Hitachi's New Long-term Plan "Environmental Vision 2025"

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OVERVIEW: The warning bell has clearly sounded on global warming and other environmental concerns with the publication in November 2007 of the Fourth Assessment Report of the Intergovernmental Panel on Climate Change and the World Energy Outlook 2007 report of the International Energy Agency, and addressing these global concerns has become an urgent worldwide concern. For its part, the Hitachi Group has drafted Environmental Vision 2025, a comprehensive plan detailing environmental management and environmental business strategies for grappling with the environmental situation in the years ahead. Here we describe how the longer term Environmental Vision 2025 plan is related to the medium-term Environmental Vision 2015 plan that is centered around the concept of emission neutrality and currently under way, and highlights some of the policy initiatives for implementing the Environmental Vision 2025 plan.

ADVANCING GLOBAL WARMING AND COUNTERMEASURE PROSPECTS

RECOGNIZING the world's shared concern with dealing decisively with climate change, heads of state and government at the G8 (Group of Eight) Summit in Heiligendamm, Germany in June 2007 announced a global goal of "at least halving global CO_2 emissions by the 2050."

This was followed in November 2007 with the publication of the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), finding that climate change has been confirmed in almost all of the ecosystems currently under observation, and there can be no doubt that local changes in climate (especially rising atmospheric temperatures) are affecting the natural environment. The report also found that most of the observed increase in globally averaged temperatures since the mid-20th century is very likely due to observed increase in anthropogenic greenhouse gas[(a)] concentrations.

