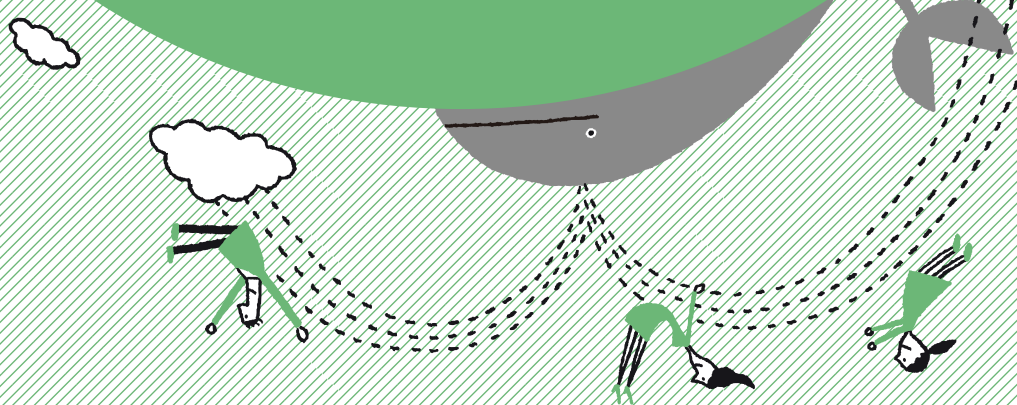


Environmental Report

Strengthening internal and external communications with an eye toward the earth's future

JTEKT, in order to support the sustainable growth of society and the earth, places high priority on environmental conservation when determining its corporate activities.

This section introduces the efforts JTEKT made in FY2008 to promote environmentally friendly manufacturing. JTEKT strove to maintain a comprehensive view, promoting activities on a global basis and striving to lower environmental load in all stages within the business cycle. JTEKT will continue looking toward the future with an eye to make improvements in all areas without being satisfied with the present situation.



Environmental management

➔ P34

Kickoff meeting on reduction of CO₂ emissions held in Europe and attended by European affiliates

➔ P34



Pre-registration of substances subject to REACH completed

➔ P37

Training for environmental emergency response conducted at each plant

➔ P39



Environmental Report

Summary of FY2008 activities



Environmental Report

Activities related to production and logistics

➔ P44

Improved transport to Kyushu (western Japan) reduced CO₂ emissions 229 tons per year

➔ P45

Waste fluid requiring disposal by subcontractor eliminated by introduction of ozone treatment technology

➔ P47



FY2010 target for reducing output of PRTR substances already achieved

➔ P47

Activities in the development and design stage

➔ P40

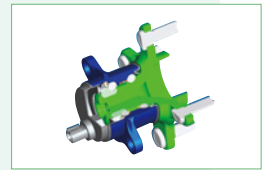
World's first column type EPS system with motorized tilt & telescopic functions for full-sized and high-end vehicles developed

➔ P41



Weight of mini-vehicle bearings reduced and torque loss reduced 30% by shape change

➔ P42



Received 2008 JSPE Technology Award for grinding process technology lowering volume of coolant supply

➔ P43



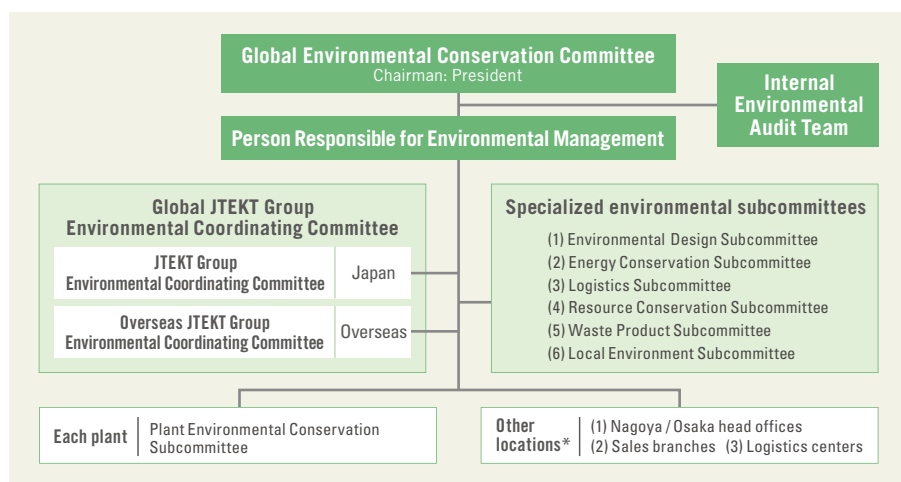
Environmental management

JTEKT, with the aim of being an environmentally friendly manufacturer, carries out environmental conservation activities on a groupwide basis in order to contribute to the creation of a sustainable society.

Activities are pursued in all business fields, including activities to reduce environmental load through achieving high productivity and activities to develop environmentally friendly products.

Promotion structure

Under the direction of the Global Environmental Preservation Committee chaired by the President, JTEKT issues a companywide policy twice yearly, monitors activity progress, studies problems, and determines countermeasures. In April 2009, JTEKT revised its Environmental Policy to clarify that environmental conservation activities must be carried out not only by product development and manufacturing departments but also by sales and administrative departments.



