

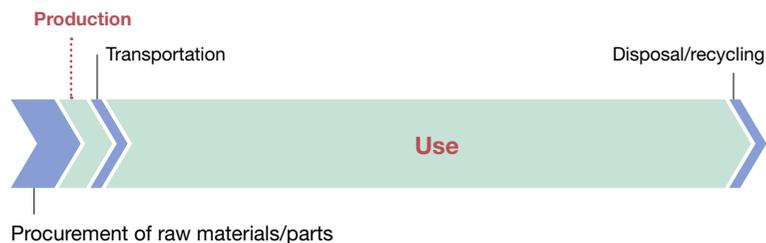
Achieving a Low-Carbon Society

Efforts to Achieve a Low-Carbon Society Policy

In line with the scenario in the IPCC's *Fifth Assessment Report* to keep the increase in global temperatures below 2°C, we have established long-term reduction targets for CO₂ emissions of 50% by fiscal 2030 and 80% by fiscal 2050 (compared to fiscal 2010 levels) throughout the value chain.

Approximately 90% of the value-chain emissions of our products and services—from the procurement of raw materials and parts to production, transportation, use, disposal, and recycling—result from the use of our products and services after they were sold. For this reason, to reduce emissions across the value chain and achieve our long-term targets, it is crucial that we reduce CO₂ emissions not just during production but also during the stage of use.

Ratio of CO₂ Emissions at Each Stage of Hitachi Value Chain



We will not only further enhance the energy efficiency of our products and services to contribute to emission reductions during their use but also seek to globally expand our decarbonization business that utilizes IT and other innovative technologies. We are also actively implementing measures to reduce CO₂ emissions during production; in fiscal 2018, for example, we introduced the Hitachi Internal Carbon Pricing (HICP) framework to raise production efficiency at factories and offices and to promote energy-saving initiatives, and we are taking a variety of steps to accelerate the shift to renewable energy sources.

In response to the growing interest of investors in the financial impact of climate change on corporate operations, in June 2018 we announced our support for the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). We are actively disclosing climate-related information in accordance with these recommendations and conducting dialogue with investors.

Contributing to a Low-Carbon Society Through the Decarbonization Business Objectives, Activities, and Achievements

Expanding the Decarbonization Business

Hitachi is utilizing Lumada to expand its decarbonization business. Through collaborative creation, we will help the world mitigate and adapt to climate change by supplying solutions in the five business areas of IT, energy, industry, mobility, and smart life—the growth areas identified in the 2021 Mid-term Management Plan.

Decarbonization Business: A Hitachi Focus

IT solutions	Energy solutions	Industry solutions	Mobility solutions	Smart life solutions
<ul style="list-style-type: none"> ■ Finance and public-oriented solutions <ul style="list-style-type: none"> • Promoting digital solutions ■ Data center <ul style="list-style-type: none"> • Developing smart data centers ■ Servers/storage <ul style="list-style-type: none"> • Enhancing energy-saving features of servers and storage 	<ul style="list-style-type: none"> ■ Power grid solutions <ul style="list-style-type: none"> • Enhancing efficiency of power transmission/distribution ■ Energy management <ul style="list-style-type: none"> • Advancing smart energy management to reduce peak electricity demand ■ Power generation <ul style="list-style-type: none"> • Promoting power generation systems using wind and other non-fossil energy sources 	<ul style="list-style-type: none"> ■ Smart logistics <ul style="list-style-type: none"> • Improving energy-saving features through fully IT-enhanced logistics ■ Factory automation <ul style="list-style-type: none"> • Enhancing energy efficiency through shorter lead times ■ Water business <ul style="list-style-type: none"> • Enhancing efficiency of water and sewage systems ■ Industrial products <ul style="list-style-type: none"> • Enhancing efficiency of industrial products 	<ul style="list-style-type: none"> ■ Railways <ul style="list-style-type: none"> • Enhancing energy-saving features of rolling stock • Developing smart operating systems ■ Elevators <ul style="list-style-type: none"> • Enhancing energy-saving features of elevators and escalators through replacement • Enhancing energy efficiency through total building solutions 	<ul style="list-style-type: none"> ■ Smart cities <ul style="list-style-type: none"> • Reducing CO₂ through comprehensive urban energy management solutions ■ Vehicle electrification <ul style="list-style-type: none"> • Promoting electrification through electric powertrain systems ■ Home appliances <ul style="list-style-type: none"> • Enhancing energy efficiency of home appliances • Promoting connected home appliances ■ Smart therapies <ul style="list-style-type: none"> • Enhancing energy-saving features of medical devices



In the IT sector, Hitachi is contributing to building a low-carbon society by transforming social systems and lifestyles by providing innovative digital solutions.

In the energy sector, we are contributing to CO₂ reduction through the provision of power generation systems using non-fossil energy, such as renewable energy and nuclear power, and creating smart grids that transmit and distribute power efficiently and stably and can optimize local supply and demand.

In the industry sector, along with providing high-efficiency industrial products and improving the overall efficiency of clients' factories, we are using IoT and AI to optimize operations to help our customers reduce their CO₂ emissions.

In the mobility sector, we are promoting energy savings by making trains lighter and introducing operating systems that use cutting-edge IT to improve overall efficiency.

Finally, in the smart life sector, we are providing clean-energy vehicles, smart home appliances, and other highly efficient, energy-saving products and services to make people's lives safer, more convenient, and comfortable by improving connectivity through the use of IT. In addition, we are working with our business partners to build smart cities and smart mobility systems that bring those technologies together, thereby helping to create decarbonized cities that improve the lives of all residents.

Calculating Avoided Emissions During the Use of Products and Services

In calculating CO₂ emission reductions from the use of our products and services, such as those cited in our decarbonization business above, we use the following methods depending on the nature of the business, as set out in the Guidelines on Calculating CO₂ Emission Reductions for Hitachi Group Products and Services.*1

(1) Enhancing energy-saving features

Calculate avoided emissions as reductions in CO₂ emissions by comparing the reductions in CO₂ emissions due to energy-saving improvements in new products and services with earlier ones having equivalent functions (using fiscal 2010 as the base year), considering the production volume of the relevant years.

(2) Switching to other solutions

Calculate avoided emissions as reductions in CO₂ emissions as a result of switching to a new solution offering value equivalent to an earlier solution.

(3) Switching to non-fossil energy sources

Calculate avoided emissions as reductions in CO₂ emissions when embracing energy

solutions entailing a switch from grid-supplied electricity (from both fossil and non-fossil fuels, using fiscal 2010 as the base year) to electricity from just non-fossil energy sources, such as renewable energy and nuclear power.

Based on the above approach to reducing CO₂ emissions as avoided emissions, we will further enhance the energy-saving features of our products and services, promote electricity from non-fossil fuels, and provide low-carbon solutions to achieve our long-term targets for further reductions through our decarbonization business.

