Hitachi's Action on Climate Change to Achieve "Hitachi Environmental Innovation 2050"

Recent Developments Regarding Climate Change

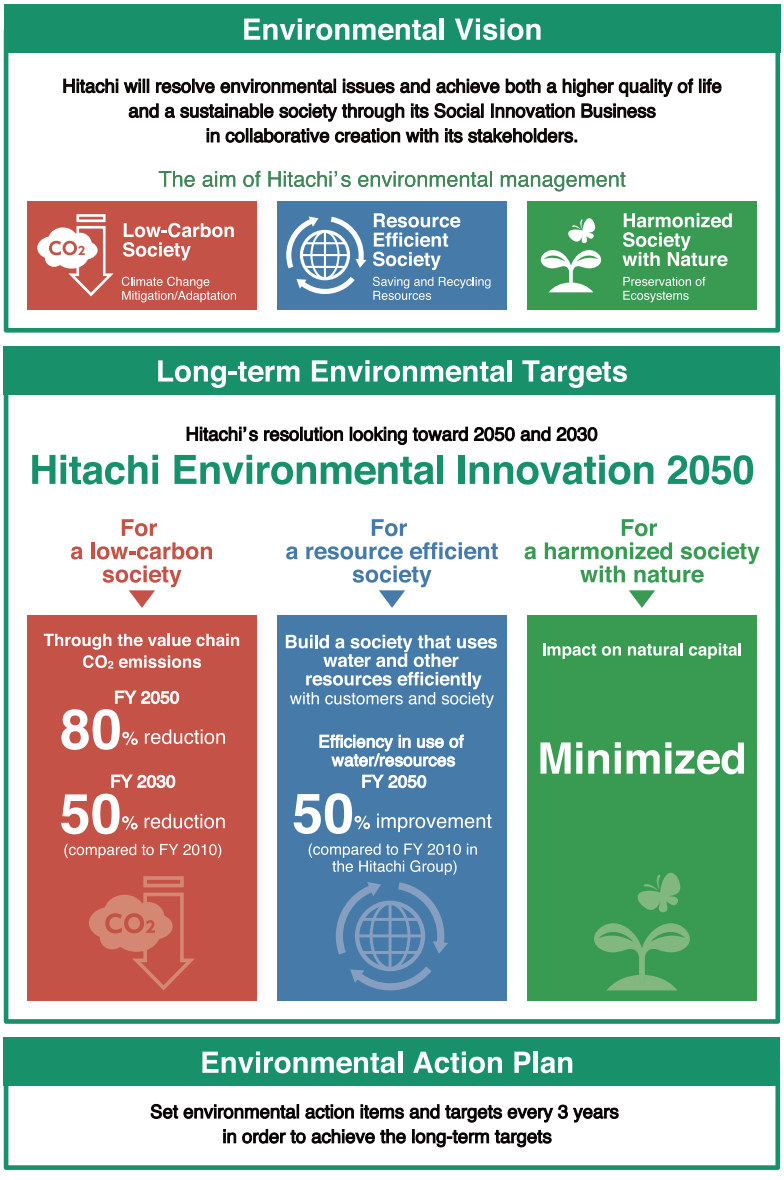
A series of natural disasters occurred around the world during 2018 in which climate change is believed to play a part, including extreme rainfall events in Japan, wildfires in California, and drought in Europe. Climate change is starting to have an impact on human activity much faster than expected.

Internationally, several developments have taken place in relation to climate change. "Global Warming of 1.5°C," a special report by the Intergovernmental Panel on Climate Change (IPCC) released in 2018, makes the point that most of the effects of climate change can be avoided if the temperature rise is limited to 1.5°C. The 24th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP24) held in December of that year adopted guidelines for implementing the Paris Agreemant that came into effect in 2016. Meanwhile, the European Commission of the European Union issued new reduction targets in November 2018 that set a target of net-zero emissions of greenhouse gases within its territory by 2050. In April 2019, the Japanese government issued a long-term strategy expressing its policy of achieving net-zero emissions of greenhouse gases as soon as possible.

Along with rapidly expanding ESG investment*, institutional investors such as pension funds and insurers who invest for the long term are also taking steps to pursue corporate action on climate change for financial reasons. In June 2017, at the request of the G20 Finance Ministers and Central Bank Governors Meeting, the Task Force on Climate-related Financial Disclosures (TCFD) set up by the Financial Stability Board issued a statement calling for companies to disclose information for investors on climate-related risks and opportunities and the associated governance. The Japanese government also followed up on these developments, with the Ministry of Economy, Trade and Industry formulating TCFD Guidance in 2018, establishing a TCFD Study Group on Implementing TCFD Recommendations for mobilizing green finance through proactive corporate disclosures. Subsequently, a TCFD Consortium was launched in May 2019 with participation by TCFD member companies;

* ESG investment: Investment that takes account not only of conventional financial information, but also environmental, social, and governance considerations.