* Outside the scope of third-party certification

Promotion of global environmental management

In view of the globalization of JTEKT's operations and to promote groupwide efforts, we established a Global JTEKT Group Environmental Coordinating Committee to carry out environmental conservation activities in cooperation with affiliated companies in Japan and overseas. In FY2008, JTEKT Group Environmental Coordinating Committee meetings were held with manufacturing affiliates in Japan to set common targets for reduction of CO₂ emissions and waste and to jointly monitor the progress of activities to reach these targets. In Europe, a kickoff meeting for reduction of CO₂ emissions was held to strengthen measures against global warming. Also, JTEKT audited the environmental management of seven affiliates in China.

Environmental Policy

JTEKT, based on deep awareness of the importance of environmental conservation, will proactively pursue environmental conservation in all business activities in the fields of bearings, driveline components, steering systems, and machine tools & mechatronics at all plants, head offices and sales offices with the active participation of all employees.

- Continuously improve our environmental management system to harmonize our business activities with the environment and promote the cooperation of all suppliers of raw materials, etc.
- Comply with all requirements of environmental laws, regulations, treaties, agreements, etc. related to our business activities and strive actively to prevent environmental pollution. Also, contribute to society by accurately grasping technical needs related to environmental conservation and developing products to meet such needs.
- Raise the environmental awareness of all employees and pursue the following as important environmental management objectives in relation to all our business activities, products and services:
 - Develop and design environmentally friendly products
 - Reduce CO₂ emissions through effective energy utilization
 - Reduce waste
 - Thoroughly control chemical substances and reduce environmentally burdensome substances
 - Reduce raw materials and consumable materials
 - Reduce CO₂ emissions in logistics
 - Maintain and improve community environments
- Maintain an environmental conservation promotion structure, clarify the purposes and targets of environment conservation activities, conduct periodic reviews, and pursue environmental conservation activities with the participation of all employees.
- Maintain an awareness of the community surrounding each business site, maintain good communication with concerned government agencies and local residents, and publicly disclose information on our environmental management activities as necessary.

April 1, 2009

TOPICS

Kickoff meeting held in Europe on reduction of CO₂ emissions

In November 2008, the first meeting of the Global JTEKT Group Environmental Coordinating Committee for Europe was held at JTEKT's

affiliate in Belgium as a kickoff meeting on activities to reduce CO₂ emissions. Representatives from all nine European manufacturing affiliates attended this meeting. The participants set common reduction targets for Europe and shared examples of successful activities. Encouraged by this meeting, they will continue working to strengthen activities in Europe.



First meeting of the Global JTEKT Group Coordinating Committee for Europe (JTRE, Belgium)

Targets and results

JTEKT Environmental Action Plan

To contribute to the creation of a recycling-based society, JTEKT has issued an Environmental Action Plan stipulating its activities policy and targets to be achieved by FY2010. Following this plan, JTEKT along with its affiliated companies is carrying out environmental conservation activities. In the case of action items regarding which the FY2010 goals were already reached, we set even higher targets and are working to achieve them.

*Per-sales-unit amounts

JTEKT uses per-sales-unit amounts calculated by dividing CO₂ emission amount by sales volume as its CO₂ emission reduction index.

[1] Enhance environmental conservation activities through further efforts to reduce environmental load

Asterisk (*) indicate internal "challenge" targets. Target and results percentages in parentheses are in comparison with the base year.

Action items	Details	FY2008 targets	Results	Assessment	Related pages
Promote measures to prevent global warming	● CO ₂ emissions: 5% reduction from FY2003 by the end of FY2010	266,800 t-CO ₂ (+5%)	239,665 t-CO ₂ (-6%)	○	44
	● CO ₂ emissions per sales unit (*): 30% reduction from FY2005 by the end of FY2010*	386 t/billion yen (-18%)	407 t/billion yen (-14%)	×	
	● CO ₂ emissions per sales unit (global): 30% reduction from FY2003 by the end of FY2010*	462 t/billion yen (-21%)	453 t/billion yen (-23%)	○	
Strengthen control of environmentally burdensome substances and reduce usage	● Substances subject to PRTR: 50% reduction from FY2006 by the end of FY2010*	85t (-17%)	68t (-34%)	○	47
Reduce waste and promote resource conservation	● Zero landfill waste: Zero by the end of FY2010*	19 t	9 t	○	46~47
	● Incineration waste: 90% reduction from FY2001 by the end of FY2010*	800 t (-80%)	686 t (-83%)	○	
	● Wastes per sales unit: 30% reduction from FY2003 by the end of FY2010*	90 t / billion yen (-26%)	88 t / billion yen (-27%)	○	
	○ Weight of primary materials per sales unit: 5% reduction from FY2005 by the end of FY2010	1.520 t / million yen (-3%)	1.456 t / million yen (-7%)	○	
	○ Amount of primary materials per sales unit: 5% reduction from FY2005 by the end of FY2010	9.37 million yen / million yen (-5%)	10.19 million yen / million yen (+3%)	×	
Promote logistics streamlining	● CO ₂ emissions in logistics: FY1990 level (15,865t-CO ₂) or lower by the end of FY2010	17,000 t-CO ₂	14,779 t-CO ₂	○	45
	● CO ₂ emissions per sales unit in logistics: 40% reduction from FY1990 by the end of FY2010 [improvement in long-distance transportation]	2.51 t / billion yen (-31%)	2.51 t / billion yen (-31%)	○	
	○ Amount of secondary materials per sales unit: 5% reduction from FY2005 by the end of FY2010	4.23 million yen / million yen (-5%)	4.30 million yen / million yen (-3%)	×	

