouse gas emissions from the manufacturing of these products account for a large part of Hyosung Heavy Industries. Therefore, we calculated Life Cycle Assessment (LCA) carbon emissions for power transformer and circuit breaker products. Through the Life Cycle Assessment (LCA), the energy usage and greenhouse gas emissions of the product could be quantified to evaluate their potential impact on the environment, and quantitative confirmation of greenhouse gas emissions through this Life Cycle Assessment (LCA) is a driving force to attract customers. Hyosung Heavy Industries plans to expand the number of carbon footprint products in the future, and furthermore, it plans to consider promoting certification for products that have already been developed with carbon footprint in the future.

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## C12.2

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### (C12.2) Do your suppliers have to meet climate-related requirements as part of your organization's purchasing process?

Yes, suppliers have to meet climate-related requirements, but they are not included in our supplier contracts

## C12.2a

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### (C12.2a) Provide details of the climate-related requirements that suppliers have to meet as part of your organization's purchasing process and the compliance mechanisms in place.

#### Climate-related requirement

Implementation of emissions reduction initiatives

#### Description of this climate related requirement

Requires organization dedicated to the environment, introduce in-house energy education program, Manage energy use, Implement energy reduction initiatives, Assess whether energy consumption is reduced

#### % suppliers by procurement spend that have to comply with this climate-related requirement

69.2

#### % suppliers by procurement spend in compliance with this climate-related requirement

63.1

#### Mechanisms for monitoring compliance with this climate-related requirement

Supplier scorecard or rating

#### Response to supplier non-compliance with this climate-related requirement

Other, please specify (May be excluded from shared growth suppliers (exclude from incentive suppliers))

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## C12.3

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### (C12.3) Does your organization engage in activities that could either directly or indirectly influence policy, law, or regulation that may impact the climate?

#### Row 1

#### Direct or indirect engagement that could influence policy, law, or regulation that may impact the climate

Yes, we engage indirectly through trade associations

#### Does your organization have a public commitment or position statement to conduct your engagement activities in line with the goals of the Paris Agreement?

Yes

#### Attach commitment or position statement(s)

210406\_Agreement on Mutual Cooperation for the Establishment of Energy Alliance\_Korean.pdf

#### Describe the process(es) your organization has in place to ensure that your engagement activities are consistent with your overall climate change strategy

The CEO of Hyosung Heavy Industries participates as vice-chairman in the Energy Alliance-related meetings. Our company is one of five companies with the right to speak among 13 major member companies in the energy industry of Korea, leading the response of companies in the era of the climate crisis. Hyosung Heavy Industries pays the association every year to maintain the association, and actively accepts and responds to the association's requests.

#### Primary reason for not engaging in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

<Not Applicable>

#### Explain why your organization does not engage in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

<Not Applicable>

## C12.3b

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**(C12.3b) Provide details of the trade associations your organization engages with which are likely to take a position on any policy, law or regulation that may impact the climate.**

**Trade association**

Other, please specify (Energy Alliance)

**Is your organization's position on climate change consistent with theirs?**

Consistent

**Has your organization influenced, or is your organization attempting to influence their position?**

We publicly promote their current position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

In April 2021, the 'Energy Alliance', a private enterprise-centered energy alliance, was launched to actively respond to the government's carbon neutrality policy and support energy transition policies. 10 companies including Hyosung Heavy Industries, signed MOUs to secure carbon-neutral innovation initiatives for the 'Energy Alliance,' and a total of 13 companies are currently participating. All participating companies join the carbon neutrality policy and cooperate with each other in pursuing a rational energy transformation for the common benefit of sustainable national economic development. The 'Energy Alliance' will jointly respond to related policies and consider business strategies in line with the global de-carbonization trend, and Hyosung Heavy Industries' position is also in line with the opinion of this 'Energy Alliance' association.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

50000000

**Describe the aim of your organization's funding**

Hyosung Heavy Industries joins the carbon neutrality policy of the 'Energy Alliance' and declares agreement with the association's opinion. Funds were provided for the purpose of maintaining the association.

