

C0. Introduction

C0.1

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

Since its establishment in 1952 under the founding philosophy of 'contributing to the nation and society,' Hanwha Corporation has continued its growth over the last six decades, playing a crucial role in supporting the nation's economic development during that time. There are 3 divisions under the Hanwha Corporation: Global, Defense, and Machinery. Based on the pride as the patent company of Hanwha Group, Hanwha Corporation is now focusing on its expansion abroad to ensure the sustainable growth.

Hanwha Corporation/Global Division

Global division has been newly launched to provide the premier solution based on superior chemical technology and create new values through the integration between explosives division and trading division.

Having succeeded in the development of the nation's first dynamite and the supply of safe and high-quality explosives and related chemicals to domestic industries, Global Division leads the commercial explosives markets at home and abroad with world-class technology and safety standards. It also provides various services including fireworks shows through our Fireworks Promotion Unit, while further expanding our presence in the new global markets with our experiences and achievements in Indonesia and Australia, where we are winning blasting projects and exporting our plant technologies. The Chemical Unit has a five-decade history with accumulated business capacities in its key business areas, ranging from petrochemical and in-organic chemicals, to machinery and defense, boasting a stable profit structure. Building on its massive overseas network, it continues to sign new projects and secure stable source of profits, while working with world-class leaders through technology alliances to further build future business platforms.

Hanwha Corporation/Defense Division

Defense Division contributes to the safeguarding of the people and the nation, building a better future, and improving defense capabilities.

Our Defense Division has industry-leading expertise in precision-guided munitions ranging from the designing of guidance systems to comprehensive testing, and it is continuing its research and development efforts to enhance the range and accuracy of existing ammunition. Based on our explosives technology, we advanced to the defense industry in 1974 and have been shown our independent national defense capability for the past forty years.

In addition, we are leading to develop small unmanned systems suited for the future of warfare and the minimization of overall risks to military personnel, navigation equipment that can be installed on guided munitions or other various military platforms, and sonar sensors for underwater monitoring systems. With more than forty years of experience and know-how, we are striving to strengthen our competitiveness globally through partnerships with leading companies.

Hanwha Corporation/Machinery Division

Machinery Division provides automated engineering solutions and services to help customers' business succeed. We have led the global machinery and equipment industry based on our knowledge and technology accumulated for more than half a century since our establishment in 1953. Hanwha has produced a variety of high-value-added mechanical equipment through continued technological enhancement and innovation and is expanding its scope to robotics to evolve into a leading player. Our Machinery Division, a global provider of automated engineering solutions based on high-tech value-added equipment, will continue to strengthen its partnership with customers by creating world-class technologies through constant research and development.

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 2020	December 31 2020	No	<Not Applicable>

C0.3

**(C0.3) Select the countries/areas for which you will be supplying data.**

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

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
Director on board	Hanwha makes important decisions on the operation of the Company by deliberating/resolving on the main agenda presented by the Board of Directors. We have established and operated the ESG Committee, an organization dedicated to ESG under the Board of Directors, especially for professional deliberation on our sustainability and compliance management. The main roles of the ESG Committee are to deliberate on eco-friendly policy activities and objectives such as the reduction of GHG and hazardous substances, to manage safety at workplaces, and to improve the working conditions. The ESG Committee is the highest position in the safety and environment sector and is the highest decision-making organization. Hanwha is holding a regular meeting of the board of directors once a quarter and submits the operational plans for environmental safety and health to the board of directors every year and conducts the work after approval. The main content is to establish the plans such as the establishment of a reduction plan of GHG emission and related investment, emission trading, and activities to prevent mortality events in the workplace, and it is decided after submitting it to the board of directors after approval by the ESG Committee. Based on the operational plan approved in February 2020, we conduct the related tasks with the approval of the plan to reduce about 300,000 tons of GHG at each workplace. In addition, indirect emissions from electricity use are drastically reduced and show positive results in GHG trading by producing and using the 310MW of electricity annually through installing generating units for solar power after reviewing/approving of CSO through ESG Committee on the necessity of solar power generating units in idle sites at workplaces.

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	Reviewing and guiding strategy Reviewing and guiding major plans of action Reviewing and guiding risk management policies Monitoring implementation and performance of objectives	<Not Applicable>	Hanwha established the ESG Committee in 2021. The committee holds a meeting once a quarter and hold an extraordinary committee frequently. The committee conducts activities such as reviewing and deliberating on policies to cope with climate change, such as reducing GHG.

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
Other C-Suite Officer, please specify (Chief Safety Officer)	<Not Applicable>	Assessing 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).**

The ESG consultative group, consisting of a working group such as the safety environment team leader and team members at each workplace, identifies risks/opportunities related to environmental management, including sustainability management and Compliance management, and climate change issues, and conducts a materiality assessment at least once a quarter. The assessed results are reported to the ESG consultative group, which reports to the ESG Committee on critical issues, whereas the ESG consultative group makes decisions on non-critical issues. Both the ESG consultative group and the ESG Committee reports all impacts of climate change on Hanwha to the CSO (Chief Safety Officer) who manage the decision-making process. Therefore, the CSO has full responsibility for climate change issues and has the highest decision-making authority on climate change. Accordingly, the CSO is accountable for climate change in the company and makes all decisions regarding the types of risks caused by climate change (regulation, technology, market, reputation, physical environmental change).

\* reference

- The ESG Committee is a review board and is not able to replace the functions of the Board of Directors.

### 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	

### 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
Other C-Suite Officer	Monetary reward	Company performance against a climate-related sustainability index	The CSO, the organization leader of our company related ESG, reflects the environment, climate change (greenhouse gas reduction, etc.), and safety and health-related items evaluating by KCGS in Korea, which are related to ESG management assessment, CDP rating, and accident rate, in the KPI. It is directly related to the performance of the executive and linked to the performance-based bonus.