[2] Develop and design environmentally friendly products

Action items	Details	Results	Assessment	Related pages
Promote efforts in the development and design stage	● Reduce environmental load	-Development of column type electric power steering system with motorized tilt & telescopic functions -Development of lightweight, low-torque hub unit wheel bearings for mini-vehicles -Development of low-torque thrust needle roller bearings -Improvement of durability of intelligent torque controlled couplings (ITCC) for 4WD vehicles -Reduction of environmental load of small-scale machining center series	○	40~43
Strengthen cooperation with suppliers	● Further promote green purchasing ● Formulate environmentally friendly purchasing guidelines to share with suppliers	Expanded Green Purchasing Guidelines	○	22

[3] Strengthen environmental management system suitable for consolidated management

Action items	Details	Results	Assessment	Related pages
Develop structures and improve activities	● Share basic policy and conduct guidelines	Continuing activities with group companies in Japan and overseas	○	34,38,40

[4] Actively participate in social activities as a corporate citizen

Action items	Details	Results	Assessment	Related pages
Promote social contribution activities	● Participate in environmental conservation activities	Implemented clean-up activities around the plant	○	30
Maintain close communications with local communities	● Cooperate with and support local community groups	Continuously hold discussions with local residents regarding environmental issues	○	29
Promote public relations activities and information disclosure	● Improve environmental information provision via website ● Improve and continue to issue our environmental reports ● Promote volunteer activities in local communities	Issued CSR report 2008	○	

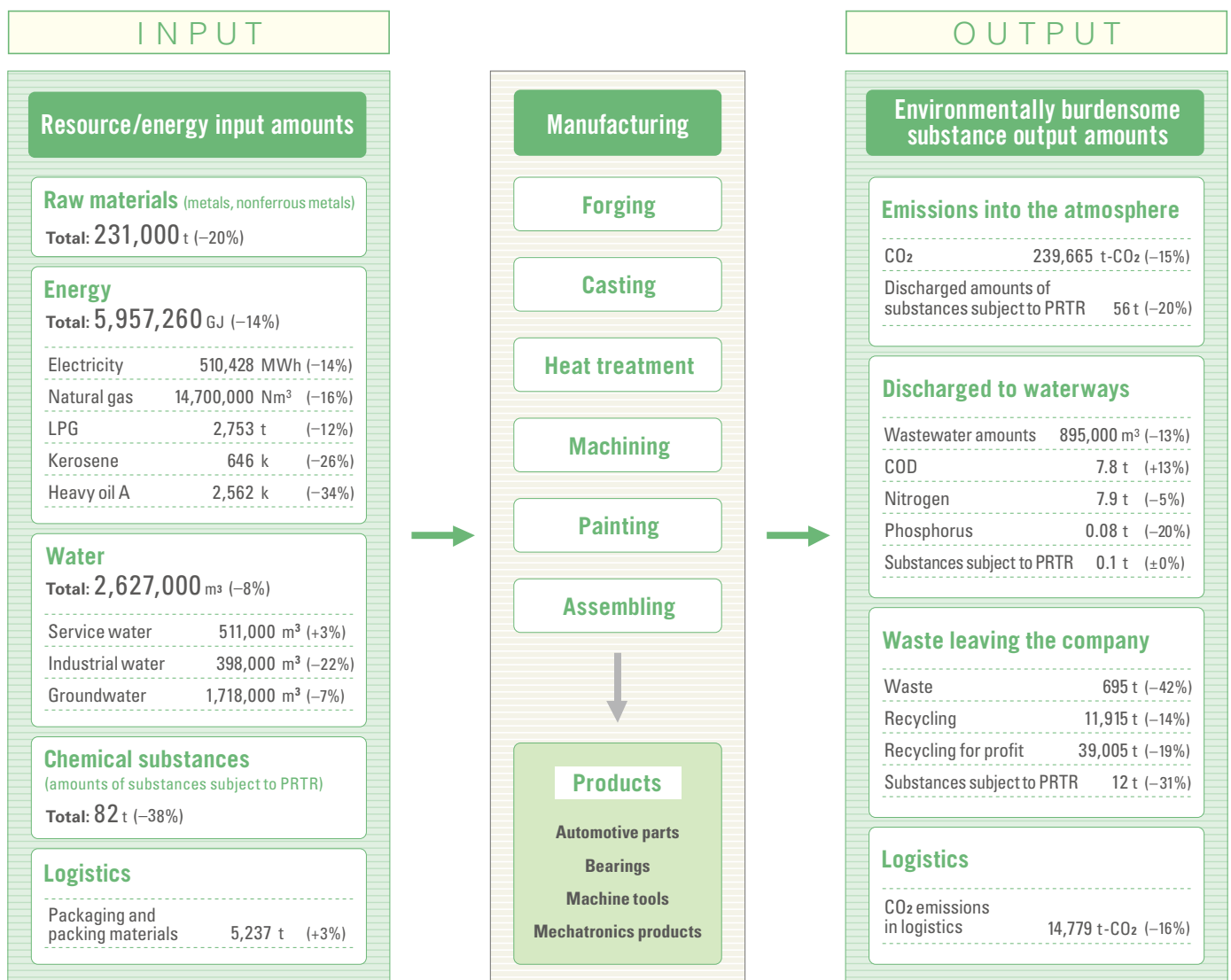
Environmental impact of business activities

JTEKT strives to quantitatively grasp resource and energy amounts used (input) and amounts discharged to the environment (output) and reduce environmental load in all business activity stages.