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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C12.4

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**(C12.4) Have you published information about your organization's response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).**

**Publication**

In mainstream reports

**Status**

Complete

**Attach the document**

2021 Business Report\_Hyosung Heavy Industries\_Korean.pdf

**Page/Section reference**

301-303

**Content elements**

Strategy

Emissions figures

**Comment**

The sustainability report, including climate change activities in 2021, is prepared and verified, and posted on the website along with the English version. In 2018, the base year, Scope 1 and 2 emissions were not calculated for the construction sector as there was no obligation. However, since the construction sector has been included in the emission trading system from 2020, we have voluntarily calculated and verified the emissions in 2018, so we added the corresponding emissions. Therefore, the Sustainability report reported that the construction sector emissions were omitted in 2018, but it was applied as the sum of the heavy industry and construction sector emissions when reporting CDP. (When Hyosung Heavy Industries established its greenhouse gas reduction target, emissions in the base year (2018) were applied based on emissions including all of the construction sector.)

**Publication**

In voluntary sustainability report

**Status**

Complete

**Attach the document**

2021 Hyosung Sustainability Report\_Korean.pdf

**Page/Section reference**

17-23, 86-88

**Content elements**

Governance

Strategy

Risks & opportunities

Emissions figures

**Comment**

The sustainability report, including climate change activities in 2021, is prepared and verified, and posted on the website along with the English version. In 2018, the base year, Scope 1 and 2 emissions were not calculated for the construction sector as there was no obligation. However, since the construction sector has been included in the emission trading system from 2020, we have voluntarily calculated and verified the emissions in 2018, so we added the corresponding emissions. Therefore, the Sustainability report reported that the construction sector emissions were omitted in 2018, but it was applied as the sum of the heavy industry and construction sector emissions when reporting CDP. (When Hyosung Heavy Industries established its greenhouse gas reduction target, emissions in the base year (2018) were applied based on emissions including all of the construction sector.)

**C15. Biodiversity**

**C15.1**

**(C15.1) Is there board-level oversight and/or executive management-level responsibility for biodiversity-related issues within your organization?**

	Board-level oversight and/or executive management-level responsibility for biodiversity-related issues	Description of oversight and objectives relating to biodiversity	Scope of board-level oversight
Row 1	No, and we do not plan to have both within the next two years	<Not Applicable>	<Not Applicable>

**C15.2**

**(C15.2) Has your organization made a public commitment and/or endorsed any initiatives related to biodiversity?**

	Indicate whether your organization made a public commitment or endorsed any initiatives related to biodiversity	Biodiversity-related public commitments	Initiatives endorsed
Row 1	No, and we do not plan to do so within the next 2 years	<Not Applicable>	<Not Applicable>

**C15.3**

**(C15.3) Does your organization assess the impact of its value chain on biodiversity?**

	Does your organization assess the impact of its value chain on biodiversity?	Portfolio
Row 1	No, and we do not plan to assess biodiversity-related impacts within the next two years	<Not Applicable>

**C15.4**

**(C15.4) What actions has your organization taken in the reporting year to progress your biodiversity-related commitments?**

	Have you taken any actions in the reporting period to progress your biodiversity-related commitments?	Type of action taken to progress biodiversity- related commitments
Row 1	No, and we do not plan to undertake any biodiversity-related actions	<Not Applicable>

**C15.5**

**(C15.5) Does your organization use biodiversity indicators to monitor performance across its activities?**

	Does your organization use indicators to monitor biodiversity performance?	Indicators used to monitor biodiversity performance
Row 1	No	Please select

**C15.6**

**(C15.6) Have you published information about your organization's response to biodiversity-related issues for this reporting year in places other than in your CDP response? If so, please attach the publication(s).**

Report type	Content elements	Attach the document and indicate where in the document the relevant biodiversity information is located
No publications	<Not Applicable>	<Not Applicable>

**C16. Signoff**

**C-FI**

**(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.**

**C16.1**

**(C16.1) Provide details for the person that has signed off (approved) your CDP climate change response.**

	Job title	Corresponding job category
Row 1	CEO	Chief Executive Officer (CEO)

**SC. Supply chain module**

**SC0.0**



**(SC0.0) If you would like to do so, please provide a separate introduction to this module.**

Hyosung Heavy Industries Co. Ltd. began by acquisition of Han Young Industrial Co., Ltd. In 1975. After merged into Hyosung Co. Ltd. In 1998, the construction / heavy industry division was spun off Hyosung Co., and newly established as Hyosung Heavy Industries Co., Ltd., on June 1st 2018. The headquarter is located in Seoul and the local workplaces consist of Hyosung R&D Labs under Hyosung Co. and a total of 5 plants.

Hyosung Heavy Industries is mainly involved in the heavy industries and the construction divisions.