## C2. Risks and opportunities

### C2.1

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

Yes

### C2.1a

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

	From (years)	To (years)	Comment
Short-term	0	1	This is for performance management of the current year under the greenhouse gas emissions trading scheme.
Medium-term	1	5	Operation plan and management of the third planning period(2021 – 2025) of the emission trading scheme.
Long-term	5	20	Conduct to implement the mid-to-long-term GHG reduction targets, such as the maintenance and management of its GHG emitting facilities in accordance with the government's GHG management policy.

### C2.1b

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

We consider it as a significant impact if it has a financial impact of 0.01% or more compared to consolidated sales in the previous year.

(Consolidated sales in 2020 are about KRW 50 trillion → KRW 5 billion in case of 0.01%

• Decision making by level of financial impact on business performance

- Financial impact of more than KRW 5 billion (significant impact): The agenda discussed by the ESG Committee is presented to the Board of Directors in Hanwha for decision-making.

- Financial impact of more than KRW 500 million to less than KRW 5 billion: The CEO makes the final decision after collecting opinions from ESG Committee.

- Financial impact of less than KRW 500 million: CSO makes final decision after collecting opinions from ESG consultative group

Recently, Hanwha Onsan Plant is planning to establish a nitric acid plant, and about 300,000 tons of GHG are expected to be generated as a by-product in the manufacturing process. As the additional amount of emission rights is expected to be about KRW 5 billion based on the emission rights amount of KRW 17,700 per ton in 2021, the ESG Committee will collect opinions and submit them to the board of directors to make decisions.

**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**

The safety environment team (ESG consultative group) in each workplace identifies risks and opportunities for work at least once a year by considering various regulations, physical and environmental aspects, requirements by stakeholders, and issues that our company is faced with. The identified content is assessed for materiality in consideration of short, medium and long-term aspects, and the criteria for assessing materiality are considered to be significant if they have a financial impact of 0.01% or more on consolidated sales. The consolidated sales in 2020 are about KRW 50 trillion, which is determined by a significant impact in the case of a business that has a financial impact of KRW 5 billion, which is equate to 0.01%. The significant impact (financial impact of more than KRW 5 billion) will be submitted by ESG committee to BOD for final decision-making. In addition, for financial impact of more than KRW 500 million to less than KRW 5 billion, CEO will make a final decision. The financial impact of less than KRW 500 million will be handled by the relevant department after the consultation with the ESG consultative group. As the recent rise in temperature caused by climate change, there are concerns about explosives explosions caused by the summer heatwave. In the case of occurring an explosion, financial losses of more than KRW 5 billion are expected due to human and material losses, and to prevent this, we conduct monthly inspections of warehouses that store explosives. In addition, to prevent the temperature rise of explosives warehouses, we are conducting activities to prevent the risk of accidents through less than KRW 500 million, including the installation of indoor air conditioners. As the activity causes financial losses of less than KRW 500 million, we strive to prompt action to prevent accidents through the decision-making by CSO. Emissions trading system is a regulation for responding to the issues of GHG emissions and climate change in Korea, which shall allocate emission rights and excess portion or excess quantity to pursue voluntary GHG reduction by companies. Our Onsan Plant is expected to emit large quantities of GHG emission when the nitric acid plant is newly established. About 300,000 tons of GHG are expected to be generated as a by-product in the manufacturing process. As the additional amount of emission rights is expected to be about KRW 5 billion based on the emission rights amount of KRW 17,700 per ton in 2021, the ESG Committee will gather opinions and submit them to the board of directors to make decisions. To minimize financial risks, we plan to drastically reduce GHG emissions by installing a GHG capture device at the end of the process after the board's decision-making, and to make additional profits in the case of surplus emission rights.

