

Special Story

Komatsu's Efforts to Combat Climate Change

Comprehensively pursuing energy conservation in manufacturing and logistics to mitigate global warming



Efforts to Combat Climate Change As the Responsibility of All Humanity

Global warming has been intensifying along with increases in the use of fossil fuels. The most recent report released by the Intergovernmental Panel on Climate Change (IPCC) stated that the years 1995 to 2006 are among the twelve warmest years recorded since observation equipment came into being in 1850. In the midst of growing concern about rising sea levels as mountain glaciers and snow coverage have shrunk in both the northern and southern hemispheres, efforts to address climate change, as epitomized by global warming, are the responsibility of all humankind.

Komatsu's Efforts towards Mitigating Climate Change

To minimize the global environmental effects generated through its business activities and products, Komatsu is working to improve its products' fuel efficiency while also reducing the environmental impact resulting across products' entire lifecycles in manufacturing, procurement, logistics, sales, use, and disassembly. In particular, as part of its efforts to mitigate climate change, the company is keenly aware of the importance of reducing CO₂ emissions and devotes significant attention to conserving energy during the manufacturing stage, improving logistics, and improving fuel and operational efficiency during the usage stage.

Energy Conservation Activities in the Manufacturing Division

Energy Conservation as the First Step

In response to the energy conservation law enacted in Japan in 1979, Komatsu has reduced the amount of energy used at its manufacturing facilities. The company found the patient efforts of the energy conservation teams created at each manufacturing facility and the investments made in energy-saving equipment to be very effective, with the Osaka Plant and Oyama Plant cited as excellent energy control-designated factories in 1982 and 2002, respectively, a commendation given by the Minister of Economy, Trade and

Industry. The Energy Saving Working Group has led these activities.

Reorganizing the Energy Saving Working Group in 2000

Komatsu's Earth Environment Committee has undertaken energy conservation efforts in manufacturing activities across the board. Launched in 1991, the committee established an Energy Saving Working Group as a task force under the Manufacturing Technology Meeting, a subordinate organization of the committee. To make those efforts even more thorough and far-reaching, the committee reorganized the Energy Saving Working Group in 2000 and launched activities that emphasize the following two angles:

practices that have generated results at individual manufacturing facilities should be promoted throughout the entire Komatsu Group, and through the Working Group, Komatsu should communicate with other companies having environmental excellence and collect examples of practices and then promote the good practices of other companies within Komatsu.

The people responsible for better approaches to energy from each manufacturing facility in Japan from Tohoku to Kyushu convene twice annually, engaging in technical discussions and introducing effective practices. In addition, since 2001, well-planned efforts have been underway to improve energy conservation through Energy Service Company (ESCO) operations, which require no direct capital expenditures.



Energy Saving Working Group

From Energy Conservation to CO₂ Emissions Reductions

Energy Conservation Activities Transitioned Steadily

Energy conservation activities at Komatsu manufacturing facilities transitioned smoothly, with the company achieving in FY2003 a 22% reduction in the amount of energy used per unit of manufacturing value (the heat energy equivalent used per unit of manufacturing value) compared to the FY1990 level.

Establishing CO₂ Emissions Reductions as a New Objective

At the same time, regardless of the degree of facilities' excellence in energy conservation, there remains room for improvement in reducing CO₂ emissions, which are regarded as a major cause of climate change. With that in mind, to mount an institutional response to climate change, Komatsu deemed it necessary to change its objective from reductions in the heat energy equivalent used per unit of manufacturing value to reductions in the amount of CO₂ emissions. Consequently each manufacturing facility has been implementing various measures in line with the new policy of reducing CO₂ emissions volume. The company has been working towards the dual goals of energy conservation and CO₂ emissions reductions.

Major Energy-related Conversions

Type of energy conversion	Equipment involved and overview of improvements	Facility undertaking the conversion
Kerosene → natural gas	Turbine plant fuel conversion	Oyama Plant
Coke → electricity	Change of melting furnace (cupola furnace → high-frequency furnace)	Komatsu Castex Ltd.
Heavy oil A → electricity	Elimination of on-site power generation that uses heavy oil A	Mooka Plant, Oyama Plant
Factory air pressure → low-pressure air	Using factory air pressure in drying process → using low-pressure air blowers	Oyama Plant
LPG → electricity	Change of heating furnace (gas firing → electricity)	Awazu Plant

1. Conversion to natural gas

At the Oyama Plant, a decision was made to convert the fuel for the turbine plant (cogeneration), which had been introduced as an energy conservation measure, from kerosene to natural gas. Through this, the plant as a whole achieved a 10% reduction in its CO₂ emissions.

2. Elimination of the use of coke

At Komatsu Castex Ltd.'s Himi Plant, which manufactures castings, the cupola furnace utilized during melting was changed to a high-efficiency high-frequency furnace and coke is no longer used.