*1 The Guidelines are based on various standards, including the Guidance on Quantifying Greenhouse Gas Emission Reductions from the Baseline for Electrical and Electronic Products and Systems (IEC TR62726) issued by the International Electrotechnical Commission (IEC), and calculation methods established by the government or industrial associations.

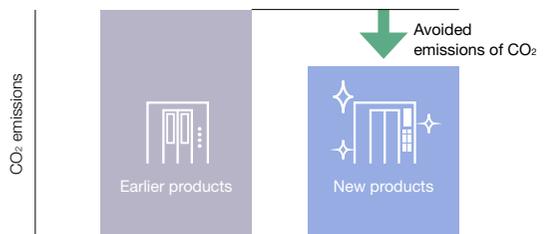
Calculating CO₂ Emission Reductions as Avoided Emissions

Reductions through enhanced energy-saving features of products and services

(1) Enhancing energy-saving features

- Calculate avoided emissions as reductions in CO₂ emissions by comparing the reductions in CO₂ emissions due to energy-saving improvements of new products and services with earlier ones having equivalent functions

E.g., Elevators

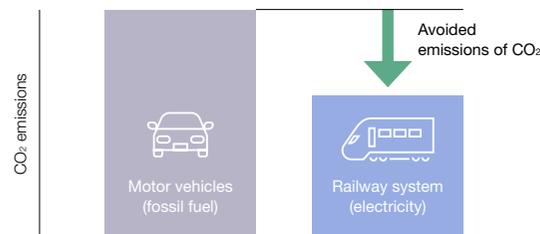


Reductions through solutions

(2) Switching to other solutions

- Calculate avoided emissions as reductions in CO₂ emissions as a result of switching to a new solution offering value equivalent to an earlier solution

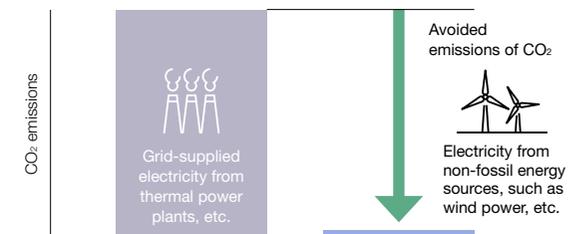
E.g., Railway system



(3) Switching to non-fossil energy sources

- Calculate avoided emissions as reductions in CO₂ emissions by comparing with grid-supplied electricity

E.g., Wind power, nuclear power plants, etc.

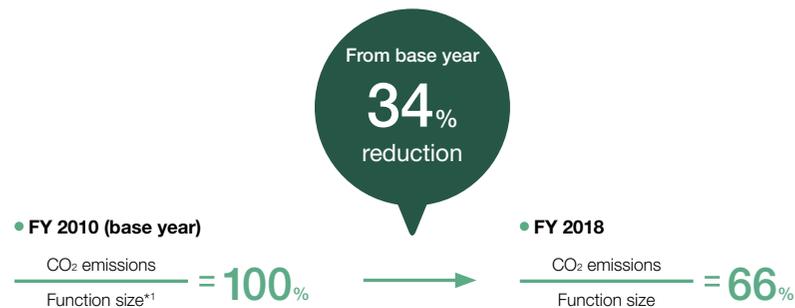


Improved Environmental Performance in Products and Services

Under the Environmental Action Plan for 2018, Hitachi set a target of reducing CO₂ emissions during usage per product and service function. Our goal was to reduce CO₂ emissions by 40% in fiscal 2018—the final year of the action plan—compared to fiscal 2010 for a group of products capable of making a big contribution to resolving environmental issues. Our actual rate of reduction in fiscal 2018 was 34%. We attribute the shortfall to the fact that, among our broad array of products, those featuring high environmental performance failed to reach their sales targets, resulting in a lower reduction rate for the Group as a whole.

Key Indicators

- Reduction in CO₂ Emissions (Hitachi Group)



*1 Major functions of products correlated to CO₂ emissions.

Fiscal 2019 marked the start of the Environmental Action Plan for 2021, established in line with the 2021 Mid-term Management Plan. Going forward, we will continue our efforts to reduce the environmental burden globally by further promoting environmentally conscious design in our products and services and developing and advancing innovative solutions.

Improving Environmental Performance Through Environmentally Conscious Design Assessments

We conduct independently developed Environmentally Conscious Design Assessments for all products and services involving a design process to steadily improve environmental performance throughout the Group. To reduce the environmental burden in multifaceted ways, 30 environment-related areas are assessed for their impact on climate change, resource depletion, and environmental pollution (ecosystem degradation) at each stage of our products' and services' life cycle.

In addition to implementing these assessments, to meet the IEC 62430*1 criteria for environmentally conscious design, we are integrating environmentally conscious design and development of products and services into our existing management system, including by meeting environmental regulatory requirements and ascertaining the environment-related needs of our stakeholders.

For our main, priority products, we conduct not only Environmentally Conscious Design Assessments but also Life Cycle Assessments (LCAs) to quantitatively evaluate their burden on the global environment in such areas as the consumption of mineral resources, fossil fuels, and water resources, as well as their impact on climate change and air pollution. The results of such LCAs are disclosed to our stakeholders and utilized in improving the design of next-generation products.

*1 The standard developed by the International Electrotechnical Commission concerning environmentally conscious design for electrical and electronic products.

Visualizing CO₂ Emissions Through Our Carbon Footprint

Participation in the Carbon Footprint Communication Program (Services & Platforms Business Unit, Hitachi, Ltd.)

The carbon footprint of products (CFP) is the CO₂ equivalent of the total amount of greenhouse gases (GHGs) emitted over the entire life cycle of a product or service—from procurement of materials through to disposal and recycling. Making the GHG emission amount visible in this way encourages efforts to reduce the amount of carbon emitted by products over their whole life cycle. Countries and regions around the world use the CFP approach.

Hitachi launched CFP assessment in 2009. We participate in the Carbon Footprint Communication Program of the Japan Environmental Management Association for Industry (JEMAI) and are working to expand the number of Approved CFP Products.*¹ The program calls for the calculation and disclosure of CO₂ emissions throughout the life cycle of approved products. We go one step further, though, disclosing not only the CO₂ emitted by our products but also the rate of reduction from previous models in an attempt to provide relevant data that is more specialized, transparent, and neutral in nature.

In fiscal 2018, the midrange storage array Hitachi Virtual Storage Platform G130 (and five other models in the series) was newly verified and approved by the JEMAI CFP Program. Products approved in earlier years are introduced in our catalogs and on both in-house and external websites.

*¹ Approved CFP Product: A product that is tested according to the product category rules of the Carbon Footprint Communication Program, is verified as conforming to those rules, and for which an application is made for registration and public announcement.

Products Approved/Certified for a CFP Declaration in Fiscal 2018

Product	Midrange storage array	
Model (parentheses indicate name of previous model)	Hitachi Virtual Storage Platform G130 (G100), G150 (G100), G350 (G200), G370 (G400), G700 (G600), G900 (G800)	
Rate of reduction in CO₂ emission (compared to previous model)	-34% to -57%	

Reducing CO₂ Emissions Throughout the Value Chain

“Chatbot Service” to Facilitate Digital Communications (Systems & Services Business, Hitachi, Ltd.)