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**C2.2a**

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

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	Our company is included in the highly regulated emission trading scheme in South Korea. The emission trading system establishes a planned period to encourage each company to voluntarily reduce carbon emissions and gives each company the carbon credit based on the past emission results. In emission trading system, we received 100% free allocation in 1 Phase (2015-2017), and also incurred financial expenditures of KRW 74,376,122 in 2019 and KRW 91,567,000 in 2020 due to the 3% of auctioning allocation in the 2 Phase (2018-2020) and purchases of shortfalls. As a result of the materiality assessment, it was equivalent to less than KRW 500 million, so the company established a cost plan and purchased emission rights to meet the standard for regulation.
Emerging regulation	Relevant, always included	The requirements from RE100 (Renewable Energy 100) under the low-carbon transition plan recently have been increasing, and many global companies are proactively responding to requirements from RE100. The compliance with RE100 affects the decision-making process of clients as well as investors. If we adhere to using fossil fuel energy without responding to RE100, there is a risk of withdrawal of investment by investment institutions and loss of customers. In this context, we decided to introduce an internal systems for RE100 and Electric Vehicle 100 (EV 100) that are emerging as social issues due to the trend of pursuing carbon neutrality. Through the short-term investment, we will bring the fundamental changes in our energy use environment. For this, we are reviewing third-party PPA contracts for renewable energy, building solar-power generation facilities in the idle site, and assessing our environment in vehicle usage. We are also planning to establish the detailed action plans within 2 years.
Technology	Relevant, sometimes included	Demands for effective reduction of GHG through expanding the need for renewable energy, such as global regulations on climate change issues, continues to be tightened. It is necessary to introduce the technology for reducing power at workplaces as GHG emissions from power in our company use account for more than 50% of the total emissions. As applying technology for solar-power generation by using idle site or plant's roofs to reduce indirect emissions through renewable energy and expand the use of renewable energy, we continue to review and establish schedules and budgets to ensure a positive financial impact through reducing costs of power in the long-term for effectively reducing the amount of electricity consumption from the plant.
Legal	Relevant, always included	The environmental regulations can affect our reputation as well as our financial situation, which can have a significant impact on sustainability management. In particular, our company operates in diverse divisions such as global, defense, machinery, etc., and it is significant to lead sustainable businesses by adopting risk management and opportunity in various businesses through the risk management process when it affects the legal impact in certain fields. In addition, if illegal trade in the emission trading system regarding climate change occurs, a fine of up to KRW 100 million or imprisonment of up to three years can be imposed on the business owner, which can have a significant impact on business maintenance. In response, Hanwha reviews risks and opportunities from the pre-announcement of legislation by analyzing the revised and tightened laws more than twice a month with the ESG consultative group and the legal team. We are actively investing and improving through decision-making through ESG committees and boards in critical issues (e.g. ESG management). For M&A or Korea Investment Corporation, it complies with the legal regulations through a preliminary review of climate change and further manages ESG management such as effective reduction of GHG.
Market	Relevant, sometimes included	Global companies are developing technologies to effectively cope with the issues regarding climate change such as solar-power generation and the transition from internal combustion engine vehicles to EVs (Electric Vehicles). Global automotive companies are moving toward to be zero production of internal combustion engine vehicles and to transit to EVs as of 2030. Our Machinery Division has a significant impact on the business for the existing assembly line of the internal combustion engine (engine and mission) and is expected to lose more than 10% of our sales due to the downsizing of our business. The Machinery Division as a specialized company for engineering will contribute to responding to climate change issues through the business transitions (e.g. rechargeable batteries, production facilities for EV batteries) and preserve for the expected loss of sales. It also secures technology and competitiveness through the continued research and development to increase sales to about 20% by 2030.
Reputation	Relevant, always included	Hanwha Corporation, as a representative explosives and defense company in Korea, and has been leading related business for about 70 years since the 1950s. As ESG management becomes more significant globally and the interest in compliance management gradually increases, the management system should take into consideration the current trends when making a decision to lead a business socially and globally. In South Korea, it becomes uncertain regarding financing from investment institutions when sustainability management based on ESG is not ensured. Recently, TCFD (Task Force on Climate-Related Financial Disclosures) from BNP Paribas Corporate and Institutional Banking in Korea is assessing our company through the questionnaires on ESG management (e.g. whether to submit a CDP report) and other financial institutions are also assessing it. These are able to affect the financing of more than KRW 5 billion. Accordingly, Hanwha determines more than KRW 5 billion in financial impact as the significant impact based on the results of the materiality impact assessment, publishes CDP reports through the approval from boards, and issues sustainability management reports reflecting ESG assessments through the Korea Corporate Governance Service. We will also actively communicate with stakeholders to recognize that ESG management including climate change is the core of the business and to lead our business by increasing the completeness of various activities.
Acute physical	Relevant, sometimes included	Our company located in mountainous areas and coastal areas can be affected by typhoons and floods from climate change. Such as, it can have a significant impact on our business performance regarding the road closure and factory building damage/destruction due to flooding, landslides, etc. caused by rapid flooding in mountainous areas, and flooding caused by rising sea levels in coastal areas. Due to torrential rains in the past, there was an issue in which the soil surrounding the explosives manufacturing facilities was washed away so we addressed it at a cost of about KRW 100 million. In response, each workplace establishes an emergency response system in accordance with the past cases and weather forecasts and responds to emergency situations by constructing related facilities (floodwalls, installation of water pumps, etc.). In addition, we maintain the system so that the business is able to be normalized by responding to accidents quickly through regular education in emergency.
Chronic physical	Relevant, always included	The unusual weather due to climate change is intensifying over the long term. Climate change issues including physical environmental changes in the short term can have a significant impact on maintaining our business. Our plant located in Yeosu is located on the coast, so there may be a risk of flooding in the workplace during the rainy season due to rising sea levels caused by climate change. In response, it has established a short-term and long-term plan to cope with climate change from 2020 to 2040. We are also planning and pursuing sustainable business based on data accumulated from emergency supplies, facilities, and training in case of severe cold/heat and rainy season.

**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?**

No

**C2.3b**

**(C2.3b) Why do you not consider your organization to be exposed to climate-related risks with the potential to have a substantive financial or strategic impact on your business?**

	Primary reason	Please explain
Row 1	Risks exist, but none with potential to have a substantive financial or strategic impact on business	Hanwha Corporation considers risks and opportunities in various fields (e.g. market, reputation, regulation, short-term and long-term physical impacts) and assesses its materiality. As the result of an assessment, the emission trading system, which has a regulatory nature, in 2020 may be subject to materiality. The emission trading system, one of the GHG emission regulations in South Korea, began in 2015 and is currently in progress as of 2021, entering 3 Phase (2021-2025). They are progressing in the order of introduction of the emission trading market (1 Phase), reduction of GHG through emission trading (2 Phase), and active reduction of GHG emissions (3 Phase). The allocation of emission rights for each company is gradually expanding to the free allocation in 1 Phase, auctioning allocation of 3% in 2 Phase, and 10% auctioning allocation in 3 Phase. Hanwha Corporation believes that the risk will be low with the expectation of sufficient GHG emission rights from the CDM project, but we did not adopt it as a climate change risk due to the uncertainty over its sustainability, as the standards change every year in accordance with the government's guidelines for CDM project certification. For this reason, we will respond to the changes in government guidelines through decision-making by the board if necessary.