The heavy industry division has manufactured important power sources for electrical power systems such as electric motors, generators, and gears as well as crucial equipment such as extra-high transformers, breakers and low and medium voltage switchers supplied for building electrical power systems in the electric power industry and SOC projects. UHV, Circuit breakers and low and medium voltage switchers, major products in the heavy industries, have continued a moderate rise depending on the global demand of replacing the old facilities and are expected to grow steadily as the demand of new renewable energy like solar and wind energy increases due to the development of new energy sources and the enhancement of environmental policies to respond to climate change in the globe. The construction division is the expansive key industry involving in the house construction which national life bases on and the building infrastructure facilities like roads and is expected to change into the developed one focusing on maintenance as the infrastructure completes and the housing supply rate improves. Considering the convergence with ICT high technology, the base of the fourth industrial revolution, and sustainable reconstruction of national land, its potential growth is expected. As the usage of communication data grows, the demand for DB center increases. Therefore, it plans to foster the construction of DB center as a new growth engine.

Hyosung Heavy Industries is a subject company to the allocation of ETS, the government GHG regulation and has the obligation to report its emissions every year. According to the "Framework Act On Carbon Neutrality And Green Growth For Coping With Climate Crisis" enacted in 2022, the government has set a national reduction target for 2030 to 40% reduction of total national greenhouse gas emissions compared to 2018. And Hyosung Heavy Industries, which belongs to the industrial sector aims to reduce 14.5% in 2030 (222.6 million tons) compared to 2018(260.5 million tons). In 2021, Hyosung Heavy Industries set emission targets equivalent to NDC (Nationally Determined Contribution). Hyosung Heavy Industries set '14.5 % reduction by 2030 compared to the total of the national GHG emissions of 2018 as the final emissions reduction target. In addition, Hyosung Heavy Industries established the green management vision 'realization of an eco-friendly company that leads a better life for mankind' and the 4 strategies 'reduction of greenhouse gas emissions, commercialization of low-carbon technology through development of eco-friendly technology, creation of an eco-friendly corporate culture, and establishment of stakeholder trust through environmental information disclosure ' to implement green management activities for all domestic business sites. The detailed promotion work is like the following, 'contribution to GHG emission reduction when using products, decline in subsidiary materials usage including water, utility, et cetera and expansion of recycling and reuse.' In August 2021, Hyosung Heavy Industries established the ESG Management Promotion Committee by integrating the EHS Committee and the CSR Committee and established the ESG Management Team as a dedicated management team under the ESG Management Promotion Committee. The team manages the environment on climate change and check for safety management companywide. As of 2021, the safety environment team monitors every year, and internal ISO review is also conducted for 42 departments.

**SC0.1**

**(SC0.1) What is your company's annual revenue for the stated reporting period?**

	Annual Revenue
Row 1	2355525000000

**SC1.1**

**(SC1.1) Allocate your emissions to your customers listed below according to the goods or services you have sold them in this reporting period.**

**SC1.2**

**(SC1.2) Where published information has been used in completing SC1.1, please provide a reference(s).**

No

**SC1.3**

**(SC1.3) What are the challenges in allocating emissions to different customers, and what would help you to overcome these challenges?**

Allocation challenges	Please explain what would help you overcome these challenges
Other, please specify (No any other customers requesting emissions disclosure.)	No, any other customers requesting emissions disclosure.

**SC1.4**

**(SC1.4) Do you plan to develop your capabilities to allocate emissions to your customers in the future?**

No

**SC1.4b**

**(SC1.4b) Explain why you do not plan to develop capabilities to allocate emissions to your customers.**

Currently, there are no customers requesting disclosure of emissions, and in the event of additional customers requesting disclosure of emissions in the future, the allocation method should be developed in consideration of the type of customer (stakeholders, suppliers, investors, etc.) Therefore, it is not possible to develop an allocation method without the customer being determined.

**SC2.1**

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**(SC2.1) Please propose any mutually beneficial climate-related projects you could collaborate on with specific CDP Supply Chain members.**

**SC2.2**

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**(SC2.2) Have requests or initiatives by CDP Supply Chain members prompted your organization to take organizational-level emissions reduction initiatives?**

No

**SC4.1**

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**(SC4.1) Are you providing product level data for your organization's goods or services?**

No, I am not providing data

**Submit your response**

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**In which language are you submitting your response?**

English

**Please confirm how your response should be handled by CDP**

	I understand that my response will be shared with all requesting stakeholders	Response permission
Please select your submission options	Yes	Public

**Please confirm below**

I have read and accept the applicable Terms