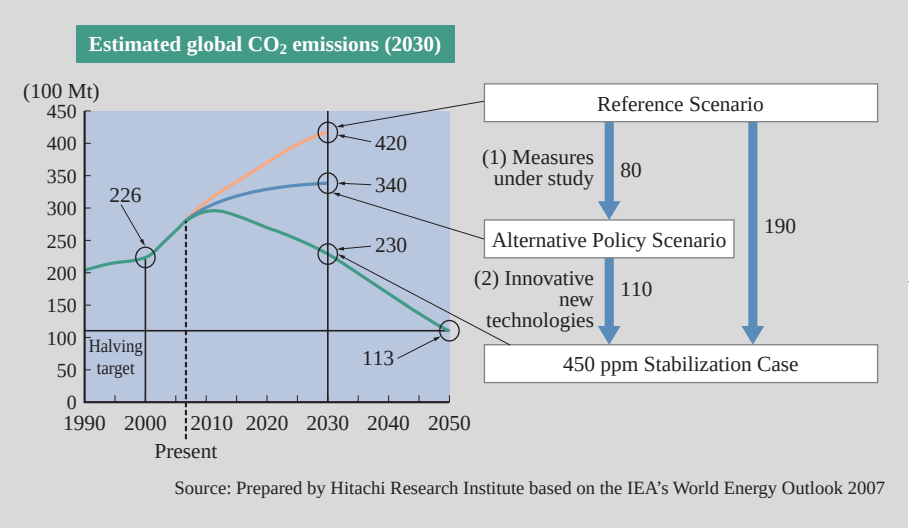
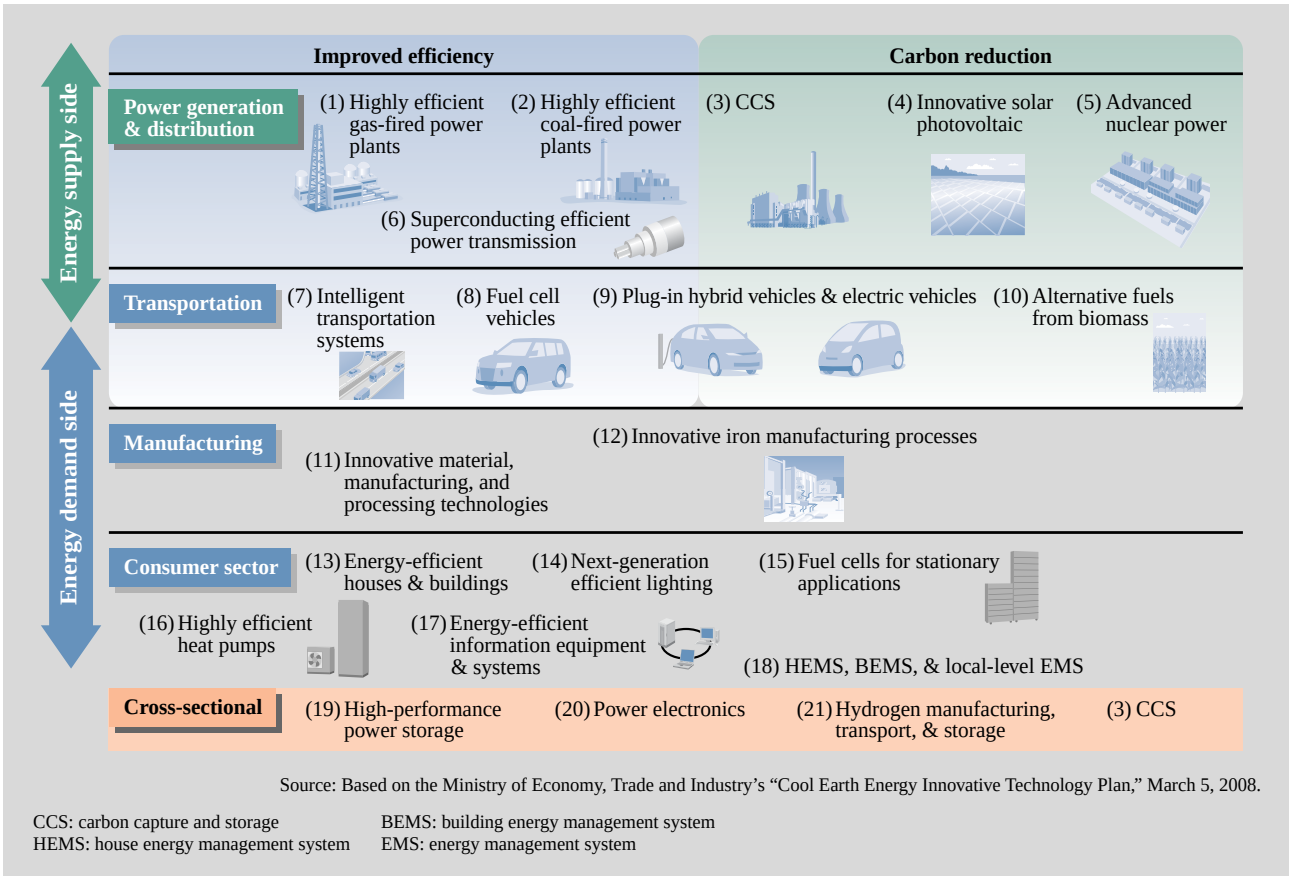


Fig. 1—Global Warming Mitigation Scenarios: IEA Scenarios. The International Energy Agency (IEA) proposed a "450 ppm Stabilization Case" (with 2°C warming) that could "halve global CO_2 emissions by 2050."

Even continuing the greenhouse gas interventions that are now available, concentrations will continue to rise over the next 20 to 30 years, increasing by 4.0ºC (2.4–6.4ºC) in the business-as-usual high scenario and increasing by about 1.8ºC (1.1–2.9ºC) for creative-intervention low scenario. However, the report concluded on an optimistic note recognizing that there is as yet plenty of room for reducing global greenhouse gas emissions, and they could even be reduced below current levels.

In November 2007, the 450 ppm Stabilization Case to "halve global CO_2 emissions by 2050" (see Fig. 1) was proposed for the first time in the World Energy Outlook 2007 published by the International Energy Agency (IEA). This case would require CO_2 emissions to be cut to around 23 Gt (to the same level as in the year 2000) by the year 2030. In addition to current mitigation efforts of each country, this would require extensive adoption of the innovative new technologies including widespread deployment of CCS (carbon capture and storage) measures, far more extensive use of nuclear power, and substantially improved efficiency in fossil-fuel use, but whether this can be achieved is not at all clear. The IEA has also projected a number of other scenarios. The Reference Scenario assumes that governments around the world do nothing more than the current mitigation efforts, and in this case we could expect to see a reduction in CO_2 emissions to 42 Gt (i.e. 19 Gt more than the 450 ppm Stabilization Case). Finally, the Alternative Policy Scenario includes other mitigation measures that are now being considered and would reduce CO_2 emissions to 34 Gt, but the prevailing trend of increasing emissions would continue as before.