Figure 1 | **Hitachi's Environmental Vision and Long-term Environmental Targets**



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the Ministry of Economy, Trade, and Industry; the Financial Services Agency; and the Ministry of the Environment.

Given these developments, the expectation for companies is that they will take the lead in the decarbonization of society.

Hitachi's Environmental Vision and Long-term Targets

Hitachi engages in environmental management with a long-term perspective based on its corporate mission of "contributing to society through the development of superior, original technology and products."

Hitachi's Environmental Vision lays out the future directions for Hitachi on environmental matters, expressing its long-term commitment to achieving a sustainable society together with improvements in people's quality of life (QoL) by working through its Social Innovation Business to overcome societal challenges.

To achieve the low-carbon society, the resource-efficient society, and the society harmonized with nature that are component parts of the sustainable society envisaged by the Environmental Vision, Hitachi has formulated long-term environmental targets that look ahead to 2030 and 2050, publishing these as "Hitachi Environmental Innovation 2050" (see Figure 1).

Based on an IPCC scenario for keeping temperature rise to less than 2°C, one of the measures adopted by Hitachi for achieving a low-carbon society is its target of reducing carbon dioxide (CO_2) emissions in its value chain in FY2050 by 80% relative to FY2010.

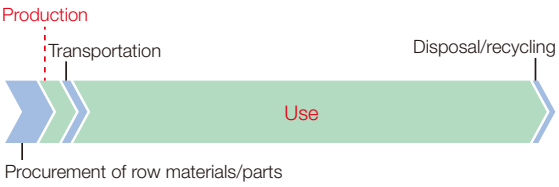
Hitachi formulates three-yearly environmental action plans and engages in activities aimed at achieving these long-term environmental targets. The environmental action plans are implemented across the Hitachi Group by way of environmental strategy officers appointed in each business unit and major group company.

Measures for Achieving a Low-carbon Society

In seeking to achieve a low-carbon society, it is important that Hitachi reduce emissions of greenhouse gases in its corporate activities, especially the emissions of CO_2 that accompany energy consumption.

A calculation of the emissions of CO_2 across Hitachi's entire value chain shows that 90% of total emissions occur during the use of the products and services it sells (see Figure 2). Here, the term "value chain" refers to the sequence of steps involved in the supply of products, services, and solutions, encompassing materials and parts procurement, production, transportation, use, and ultimate disposal and recycling. As Hitachi's business includes many products and services that consume substantial amounts of energy during use, the key to achieving the target lies in reducing CO_2 emissions in the use of these products (by making them more energy efficient).

Figure 2 | **Retio of CO_2 Emissions at each Stage of Hitachi Value Chain**



Expansion of Low-carbon Businesses to Reduce CO_2 Emissions from Products in Use

To reduce CO_2 emissions at the stage of the value chain where products are actually used, Hitachi will need to expand its low-carbon businesses (those that reduce the carbon emissions associated with products and services) in the sectors where its activities are focused, including energy, mobility, lifestyle, industry, and IT.

In the energy sector, this involves the supply of energy systems that are based on renewables and other forms of energy that do not derive from fossil fuels and the implementation of smart grids with benefits that include more efficient and reliable electricity transmission and distribution. In terms of mobility, Hitachi is promoting the weight reduction of railway cars and efficiency improvements via the traffic management system. In the automotive sector, it is seeking to make transportation more energy efficient by boosting uptake of the electric power trains used in electric vehicles (EVs) and other products. In the lifestyle sector, Hitachi is seeking to make cities more efficient by working on total solutions for buildings that improve all aspects of their efficiency. In IT, Hitachi is helping reduce energy consumption by supplying innovative digital solutions and enhancing the efficiency of various different systems used in society.

The following are examples of low-carbon businesses in which Hitachi is involved. If products can be made more efficient, such that they consume less energy while still delivering equal or better functionality, then they will help reduce CO_2 emissions during their use.

The Oil-immersed type amorphous transformers made by Hitachi Industrial Equipment Systems Co., Ltd. use an amorphous alloy and are up to 13% more energy-efficient than previous transformers, giving them industry-leading energy performance that is up to 166% of the Top Runner standard (see Figure 3). Thanks to optimization of the design, the new transformers have roughly the same size and installation dimensions as the previous models, making them suitable for sites where installation space is limited or for improving energy efficiency as part of an equipment upgrade.

Air compressors are widely used to supply compressed air as a source of power at industrial facilities. Hitachi's oil-free scroll compressors feature low noise and vibration, do not require lubricant, and are widely used in applications such as the food industry, healthcare, and research. An oil-free scroll compressor with a built-in amorphous motor achieves even better energy efficiency than previous models through use of a motor that satisfies the highest international efficiency standard (IE5) (see Figure 4).