To support workstyle reforms, Hitachi, Ltd. developed and launched in June 2018 “Chatbot Service,” a digital communications tool that can advance operational reforms and create new value. The service uses a chatbot*1 to improve the efficiency of responses to inquiries for a variety of businesses. In responding to inquiries via chat, it automatically draws on operational scenarios and FAQs created from knowledge accumulated within a company. This can lighten the work burden of help desks and contact centers that handle internal and external inquiries.

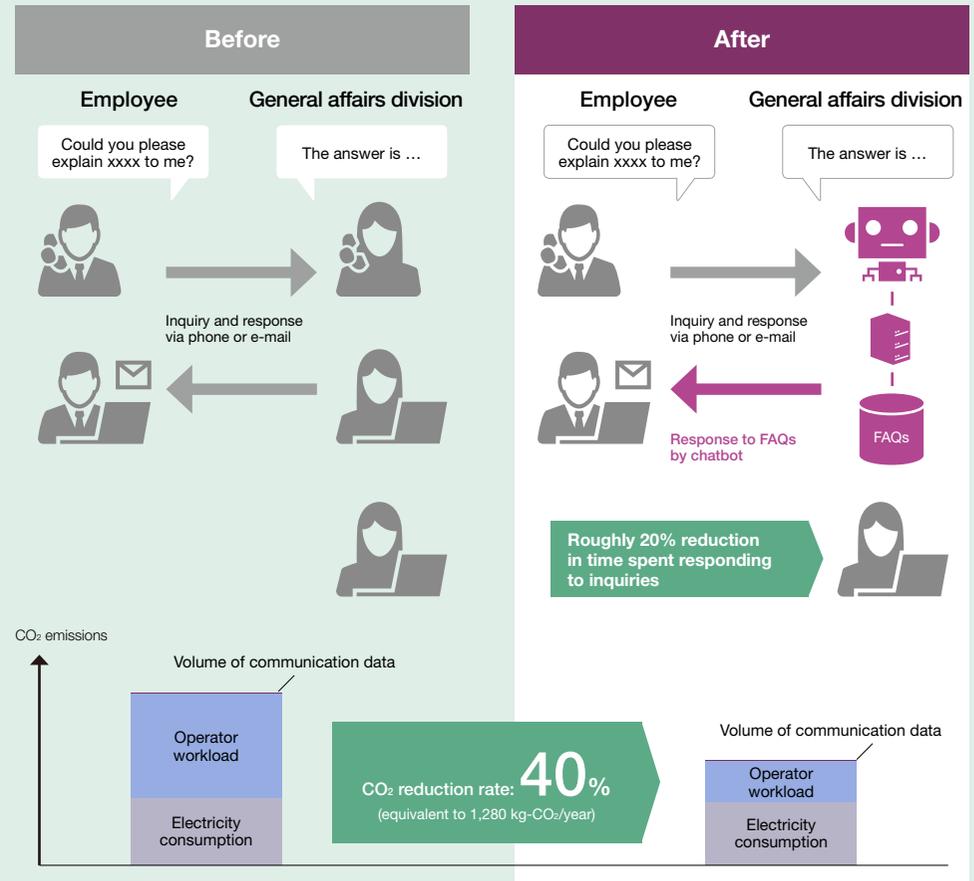
A chatbot service was developed following trials within Hitachi’s general affairs division, where it was used alongside human operators to respond to inquiries. This helped reduce the number of inquiries handled by operators in fiscal 2018 by 20% compared to fiscal 2017. The improved efficiency in both workload and energy consumption from equipment use resulted in reducing CO₂ emissions by 40% (equivalent to 1,280 kg-CO₂) from the previous fiscal year, as calculated using the SI-LCA method*2 developed by Hitachi. This method assesses CO₂ emissions over the entire life cycle of services and solutions, from design and development to use and disposal.

Hitachi will strengthen its chatbot functions and expand the range of digital communications services, developing them into solution cores for Lumada. We will thereby support the creation of new value and reform of workplace operations, while also contributing to reducing the environmental burden, such as through lower CO₂ emissions.

*1 Chatbot: A computer program that uses artificial intelligence to respond automatically to questions using text and audio.

*2 SI-LCA: The System Integration-Life Cycle Assessment method used to calculate CO₂ emissions.

Before and After Introducing the Chatbot Service



Contributing to a Low-Carbon Society at Factories and Offices

Objectives, Activities, and Achievements

Reducing CO₂ Emissions at Factories and Offices

In order to achieve our long-term environmental targets, we are aiming to reduce CO₂ emissions from our factories and offices 50% by fiscal 2030 compared to fiscal 2010 levels, and working to promote thoroughgoing energy savings and encourage the deployment of renewable energy.

Specifically, at our factories we are advancing initiatives to improve equipment efficiency by introducing and upgrading to high-efficiency equipment as well as to reduce energy use during production by raising efficiency through IoT-based measures such as installing smart meters. At our offices, we are making efforts to reduce CO₂ emissions by building new high-efficiency facilities and combining and integrating existing facilities.

We are also proceeding with plans to install solar power generation systems at our factories and offices and purchase renewable energy as well as advancing the adoption of renewable energy credits.*1 In fiscal 2018 we introduced a new solar power generation scheme. This is an off-balance-sheet self-consumption scheme in which solar power generation equipment is installed at facilities without becoming an asset of Hitachi itself, and under which electricity is paid for according to the amount generated. We are also advancing our purchasing of renewable energy, with wind, hydroelectric, and geothermal power already accounting for 100% of the electricity purchased at two business sites.

As a result of these initiatives, in fiscal 2018, 0.3% of the energy used across Hitachi was renewable energy generated at our factories and offices. We will continue to deploy renewable energy at our factories and offices, aiming to generate 2% of the total amount of electricity used by the Group by fiscal 2030.

*1 Credits assigned to energy certified as having been produced from renewable sources. Purchasers of such credits can offset their conventional energy use instead of implementing their own reduction measures.

UNIPARA-mini Series Uninterruptible Power System (Hitachi Industrial Products, Ltd.)

Hitachi Industrial Products provides an uninterruptible power system (UPS) to supply electricity in emergency situations, such as a power outage or malfunction, to manufacturing equipment, public facilities, and a range of other fields. In fiscal 2018, a new series of compact systems was launched called the UNIPARA-mini (10 to 50 kVA) providing high energy efficiency.