**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?**

No

## C2.4b

### (C2.4b) Why do you not consider your organization to have climate-related opportunities?

	Primary reason	Please explain
Row 1	Opportunities exist, but none with potential to have a substantive financial or strategic impact on business	Our Global Division is planning to invest KRW 190 billion to build a nitric acid plant by 2023. It is expected that about 300,000 tons of GHG to be generated as a by-product in the nitric acid manufacturing process. As the additional amount of emission rights is expected to be about KRW 5 billion based on the emission rights amount of KRW 17,700 per ton in 2021, the ESG Committee will gather opinions and submit them to the board of directors to make decisions. To minimize financial risks, we plan to drastically reduce GHG emissions by installing a GHG capture device at the end of the process after the board's decision-making, and to make additional profits in the case of surplus emission rights. Our company expects to earn sales income by selling surplus emission rights to the market by receiving additional emission rights if it is recognized as an early reduction by the Korea-Emission Trading System (K-ETS). The CDM project from the new nitric acid plant is considered as an opportunity, but it has not been adopted as an opportunity because it is uncertain whether it will be adopted or not. Thus, the materialized figures or positive financial impacts of the determined opportunity are still insufficient. We will estimate the details by assessing a risk/opportunity again if the further plan is decided to progress.

## C3. Business Strategy

### C3.1

#### (C3.1) Have climate-related risks and opportunities influenced your organization's strategy and/or financial planning?

Yes

### C3.1b

#### (C3.1b) Does your organization intend to publish a low-carbon transition plan in the next two years?

	Intention to publish a low-carbon transition plan	Intention to include the transition plan as a scheduled resolution item at Annual General Meetings (AGMs)	Comment
Row 1	Yes, in the next two years	Yes, we intend to include it as a scheduled AGM resolution item	Hanwha established the ESG Committee, the highest review board regarding ESG management in 2021. We plan to establish a transition plan for low-carbon in cooperation with the divisions of Hanwha Corporation Global/Defense/Machinery within two years and to include it as a scheduled resolution item to the Annual General Meetings through the review from the ESG Committee.

### C3.2

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

No, but we anticipate using qualitative and/or quantitative analysis in the next two years

### C3.2b

#### (C3.2b) Why does your organization not use climate-related scenario analysis to inform its strategy?

Hanwha considers regulatory compliance as the main target when management strategies are established and strives to react more structuredly to government policies. Currently, the low-carbon energy is becoming a new global trend, and South Korea has also pledged to achieve carbon neutrality by 2050. However, since the Korean government has yet to establish a scenario for reducing GHG emissions and 2030 national carbon neutrality, it is difficult to analyze the climate change scenario, so no scenario analysis has been conducted at the moment. As detailed direction and implementation plan of government policies will be established in the second half of 2021, we plan to reflect the Korean government's carbon neutrality plan and conduct scenario analysis by using NDC and IEA B2DS. In addition, based on the scenario analysis results, we plan to actively utilize it to establish our management strategy.

### 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	Demand for renewable energy, which can replace existing resources such as oil and coal, is increasing to cope with climate change. Thus, we continue to implement by establishing business strategies related to renewable energy. For instance, the Machinery Division has been pursuing for construction of renewable energy plants since 2012, including waste energy plants, wood pellet manufacturing plants, and Biomass energy plants. In addition, it is strengthening the capabilities of production facilities for renewable energy such as rechargeable batteries and solar-power, and it also have manufactured and sold solar power cell/module manufacturing lines and battery manufacturing lines for EVs that can reduce GHG emissions in 2020. The Global Division plans to pursue the hydrogen business of ammonia extraction from 2021, expanding to hydrogen supply business for hydrogen fueling stations and hydrogen fuel cell/Hydrogen-gas turbines in the future.
Supply chain and/or value chain	Yes	Hanwha Group aims to strengthen its eco-friendly business by establishing a value chain for the hydrogen business. Hanwha Global Division as a parent company of Hanwha Group contributes to form the group's value chain and reflects the business that can actively respond to climate change into the business strategy. A typical example is the Green Hydrogen Project through ammonia extraction. The company is actively pursuing green projects by expanding the ammonia supply business, which started in 1991 in Yul-do, Incheon, to the hydrogen production business, which is renewable energy, in 2020. We expect to contribute to the hydrogen economy of carbon neutrality through the production, storage, and utilization of the green hydrogen sector. The green hydrogen extracted from ammonia is eco-friendly because there is no carbon dioxide during the manufacturing process. As the extracted green hydrogen is one of the ultimate clean energy sources in the future to replace oil and coal, it is expected to have a significant impact on the achievement of carbon neutrality around the world by expanding the business of supplying hydrogen fuel cells and Hydrogen-gas turbines.
Investment in R&D	Yes	Hanwha Global Division strives to develop eco-friendly products by setting up its vision as "a chemical-based solution company that connects energy and the environment". The Global Technology Research Center focuses on developing eco-friendly products such as reducing the use of hazardous chemicals and reducing GHG emissions every year when setting up new R&D tasks, and it is reflected in financial plans and business strategies so that actual R&D investments are able to be made. As a typical example, in order to develop explosives that can reduce the amount of GHG generated after blasting from 2020, we selected "Eco-friendly Explosive Development" as a new project and started the development. For this, we strive to complete the development in 2022. Furthermore, the Machinery Division established a strategy to cope with climate change by strengthening the capacity of renewable energy production facilities such as rechargeable batteries and solar power. For this reason, it reflected KRW 23.248 billion in its financial plan for investment expenses such as facilities to strengthen R&D capabilities in 2021.
Operations	Yes	For the plants which emit GHG directly, the mid-term GHG plan reflects the risk of climate change. In 2020, the estimated emissions for the 3 Phase (2021-2025) were determined, and we calculated the shortage compared to the allocated emission rights in advance and established a response plan for the shortage. To implement the detailed plan, the business strategy shall be established by reflecting the reduction activities in our next year investment plan at the end of each year. As a typical example, Yeosu Plant in Defense Division established a business strategy by reflecting the investment to streamline the pump system, as an item for reducing GHG emissions discovered during the establishment of the mid-term plan, in the investment plan for 2021.

