NAVER

NAVER
TCFD Report 2020

Task Force on Climate-related Financial Disclosures

(Updated in April, 2021)

TCFD | TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

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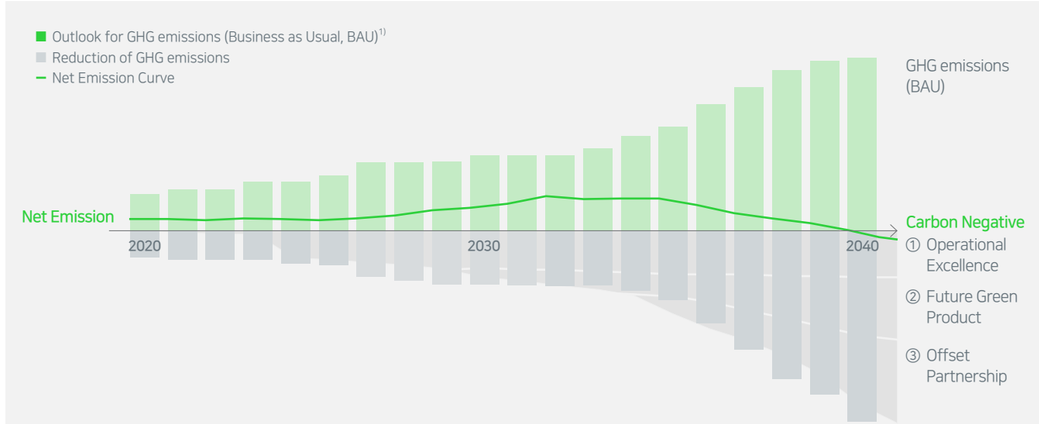
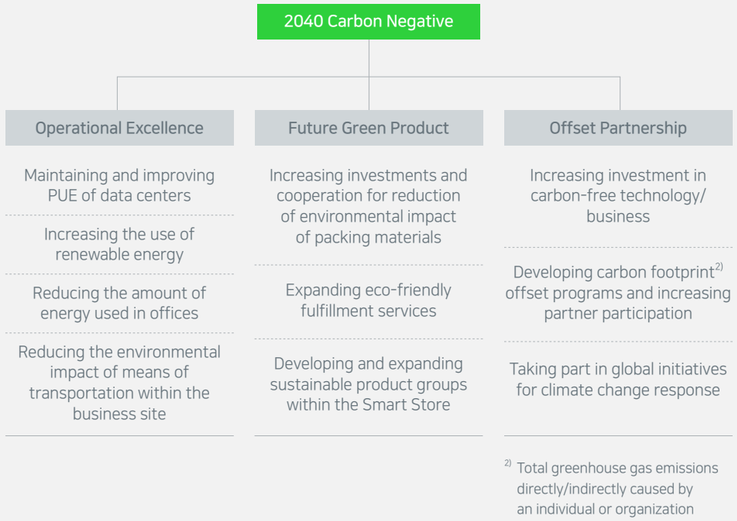
NAVER's Climate Strategy

NAVER's greenhouse gas (GHG) emissions are forecast to increase over the next decade due to construction of our second data center and a rise in data use in the contactless/5G era, and this can become a major risk to easing climate change. In addition, it can reduce revenues and increase operation expenses, in various forms, of the business of NAVER, where data center is used as a key asset, and is therefore expected to have a substantial impact on securing sustainable business competitiveness. We recognized this operational risk and established a strategy on minimizing the risk, while also formulating an eco-friendliness strategy that secures mid- to long-term business opportunities and reviewing goals. We declared a strategy that achieves "2040 Carbon Negative" by maximizing eco-friendliness effects through business activities and minimizing negative environmental impact that is triggered by business activities.



[1] An emission projection estimates future emissions based on current emissions

Carbon Negative is a strategy of offsetting by reducing greenhouses gases more than the GHG amount that is emitted, thus making the net emissions amount 0 or less. To achieve this goal, we have set the following three detailed strategic directions and plan to expand relevant activities. By ①pursuing operational excellence that enables us to reduce our environmental impact; ②developing future green products and services; and ③expanding external partnerships, we will actively take part in accelerating the transition to a low-carbon economy. In this process, we will make joint efforts with several partners who use NAVER platforms to expand the eco-friendly ecosystem.