The UNIPARA-mini is the first small- to medium-capacity model in the industry to fully use a silicon carbide (SiC) element as the main circuit. The series takes advantage of the high-temperature operation features and high-speed switching capabilities of SiC elements to miniaturize the cooling unit and filter, reducing the weight by up to around 40% and the installation area by roughly 60%, compared to the previous model. In addition, thanks to the low level of electricity loss, the series offers an energy efficiency rating of 93.5% at 20 kVA (and maximum efficiency of 94.3%)*1 which is top-class for the industry, helping reduce UPS power consumption. Through these improvements, annual energy reduction has increased to 8,744 kWh and CO₂ reductions have risen to 4.6 t-CO₂*2 compared to Hitachi's previous Hiverter-MP model.

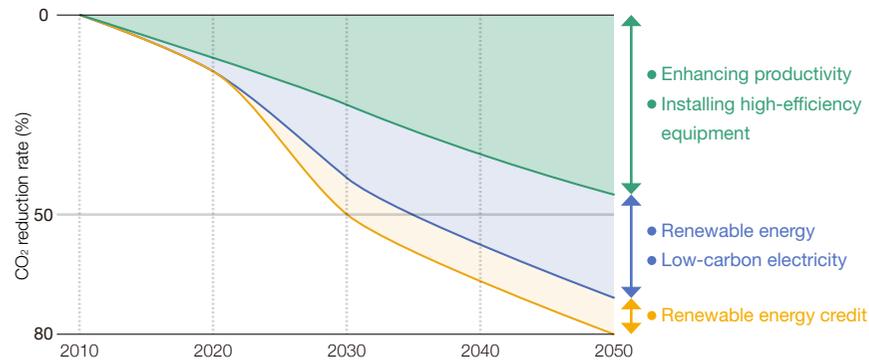


UNIPARA-mini (30 kVA).

*1 The efficiency rating is based on the 20 kVA UPS (20 kVA/16 kW output) and maximum efficiency on the 20kVA UPS (10 kVA/10 kW output), calculated using the UPS efficiency: measurement method of the JIS C 4411-3 2014 Annex J (standard).

*2 Calculations for both the UNIPARA-mini and the previous model (H-MP) are based on an efficiency rating of 20 kVA, 24-hour continuous operations 365 days a year, an air-conditioning performance coefficient of 2.0, a power factor rating of 0.8, and a load factor of 100%.

Low-Carbon Roadmap for Factories and Offices



Introducing the Hitachi Internal Carbon Pricing Framework

We started operating the Hitachi Internal Carbon Pricing*¹ (HICP) framework in fiscal 2018 in order to promote increased investment in low-carbon equipment at our factories and offices. The HICP framework makes CO₂ reduction due to investment in low-carbon equipment visible, and by adding the effects of such investment to previously calculated evaluations of the effects of energy reduction through investment, it helps to facilitate internal judgments on investment in equipment that take low-carbonization into account.

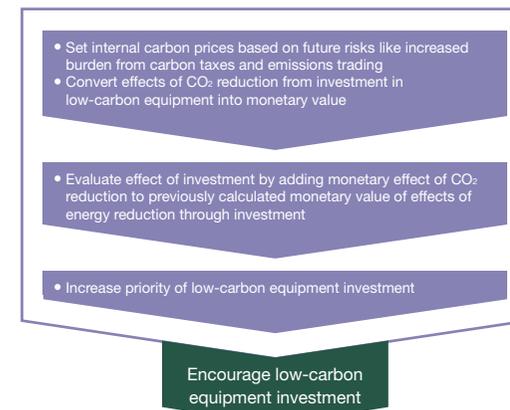
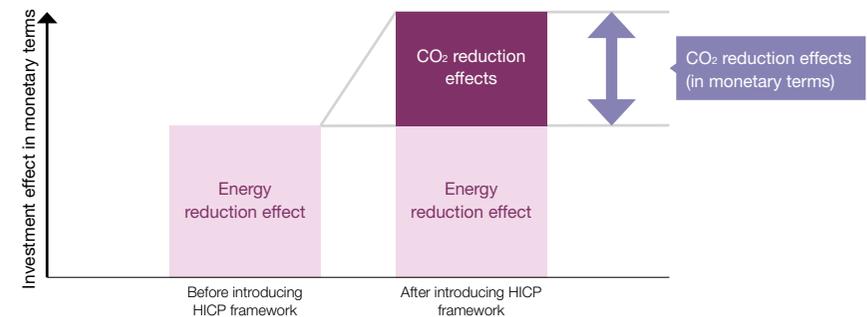
Specifically, with reference to emissions trading and carbon taxes inside and outside Japan, we establish company-internal carbon prices, convert into monetary value the effect of CO₂ reduction due to investment in low-carbon equipment, add this to the value of energy reduction effects, and use the result to evaluate the effect of our investment. By applying incentives like these, we are expanding our investment in low-carbon equipment still further.

As the climate change issue deepens, we anticipate risks like increased burdens from carbon taxes and new emissions trading frameworks to emerge. By incorporating those risks into our equipment investment decisions, we can not only make low-carbon equipment investment a

higher priority, but also minimize the future risks of climate change and make ourselves more resilient. The introduction of the HICP framework is a key part of this process.

*1 Internal carbon pricing: An in-house tool to assess in monetary terms the amount of carbon generated or reduced in order to voluntarily make investment decision and conduct risk management.

Hitachi Internal Carbon Pricing (HICP) Framework



Actions and Achievements

In fiscal 2018, the final fiscal year of the Environmental Action Plan for 2018, the reduction in energy use per unit, one of the environmental goals for factories and offices, was 14% against a target of 17% (from a base year of fiscal 2005). Part of the reason for not hitting the target was an increase in energy use due to the in-house manufacture of products that had been outsourced and a lower efficiency of facility use due to a decrease in sales. There were also some business divisions that could not achieve expected reductions in energy use per unit due to a failure to appropriately respond to a reduction in the fixed power allocation linked to sales. Because Hitachi's operations cover many different areas, reductions in energy use per unit at factories and offices are assessed using an activity amount*1 at each business site as the denominator.

The Environmental Action Plan for 2021 calls for even higher goals around the world, and we will continue to harness our expertise in control and IoT technologies to actively pursue energy conservation measures at our factories and offices.

We report the total amount of CO₂ emissions from our entire Group, including CO₂ emissions from power plants selling electricity. Total CO₂ emissions in fiscal 2018 decreased by approximately 200 kt-CO₂ compared to fiscal 2017. This is due largely to a reduction in the operation rate of power plants, as annual CO₂ emissions by region, excluding that from these power plants, remained almost the same with that in fiscal 2017. In the Americas, a materials company that became a consolidated member of the Hitachi Group in fiscal 2016 accounts for a large portion of CO₂ emissions, and we will look into ways to promote the use of inexpensive renewable energies.

*1 A value closely related to energy use at each business site (for example, production quantity, output, building floor space, and number of employees).