The World Economic Forum is non-for-profit Geneva-based foundation whose annual meetings in Davos, Switzerland bring together some 2,500 top business leaders, national political leaders, and selected intellectuals and journalists to discuss pressing global issues. Prime Minister Fukuda unveiled the Japanese government's Cool Earth Initiative for addressing environmental challenges at the Davos Forum on



Source: Based on the Ministry of Economy, Trade and Industry's "Cool Earth Energy Innovative Technology Plan," March 5, 2008.

CCS: carbon capture and storage
BEMS: building energy management system
HEMS: house energy management system
EMS: energy management system

Fig. 2—Top Priority Energy Innovative Technologies.
To effectively promote development of energy innovative technologies, breakthrough technologies have been identified that are not just extensions of existing technologies.

January 26, 2008 and at the Hokkaido Toyako Summit on July 7–9, 2008. In order to halve CO_2 emissions by the year 2050, the Cool Earth Initiative highlights the following three key points for achieving practical action:

(1) Post-Kyoto framework
(2) International environmental cooperation
(3) Innovation

The first point emphasizes the importance of ensuring that the obligations for reducing CO_2 emissions are fairly and equitably distributed on all participants. The second and third points highlight Japan's idea to invest in the transfer of energy-efficient technologies to developing countries and the development of innovative technologies.

On March 5, 2008, the Japanese government unveiled its Cool Earth Initiative, Energy Innovative Technology Plan, expressly to promote the development of innovative new technologies. Under the plan, 21 technologies were identified by a panel of experts for priority development as shown in Fig. 2, including natural gas-fired power plants, advanced nuclear power plants, plug-in hybrid vehicles(b), radically more energy-efficient home and office buildings, and highly energy-efficient heat pumps(c).

In pursuit of a genuinely environmentally sound sustainable society through its products and services, the Hitachi Group has been implementing green management practices based on an environmental vision. As illustrated in Fig. 3, the Group's environmental vision is based on three fundamental concepts: "reduction of global warming," "resource recycling," and "conservation of ecosystems." More specifically, "reduction of global warming" means creating new sources of energy that produce less CO_2 emissions or products that use less energy, "resource recycling" means contributing to the formation of a total recycling society, and "conservation of ecosystems" means contributing to cleaner air, water, and soil, and protecting biodiversity.

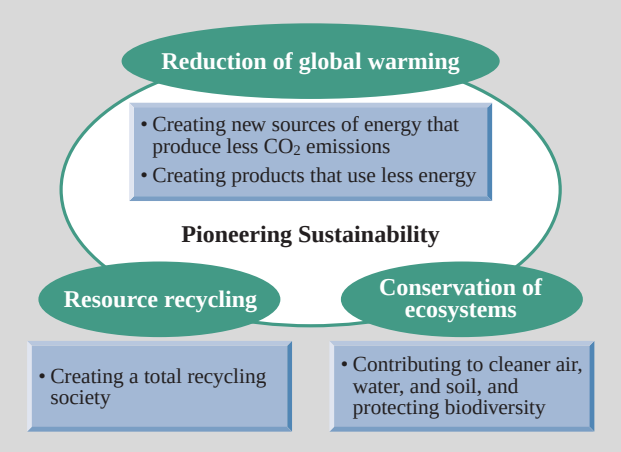


Fig. 3—Three Fundamental Concepts of the Hitachi Group's Environmental Vision.
Hitachi seeks to contribute to society through its products and services based on three fundamental concepts of its environmental vision: "reduction of global warming," "resource recycling," and "conservation of ecosystems."