Resource and energy input amounts and environmentally burdensome substance output amounts ➡ Figure -01

Figure 01 shows the resource and energy input amounts and environmentally burdensome substance output amounts for FY2008. In order to minimize the contribution of business activities to global warming, JTEKT strives to reduce energy usage in all production processes such as forging, casting, heat treatment and machining and to switch to more-efficient energy sources such electricity and natural gas. At present, 95.6% of JTEKT's energy consumption is electricity and natural gas by thermal conversion.

➡ Figure -01
Resource and energy input amounts and environmentally burdensome substance output amounts



Notes regarding "Resource and energy input amounts and environmentally burdensome substance output amounts" charts

CO₂ conversion coefficients to calculate CO₂ emissions volume

Electricity	0.3817 kg-CO ₂ /kWh
Heavy oil A	2.7000 kg-CO ₂ /ℓ
Kerosene	2.5308 kg-CO ₂ /ℓ
Propane gas	3.0094 kg-CO ₂ /kg
Natural gas	2.3576 kg-CO ₂ /m ³

The CO₂ conversion coefficients in the above table were used both in Japan and overseas. Regarding the conversions in this report, to enable assessment of JTEKT improvement results, we fixed the electrical conversion coefficients, and for cogeneration CO₂ reduction results, we converted by thermal energy average and indicated the result of that as output amount.

Heavy oil A: Among the three classes (A, B, C) of heavy oil, heavy oil A is the closest to kerosene and is used as fuel for boilers or heating.

GJ: Giga-joule (unit of heat quantity), G=10⁹

PRTR regulation: Pollutant Release and Transfer Register is a system to collect and disseminate information on environmental releases and transfer of toxic chemicals from industrial and other facilities.

COD: Chemical Oxygen Demand (measure of water quality)

* Percentages in parentheses are comparisons with the previous fiscal year.

Reduction of local community environmental risks

JTEKT strives to minimize environmental risk to local communities such as the risk of environmental accidents or environmental law violation by formulating preventive measures. We review cases that had the potential to lead to an accident or violation, identify causes, implement countermeasures, and communicate these throughout the company so that no such accident or violation will actually occur. We also carry out training for responding to environmental emergencies once a year.

Situation regarding legal compliance with environmental laws and regulations

In FY2008, JTEKT did not receive any fines or penalties and was not the subject of any lawsuits related to environmental matters.

Environmental complaints and accidents

JTEKT has established internal standards (*1) regarding amounts of plant wastewater discharge and substances released into the atmosphere that are stricter than regulatory amounts and strives to prevent environmental accidents and complaints. While JTEKT had no accidents and received no complaints regarding environmental matters in FY2008, there were four cases in which plant wastewater discharge COD (Tadomisaki Plant) and nitrogen content (Hanazono Plant) exceeded internal standards and that potentially could have resulted in problems. We thoroughly investigated the causes and took corrective measures for each of these cases, and expanded these measures to all of our plants. We will continue to promote preventive activities on a continual basis.

Response to REACH regulation (new European chemicals legislation)

In response to the new REACH European chemical regulation (*2), which went into effect in June 2007, JTEKT conducted many internal meetings with the participation of all concerned departments. Participants listed all items (substances and compounds) requiring pre-registration under REACH that were being used by JTEKT's European affiliates and completed pre-registration by the deadline of December 1, 2008. JTEKT will continue efforts to complete normal registration by the deadline based on the chemical substance usage amount and control substances of high concern.

Soil and groundwater measures (continued report)

→ Figure -01

Regarding the groundwater contamination the Kariya and Okazaki plants had previously caused by the trichloroethylene they used as cleaning agents, etc., in 1998 they implemented a pumping and aeration system (*3) as a sewage leakage-prevention and purification measure. Furthermore, in FY2004 the Okazaki Plant adopted a microbial purification system (*4) that utilizes microbes stimulated by nutrients. As a result, the soil and groundwater quality of these plants has significantly improved and now satisfies the regulatory standards in most designated places. Measurement results were reported to the local government agency and to local residents at community discussions.

→ Related article in [page 29](#)

Environmental audits

JTEKT receives a once-a-year internal audit as well as external audits to ensure that its management system is properly maintained and satisfies ISO 14001 requirements. Audit results are reported to JTEKT's top management through the Global Environmental Conservation Committee, which oversees companywide environmental conservation activities.

Internal audits

Although the 2008 internal audit revealed that certain log content was insufficient and the action plan was partly unclear, no deficiencies were recorded. Also, workshops were held for employees qualified to carry out internal environment audits in order to confirm their auditing capability and raise their skills. Based on such activities, we will continue efforts to improve our pool of employees capable of conducting these audits.