**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 Direct costs Liabilities	The emissions rights freely allocated by the government in relation to the allocation and trading system of GHG emissions shall be measured as zero. In addition, the emissions exceeding the amount of emissions rights allocated free of charge shall be measured as emissions debts. The emission debts are measured at the best estimate expected to be incurred in the emission debts. Moreover, emission rights actually purchased in the following year are measured at the cost price as a direct cost. For instance, emission debts, which are the expenses of excess emissions required in 2020 as the implemented year, are reflected in the 2020 financial plan, and actually purchased emission expenses are reflected in the cost price in 2021. The KOC certified by the CDM business from Onsan plant will be reflected in the sales plan for the year when the certification of emission reduction is completed. Our company currently reflects the CER that occurred in 2019 as a sales plan for 2021.

**C3.4a**

**(C3.4a) Provide any additional information on how climate-related risks and opportunities have influenced your strategy and financial planning (optional).**

**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**

2020

**Target coverage**

Company-wide

**Scope(s) (or Scope 3 category)**

Scope 1+2 (location-based)

**Base year**

2019

**Covered emissions in base year (metric tons CO2e)**

89328

**Covered emissions in base year as % of total base year emissions in selected Scope(s) (or Scope 3 category)**

100

**Target year**

2025

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

10.91

**Covered emissions in target year (metric tons CO2e) [auto-calculated]**

79582.3152

**Covered emissions in reporting year (metric tons CO2e)**

95490

**% of target achieved [auto-calculated]**

-63.227983732862

**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**

&lt;Not Applicable&gt;

**Please explain (including target coverage)**

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**Target reference number**

Abs 2

**Year target was set**

2020

**Target coverage**

Company-wide

**Scope(s) (or Scope 3 category)**

Scope 1+2 (location-based)

**Base year**

2019

**Covered emissions in base year (metric tons CO2e)**

89328

**Covered emissions in base year as % of total base year emissions in selected Scope(s) (or Scope 3 category)**

100

**Target year**

2040

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

64.36

**Covered emissions in target year (metric tons CO2e) [auto-calculated]**

31836.4992

**Covered emissions in reporting year (metric tons CO2e)**

95490

**% of target achieved [auto-calculated]**

-10.7181060056794

**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**

&lt;Not Applicable&gt;

**Please explain (including target coverage)**

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**Target reference number**

Abs 3

**Year target was set**

2020

**Target coverage**

Business activity

**Scope(s) (or Scope 3 category)**

Scope 3: Investments

**Base year**

2019

**Covered emissions in base year (metric tons CO2e)**

1072036

**Covered emissions in base year as % of total base year emissions in selected Scope(s) (or Scope 3 category)**

95

**Target year**

2040

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

2.1

**Covered emissions in target year (metric tons CO2e) [auto-calculated]**

1049523.244

**Covered emissions in reporting year (metric tons CO2e)**

938363.7

**% of target achieved [auto-calculated]**

593.762487364941

**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**

&lt;Not Applicable&gt;

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

No other climate-related targets

**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

**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	280
Implementation commenced*	1	245
Implemented*	1	517
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	Waste heat recovery
---	---------------------

**Estimated annual CO2e savings (metric tonnes CO2e)**

517

**Scope(s)**

Scope 1

**Voluntary/Mandatory**

Voluntary

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

96000000

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

30000000

**Payback period**

<1 year

**Estimated lifetime of the initiative**

Ongoing

**Comment**

It is a record of our reduction through the establishment of a waste heat recovery system through the use of water in boilers by recovering boiler steam condensate and was accepted as an internal reduction by the Korean government.

C4.3c

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

Method	Comment
Internal price on carbon	HHanwha estimates the investment effectiveness cost by setting the average KAU and KOC prices as the internal carbon price for the planned period during which the investment review time in emission reduction activities belongs. For instance, when estimating the investment effectiveness of installing solar generators at Boeun Plant in 2020, we calculated the amount by setting the average KAU price of 30,248 KRW during the 2 Phase (2017-2020) as the internal carbon price.
Dedicated budget for other emissions reduction activities	Hanwha manages continued reduction activities by reflecting the appropriation of budget for ongoing emission reduction activities in the annual master plan. In the case of the CDM business from Onsan plant, it is managed by reflecting individual budgets for the maintenance of CDM business certification/verification of reduction amount of emissions.
Financial optimization calculations	Hanwha reviews the feasibility of investment by analyzing the financial effectiveness of energy efficiency. For Yeosu Plant, We analyzed whether the cost was financially effective by calculating the cost of energy efficiency and the cost of building a system when using boiler water by retrieving the boiler steam condensate water.

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products or do they enable a third party to avoid GHG emissions?

No

C5. Emissions methodology

C5.1

**(C5.1) Provide your base year and base year emissions (Scopes 1 and 2).**

**Scope 1**

**Base year start**

January 1 2019

**Base year end**

December 31 2019

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

36994.6

**Comment**

**Scope 2 (location-based)**

**Base year start**

January 1 2019

**Base year end**

December 31 2019

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

52333.4

**Comment**

**Scope 2 (market-based)**

**Base year start**

January 1 2019

**Base year end**

December 31 2019

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

**Comment**

**C5.2**

---

**(C5.2) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.**

IPCC Guidelines for National Greenhouse Gas Inventories, 2006  
Korea GHG and Energy Target Management System Operating Guidelines

**C6. Emissions data**

---

**C6.1**

---

**(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)**

39165

**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**

## C6.3

---

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

#### Reporting year

##### Scope 2, location-based

56325

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

<Not Applicable>

##### Start date

<Not Applicable>

##### End date

<Not Applicable>

##### Comment

## C6.4

---

### (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

Not relevant, explanation provided

##### Metric tonnes 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

It is unable to verify the details due to security reasons because the company operates a defense business.