On December 20, 2007, Hitachi rolled out Environmental Vision 2025 committing the Group to vastly expand its green Eco-Product offerings as shown in Fig. 4, and reinvigorate and strengthen our environmental businesses. Let us next take a closer look at the substance of the recently unveiled Environmental Vision 2025, and show how it relates to Hitachi's earlier mid-term Environmental Vision 2015.

TRANSITION FROM ENVIRONMENTAL VISION 2015 TO 2025

Fig. 5 shows a timeline and schematic overview of Hitachi's environmental visions showing how the mid-term Environmental Vision 2015 drafted in 2006 and the long-term Environmental Vision 2025 that just came out in 2007 are interrelated. Hitachi implemented the recommendations of its first Environmental Vision 2010 plan promulgated in 2001 and was able to reduce CO_2 emissions produced by the Group's business activities by 3% (taking fiscal 1990 as the baseline). The mid-term Environmental Vision 2015 plan was formulated in fiscal 2006 to promote "reduction of

(a) Greenhouse Gases
Gases in the atmosphere that absorb longer wavelength radiation and emit that radiation downward and thereby warming the surface of the earth. The abrupt increase of anthropogenic greenhouse gas emissions in recent years has raised the average temperature of the planet. The UNFCCC (United Nations Framework Convention on Climate Change) identifies six primary greenhouse gases — CO_2 (carbon dioxide), CH_4 (methane), N_2O (nitrous oxide), PFC (perfluorocarbon), HFC (hydrofluorocarbon), and SF_6 (sulfur hexafluoride) — but reduction of CO_2 emissions produced by combusting fossil fuels is the most critical.
(b) Plug-in Hybrid Vehicles
Combustion engines of PHEVs (plug-in hybrid vehicles) can be powered by batteries that are recharged by connecting a plug to a household or other electric power source. PHEVs have greater battery capacity and operate more on electricity and less on gasoline than conventional hybrid vehicles, so they will reduce CO_2 emissions and have less impact on the environment.
(c) Heat Pumps
A heat pump is a device that moves heat from one location to another based on the principle that the temperature of gas rises as pressure increases and falls as pressure decreases. Heat pumps have been applied to air conditioners and refrigerators, and more recently to water heaters. Most commonly heat pumps for heating and cooling condense heat that is drawn from the air, and yield a COP (coefficient of performance) exceeding three times. Given the magnitude of their energy efficiency, heat pumps have attracted great interest as a potential technology for reducing CO_2 emissions, and efforts are underway to make them even more efficient.

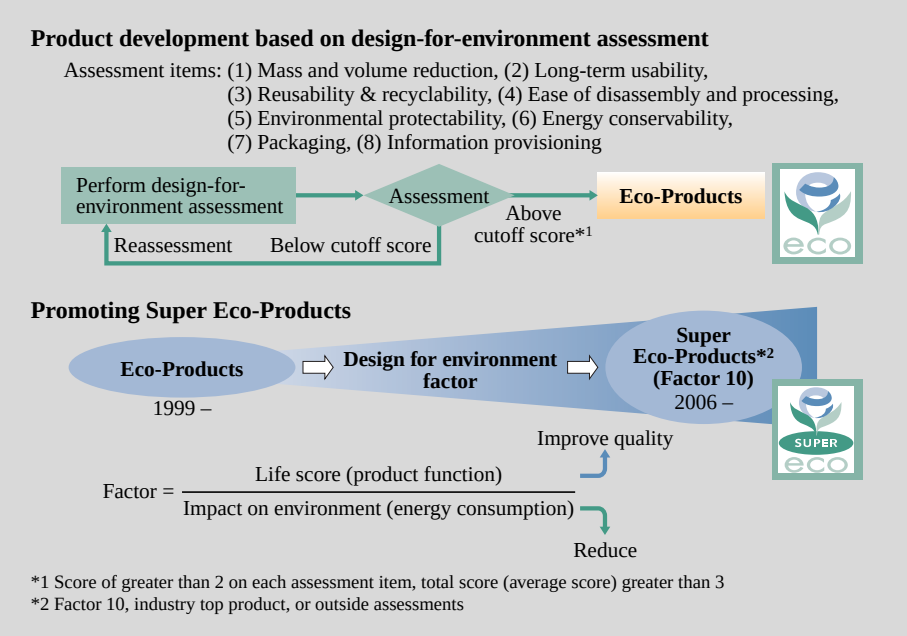


Fig. 4—Development of Eco-Products. Green products that get above a certain score on "design-for-environment assessment."