Figure 3 | **Oil-immersed Type Amorphous Transformer**

Figure 4 | **Oil-free Scroll Compressor with Built-in Amorphous Motor**

Reducing Production CO_2 Emissions at Factories and Offices

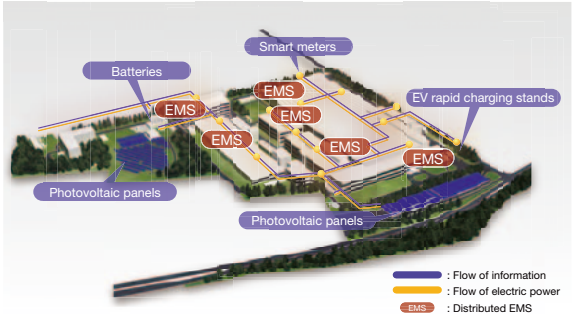
Ways of reducing CO_2 emissions during the production stage of the value chain include making production at factories and offices more efficient, promoting energy efficiency, and making greater use of renewable energy.

Hitachi undertakes rigorous efficiency-improvement and energy-saving measures at its own factories and offices. At factories, it is working on using the Internet of Things (IoT) to improve productivity, the installation of smart meters to reduce the amount of energy consumed in production, and the utilization of renewable energy.

At Omika Works, activities include use of smart manufacturing practices to save energy at the site. This includes installation of 940 kW of photovoltaic panels and 4.2 MWh of battery storage to make greater use of renewable energy, and the site is also seeking to improve productivity and reduce the load on the environment using the IoT to save energy, having installed smart meters at approximately 900 locations (see Figure 5).

Hitachi also supplies a wide variety of solutions to its customers that are based on the highly efficient production models established at Omika Works. These use digital technology to bring innovations to the manufacturing workplace while

Figure 5 | **On-site CO_2 Emission Reductions Achieved through Smart Manufacturing**



EV: electric vehicle EMS: energy management system

also helping customers to lower CO_2 emissions by being more energy-efficient.

Publication of Climate Change Information

The IPCC has developed a number of different scenarios for future climate change, including one in which a low-carbon society succeeds in keeping the temperature rise to within 2°C and another where countermeasures prove inadequate and temperatures rise by 4°C or more. In a statement, the TCFD called for companies to provide information on whether they will be able to remain in business under these different scenarios and to indicate whether they are aware of the risks and opportunities that climate change poses.

Hitachi expressed its approval of the TCFD statement in June 2018 and set about providing the requested information. While Hitachi had published its assessment of the risks and opportunities of both climate change and water in previous editions of its Hitachi Sustainability Report, the information in the 2018 report was collated in accordance with the classifications used in the TCFD statement. These included the risks associated with the transition to a low-carbon economy, the risks from the physical impacts of climate change, and so on.

One of the risks of transitioning to a low-carbon economy identified by Hitachi is the potential for increases in production costs brought about by tighter government policy and regulation, such as a carbon tax, taxation of fuel and energy consumption, or emissions trading. To address this risk, Hitachi invested about 5.4 billion yen in energy efficiency during FY2017 to improve production efficiency and to make its products use less energy.

Another risk is that Hitachi's low-carbon technology will lose market competitiveness. Having set an ambitious target of reducing CO_2 emissions by 80% by FY2050, Hitachi is striving to improve its technologies for producing products and services that will help create a low-carbon society. Meanwhile, addressing this risk has the potential to create opportunities for higher market prices or revenues through the supply of innovative products and services that deliver energy efficiency. Accordingly, actions by Hitachi include the development of innovative devices and materials that will contribute to the development and wider adoption of highly efficient products and low-carbon energy and to reducing the load on the environment.

Hitachi has also given thought to the physical impacts of climate change such as interruptions to plant operation resulting from more frequent natural disasters. Hitachi strives to reduce risks in ways that take account of the particular topography and other characteristics of each site, including by assessing factors such as potential for flooding when selecting sites for factories or other new facilities, and by compiling business continuity plans (BCPs) that specify what to do if a disaster does happen.

Future Activities

By engaging in low-carbon businesses through its Social Innovation Business, Hitachi is seeking to reduce the emission of CO_2 during product use, which accounts for the bulk of its greenhouse gas emissions. Hitachi is also introducing measures for improving efficiency and saving energy at the factories and offices where the production stage of the value chain takes place.

Being a year in which Hitachi will publish an updated edition of its three-yearly environmental action plan, FY2019 will see the formulation of new plans for FY2021 and the commencement of action to implement these across the company. Hitachi believes that, by consistently hitting the targets set in these successive environmental action plans, it will achieve its long-term environmental targets and make a contribution to creating a low-carbon society.

Hitachi intends to continue contributing to the achievement of the sustainable, low-carbon society envisaged by its Environmental Vision.

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