#### Capital goods

##### Evaluation status

Relevant, calculated

##### Metric tonnes CO2e

86.49

##### Emissions calculation methodology

Purchased material and equipment × (previous step in manufacturing + Manufacturing) Phase Emission Factor

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

100

##### Please explain

Scope3 emissions were estimated based on the purchased material and equipment, and the emission factor (LCI DB) was used in the process of producing the material and equipment.

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

##### Evaluation status

Relevant, calculated

##### Metric tonnes CO2e

3507

##### Emissions calculation methodology

Scope1,2 Fuel Purchase quantity × Production Emission Factor

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

100

##### Please explain

Estimation of GHG emissions generated during the production phase among energy purchases used by our company.

## Upstream transportation and distribution

### Evaluation status

Not relevant, explanation provided

### Metric tonnes 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

It is unable to verify the details due to security reasons because the company operates a defense business.

## Waste generated in operations

### Evaluation status

Relevant, calculated

### Metric tonnes CO2e

1765

### Emissions calculation methodology

Waste at workplaces × Emission factor by waste disposal method

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

100

### Please explain

Emissions generated in the process of reclaiming and incinerating wastes generated at a place of business were estimated.

## Business travel

### Evaluation status

Not relevant, explanation provided

### Metric tonnes 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

The emissions are less than 5% of our Scope3 emissions, so they are not estimated individually.

## Employee commuting

### Evaluation status

Not relevant, explanation provided

### Metric tonnes 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

The emissions are less than 5% of our Scope3 emissions, so they are not estimated individually.

## Upstream leased assets

### Evaluation status

Not relevant, explanation provided

### Metric tonnes 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

The emissions are less than 5% of our Scope3 emissions, so they are not estimated individually.

## Downstream transportation and distribution

### Evaluation status

Not relevant, explanation provided

### Metric tonnes 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

The emissions are less than 5% of our Scope3 emissions, so they are not estimated individually.

## Processing of sold products

### Evaluation status

Not relevant, explanation provided

### Metric tonnes 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

It is unable to verify the details due to security reasons because the company operates a defense business.

## Use of sold products

### Evaluation status

Not relevant, explanation provided

### Metric tonnes 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

It is unable to verify the details due to security reasons because the company operates a defense business.

## End of life treatment of sold products

### Evaluation status

Not relevant, explanation provided

### Metric tonnes 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

It is unable to verify the details due to security reasons because the company operates a defense business.

## Downstream leased assets

### Evaluation status

Not relevant, explanation provided

### Metric tonnes 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

The emissions are less than 5% of our Scope3 emissions, so they are not estimated individually.

**Franchises**

**Evaluation status**

Not relevant, explanation provided

**Metric tonnes 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**

The emissions are less than 5% of our Scope3 emissions, so they are not estimated individually.

**Investments**

**Evaluation status**

Relevant, calculated

**Metric tonnes CO2e**

979139

**Emissions calculation methodology**

GHG emissions from investment enterprises X equity ratio of investment

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

100

**Please explain**

The emissions from investment enterprises were determined based on their holdings.

**Other (upstream)**

**Evaluation status**

Not relevant, explanation provided

**Metric tonnes 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**

The emissions are less than 5% of our Scope3 emissions, so they are not estimated individually.

**Other (downstream)**

**Evaluation status**

Not relevant, explanation provided

**Metric tonnes 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**

The emissions are less than 5% of our Scope3 emissions, so they are not estimated individually.

**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**

1.9e-9

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

95490

**Metric denominator**

unit total revenue

**Metric denominator: Unit total**

50926451000000

**Scope 2 figure used**

Location-based

**% change from previous year**

47.5

**Direction of change**

Decreased

**Reason for change**

In order to reduce GHG emissions, we have improved N2O capture facilities in nitric acid manufacturing facilities. In addition, we were able to reduce GHG by establishing a utilization system of boiler water through the recovery of boiler steam condensate, installing solar power facilities, and we were also able to realize the reduction of intensity compared to sales.

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	37778.4	IPCC Second Assessment Report (SAR - 100 year)
CH4	31.7	IPCC Second Assessment Report (SAR - 100 year)
N2O	1354.4	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	39165

C7.3

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

By business division

C7.3a

**(C7.3a) Break down your total gross global Scope 1 emissions by business division.**

Business division	Scope 1 emissions (metric ton CO2e)
"Global" division	11410.7
"Defence" division	27580.6
"Machinery" division	173.7

**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)	Purchased and consumed electricity, heat, steam or cooling (MWh)	Purchased and consumed low-carbon electricity, heat, steam or cooling accounted for in Scope 2 market-based approach (MWh)
Republic of Korea	56325	0	121905.47	0