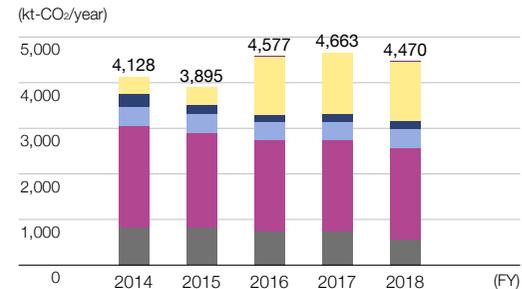
Key Indicators

- Reduction in Energy Use per Unit (Hitachi Group) ✓



*1 Energy volume used within the organization (Scopes 1 and 2).

- CO₂ Emissions (Hitachi Group's factories, offices, and power plants) ✓



Breakdown by Region (kt-CO₂/year) ✓

	2014	2015	2016	2017	2018
Europe	8	7	11	16	15
Americas	358	375	1,273*1	1,332*1	1,307*1
China	305	211	166	175	170
Rest of Asia	423	402	384	407	426
Japan	2,217	2,090	2,011	1,994	1,996
Power plants*2	817	810	732	739	556
Total	4,128	3,895	4,577	4,663	4,470

*1 Includes 958 kt-CO₂ (fiscal 2016), 1,036 kt-CO₂ (fiscal 2017), and 1,087 kt-CO₂ (fiscal 2018) emitted by a materials company that became a consolidated member of the Hitachi Group in fiscal 2016.

*2 Emissions by power plants selling electricity were retroactively added in fiscal 2017.

Notes:

- The CO₂ electrical power conversion factor uses the 2005 emission coefficient for Japan published by the International Energy Agency (IEA) in the 2010 edition of *CO₂ Emissions from Fuel Combustion*.
- Energy-related CO₂ emissions were 1,869 kt-CO₂ (Scope 1) and 2,601 kt-CO₂ (Scope 2).

Introducing Renewable Energy

We are promoting the use of solar, wind, and other forms of renewable energy at our business sites. During fiscal 2018, Hitachi generated an aggregate of 7,067 MWh of renewable energy for its own use, which is 2.2 times the amount generated in fiscal 2017, corresponding to annual power consumption by 3,000 households. Hitachi Computer Products (America) and Tata Hitachi Construction Machinery (India) purchased 10,425 MWh and 7,500 MWh of renewable energy, respectively, to power their factories during fiscal 2018.

Reducing Transportation Energy Consumption

As part of our efforts to reduce energy output during transportation as well as at our factories and offices, we have established targets for the reduction of transportation energy use per unit for each business unit and Group company. Our business sites are promoting a modal shift to highly efficient transportation methods, improving truck loading ratios and taking other measures to reduce transportation energy consumption, and switching to the use of eco-cars for in-house operation. CO₂ emissions from transportation inside Japan for the Hitachi Group in fiscal 2018 were 102.8 kt-CO₂,  equivalent to automobiles owned by 78,000 households.

We are making efforts to reduce transportation energy by actively promoting the use of railways, particularly for long-distance transportation. In recognition of the efforts, Hitachi, Ltd. and Hitachi-Omron Terminal Solutions have been designated by the Ministry of Land, Infrastructure, Transport, and Tourism as Eco Rail Mark companies*¹ as of fiscal 2018. Furthermore, the Eco Rail Mark was conferred on Hitachi, Ltd. and Hitachi Industrial Equipment Systems, recognizing four of their products as Eco Rail certified products.*² A modal shift from truck to railway

transportation is estimated to reduce CO₂ emissions per unit to one-eleventh, and we will continue to make more use of railways for long-distance transportation.

*¹ A mark conferred on companies using railways for more than 15% of its freight land transportation covering 500 km or more; for 15,000 metric tons or more in volume per year; or for more than 15 million ton-kilometers in volume x distance per year.

*² A mark conferred on products using railways for more than 30% of its freight land transportation covering 500 km or more in terms of volume x distance.



About the Eco Rail Mark

Energy Savings in Eco-Factories & Offices

Achieving Low-Carbon Factories Through Photovoltaic Power Generation (Tata Hitachi Construction Machinery Co. Pvt. Ltd.)

Tata Hitachi Construction Machinery in India, a consolidated subsidiary of Hitachi Construction Machinery, is actively introducing renewable energy at its business sites. India's supply of electricity is chronically unstable, as rapid economic growth is causing demand for electricity to expand by an average of 4.9% a year. In response, the company is proactively introducing large-scale photovoltaic power generation facilities, which helps to not only stabilize the supply of electricity and operations at its plants but also reduce CO₂ emissions and electricity costs.

A large-scale, 5,000 kW photovoltaic power generation facility was established on the grounds of the company's Kharagpur Works in West Bengal State, generating around 7,000 MWh of electricity per year, or around 30% of the plant's energy consumption. This lowered CO₂ emissions by around 3,500 tons in fiscal 2018 and also lowered electricity costs by some 25%.

The company's Dharwad Works in Karnataka State, meanwhile, consumes around 7,500 MWh of solar energy generated offsite to meet approximately 75% of its annual electricity needs. The electricity is supplied through a power purchase agreement under India's open access system.*1

Solar-generated energy used by the two plants combined annually is 14,500 MWh. This is approximately 50% of the total electricity consumed by Tata Hitachi Construction Machinery and makes the company one of the highest consumers of such energy within the Group.



Solar panels on the grounds of the Kharagpur Works.

*1 Open access system: A system in which access to the power grid managed by power transmitters and distributors is opened to generators of natural energy, allowing the prioritized transmission of natural energy generated offsite to customers (plants) and others.

R&D Facility Featuring High Environmental Performance and Comfort (Central Research Laboratory, Hitachi, Ltd.)

The Central Research Laboratory of Hitachi, Ltd. established a new research hub in April 2019 to accelerate innovation through open, collaborative creation for the realization of the Sustainable Development Goals (SDGs) and Society 5.0.

Called "Kyōsō-no-Mori,"**1 it is a new R&D center for collaborative creation centered on a research building (Kyōsō-tō) offering comfort conducive to the creation of new ideas and solutions, as well as outstanding environmental performance. The building design combines the use of natural light with highly efficient lighting while also optimally controlling the inflow of fresh air and thermal insulation, depending on the season. It also actively incorporates advanced, highly efficient BAT (best available technology) equipment certified by the Ministry of the Environment. The result is a highly hospitable working environment featuring enhanced energy efficiency and incorporating the natural richness of the surrounding forest.

As a result of these efforts, the Kyōsō-tō received the highest S ranking (BEE 3.2)**2 from the Comprehensive Assessment System for Built Environment Efficiency (CASBEE), which evaluates overall environmental performance. The office was also recognized for its energy efficiency, receiving a Building Energy Index (BEI) value of 0.74 under the Building-housing Energy-efficiency Labeling System (BELS) to gain accreditation as a low-carbon facility.

Through open, collaborative creation at Kyōsō-no-Mori, Hitachi will engage in innovation to resolve social issues and raise quality of life for a human-centric sustainable society.



The new Kyōsō-tō research building within the Kyōsō-no-Mori facility.

