

Environmentally Conscious Products

al protection activities of FY2002, we en-
 less division to start exercising environ-
 s as early as possible in the product de-
 nd, we attempted to promote the develop-
 of product assessment regulations.

of 13 divisions have established these
 remaining three are on the way to estab-
 s. The rate of implementation in five divi-
 0% for the subjects stipulated in the reg-
 per of cases of product assessment in the
 ceeded 120.

We are going to further increase the range of product assess-
 ment implementation and will revise the regulations as neces-
 sary to enhance their effectiveness.

[Implementation of Product Assessments in Past Years]

FY	1998	1999	2000	2001	2002
	1/14	7/14	10/14	11/14	10/13
	10	47	69	138	123

The total has decreased from the previous year due to the integration of two divisions.

plies, is expanding to production stage.

Plant & Infrastructure Engineering Company

Consumer Products & Machinery Company

Kawasaki Shipbuilding Corporation

We are investigating and reviewing the feasibility of applying LCA tech-
 niques to propulsion system of ships. So far, a summary LCA for merchant
 ships has been performed on an experimental basis.

als purchased by green procurement policy.

Additionally, to encourage the promotion of this practice by
 each internal company, we are developing procurement stan-
 dards for equipment purchases for the environmental consider-
 ations that must be included in product specifications.

[Basic Policy of Green Procurement]

and the green procurement rate through
 stem (starting in FY2003) for indirect ma-
 tem, we will monitor the amount of materi-

Green procurement standards

Request for environmentally conscious product specifications

Representative Products for Environmental Impact Reduction

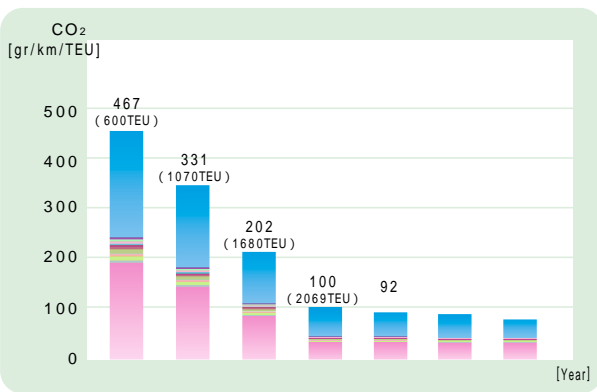
80% Reduction in 30 Years

Container ships provide speedy maritime transportation for the large amounts of cargo that are vital for maintaining the abundance of modern lifestyles, but they consume fossil fuels including heavy oil and, in turn, emit CO₂.

In the work of developing container ships, Kawasaki fully employs its expertise in shipbuilding technology in order to contribute to global environmental preservation. Improvement of marine vessels requires a wide range of technology and a long time span. Over the past 30 years, we have succeeded in attaining dramatic decreases in CO₂ emissions

through larger ship size, improved hull design, enhanced propulsion performance and reduction in fuel consumption of the main engine. The CO₂ emissions associated with transportation of one container for 1 km dropped by 80% in the 30-year span from 1970 to 2000.

Compared with trucks and railway trains, container ships emit much less CO₂. Notwithstanding, we are determined to further reduce environmental impacts through continued technological innovation.



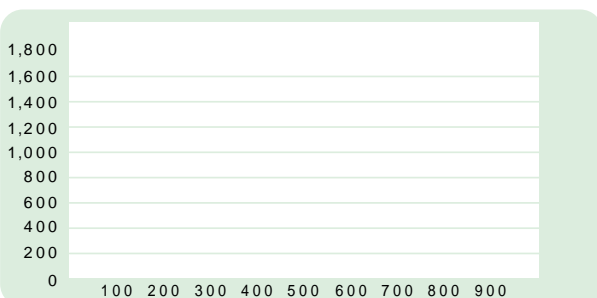
In the aviation sector, helicopters play an important role in swiftly transporting personnel and cargo. Kawasaki has dramatically improved the performance of its BK117 helicopter by introducing newly designed main rotor blades and fuselage. This new design has also improved environmental efficiency.

In this design, the new main rotor blade is reverse-tapered toward the outer edge instead of the previous rectangular shape, and the outermost portion of the new blade has an oval shape. Though the newly designed fuselage was made larger than the one in the previous models in order to increase the transportation capacity, the fuselage drag is much smaller. The advantages of the new design are:

Improved lift increases payload.