**C7.6**

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

By business division

**C7.6a**

**(C7.6a) Break down your total gross global Scope 2 emissions by business division.**

Business division	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
"Global" division	18200.2	0
"Defence" division	31307.8	0
"Machinery" division	6817	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	N/A
Other emissions reduction activities	517	Decreased	0.6	Reduction through the reflection of reduction performance by the establishment of a waste heat recovery system through the utilization of boiler water by recovering boiler steam condensate, 517 tCO2/y(Performance of internal reduction certification among Korea's K-ETS policy) (Emissions in 2020(517tCO2eq) ÷ Emissions in 2019 (89,328tCO2eq) = 0.006)
Divestment	0	No change	0	N/A
Acquisitions	0	No change	0	N/A
Mergers	0	No change	0	N/A
Change in output	0	No change	0	N/A
Change in methodology	0	No change	0	N/A
Change in boundary	0	No change	0	N/A
Change in physical operating conditions	0	No change	0	N/A
Unidentified	0	No change	0	N/A
Other	0	No change	0	N/A

## 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

## 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	174329.06	174329.06
Consumption of purchased or acquired electricity	<Not Applicable>	0	322134.6	322134.6
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	0	1105	1105
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	497568.66	497568.66

### 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	Yes
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.**

**Fuels (excluding feedstocks)**

Liquefied Petroleum Gas (LPG)

**Heating value**

HHV (higher heating value)

**Total fuel MWh consumed by the organization**

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

&lt;Not Applicable&gt;

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

0

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

27

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

&lt;Not Applicable&gt;

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

&lt;Not Applicable&gt;

**Emission factor**

2.93955

**Unit**

metric tons CO2 per metric ton

**Emissions factor source**

- Korea GHG and Energy Target Management System Operating Guidelines - IPCC Guidelines for National Greenhouse Gas Inventories, 2006

**Comment****Fuels (excluding feedstocks)**

Diesel

**Heating value**

HHV (higher heating value)

**Total fuel MWh consumed by the organization**

11073

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

&lt;Not Applicable&gt;

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

11073

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

0

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

&lt;Not Applicable&gt;

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

&lt;Not Applicable&gt;

**Emission factor**

2.65418

**Unit**

kg CO2e per liter

**Emissions factor source**

- Korea GHG and Energy Target Management System Operating Guidelines - IPCC Guidelines for National Greenhouse Gas Inventories, 2006

**Comment****Fuels (excluding feedstocks)**

Liquefied Natural Gas (LNG)

**Heating value**

HHV (higher heating value)

**Total fuel MWh consumed by the organization**

88058

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

&lt;Not Applicable&gt;

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

88058

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

0

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

&lt;Not Applicable&gt;

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

&lt;Not Applicable&gt;

**Emission factor**

0.00221

**Unit**

metric tons CO2e per m3

**Emissions factor source**

- Korea GHG and Energy Target Management System Operating Guidelines - IPCC Guidelines for National Greenhouse Gas Inventories, 2006

**Comment**

---

**Fuels (excluding feedstocks)**

Kerosene

**Heating value**

HHV (higher heating value)

**Total fuel MWh consumed by the organization**

581

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

<Not Applicable>

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

25

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

556

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

<Not Applicable>

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

<Not Applicable>

**Emission factor**

2.47515

**Unit**

kg CO2e per liter

**Emissions factor source**

- Korea GHG and Energy Target Management System Operating Guidelines - IPCC Guidelines for National Greenhouse Gas Inventories, 2006

**Comment**

---

**Fuels (excluding feedstocks)**

Refinery Oil

**Heating value**

HHV (higher heating value)

**Total fuel MWh consumed by the organization**

24907

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

<Not Applicable>

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

0

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

24907

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

<Not Applicable>

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

<Not Applicable>

**Emission factor**

2.47471

**Unit**

kg CO2e per liter

**Emissions factor source**

- Korea GHG and Energy Target Management System Operating Guidelines - IPCC Guidelines for National Greenhouse Gas Inventories, 2006

**Comment**

---

**Fuels (excluding feedstocks)**

Lubricants

**Heating value**

HHV (higher heating value)

**Total fuel MWh consumed by the organization**

45583

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

<Not Applicable>

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

0

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

45583

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

<Not Applicable>

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

<Not Applicable>

**Emission factor**

2.72131

**Unit**

kg CO2e per liter

**Emissions factor source**

- Korea GHG and Energy Target Management System Operating Guidelines - IPCC Guidelines for National Greenhouse Gas Inventories, 2006

**Comment**

---

**Fuels (excluding feedstocks)**

Propane Gas

**Heating value**

HHV (higher heating value)

**Total fuel MWh consumed by the organization**

1114

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

<Not Applicable>

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

1114

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

0

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

<Not Applicable>

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

<Not Applicable>

**Emission factor**

2.92399

**Unit**

metric tons CO2e per metric ton

**Emissions factor source**

- Korea GHG and Energy Target Management System Operating Guidelines - IPCC Guidelines for National Greenhouse Gas Inventories, 2006

**Comment**

---

**Fuels (excluding feedstocks)**

Petrol

**Heating value**

HHV (higher heating value)

**Total fuel MWh consumed by the organization**

2985

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

<Not Applicable>

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

2985

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

0

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

<Not Applicable>

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

<Not Applicable>

**Emission factor**

2.19081

**Unit**

kg CO2e per liter

**Emissions factor source**

- Korea GHG and Energy Target Management System Operating Guidelines - IPCC Guidelines for National Greenhouse Gas Inventories, 2006

**Comment**

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## C9. Additional metrics

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### C9.1

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

## 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	No emissions data provided

### C10.1a

---

**(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**

Statement Verification Report.PNG

**Page/ section reference**

1

**Relevant standard**

Korean GHG and energy target management system

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

100

---

### C10.1b

---

(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**

Third party verification/assurance underway

**Attach the statement**

Statement Verification Report.PNG

**Page/ section reference**

1

**Relevant standard**

Korean GHG and energy target management system

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

100

---

C10.2

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(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?