*1 Internal standards

JTEKT has set its internal standards at 80% of the regulatory requirements.

*2 REACH regulation

REACH stands for Registration, Evaluation, Authorization and Restriction of Chemicals. This regulation is intended to minimize potential harm to human health. Manufacturers handling chemical substances in the European region in quantities of one ton or more per year are required to assess safe use thereof, submit a registration to the European Chemicals Agency, and disclose information to the public in order to clarify their responsibility as manufacturers and ensure problem prevention.

→ Figure -01

Trichloroethylene measurement values

Plants	Maximum measurement values in groundwater	
	FY2007	FY2008
Kariya	0.710 mg / ℓ	0.472 mg / ℓ
Okazaki	0.137 mg / ℓ	0.040 mg / ℓ

*Environmental standard: 0.03mg / ℓ

*For plants other than the above, no trichloroethylene was detected in measurements taken in wells around the plant borders.

*3 Pumping and aeration system

Groundwater is pumped up and sprayed and air is blown on it from below to aerate and separate organic solvents, which are made to adhere to activated carbon for removal.

*4 Microbial purification system

This is a method of restoring contaminated environments by utilizing microbial function. The purification capability of microbes living in the environment is raised by injection of nutrients, etc.

External audits

In March 2009, in order to renew its ISO 14001 certification as required every three years, JTEKT received an audit to assess its environmental management system and activities from FY2006 to FY2008. In this audit, JTEKT received five suggestions for improving the management system, but no deficiencies were recorded. The auditors commended JTEKT for companywide activities such as the "Mottainai Activity" (*1) being carried out with the participation of all employees under the leadership of the Person Responsible for Environmental Management based on a company slogan of "a manufacturing company friendly to the environment." They confirmed that JTEKT's management system was being continuously maintained and improved and renewed our certification.

Environmental management system certification in the JTEKT Group

⇒ Figure -01

In FY2008, two group business sites in China acquired ISO 14001 certification.

Environmental accounting

JTEKT utilizes environmental accounting in order to quantitatively grasp the costs and benefits of environmental conservation activities and to effectively and efficiently promote continuous improvements. At the same time, it discloses this environmental accounting information to stakeholders to help them understand JTEKT's environmental conservation activities.

Environmental conservation costs

(Millions of yen)

Type	Details	Investments	Costs
① Business on-site costs			
① Pollution prevention costs	<ul style="list-style-type: none"> ● Maintenance of drainage ● Maintenance and repair of wastewater treatment facilities ● Maintenance and repair of dust collectors, etc. 	126	291
② Environmental conservation costs	<ul style="list-style-type: none"> ● Measures for energy conservation 	203	58
③ Resource recycling costs	<ul style="list-style-type: none"> ● Investment and management related to waste reduction, etc. ● Waste disposal and recycling 	118	609
② Upstream and downstream costs	<ul style="list-style-type: none"> ● Green purchasing ● Amount paid to industrial organizations 	—	657
③ Management activity costs	<ul style="list-style-type: none"> ● Training activities ● Maintenance of ISO 14001 certification ● Environmental monitoring, measurements, etc. 	—	163
④ R&D costs	<ul style="list-style-type: none"> ● R&D for eco-friendly products 	798	1,719
⑤ Social activities costs	<ul style="list-style-type: none"> ● Disclosure of environmental information ● Tree-planting, etc. 	—	61
⑥ Environmental damage costs	<ul style="list-style-type: none"> ● Local tax on pollutant amounts (Tokyo and Tokushima) ● Soil and groundwater restoration 	—	4
Total		1,245	3,562
Grand total		4,807	

Economic benefit of environmental conservation measures (*2)

(Millions of yen)

	Details of benefits	Benefit amount
Income	Business income from recycling waste generated by main business activities, used products, etc.	1,538
Expenditure reduction	Energy-cost reduction from promoting energy conservation	430
	Reduction of waste treatment costs resulting from resource conservation and recycling	52
Total		2,020



External audit

*1 Mottainai Activity

Employees are instructed in environmental awareness workshops to have "mottainai" ("wastefulness") awareness and not use energy wastefully or throw away items wastefully and to turn off lights and equipment not in use, etc.

⇒ Figure -01

Group companies acquiring ISO 14001 certification in FY2008 (overseas)

Affiliate	Certification
JSSX (China)	September 2008
KWA (China)	December 2008

*2 Economic benefit of environmental conservation measures

Items such as contribution to products' added-value, environmental risk avoidance, and corporate image improvement are not included in the calculation. The scope is limited to items regarding which economic benefit can be quantitatively calculated. Depreciation costs are not included. Expenditures with multiple outlay purposes are calculated pro-rata.