*1 Kyōsō-no-Mori (forest of collaborative creation) includes a museum (Odaira Kinen-kan) to showcase capabilities, a research building (Kyōsō-tō) to carry out projects, and a production shop (Jinsō-tō) to rapidly develop prototypes.

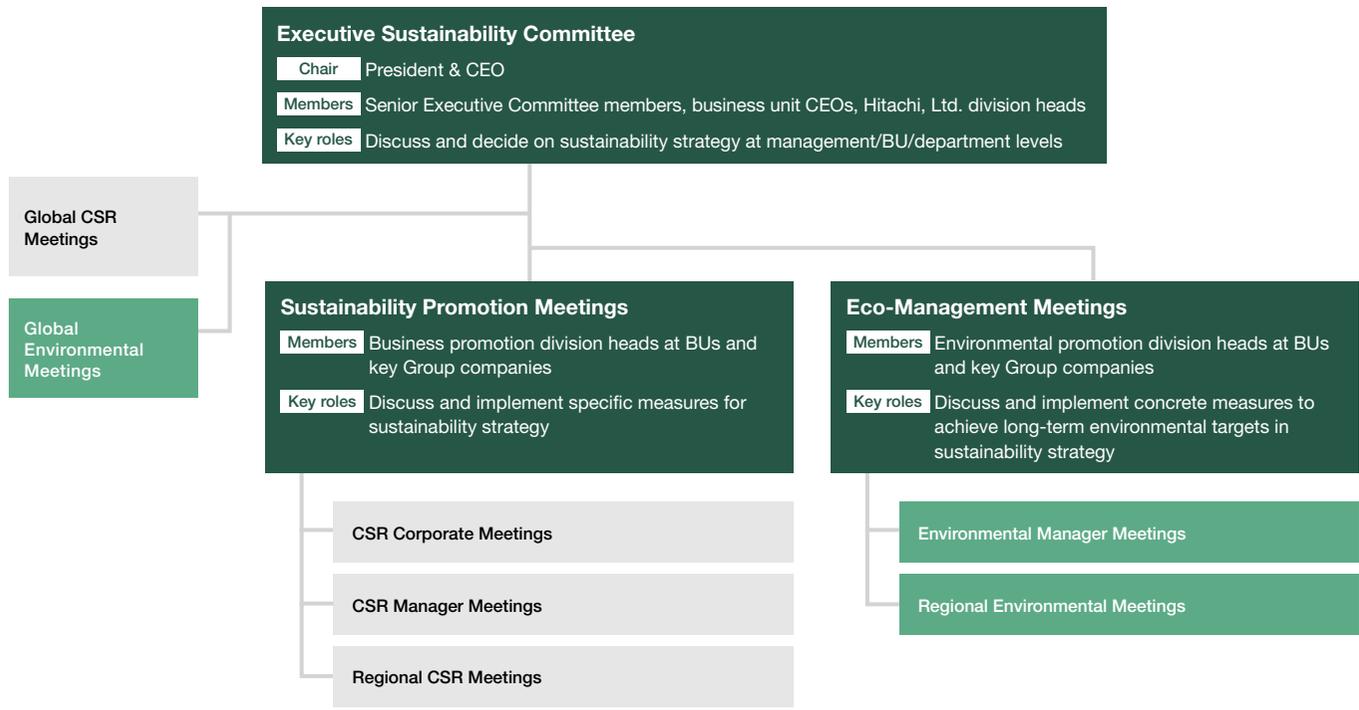
**2 BEE: Building Environmental Efficiency.

Climate-related Information Disclosure (Based on TCFD Recommendations)

The Task Force on Climate-related Financial Disclosures (TCFD), established by the Financial Stability Board (FSB), published its final report on information disclosure in June 2017 noting that investors needed more clarity in corporate disclosures on climate-related risks and opportunities and governance measures. In June 2018, Hitachi announced its endorsement of the TCFD's recommendations.

The following contains key climate-related information in line with the TCFD's recommendations.

Sustainability Strategy Promotion Structure



Governance

Hitachi sees climate change and other environmental issues as important management issues. In September 2016, after discussions at the Board of Directors, we established and announced long-term environmental targets called Hitachi Environmental Innovation 2050 containing CO₂ reduction targets for 2030 and 2050.

In April 2017, we established the Executive Sustainability Committee, chaired by the president and CEO and staffed by other top executives, as the highest-ranking body to discuss and reach decisions on the Group's sustainability strategy in accordance with our management and business strategies. Members meet twice a year to discuss material environment-related policies and measures, including those in response to climate change, to share progress reports and achievements, and to set the course for further improvements and new initiatives.

We have adopted a committee system to separate the responsibilities for management oversight from the execution of business operations. Under this system, the Audit Committee of independent directors conducts an audit of sustainability-related operations once a year. Reports on climate-related material issues are made to the committee by Hitachi executive officers.

Hitachi, Ltd. Vice President and Executive Officer Osamu Naito participated in the TCFD Study Group on Implementing TCFD Recommendations for Mobilizing Green Finance Through Proactive Corporate Disclosures, launched by the Ministry of Economy, Trade, and Industry in August 2018, and helped compile its December report. Hitachi also participates in the TCFD Consortium—launched in May 2019 with the participation of 164 companies and other organizations—as a member of its Steering Committee and contributes to discussions on approaches to effective corporate information disclosure and the use of such information by financial institutes and other entities to make appropriate investment decisions.

Sustainability Strategy Promotion Structure

Enhancing Environmental Governance

Audit Committee

Strategy

We established long-term environmental targets called Hitachi Environmental Innovation 2050 in September 2016 based on our Environmental Vision defining the goals of environmental management from a broader perspective. Wishing to fulfill our responsibilities as a global company in achieving a low-carbon society and taking note of the total CO₂ reductions required globally—as projected under the RCP 2.6*¹ and RCP 8.5*² scenarios in the *Fifth Assessment Report* of the Intergovernmental Panel on Climate Change (IPCC)—we have set long-term CO₂ reduction targets for our entire value chain of 50% by fiscal 2030 and 80% by fiscal 2050, compared to fiscal 2010.

Our 2021 Mid-term Management Plan announced in May 2019, meanwhile, calls for reducing CO₂ emissions throughout the value chain by more than 20% by fiscal 2021, compared to fiscal 2010.

*1 A Representative Concentration Pathway (RCP) scenario under which, at the end of the 21st century, the increase in global temperatures from preindustrial levels is kept below 2°C.

*2 An RCP scenario that assumes that emissions continue to rise, resulting in an approximately 4°C rise in global temperatures compared to preindustrial levels.