Internally, we are reducing the environmental impact of facilities by increasing renewable energy use. Externally, we are actively looking for business opportunities to increase various businesses and investments related to eco-friendliness, such as technology investments and M&As with key players in the area of eco-friendly commerce. The status and plan of our climate action implementation will be actively monitored and reviewed by the ESG Committee under the BOD, and will be continually communicated to our stakeholders, including shareholders. We will continue to take the lead in creating a more sustainable business environment and fulfill corporate social roles and responsibilities.

Governance

A. The Board's oversight of climate-related risks and opportunities

NAVER established the ESG Committee, consisting of the CEO and three independent outside directors, based on a BOD decision in October 2020. In 2020, the ESG Committee reviewed and decided on setting the 2040 Carbon Negative goal and establishing NAVER's mid- to long-term direction to respond to climate change. Moving forward, the ESG Committee will review NAVER's mid- to long-term climate change strategy directions every quarter, and approve major tasks while also managing and supervising the execution of the tasks.

B. Management's role in assessing and managing climate-related risks and opportunities

The Chief Financial Officer (CFO) is assigned with roles and responsibilities for various matters related to executing investments and raising capital for the establishment and implementation of climate change strategies of NAVER. The Chief Executive Officer (CEO) takes the lead in identifying business items that are related to environmental sustainability within the area of commerce to call for the transition to a low carbon economy and to expand green business opportunities.

What NAVER's management has been mainly interested in since the announcement of the 2040 Carbon Negative is to promote understanding among all employees of the direction that NAVER should move towards in order to counter climate change and to induce company-wide cooperation. Accordingly, outside experts were invited in the second half of 2020 to provide trainings on climate change strategy to environmental management leaders who are in charge of office building and data center operations and commerce leaders who devise green business items. Management is directly taking the lead for active discussions on relevant items.

Strategy

A/B. Climate-related risks and opportunities the company has identified over the short, medium and long term, and the impact on the company's businesses, strategy and financial planning

NAVER is an information & communications technology (ICT) company, and its business areas include search platform, commerce, fintech, contents, and cloud. The risks and opportunities that may arise from climate change throughout NAVER's overall business can be categorized as follows:

Types of Risks Due to Climate Change

Transition Risks	Changes in policy and regulation, technology, and market that arise in the process of shifting to a low carbon economy and impact on reputation
Physical Risks	Acute/chronic risks in business infrastructure aspects that are triggered by the abnormal climate and worsening severe weather that are caused by climate change

Financial Impact of Short, Mid- to Long-Term Risks and Opportunities

Risk
Opportunity

		Impact on profit/loss	Impact on financial position
Transition Risks	Short-term	a A rise in expenses from purchasing carbon credit in case the credit price increases and emissions continue to increase	A rise in GHG emission liabilities in case of an increase in expenses from purchasing carbon credit
		b A rise in low carbon facility and infrastructure investment costs	Expansion of low carbon facilities and infrastructure
		c Fluctuation in operating revenues due to a rise in consumer demand for green products and services	d Reduction in cost of capital and attraction of new investments in case of inclusion in the ESG investment asset class
	Mid to long-term	e Fluctuation in renewable energy purchase costs	f Growth of intangible assets such as brand value and goodwill, resulting from taking leadership in green/sustainable business
Physical Risks	Short-term	—	—
		g Asset impairment and resulting compensation/restoration expenses	Asset impairment from the data center, etc.
	Mid to long-term	i Increase in operation costs of data center due to rising temperatures	
		h Reduction in operating revenue from e-commerce business due to a damage in the supply chain and logistics chain	

a A rise in expenses from purchasing carbon credit and GHG emission liabilities in case the credit price increases or emissions continue to increase