3. Elimination of on-site power generation that uses heavy oil A

The Mooka and Oyama Plants eliminated on-site power generation* that uses heavy oil A, a low-cost source of energy.

*For on-site power generation, electric power suppliers establish power-generating facilities within the premises of Komatsu manufacturing facilities and are responsible for the fuel, heavy oil A. Komatsu purchases the resulting energy. However, since the CO₂ emitted originates from within the Komatsu premises, the CO₂ emissions resulting from the power generation have been calculated as Komatsu's.

Achieving a Medium-term Objective Ahead of Schedule

As a result of various energy-related conversions like these, the amount of CO₂ emissions per unit of manufacturing value for FY2006 showed a 27.3% improvement over that of FY1990. The medium-term objective set to be attained in FY2010 could be achieved ahead of schedule.

Reduction of CO₂ Emissions from Each Division

In order to bring about CO₂ emissions reductions, Komatsu is working to advance various efforts beyond those made at manufacturing facilities. For example, in order to realize reductions in CO₂ emissions generated during the transport of products, the logistics division is engaged in the following activities:

- increasing the full-load ratio of trucks and trailers through a collaborative transport alliance, and

- promoting a modal shift from truck-based transport to rail-based transport.

In addition, because it is difficult for the Research Division to reduce energy consumption during the course of operations, it has introduced a large-scale electric power storage system utilizing lead storage batteries through which nighttime electric power is used effectively, bringing about reductions in CO₂ emissions. Beyond this, in the Head Office building as well, the lighting, air conditioning, and other systems have been thoroughly reviewed, resulting in a reduction of CO₂ emissions of approximately 23% in FY2006 compared with FY1995.



Electric power storage system utilizing lead storage batteries in the Research Division

Aiming at Still Greater CO₂ Emissions Reductions

The Idea of Locating a Plant Adjacent to a Port

In many export destinations, construction equipment such as wheel loaders can be driven on public roadways. However, in Japan it is prohibited. For that reason, it has until now been necessary to disassemble each vehicle into five to eight pieces and transport the vehicle to port by trailer. Not surprisingly, CO₂ emissions result from the disassembly, packaging, transport by trailer, cargo handling at ports, and reassembly at the vehicle's final destination.

Komatsu envisioned constructing a plant immediately adjacent to a port as a radical means of addressing this issue, and in FY2006 in Japan it constructed the Ibaraki Plant adjacent to the port of Hitachinaka in Ibaraki Prefecture and the Kanazawa Plant next to the port of Kanazawa in Ishikawa Prefecture. After operations at both plants commence, CO₂ emissions are expected to drop by 2,500 tons annually by reducing the amount of overland transport of products to the port.

For the Future of the Globe

Through various efforts in the years to come Komatsu will continue to respond to climate change, an issue affecting all humanity. In addition, the company believes that its activities can further its economic and social contributions while at the same time help future generations enjoy a beautiful global environment.

Adoption of Cutting-edge Ecological Technology at the Ibaraki Plant

The Ibaraki Plant, which manufactures wheeled large construction and mining equipment, incorporates a large number of the latest ecological technologies. Solar cells sit atop the southern part of the building, generating an average of 20 kWh of electricity, which is used as a power source for the administration building's indoor lighting, computers, and more. In addition, energy conservation has been pursued through a building design that emphasizes natural illumination and daylight. For smaller kinds of equipment as well, the plant adopts those having the most superior energy-conservation features among currently-available mass-marketed products. In deference to the fact that the plant has been constructed near a port, the plant has adopted careful protections to guard against salt damage.



Built in the spirit of "if Komatsu were to build an environment-friendly facility, this is what it would be," the Ibaraki Plant represents a condensed form of Komatsu's philosophy and its technologies. For that reason, a great deal is expected of this facility as a model plant depicting the future of Komatsu's manufacturing.

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The Kanazawa Plant Adopts "A People- and Environment-friendly Plant" as Its Motto

The Kanazawa Plant, which manufactures large presses and other industrial machinery, has been designed with the motto, "a people- and environment-friendly plant." The plant is engaged in various measures to preserve the environment, including efforts to keep down its CO₂ emissions, which are a major cause of climate change, as well as actions to reduce the release of volatile organic compounds (VOCs). Moreover, by such actions as developing a dust collecting machine that targets the microscopic mineral dust generated through welding operations (welding fumes), the plant reflects thorough consideration of worker safety. In addition, in consideration of its location next to a port in the Hokuriku District facing the Sea of Japan, the plant gives ample attention to measures to deal with wind, salt, and snow.



Because the winter in the Hokuriku District is quite cold, the Kanazawa Plant has been constructed with double-layered roofs and outer walls. This insulates the plant, keeping it warm and reducing the need for heating. In addition, the external lights of the plant's parking facilities are supplied with solar and wind-generated power.

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