No, but we are actively considering verifying within the next two years

C11. Carbon pricing

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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 2020

**Period end date**

December 31 2020

**Allowances allocated**

35190

**Allowances purchased**

7210

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

39165

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

56325

**Details of ownership**

Facilities we own and operate

**Comment**

**C11.1d**

---

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

Hanwha Corporation, as a company subject to the emission trading system in Korea, monitors its GHG emissions through the GHG inventory in the internal computer system. Through this, it verifies its GHG emissions every month. The company also verifies the financial impact of its KOC sales and KAU purchases by monitoring domestic GHG emission prices and trading trends every month. As a case of the applying method of a strategy for the emission trading system, we have secured the shortage of our GHG emission rights within the 2 Phase and 3 Phase (planning periods for GHG) in Korea through the KOC obtained by the CDM project from our nitric acid production facilities. For GHG emission rights which are currently insufficient within the 3 Phase, it has been verified that they can be offset through KOC generated through CDM projects. As the current trend of reducing the free allocation of GHG emission rights and the timing of the plan to terminate the CDM project certification, it is expected that GHG emission rights will be insufficient from the 4 Phase planning period. For responding to the 4 Phase planning period when GHG emission rights are expected to be scarce, we are monitoring the reduction activities of internal GHG emissions and CDM business opportunities inside and outside of the country. Moreover, we are considering various ways to reduce Scope2 emissions through the introduction of the internal RE100 system.

**C11.2**

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

Yes

**C11.2a**

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(C11.2a) Provide details of the project-based carbon credits originated or purchased by your organization in the reporting period.

**Credit origination or credit purchase**

Credit origination

**Project type**

N2O

**Project identification**

N2O Reduction Project of Hanwha Corporation's Nitric acid Plant in Ulsan

**Verified to which standard**

CDM (Clean Development Mechanism)

**Number of credits (metric tonnes CO<sub>2</sub>e)**

287524

**Number of credits (metric tonnes CO<sub>2</sub>e): Risk adjusted volume**

287524

**Credits cancelled**

Yes

**Purpose, e.g. compliance**

Voluntary Offsetting

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## 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

#### GHG Scope

Scope 1

Scope 2

#### Application

It is to measure financial opportunities for investing in the low-carbon transition conducted by our company.

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

30248

#### Variance of price(s) used

The actual internal carbon price applied was estimated based on the average price of KAU during the 2 Phase (GHG planning period) by the Korean government. We operate an internal carbon price based on K-ETS market price by reflecting changes in KAU policy.

#### Type of internal carbon price

Shadow price

#### Impact & implication

Hanwha is investing to reduce internal GHG emissions to respond to the lack of GHG emission rights. For this, The company is also utilizing internal carbon prices to estimate opportunity costs for GHG reduction. As an applying case, for its solar energy facility investment, there is a case in which Hanwha estimates the amount of GHG emission reduction and the recognition of the internal reduction performance by the Korean government and used it to prove the feasibility of solar energy investment through transiting it into an amount basis. As a result, the company analyzed the feasibility of solar energy for the new vacancy in 2020 and decided to install solar energy on the roof of the new vacancy in 2021 by securing economic feasibility based on the internal carbon price.

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## 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?

No, we do not engage

## C12.1e

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### (C12.1e) Why do you not engage with any elements of your value chain on climate-related issues, and what are your plans to do so in the future?

Hanwha Corporation produces industrial explosives and defense products, and most of our major customers are government agencies. It is difficult to consider the factor regarding climate change in product development due to military security and product characteristics (explosion in product use). The manufacturing method of the product is also difficult to improve except for methods approved by government agencies, so there is no demand for engagement activities. Nevertheless, as of the period of carbon neutrality, our company is internally considering ways to improve process efficiency and use renewable energy. As we are figuring out the needs for the engagement activity in our company, we are planning to do the engagement activities in the future.

## C12.3

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### (C12.3) Do you engage in activities that could either directly or indirectly influence public policy on climate-related issues through any of the following?

Other

## C12.3e

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**(C12.3e) Provide details of the other engagement activities that you undertake.**

Hanwha regularly sponsors a civic environmental organization called "Environmental Justice." The organization conducts various activities related to climate change, and the main activities are as follows.

- 1.Assessment of the current government's environmental policies and proposals tasks for next presidential election policy
- 2.Discovering and responding to cases of hidden environmental irregularities in the local
- 3.Discovering and responding to new policy agendas through solidarity activities on policy issues

**C12.3f**

**(C12.3f) What processes do you have in place to ensure that all of your direct and indirect activities that influence policy are consistent with your overall climate change strategy?**

Hanwha establishes a business process for monitoring government policies and legislative trends in accordance with the provisions of "Law Management Guidelines". As a result of that process, each person in charge of our company is aware of the changes and reflecting them into our strategy regarding climate change. In addition, our headquarters establish a company-wide GHG strategy through the regulation named "GHG Management Guidelines", and the strategy is shared company-widely and reflected and implemented in the detailed GHG plans by each workplace. Our company manages the stakeholders' pool, which is managed in accordance with the regulation of "Safety, Environmental, and Health Communication Guidelines". The stakeholders, registered according to the regulations, regularly verify contact points, and the items received by stakeholders are recorded and managed.

**C12.4**

**(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**

Annual Report.pdf

**Page/Section reference**

813~814

**Content elements**

Strategy

Emissions figures

Other metrics

Other, please specify (Green Management Certification )

**Comment**

Other metrics : Energy consumption

**C15. 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.**

**C15.1**

**(C15.1) Provide details for the person that has signed off (approved) your CDP climate change response.**

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

**Submit your response**

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

English

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

	I am submitting to	Public or Non-Public Submission
I am submitting my response	Investors	Public

**Please confirm below**

I have read and accept the applicable Terms