NAVER is subject to the national carbon emissions trading scheme, and for the amount of carbon emissions that is in excess of the emission permit, the company is required to purchase carbon credit in the Korea Exchange ETS (K-ETS) market. In this regard, we have been recognizing and managing GHG emission liabilities in our financial statements since 2019, and the amount stood at around KRW 970 million as of the end of 2020. This is less than around 0.018% of the annual consolidated operating revenue in 2020. However, relevant financial impact is expected to intensify. For example, GAK Sejong which is our second internet data center (IDC) in Sejong that is planned for completion at the end of 2022, is at least six times larger than Chuncheon Data Center GAK, and is planned to be built at a hyperscale, with more than around 100 thousand servers. Data centers, which is highly carbon-intensive compared to general office buildings, are included in those to which emission regulations apply, and are required to reduce the amount of electric power used every year. However, the arrival of 5G and the contactless era will exponentially increase NAVER's data processing, resulting in an inevitable rise in carbon emissions levels. Accordingly, if NAVER is not able to adjust its carbon emissions or if the carbon credit price continues to rise in the trade market, our expenses from purchasing the carbon credit and GHG emission liabilities will increase and can have an impact on financial soundness. Based on forecasts on future emissions level increases, we derived that our financial burden from purchasing carbon credit can reach an accumulative KRW 1.3 trillion by 2030 if we fail to secure emissions rights with the completion of our second IDC. To respond to this financial risk, we established a mid- to long-term carbon reduction target and are looking into various measures to realize this target, including expanding renewable energy and participating in offset programs.

b A rise in low carbon facility and infrastructure investment costs and relevant assets

Low-carbon and low-power infrastructure regulations and relevant certifications are expanding. There is also demand for minimizing environmental impact due to business site operation. Facility investment aimed at satisfying eco-friendly building requirements requires investment costs. NAVER has recognized the importance of eco-friendliness in business site operation and is already operating a data center with the world's lowest-level power usage effectiveness (PUE), as well as an eco-friendly office building with an LEED platinum grade. In particular, the Data Center GAK uses photovoltaic energy, and also continually invests in relevant businesses. We markedly improved the capability of photovoltaic power generation at the building in 2018, and as a result, 213 MWh of power were saved in 2020, along with about 95 tons of GHG emissions. To further expand this achievement, we are increasing green purchasing for our second office building and r second IDC that are now under construction, in addition to the currently-operated business site. Expected to be completed in 2021, "1784", our second office building, has a 763.2 kW geothermal system to make the most of its basement space, and will have a 140.8 kW photovoltaic power generation facility on the rooftop despite a shortage in its area to apply new & renewable energy facilities due to its site characteristics.

c Fluctuation in operating revenues due to a rise in consumer demand for green products and services

The worsening climate change and the resulting ecological, physical damage all across the globe has been increasing the importance of sustainability in purchase decision-making, mainly by the millennials and Generation Z. Consumers prefer products that minimize environmental load and create social value throughout production, distribution, and consumption steps, and pay more for these products adopting them as a criterion for brand selection. A company may lose competitiveness in the market if it fails to respond to these trends or expand green products and services for preemptive positioning for changing market demand. NAVER plans to expand green product groups by actively engaging Smart Store, a major prat of its Commerce Business, which accounts for at least 18% of total revenue as of the end of 2020, and is cooperating with CJ Logistics to build a sustainable fulfillment system. We also recognize the environmental impact of packing materials as a major environmental risk of the e-commerce industry, and are making active preparations for reduction of packing materials and replacement by sustainable materials.

d Reduction in cost of capital and attraction of new investments in case of inclusion in the ESG investment asset class

A company's ESG risks will be assessed with greater importance in investment decision-making as a result of climate change, and companies with a high degree of negative environmental impact are already suffering from capital flight. In contrast, the size of ESG investment in companies with proven ESG management capabilities is sharply growing. NAVER has an MSCI ESG Rating of A as of December 2020, and has the highest component ratio (14.58%) among listed in the MSCI Korea ESG Leaders Index. NAVER will develop into a global ESG leader by continually strengthening ESG risk management, and secure opportunities for greater exposure to ESG investors.

e Fluctuation in renewable energy purchase costs

A data center is a facility which requires large electric power consumption, and it is essential to increase power consumption efficiency and to make an energy transition in a more cost-efficient and eco-friendly direction. As one of the major directions for achieving 2040 Carbon Negative, NAVER is considering the way to reduce carbon emissions by increasing the use of renewable energy. However, due to domestic conditions where there are limitations to self-generation from renewable energy, we need to consider purchasing externally-produced renewable energy generation credits through the green premium system or Renewable Energy Certificate (REC) system, among RE100[3] implementation support systems. In this aspect, the renewable energy purchase price is forecast to become an important variable in our operation costs. Accordingly, we are analyzing applicability, in economic and environmental perspectives, of several options that are presented by the domestic RE100 implementation support system, and seek to establish an investment plan and relevant plans from a mid- to long-term perspective of at least a decade.

f Growth of intangible assets such as brand value and goodwill, resulting from taking leadership in green/sustainable business

Consumer demand for sustainable products and services will steadily increase with worsening climate change. As such, a company that secures green business leadership can make operating revenue improvements over the short term by increasing its market share, while making improvements to its reputation over the mid- to long-term future to result in an increase in brand value and goodwill.