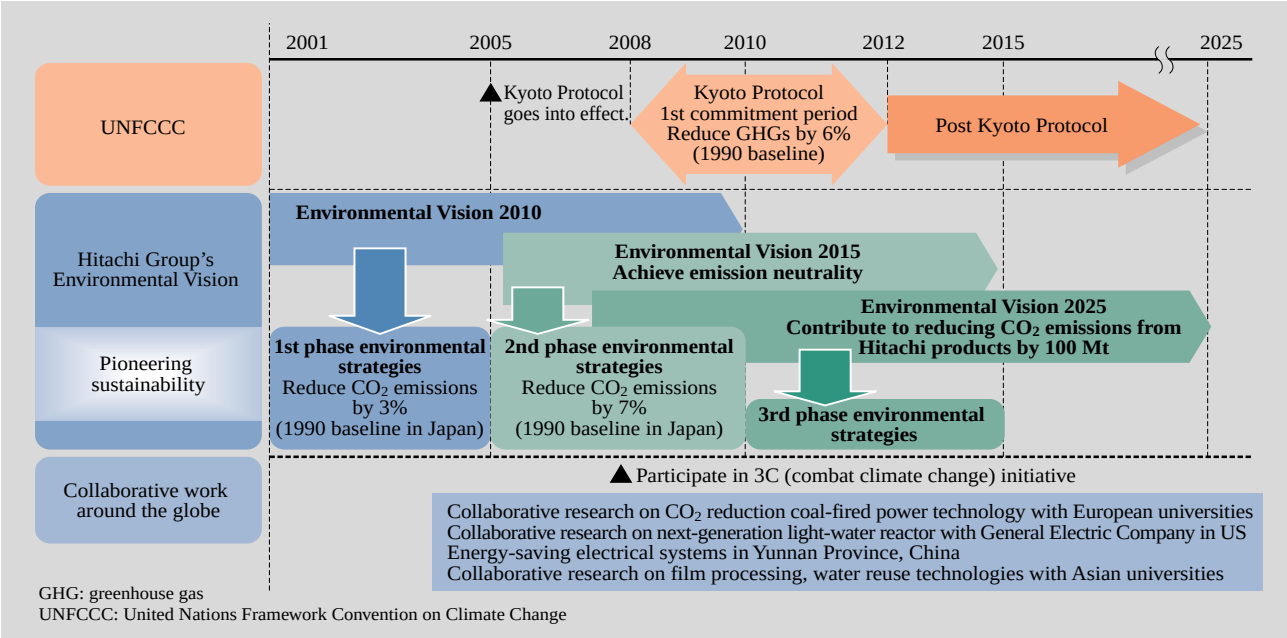


Fig. 5—Overview of Environmental Visions.
Goal of Environmental Vision 2015 is emission neutrality, goal of Environmental Vision 2025 is to contribute to reducing CO_2 emissions from Hitachi products by 100 Mt.

global warming," "resource recycling," and "conservation of ecosystems." Fig. 6 shows that the central theme of Environmental Vision 2015 is to achieve emission neutrality across Hitachi by fiscal 2015. Emission neutrality is a concept whereby Hitachi's goal is to cancel out direct environmental loads by reducing societal environmental loads by the same amount.

Direct environmental loads are defined as the total environmental impact of acquiring materials and parts for our products, energy consumed in manufacturing at all of Hitachi's plants and facilities, greenhouse gas emissions from the Group's manufacturing sites, recycling of waste products, and delivering products to consumers. Societal environmental loads refer to the total environment impact associated with the use of Hitachi products by consumers including the power consumed by products and the environmental impact of disposing of or recycling end-of-life products.