Decreased fuselage drag increases the cruising speed.

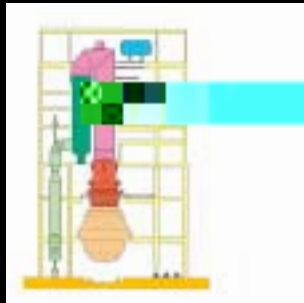
The new main rotor blades were designed for the BK117 C-2, which is the newest model of the BK117 series helicopter. 400 BK117s have been sold so far in the civil helicopter market throughout the world. Though the C-2 is equipped with the same engine as its predecessor C-1, its maximum payload is 10% greater. This means that at the same total fuel consumption the C-2 can transport 10% more weight, reducing the CO₂ emissions per unit of payload.



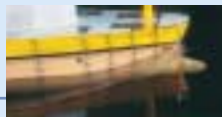
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Kawasaki has been committed to promoting "Design for Environment" (DfE) (through product assessment, LCA, etc.) for



ical re-



Four companies including Kawasaki teamed up to organize a techn

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Environmental Protection Products

Kawasaki is working on a number of products that protect the environment in diverse ways such as effective energy use, prevention of air, water and soil pollution, and waste treatment and recycling. Our FY2003 environmental key measures emphasize accurate understanding of the trends in the governmental environmental regulations and the environmental protection needs of society, as well as expansion of the scope of Kawasaki's

environmental protection products.

Some of the environmental protection products and technologies that help realize our environmental policies are summarized in the table below. We are confident these products and technologies contribute to society by solving many of the increasingly aggravated environmental problems.

The examples indicated with through are described in detail on page 16.

Technological Field	Product	Research & Development
Energy	<ul style="list-style-type: none"> • Combined cycle power plant • Gas turbine co-generation system • Waste heat recovery boiler • Cement plant waste heat power generation system • Top-pressure recovery plant for blast furnace • High efficiency Low-NOx coal fired boiler • Ice storage cooling system • District heating and cooling system • Optimization and diagnosis of industrial energy system 	<ul style="list-style-type: none"> • High performance coal gasified generation technology • High performance gas turbine • Ceramic gas turbine • High efficiency combustion technology (Various combustion system/Engine) • Fuel cell power system • Advanced battery
	<ul style="list-style-type: none"> • Photovoltaic system • Wind turbine generation system • Geothermal generation system • Co-generation system using biogas produced by methane fermentation of food and livestock waste 	<ul style="list-style-type: none"> • Black liquor gasification technology • Wood-based biomass energy utilization technology
Air Pollution Control	<ul style="list-style-type: none"> • De-SOx/De-NOx plant and dust collector for flue gas • Low-NOx gas turbine generation system • Low-NOx slag-tap firing boiler • Low-NOx combustion system for heavy oil fired boiler • De-NOx system for road tunnel • Ventilation filter for road tunnel • Electrostatic precipitator for road tunnel 	<ul style="list-style-type: none"> • Low-NOx combustion technology (Gas turbine, Boiler, Diesel, Jet engine) • De-NOx technology for lower temperature flue gas
	<ul style="list-style-type: none"> • Photocatalytic coating business (For environmental protection) 	
Water Pollution Control	<ul style="list-style-type: none"> • Sewage/Sludge treatment system • Reverse-osmosis membrane water treatment system (Recycled water etc.) • Sewage sludge processing system (Transformation of sludge into activated charcoal, fuel, fertilizer, etc.) • On vehicle sludge drying system • Turbid water filter 	<ul style="list-style-type: none"> • Dehydration technology for sludge • Membrane water treatment technology (Leachate etc.)
		<ul style="list-style-type: none"> • P電選 類驢 廠ほ荷・Bulky waste crushing and recycling system • Waste automobile/electrical appliance crushing and recycling system • Construction waste crushing and recycling system
Soil Pollution Control		<ul style="list-style-type: none"> • Crawling technology for dioxin polluted soil
Waste Treatment/ Recycling	<ul style="list-style-type: none"> • High-performance refuse incineration system (Stoker-type furnace, Internal circulation fluidized bed-type furnace) • Refuse gasifying-melting system (Fluidized bed-type gasifying-melting furnace, Shaft-type gasifying-melting furnace) • High-efficiency refuse power generation system (Power generation from refuse combined with gas turbine, etc.) • Waste-to-energy system (RDF power generation, Boiler for soda recovery, etc.) • Paper sludge burning power generation system • Flue gas treatment system for dioxin removal • Dioxin thermal decomposition system for fly ash 	<ul style="list-style-type: none"> • Waste tire freeze-crushing system • Waste glass bottle/plastic sorting system • Monitoring technology for dioxin surrogates
	<ul style="list-style-type: none"> • Crushing, Sorting 	
Others		