[3] RE100: A global initiative to increase the use of renewable energy led by the Climate Group – a non-profit organization to address climate change. Members of the initiative are committed to transition to 100% renewable power no later than 2050.

g Asset impairment and resulting compensation/restoration expenses

Our data center is one of the key assets that form the foundation of NAVER's business, and because business dependence is high and useful life is long, the economic damage caused by calamity and disaster due to climate change would be enormous. NAVER's Data Center GAK was designed with disaster prevention capabilities for earthquakes of 6.5 or higher magnitude, flood, typhoons, and fire, so as to strengthen its durability in extreme weather situations. It has a system that can generate electricity for up to 72 hours even when external supply of electric power discontinues in case of an emergency, thereby minimizing relevant risks.

h Increase in data center operation costs due to rising temperatures

A rise in temperatures caused by climate change is directly connected to an increase in electric power costs for cooling down a data center. According to research, at least 75% of annual operation costs of a general data center consists of energy-related costs, of which at least 60% is used for cooling systems and power receiving/distribution facilities. Therefore, the improvement of cooling system efficiency and minimization of outside temperature impact should be managed with great significance in the aspect of operation costs. NAVER's Data Center GAK Chuncheon uses Snow Melting (a road heating system which uses waste heat in the wintertime) and a natural cooling system using outside air to reduce server heat in a sustainable way. By doing so, the Data Center GAK minimizes the amount of electric power used for cooling, and the number of days that it uses coolers in a year is no more than around 30 days. As of the end of December 2020, the power usage effectiveness (PUE)[4] of the Data Center GAK Chuncheon was 1.09. This signifies that only 8% of total electric power was used for cooling, and 92% was used for IT resources, thereby reducing electric power needed for cooling. This is significantly lower than the average PUE of domestic data centers at 2.66 and the green data center PUE standard presented by the Korean government which is 1.75.

i Reduction in commerce operating revenue due to a damage in the supply chain and logistics chain

Commerce Business accounts for around 18.2% of operating revenues of NAVER's business as of the end of 2020. Commerce revenues are indicating firm growth as a result of a continued rise in online shopping demand and merchants with the advent of the contactless era. However, worsened unusual weather, including earthquake, flood, and fire from climate change, can cause a physical blow to the supply chain and logistics chain, and the resulting service delay/suspension acts as a severe risk to customer attraction and retention.

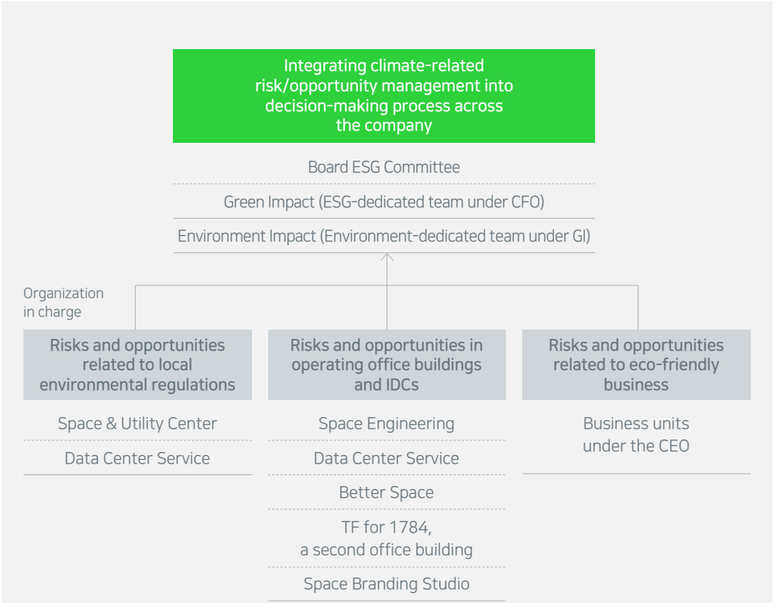
C. Resilience of NAVER business when considering the climate change scenario