Building on this momentum, Environmental Vision 2025 will drive down societal environmental loads in

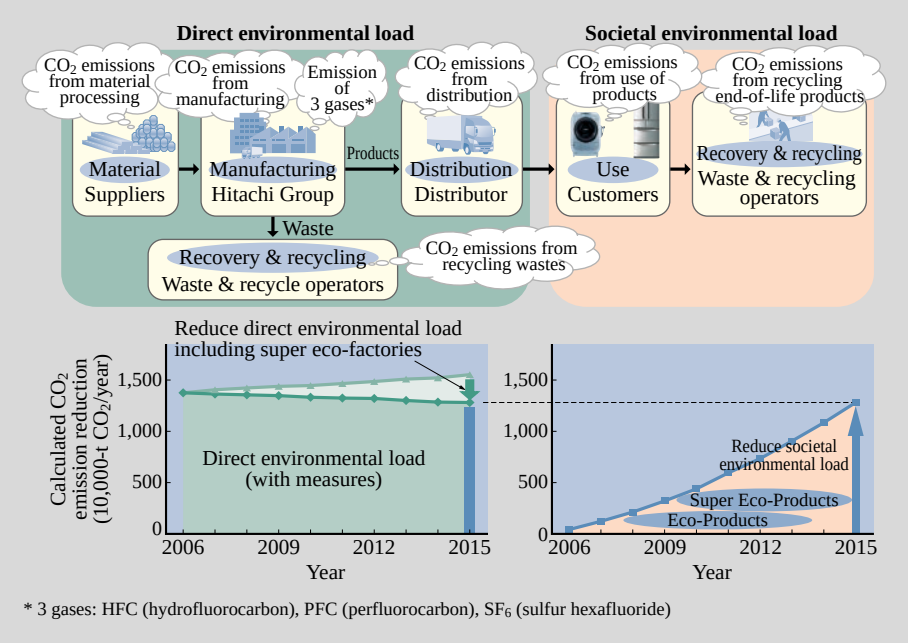


Fig. 6—Emission Neutrality in Environmental Vision 2015.
Goal is to cancel out the direct environmental loads, which is environmental impacts that can be managed and reduced by Hitachi, by the societal environmental loads, which is environmental impacts that can be reduced by improving the environmental efficiency of Hitachi products.