Company covered:
JTEKT Corporation (nonconsolidated) (head offices, branch offices, logistics centers, R&D departments, and all plants)

Period covered:
FY2008 (April 2008 to March 2009)

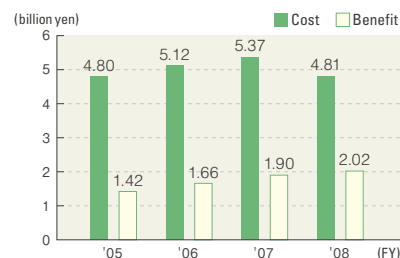
Environmental accounting results for FY2008

⇒ Figure -01

The total environmental conservation cost for FY2008 was 4.81 billion yen, comprising 1.25 billion yen in investments and 3.56 billion yen in expenditures. This marked a decrease of 0.56 billion yen, or 10.4%, from the previous fiscal year. Most of the investments were made at the Tadomisaki and Hanazono plants for ozone treatment equipment installed to reduce waste and at the Kokubu Plant for conversion to gas as a measure against global warming. The economic benefit of environmental conservation measures was 2.02 billion yen, an increase of 0.12 billion yen, or 6%, from the previous year.

⇒ Figure -01

Environmental conservation costs and economic benefits



Environmental education and training

Environmental education

JTEKT carries out various types of environmental education such as environmental awareness education and internal environmental auditor education in order to raise the environmental awareness and skills of employees. Also, in the companywide education curriculum including classes for new employees, new managers, management-track employees, and production staff, content is taught on environmental conservation.

01 | Environmental awareness education

JTEKT carries out environmental awareness education for employees as part of its "Environment Month" every June. The slogan for the FY2008 awareness education was "Let's each think of activities we can do to conserve energy and prevent environmental problems!" Meetings were held at each workplace to discuss and decide environmental conservation activities in areas such as reduction of CO₂ emissions and elimination of environmental complaints and abnormalities.



Environmental awareness education (attended by 591 employees)

02 | Internal auditor education

JTEKT carries out education on internal auditing skills for employees of JTEKT and affiliated companies once a year. In FY2008, 40 persons attended this course and were newly registered as internal environmental auditors. In addition, we carry out skill-improvement education for registered internal environmental auditors to promote a better understanding of auditing methods, relevant laws and regulations, and JTEKT's environmental management system.

Number of employees obtaining main environmental qualifications in FY2008

Pollution control manager	Air	25	Specially controlled industrial waste manager	34
	Water	30	Hazardous material handler (first-class)	3
	Noise	23	Hazardous materials handler (second-class)	352
	Vibration	18	Hazardous materials handler (third-class)	39
Energy manager		26	Chief electrical technician (first-class)	1
Energy management staff		6	Chief electrical technician (second-class)	12
Internal environmental auditor		287	Chief electrical technician (third-class)	22

Environmental emergency response training

At each worksite, JTEKT has control manuals for handling emergencies such as sudden accidents and natural disasters causing leakage of oil or chemical substances. Once a year, environmental emergency response training is carried out to confirm that actions are carried out according to the manuals.



Environmental emergency response training (Kagawa Plant)

VOICE

Environment Control Dept.
Satoru Yamamoto



We hope to cultivate environmental "key people" through auditor education

In internal environmental auditor education, we teach on interpretation of ISO 14001 standards and about environmental laws and regulations, and we also carry out simulated audits using case studies. We aim through this education not only to improve auditing skills but also to develop environmental "key people."

Activities in the development and design stage

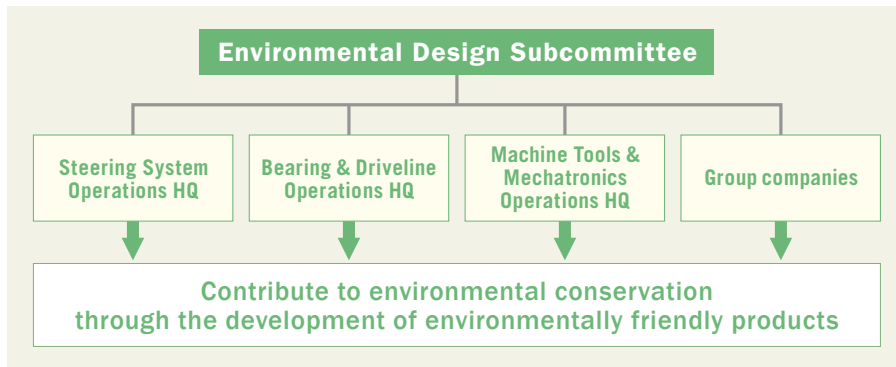
JTEKT has positioned the development and design of environmentally friendly products as an important environmental management theme.

Through technical innovation in the development and design stages, we strive to create products contributing to environmental conservation on a global basis.

Promotion structure

Management by the Environmental Design Subcommittee

Under the direction of the Environmental Conservation Committee, which oversees JTEKT's environmental conservation activities, the Environmental Design Subcommittee, including members from group companies, works to promote the creation of products that are compact, lightweight, efficient, low in environmental load, etc. for the entire group.



Targets of JTEKT product divisions and group companies

Based on the themes determined by the Environmental Design Subcommittee, each JTEKT product division and group company set targets for FY2008 and pursued actions to achieve these targets.

Steering System Operations HQ	Achieve both high performance and environmental friendliness, improve driving pleasure and safety
Bearing & Driveline Operations HQ	Create efficient, lightweight bearings and compact, lightweight driveline components; reduce energy consumption
Machine Tools & Mechatronics Operations HQ	Reduce environmental load throughout the product life cycle
Group companies	Promote activities at each company based on a unified group environmental policy

Assessment method

⇒ Figure -01

JTEKT has established an original environmental efficiency basic equation to serve as an index in quantitatively assessing environmental load reduction benefit. The larger the value, the greater the environmental load reduction benefit is. Each year JTEKT sets higher environmental efficiency targets and works to reach them while monitoring progress.