Based on the estimated carbon emissions amount for the next decade, NAVER estimated the range of costs to respond to the emissions trading system, in consideration of carbon prices in line with the 1.5℃ limit and 1.5℃ - 2℃ scenarios presented by the IPCC; average carbon emissions trading price in South Korea from 2017 to 2019; and the highest carbon emissions trading price in South Korea in August 2020, which was the time of analysis. Based on this estimation, we established a GHG emission reduction target, and are striving to minimize financial risks that accompany measures against climate change. We will go beyond financial risks from responding to regulations and advance our analysis on climate change scenarios' financial impact on tangible/intangible assets, thereby further detailing our strategies to achieve the climate change target.

[4] Power Usage Effectiveness: The ratio of total amount of energy consumption of a data center facility to the energy consumed by IT equipment. A value closer to 1 means higher efficiency.

Risk Management

A/B/C. NAVER's processes for identifying, assessing and managing climate-related risks and integrating them into the company's overall risk management



Management organizations manage environmental risks in operating NAVER's office buildings, IDCs and other infrastructure of the company as its tangible assets. They are also in charge of green purchasing for green facility construction and operation. Company-wide ESG management team under the CFO reviews and identifies the company's overall climate change risks based on outside expert advice, and establishes a short-term and mid- to long-term response directions. The CFO examines mid- to long-term investment expenditures or acquisition of financial resources that are needed to respond to the risks. Finally, the ESG Committee under the BOD makes decisions on the direction for managing major non-financial risks and on investments. In the event of a severe calamity/disaster caused by climate change, the Risk Management Committee under the BOD and supporting organization under the CEO that is exclusively in charge of risk management manage business continuity.

Metrics and Targets

A/B. Metrics used by the company to assess climate-related risks and opportunities

NAVER manages the amount of GHG emissions, amount of energy consumption, and PUE of its IDCs to manage climate-related risks and opportunities.

(1) Greenhouse Gas (GHG) Emissions

				2017	2018	2019	2020
Greenhouse Gas (GHG) Emissions							
Total GHG emissions		Total	tCO_2e	57,080	72,416	78,712	79,907
		Green Factory		7,541	7,510	7,178	6,731
		Data Center GAK		49,539	64,906	71,534	73,176
GHG emissions	Scope 1	Green Factory		276	295	244	197
		Data Center GAK		141	48	52	33
	Scope 2	Green Factory		7,265	7,215	6,934	6,534
		Data Center GAK		49,398	64,858	71,483	73,143
GHG intensity[1]		Total	tCO_2e/ Revenue (KRW billion)	12.20	12.96	18.07	15.07
		Green Factory		1.61	1.34	1.65	1.27
		Data Center GAK		10.59	11.62	16.42	13.80

(2) Energy Consumption

Total energy consumption		Total	TJ	1,178	1,495	1,624	1,649
		Green Factory		159	159	152	143
		Data Center GAK		1,019	1,336	1,472	1,506
Energy intensity[2]		Total	TJ/ Revenue (KRW billion)	0.25	0.27	0.37	0.31
		Green Factory		0.03	0.03	0.03	0.03
		Data Center GAK		0.22	0.24	0.34	0.28
Direct energy consumption		Sub Total	TJ	7.4	6.7	5.7	4.5
LNG		Green Factory		5.3	5.8	4.8	3.9
Diesel				0.01	0.04	0.01	0.01
Mobile combustion				0.1	0.1	0.1	0.1
Diesel		Data Center GAK		1.6	0.4	0.4	0.1
LNG				0.5	0.3	0.4	0.4
Indirect energy consumption		Sub Total	TJ	1,171	1,488	1,618	1,645
Electricity		Green Factory		144	143	138	130
Steam				9.6	10.0	8.8	8.5
Electricity		Data Center GAK		1,017	1,335	1,471	1,506

[1] GHG intensity in 2019 and 2020 is calculated by reflecting discontinued business (LINE and its affiliates) disclosed through the 2020 Business Report