Climate Change Mitigation/Adaptation



The Environmental Vision and Hitachi Environmental Innovation 2050

Efforts to Achieve a Low-Carbon Society

Identification and Assessment of Climate-related Risks and Opportunities

Climate-related Risks

As for climate-related business risks, we have followed the TCFD’s classification in considering (1) risks related to the transition to a low-carbon economy in the 2°C scenario and (2) risks related to the physical impacts of climate change in the 4°C scenario, which assumes that efforts to reduce global CO₂ emissions have failed. Risks are categorized into short term, medium term, and long term, defined as follows:

Short term: Over the next three years from fiscal 2019 to 2021 (corresponding to the three-year management period covered by the 2021 Environmental Action Plan, in line with the 2021 Mid-term Management Plan)

Medium term: Through fiscal 2030 (time span of our fiscal 2030 long-term environmental targets)

Long term: Through fiscal 2050 (time span of our fiscal 2050 long-term environmental targets)

(1) Risks related to the transition to a low-carbon economy (applying mostly to the 2°C scenario)			
Category	Major risks	Time span	Main initiatives
Policy and legal	Increased business costs from the introduction of carbon taxes, fuel/energy consumption taxes, emissions trading systems, and other measures	Short to long term	<ul style="list-style-type: none"> • Avoid or mitigate increases in business costs, such as from carbon taxes, by further enhancing production and transport efficiency and promoting the use of non- or low-carbon energy sources
Technology	Loss of sales opportunities due to delays in technology development for products and services	Medium to long term	<ul style="list-style-type: none"> • Contribute to reducing CO₂ emissions by developing and marketing innovative products and services that lead to the achievement of long-term environmental targets and expanding the decarbonization business • Promote the development of low-carbon products by implementing Environmentally Conscious Design Assessments when designing products and services
Market and Reputation	Impact on sales due to changes in market values or assessment of our approach to climate issues	Medium to long term	<ul style="list-style-type: none"> • In the light of rising investor and market interest in climate change and growing expectations of the business sector, clearly identify the reduction of CO₂ emissions in our management and business strategy by incorporating reduction targets for fiscal 2021 in the 2021 Mid-term Management Plan in line with our long-term environmental targets

(2) Risks related to the physical impacts of climate change (4°C scenario)

Category	Major risks	Time span	Main initiatives
Acute and chronic	Climate-related risks to business continuity, including increased severity of typhoons, floods, and droughts (acute risks) as well as rising sea level and chronic heat waves (chronic risks)	Short to long term	<ul style="list-style-type: none"> Take into account the possibility of flood damage when deciding on the location or equipment layout of a new plant. Measures tailored to the water risks of each manufacturing site will be strengthened in the future based on the results of a water risk assessment now being conducted

 Initiatives to Build a Water Efficient Society

Climate-related Opportunities

CO₂ emissions during the use of our products and services by our customers account for approximately 90% of total emissions in our value chain. To achieve the CO₂ reduction targets set forth in our long-term environmental targets and 2021 Medium-term Management Plan, it is therefore essential that we reduce emissions associated with the use of our sold products and services. Developing and providing products and services that emit zero or very little CO₂ during their use can satisfy customer needs and help meet society's demands for reduced emissions.

This represents a business opportunity for us in the short, medium, and long term and constitutes a major pillar of the Social Innovation Business that we are promoting as a management strategy.

We believe that our business opportunities will expand over the long term as we leverage the strengths of our operational technology (OT), IT, and products, as well as our expertise in R&D, to create such specific solutions as high-efficiency, energy-saving products; high-efficiency production systems using digital technology; power generation systems using non-fossil energy that do not emit CO₂; environment-friendly mobility; and the building of smart, environmental cities.

Society's need to adapt to climate change also presents business opportunities, as we can tap our technological capabilities to provide solutions in preventing and responding to natural disasters.

Climate-related opportunities

Category	Major opportunities	Main initiatives
Products/services and markets	Increased market value and revenue from expanded sales of products and services with innovative technology that can contribute to the mitigation and adaptation of climate change	<ul style="list-style-type: none"> Expand the decarbonization business, develop and market products and services that contribute to a low-carbon society, and promote the development of innovative devices and materials that contribute to reducing the environmental burden
Resilience	Provision of solutions to address climate-related natural disasters	<ul style="list-style-type: none"> Provide disaster-mitigation solutions, such as high-performance fire-fighting command systems

 Contributing to a Low-Carbon Society Through the Decarbonization Business

Responding to Business Risks and Opportunities of Climate Scenarios

To identify specific climate-related risks and opportunities, we examined the business impact of and responses to the 2°C and 4°C scenarios for five businesses that have a relatively high likelihood of being affected by climate change, namely, railway systems, automotive systems, water systems, power generation and power grids, and IT systems. These businesses contribute to improving people's quality of life and enhancing value for our business customers and thus play an important role in our Social Innovation Business. Across all of these businesses, technologies that fuse our strengths in IT and OT, along with energy-related technologies, in particular, are deemed helpful in creating social and environmental value for our customers and society and in adding great value to climate change responses.

Upon examination of the five areas of the Social Innovation Business, we believe that by paying close attention to market trends and developing our business flexibly and strategically, we have high climate resilience in the medium to long term under either the 2°C or 4°C scenario.