⇒ Figure -01

Environmental efficiency basic equation

Environmental efficiency is a value calculated based on degree of lightness, compactness, energy-savings, etc.

$$\frac{\text{Product performance}}{\text{Product environmental load}} = \frac{1}{\sqrt{W^2 + T^2 + E^2}}$$

W: Mass, T: Loss, E: Energy

Calculation of environmental load reduction benefit

Environmental load is the reciprocal of environmental efficiency. Environmental load reduction benefit is obtained from the environmental efficiency value by the following formula:

$$\text{Environmental load reduction ratio} = \left(1 - \frac{1}{\text{Environmental efficiency value}}\right) \times 100$$

In this case,

$$\text{Environmental efficiency value} = \frac{\text{Environmental efficiency of assessed product}}{\text{Environmental efficiency of standard product}} = 1.25$$

In the above case, the product's environmental load reduction benefit is 20%.

Activities and results by product division

Introduced below are JTEKT's FY2008 main activities and results for its three product divisions: steering systems, bearing and driveline components, and machine tools & mechatronics.

Steering System Operations HQ

JTEKT aims to provide steering systems, which play the crucial role of turning the vehicle, excelling in both performance and environmental friendliness as the world's No.1 supplier (*1) of steering systems in terms of environmental contribution. JTEKT seeks to develop the optimal steering system for each vehicle application and purpose that excels not only in environmental friendliness but also in driving pleasure and safety from the driver's viewpoint.






Reduction of product transport mileage (*2)

JTEKT's steering division promotes local purchasing and production with the goal of reducing CO₂ emissions created during product transport.

Improvement of fuel efficiency by environmentally friendly designs

Efforts to achieve environmental designs were focused on such themes as reducing steering system size, weight and torque loss, which resulted in the reduction of mass, torque loss and energy consumption of more steering systems than in FY2007. This contributed to the creation of systems with improved environmental efficiency and fuel efficiency.

Development result for FY2008

	Systems	Development points	Results		Environmental efficiency
			Mass	Torque loss	
Electric power steering	 Column assist type	• Integration of motorized tilt & telescopic mechanisms (lightweight, compact)	30% reduction	22% reduction	1.63
	 Pinion assist type	• Housing design optimization (lightweight)	25% reduction	27% reduction	
	 Rack assist type	• E-VGR integration (compact, lightweight)	26% reduction	40% reduction	
Electric-hydraulic power steering		• Pump efficiency improvement (torque loss reduction)	20% reduction	12% reduction	1.40
Hydraulic power steering		• Friction-weld rack (lightweight) • High flow rate valve (torque loss reduction)	13% reduction	20% reduction	1.20
			Mass	Torque loss	
			Energy consumption	17% reduction	

*1 World's No.1 in environmental contribution

JTEKT holds the top market share in electric power steering systems (EPS), which are superior to other steering types in contribution to fuel efficiency and environmental conservation.

*2 Product transport mileage

The concept of reducing CO₂ emissions by reducing the resources and energy consumed by product transport. The figure obtained by multiplying product transport quantities by transport distance is assessed.

Steering types and applicable vehicles

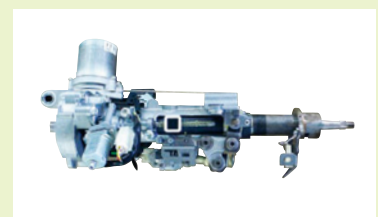
	Applicable vehicles					Installed location
	Passenger cars				Heavy vehicles	
	Mini	Small	Medium	Large		
Electric power steering (EPS)						
-Column assist type (C-EPS)	○	○	○			Passenger compartment
-Pinion assist type (P-EPS)		○	○			Engine room
-Rack assist type (R-EPS)			○	○		Engine room
Electric-hydraulic power steering (H-EPS)		○	○	○		Engine room
Hydraulic power steering (HPS)	○	○	○	○	○	Engine room

TOPICS

Development of world's first column type EPS with motorized tilt & telescopic functions

Electric power steering systems are superior to hydraulic and electric-hydraulic systems in fuel efficiency and compactness. Demands are increas-

ing for EPS systems for all vehicle types, and JTEKT, together with Aisin Seiki Co., Ltd., has become the world's first to succeed in integrating a motorized tilt & telescopic mechanism with a column type electric power steering (C-EPS) system, enabling C-EPS to be adopted on full-sized and high-end vehicles. Through achieving high output, JTEKT not only contributes to the environment but also has improved collision safety.



Column type electric power steering (C-EPS) system with motorized tilt & telescopic functions

*E-VGR, C-EPS, P-EPS, R-EPS and H-EPS are registered trademarks of JTEKT Corporation.

Bearing & Driveline Operations HQ

Bearings support the rotating parts of all types of machinery, and driveline components support the movement function of vehicles. In the development of these products, JTEKT strives to respond to needs for superior function while also achieving compactness, light weight, low energy loss, etc.