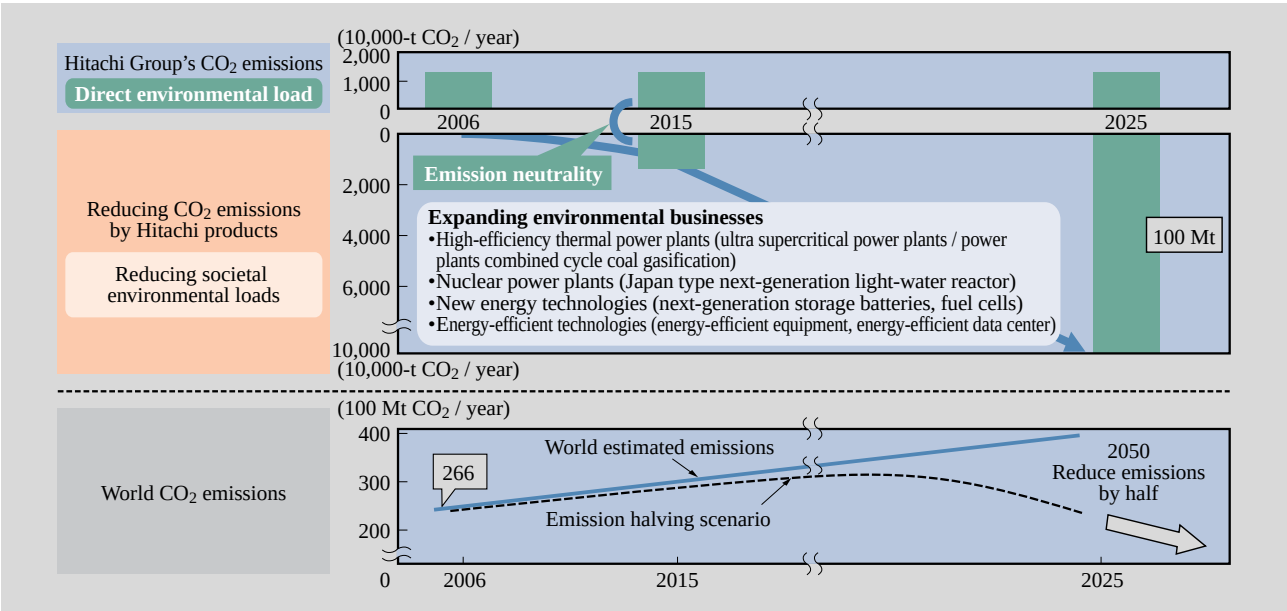


Fig. 7—Scenario for Contributing to Reducing CO_2 Emissions by 100 Mt a Year.
By expanding high-efficiency thermal power plants, energy-efficient technologies, and other environmental businesses, Hitachi is committed to reducing CO_2 emissions associated with Hitachi products worldwide by 100 Mt by fiscal 2025.

the emission neutrality equation even further as shown in Fig. 7, with the goal of contributing to reducing CO_2 emissions associated with Hitachi products worldwide by 100 Mt by fiscal 2025.

CONCEPT OF ENVIRONMENTAL VISION 2025

Extension of Mid-term Environmental Vision 2015

Hitachi will step up mid-term Environmental Vision 2015 initiatives now in progress as part of the long-term Environmental Vision 2025 plan. And pushing for early attainment of the 2015 emission neutrality goal, the Group will reduce direct environmental loads through investments in energy conservation and switching to alternative fuels, while expanding the proportion of net sales of Eco-Products. As one can see in Fig. 8, the Group aims to boost sales of Eco-Products to 6.6 trillion yen by fiscal 2010, or roughly double the fiscal 2006 figure.

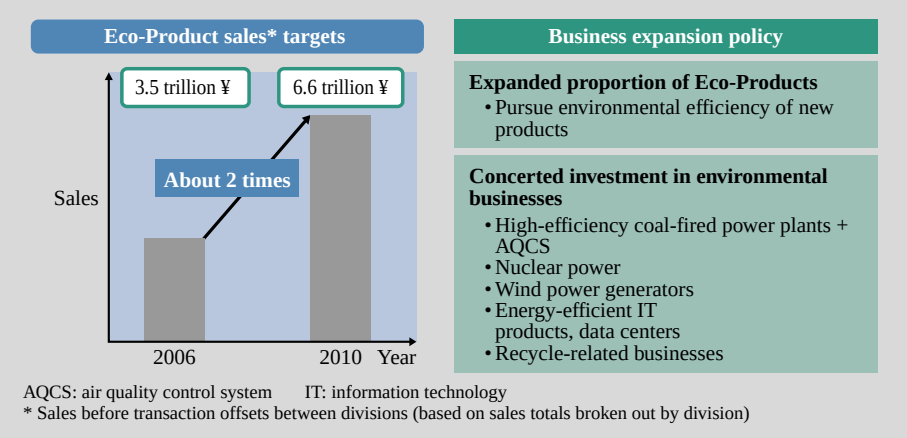


Fig. 8—Double Eco-Product Sales by 2010.
Hitachi plans to boost sales of Eco-Products to 6.6 trillion yen by fiscal 2010, or roughly double the fiscal 2006 figure.