Strategies for the 2°C and 4°C Scenarios

Target businesses	Railway systems	Automotive systems	Water systems	Power generation and power grids	IT systems
The business environment under the 2°C scenario	<ul style="list-style-type: none"> Demand for railways, which run on electricity and emit less CO₂, will grow as regulations for CO₂ emissions are strengthened globally Shift to energy-saving railcars will further accelerate, including on existing routes 	<ul style="list-style-type: none"> Electric vehicles will rapidly spread as tighter laws and regulations on fossil fuels push up fuel prices and discourage ownership of internal combustion engine vehicles. Markets for alternative, non-fossil technologies like hydrogen and biofuel vehicles will expand The number of countries and regions with near zero sales of internal combustion engine vehicles will increase 	<ul style="list-style-type: none"> Need for efficient water treatment systems that emit less CO₂ will expand as tighter regulations on CO₂ emissions in each country and region lead to stringent energy regulations on pumps used in water treatment 	<ul style="list-style-type: none"> Power generation facilities for CO₂-free renewable energy, nuclear power, and other non-fossil sources, as well as high-efficiency power generation facilities that contribute to CO₂ reduction will expand with tighter CO₂ emission regulations in each country and region Demand will expand for construction of power networks enabling the mass introduction of renewable energy with large output fluctuations Innovations in energy-saving technologies will further expand demand for energy-saving equipment and services 	<ul style="list-style-type: none"> Climate change will lead to tighter CO₂ emission regulations in each country and region and changes in the market environment, prompting shifts in customers' business portfolios and IT investments The development of and demand for energy-saving, high-efficiency IT and data analysis technologies will further expand Demand will increase for high-efficiency IT systems utilizing CO₂-free non-fossil energy Investments and loans for low-carbon businesses, green bond issues, and other financial businesses will expand
The business environment under the 4°C scenario	<ul style="list-style-type: none"> Transport-related energy regulations will remain weak, discouraging a shift to railways, and conventional modes of transportation like automobiles and motorcycles will persist in some areas The risk of flood damage to railways and related facilities will increase due to a rise in such natural disasters as typhoons and floods 	<ul style="list-style-type: none"> Fuel efficiency laws and regulations will remain lax globally, and internal combustion engine vehicles will remain a major mode of transport; the modal shift will be slow, as conventional automobiles and motorcycles will remain predominant The risk of damage to vehicles will increase due to a rise in such natural disasters as typhoons and floods in various areas 	<ul style="list-style-type: none"> Demand for clean water will increase due to an increase in abnormal weather phenomena like floods, intense heat, and drought Rising temperatures will cause a rise in the volume of required cooling water, the growth of bacteria and algae, and a deterioration in water quality due to floods The risk of damage to water-related equipment from such natural disasters as typhoons and floods will increase 	<ul style="list-style-type: none"> The cost competitiveness of non-fossil energy will increase and demand for renewable, nuclear, and other non-fossil energy will increase as the expansion of energy consumption pushes up the price of fossil fuels The risk of damage to power plants and networks will increase due to such natural disasters as typhoons and floods 	<ul style="list-style-type: none"> Demand for new, high-efficiency technology will expand as damage to information equipment from such natural disasters as typhoons and floods increases and as energy demand for multiplex IT systems in response to BCP increases Investment in social and public systems to reduce damage from more frequent natural disasters will increase
Non-environmental factors (neither the 2°C nor 4°C scenario) and market conditions	<ul style="list-style-type: none"> Economic growth, urbanization, and population growth will drive the railway business globally as an efficient form of public transport for large numbers of passengers, regardless of whether CO₂ regulations are tight; market size in Japan will remain flat, but other markets in Asia and elsewhere will expand Major railway manufacturers will expand their business to meet global demand 	<ul style="list-style-type: none"> Economic growth, urbanization, population growth, and infrastructure development like road construction will expand the global market for automobiles as a flexible and personal means of transport Carmakers will have varying degrees of enthusiasm in promoting electrification Non-environmental factors like safety, security, and comfort will drive competitiveness, as demand increases for new functions like autonomous driving and advanced safety features, and new mobility services like car sharing grow 	<ul style="list-style-type: none"> Economic growth, urbanization, and population growth will push up demand for water in some areas In Japan, local governments and other entities will accelerate wide-area collaboration and privatization in building water systems and improving the efficiency of their management Replacement demand for aging water treatment facilities will increase in developed countries 	<ul style="list-style-type: none"> Economic growth, urbanization, and population growth will push up demand for energy, especially electricity, mainly in developing countries Energy source will be chosen from the perspective of not just CO₂ emissions but also environmental burden, economic performance, safety, and supply stability Stability and efficiency of the power supply will increase through the use of digital technology Both companies and individuals will seek to diversify their energy supply and demand 	<ul style="list-style-type: none"> Further digitization will exponentially increase the volume of data circulated, accumulated, and analyzed New services and businesses utilizing big data, IoT, AI, and other digital technology will expand rapidly
Responses to future business risks and opportunities	<p>Response to 2°C or 4°C scenario</p> <ul style="list-style-type: none"> Continue to strengthen the railway business, as global demand for railways will increase under either scenario Promote R&D of new products and services that improve efficiency of railway services through digital utilization, such as dynamic headway (flexible operation in response to passenger demand), thereby offering customers increased value 	<p>Response to 2°C scenario</p> <ul style="list-style-type: none"> Promote R&D of electrification technology and other alternative technologies to enhance response to new markets, such as for electric vehicles <p>Response to 4°C scenario</p> <ul style="list-style-type: none"> Promote R&D and product development in existing technologies, including internal combustion engines, to not only improve energy efficiency but increase such non-environmental value as safety, security, and comfort 	<p>Response to 2°C or 4°C scenario</p> <ul style="list-style-type: none"> Strengthen provision of seawater desalination facilities and other water generation systems in response to increased water demand from global economic growth, urbanization, and population growth under either scenario 	<p>Response to 2°C or 4°C scenario</p> <ul style="list-style-type: none"> Continue to enhance response to relevant markets in view of expected higher demand for non-fossil energy under either scenario Strengthen the grid solution business in response to increased use of renewable energy with large output fluctuations and diversification of energy suppliers Promote digital service solutions business for diversifying needs of power customers 	<p>Response to 2°C or 4°C scenario</p> <ul style="list-style-type: none"> Continue to develop innovative digital technologies and enhance digital service solutions that generate new value in view of expected growth in society's demand and markets for digital services under either scenario
Financial information (sales volume of each target sector)	Impact on part of 616.5 billion yen in Railway Systems Business Unit sales (FY 2018)	Impact on part of 971 billion yen in automotive system business sales (FY 2018)	Impact on part of 169.1 billion yen in Water & Environment Business Unit sales (FY 2018)	Impact on part of 456.6 billion yen in Energy Sector sales (FY 2018)	Impact on part of 2,121.6 billion yen in IT Sector sales (FY 2018)

We believe that by paying close attention to market trends and developing our business flexibly and strategically, we have high climate resilience in the medium to long term under either the 2°C or 4°C scenario

Note: The above scenario analyses are not future projections but attempts to examine our resilience. How the future unfolds may be quite different from any of these scenarios.

Risk Management

The Hitachi Group is engaged in many different businesses around the world, with each having its own set of risks and opportunities. Climate-related risks are evaluated and monitored for each business unit and Group company as part of a process of assessing risks and opportunities in accordance with the Environmental Action Plan, updated every three years. The results are tabulated by the Sustainability Promotion Division of Hitachi, Ltd., and their importance is checked at Sustainability Promotion Meetings. Those risks and opportunities perceived as being particularly important for the Group as a whole are deliberated by the Executive Sustainability Committee, chaired by the president and CEO of Hitachi, Ltd.

Metrics and Targets

Our environmental activities are managed through the Environmental Action Plan, whose indicators and targets are updated every three years, including those to measure and manage climate-related risks and opportunities.

Under the 2021 Environmental Action Plan (covering fiscal 2019–2021), each business unit and Group company established their respective CO₂ reduction targets in line with the 2021 Mid-term Management Plan, announced in May 2019, calling for a reduction of at least 20% in CO₂ emissions across our value chain by fiscal 2021 compared to fiscal 2010, and environmental activities are being advanced to achieve those targets. To enable the setting of targets and monitoring of progress across our many Group businesses and services throughout the value chain, we use the reduction rate of CO₂ emissions compared to fiscal 2010 as an indicator.

Total greenhouse gas emissions (Scope1, Scope2, and Scope3) across our consolidated value chain are calculated based on GHG Protocol standards and have been published since fiscal 2013. Total CO₂ emissions can fluctuate greatly due to the restructuring of our operations, but given the nature of our business, some 90% of our emissions come from the use of sold products in Scope 3. Among our products and services featuring equivalent value, therefore, we give priority to providing customers and society with those that emit less CO₂. At the same time, we will seek to further reduce CO₂ emissions during production.

 [Environmental Action Plan for 2021 \(Fiscal 2019–2021\)](#)

 [Environmental Load Through the Value Chain](#)