[2] Energy intensity in 2019 and 2020 is calculated by reflecting discontinued business (LINE and its affiliates) disclosed through the 2020 Business Report

NAVER's carbon emissions rose by around 39.99% at the end of 2020 compared to the end of 2017. This is mainly attributable to continued increase in energy consumption used by our data center although the amount of energy used by the Green Factory office building has been indicating a downward trend for three consecutive years since 2017. The carbon credit price in South Korea rose by some three-fold from around KRW 7,800 per ton on January 2, 2017 to approximately KRW 23,000 at the end of December 2020, reflecting that the financial burden caused by increased emissions. Moreover, the third plan period of the emissions trading system will be adopted in 2021 and the completion of the construction of our second data center in Sejong City, and accordingly the scope of NAVER's business sites, included in the GHG emissions management scheme, will be expanded. We therefore decided to establish a mid- to long-term goal to reduce carbon emissions throughout our business and to manage relevant financial impact.

C. Targets used by the company to manage climate-related risks and opportunities and performance against targets

NAVER pursues the goal of "Carbon Negative" (including scope 1, 2, 3), which means to have GHG reduction levels to be higher than GHG emissions by 2040. Increased use of renewable energy is a prerequisite to reducing the environmental impact of consumption of electric power, which accounts for the highest proportion among our GHG emission sources. As such, we plan to engage in decision-making that is based on efficiency in the aspect of the renewable energy purchase price and return on investment (ROI) on infrastructure investments. Regarding achieving our climate change goal, in consideration of insufficient institutional and infrastructure conditions for expanding renewable energy use in Korea as of the second half of 2020, when we established our mid- to long-term goal, we plan to actively implement the carbon emissions reduction/offsetting system throughout our overall value chain. We plan to continually communicate with our stakeholders the amount of reduction compared to our climate change goal and performance in pursuing the goal.

Climate Risk & Opportunity Management – Environmental Impact of Hardware Infrastructure (Unit: MWh)

		2017	2018	2019	2020
Total energy saving	Sub Total	28,997	37,303	41,689	41,199
Saving through office management	Green Factory	–	138	517	837
Saving of electricity for air-conditioning and heating by adopting geothermal energy	Green Factory	101	101	101	101
Saving through office management	Data Center GAK	426	511	511	514
Saving through natural cooling system	Data Center GAK	28,435	36,371	40,343	39,534
Saving by producing renewable energy	Data Center GAK	35	182	217	213
Renewable energy consumption	Sub Total	136	283	318	314
Geothermal power	Green Factory	101	101	101	101
Solar power	Data Center GAK	35	182	217	213
PUE	Data Center GAK	1.11	1.11	1.09	1.09

Reduction performance in energy consumption at the end of 2020 recorded around a 42% increase from the end of 2017. Power generation based on renewable energy went up by around 2.3-fold during the same period, and the PUE of our data center has been improved. The Green Factory was designed to save energy, and does so at a rate of more than 5% every year through continued efforts to reduce energy consumption. We set up 22 electric vehicle-charging facilities and thus reduced the burden of commuting using an eco-mobility, and participate in "Earth Hour" every year, which is an environmental campaign hosted by the World Wide Fund for Nature. In addition, we radically improved the photovoltaic power generation facility at the building in 2018, and as a result, 213 MWh of power were saved in 2020, along with about 95 tons of GHG emissions. In addition, we are constantly monitoring and upgrading our data center operations in order to reduce water consumption for air-conditioning. Although our IT resources and resulting water consumption were increased in 2020, we made ceaseless efforts to develop improvement measures through the use of natural energy and increased energy efficiency, thereby reducing nearly 20,000 tons of GHG emissions per year. Our second office building, "1784", which is expected to be completed in 2021, was designed to earn LEED platinum certification and have an energy efficiency level of 1+, and will have a 763.2 kW geothermal system in its basement space, and a 140.8 kW photovoltaic power generation facility on the rooftop. As of the end of December 2020, the construction is in progress, and primary energy consumption is estimated to be 160.7 kWh/m^2 a year, which is in the top 10% of business facility buildings with total floor space of 10,000 m^2 or more, based on statistics provided by the Korea Energy Agency. The new building has already earned 1+ preliminary energy efficiency certificate, with main certification to be finalized after the completion of the construction work.

NAVER