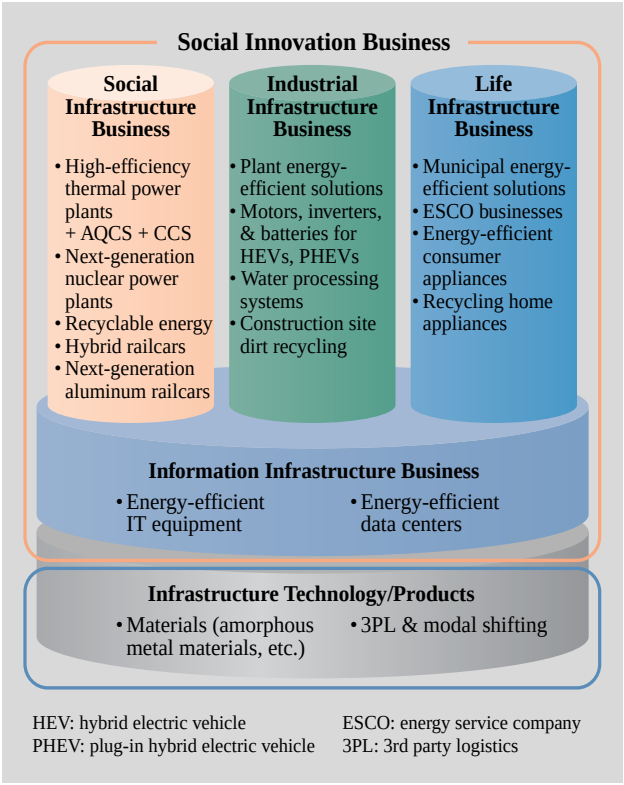


Fig. 9—Hitachi's Earth-friendly Energy-efficient Solutions. By fully exploiting group synergies, Hitachi intends on making diverse earth-friendly and energy-efficient products and solutions available worldwide.

As shown schematically in Fig. 9, Hitachi Group companies essentially consist of Social Innovation Business and Infrastructure Technology/Products which support it. Moreover, the Social Innovation Business can be classified as Social Infrastructure Business, Industrial Infrastructure Business, and Life Infrastructure Business — all of which are supported by Information Infrastructure Business. By fully exploiting group synergies, Hitachi intends on making diverse earth-friendly and energy-efficient products and solutions available worldwide.

Stepping-up Efforts to Mitigate Global Warming

Hitachi is seeking further reductions in societal environmental impact, a key element in attaining emission neutrality outlined in Environmental Vision 2025. To this end, the Group aims to contribute to curbing annual CO_2 emissions from its products by 100 Mt worldwide by fiscal 2025. It would take approximately 130,000 km^2 of Japanese cedar (sugi) farm forest land to absorb this amount of CO_2 emissions, which contain the size of Hokkaido and Kyushu combined or about one-third the area of Japan as whole. This estimation assumes 80-year-old cedar trees capable of storing 170 t of carbon per ha(1), and CO_2 equivalents per year.

Expanding Eco-Products and Strengthening Environmental Businesses

Hitachi is seeking to enhance the environmental efficiency of its products on all fronts, from materials, parts and components, to product design, systems, services and solutions. The goal is for Eco-Products to account for all Hitachi products sold by fiscal 2025. These activities will reinforce Hitachi's environmental businesses.

Promote Collaborative Creation Projects on a Global Scale

To hasten the development of environmentally beneficial technologies, Hitachi is aggressively pursuing what it calls collaborative creation projects with corporate partners, government agencies, universities and other organizations worldwide. Projects already under way include the global R&D (research and development) task of developing

technology for coal-fired power plants with lower CO_2 emissions, with joint research being undertaken with universities in the USA and Europe. Another example is a model project being conducted in cooperation mainly with China's National Development and Reform Commission that seeks to develop energy-saving electrical systems in Yunnan Province utilizing waste heat and pressure.

Strengthening Structure for Promoting Environmental Management

On December 1, 2007, Hitachi established the post of Hitachi Group CEnO (Chief Environmental Strategy Officer). The CEnO is responsible for coordinating and managing environmental strategies for the Hitachi Group. A month later, the Group created an Environmental Strategy Office on January 1, 2008. Both moves are aimed at promoting activities for achieving the goals outlined in Environmental Vision 2025. Hitachi remains committed to fulfilling its social responsibilities as a good corporate citizen by striving to realize a truly sustainable society that is in harmony with the environment through the services and products it offers.

Hitachi Committed to Achieving the Sustainable Society

In line with its Environmental Vision 2025, Hitachi is committed to the three fundamental objectives of "reducing global warming," "recycling resources," and "conserving ecosystems" to fulfill the Group's responsibilities as a good corporate citizen. With such a diverse range of diverse technologies and the ability to bring those technologies together in unique and innovative ways, Hitachi is capable of exceptional group synergies enabling the Group's companies to prosper and flourish in a global marketplace. The Hitachi Group remains committed to achieving a sustainable society that combines economic development with environmental stewardship through its products and services.

REFERENCE

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