Advanced Battery

1

● High-capacity version is available for power storage

Kawasaki has developed a unique high-capacity battery that uses granular-shaped active materials (electrode) that is the first of its kind



2

● System is optimized for Japanese climate to realize more common use

Kawasaki is actively developing and marketing wind power generation equipment, a power generation system that does not emit CO₂. The total estimated energy generation with our already installed wind power generation equipment has reached 35,000,000 kWh/year which is equivalent to a reduction of 12,950 t-CO₂/year. Currently, we are constructiV 両ヒ電設騰器9s#節



3

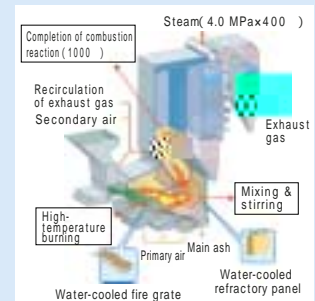
●

This filtering system efficiently captures sub-micron particles from turbid water with a hybrid filtration arrangement. This arrangement consists of a metal spring filter with a particle layer coated surface that serves as a filtration auxiliary, thus allowing the output of highly clean filtrate. We are now producing and marketing this unique filtering system that is an ideal choice for treating wastewater from the metal plating process, liquid coolant from machine tools, and wastewater from painting equipment. As the need for wastewater treatment equipment with excellent filtering performance grows, this unique compact system featuring low power consumption will find many users.

High-Performance Refuse Incineration System (Advanced Stoker-type Furnace)

4

● Low air ratio and high-temperature burning

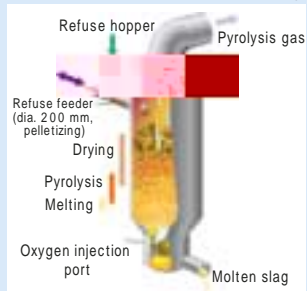


Refuse Gasifying-Melting System (Shaft-Type Gasifying-Melting Furnace)

5

● Refuse volume reduction to approximately 1/40

Using oxygen injection, this equipment gasifies and melts refuse and sludge at a high temperature. The equipment transforms ash into slag, thereby greatly decreasing the amount of refuse being disposed of in landfills. Use of oxygen helps decrease the amount of gas generated, leading to a compact design. The Minamata-Ashikita Regional Administrative Affairs Cooperative Clean Center, which treats domestic wastes, bulky wastes and sludge, adopted this system. Since then, the system has been effective in decreasing the amounts of dioxins and NO_x in the exhaust gas.



Waste Glass Bottle/Plastic Sorting System (Waste Plastic Material Sorter)

6

● Automatically sorts a bulk amount of waste plastic materials



RPF: Refuse Paper & Plastic Fuel

Coal Fired Boiler's Ash Recycling System (Road Base Material)

7

The amount of coal ash produced by coal-burning thermal power plants throughout Japan reaches 20,000 t/day. Hitherto, this coal ash has been used as a raw material for cement production or disposed of for land reclamation. However, owing to a decr 稻9塊 9聯to舊并

lb'd reclama! 互疼騰敵b'ri 秤essary" s 鉄級借費宛也庚瓜位 5/cublas p'aritem is irradiated with near-infrared rays, it a ticular waveband unique to its material type. Using this characteristic, this system sorts plastic materials. The system is capable of handling large amounts of plastic products including bottles, bags and trays as long as the products measure 30 mm or more. This compact and easy-to-operate system (multi-sorter) is very useful in material recycling for waste plastic materials, and helps support thermal recycling by reliably sorting RPF type plastic materials.

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