○ Torque loss reduction

JTEKT strives to achieve optimal configurations with the main aims of achieving high efficiency and light weight. It has reduced torque loss caused by friction and improved fuel efficiency.

Development result for FY2008

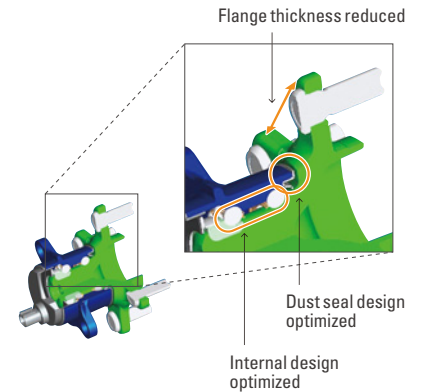
Lightweight, low-torque hub unit bearings for mini-vehicles

→ Figure -01

While maintaining fatigue strength and reliability, JTEKT reduced weight 20% by improving the bearing flange shape and internal design. Building the ABS sensor into the hub unit resulted in size reduction. By using drum brakes, which are more resistant to water than disk brakes, and improving the dust seal shape, torque loss was reduced 30% with no reduction in waterproof capability.

Mass	20% reduction
Torque loss	30% reduction
Environmental efficiency	1.19

→ Figure -01
Lightweight, low-torque hub unit bearings



Development result for FY2008

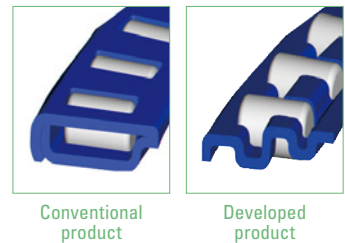
Low-torque thrust needle roller bearing (short rollers)

→ Figure -02

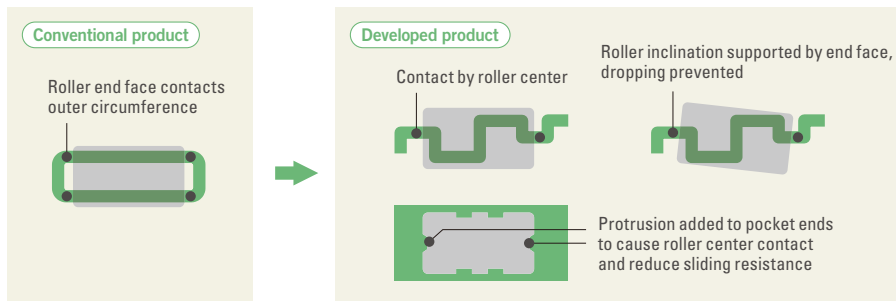
A newly developed retainer consisting of a single toroidal metal sheet is 20%~30% lighter than the conventional type, which is made of two parts. By preventing roller dropping and reducing the contact surface, torque loss during rotation is reduced 60%.

Mass	20~30% reduction
Torque loss	60% reduction
Environmental efficiency	1.35

→ Figure -02
Low-torque thrust needle roller bearings



Structures and features



○ Durability improvement

JTEKT promotes the development of materials and machining technology with the main aims of reducing the size, weight and energy consumption of driveline components. It has raised ease of installation on the vehicle and improved fuel efficiency and durability.

Development result for FY2008

Intelligent torque controlled couplings (ITCC) for 4WD vehicles (*1)

→ Figure -03

By developing a special oil and improving clutch durability, JTEKT has improved load capacity 2.1 times (*2), achieving sufficient durability for use under large-vehicle severe operating conditions. Through ITCC application on 4WDs, a 15% driveline weight reduction is achieved.

Load capacity	2.1 times
4WD driveline products	Mass: 15% reduction
Environmental efficiency	1.23

→ Figure -03
Intelligent torque controlled couplings (ITCC) for 4WD vehicles



*1 ITCC (Intelligent Torque Controlled Coupling) is a registered trademark of JTEKT Corporation.

*2 Compared with JTEKT conventional product

Machine Tools & Mechatronics Operations HQ

In the machine tools division, emphasis is placed on reducing the consumption of resources and electricity, which serves to prevent global warming. JTEKT conducts product assessments to grasp environmental impact in all product lifecycle stages from manufacture to disposal in order to create products with minimal environmental impact.

○ Reduction of downtime and defects

Because improving manufacturing-line machine operating efficiency (“bekido”) and first-pass-good (“chokko”) rates contributes to reduced energy consumption, JTEKT aims to create energy-efficient machine tools with low rates of downtime and machining defects.

Development result
for FY2008

Small-scale machining center series FH400J

⇒ Figure -01

By adopting a variable switch type pre-load mechanism that features low-heat generation and long life, the FH400J helps reduce cycle time, coolant flow volume, downtime, and defects. Although this series has the largest machining range in its class, the machine size is so compact that one truck can transport it, which contributes to reduced transport energy.

Cycle time	10% reduction
Coolant flow volume	50% reduction
Environmental efficiency	1.26

○ Close cooperation with group companies

⇒ Figure -02

The Machine Tools & Mechatronics Operations HQ works in close cooperation with group companies to develop and design environmental products. JTEKT published a brochure entitled “Eco-Challenge of the JTEKT Group” outlining the efforts of each company and promoting the further sharing within the group of activities and results. Also, the group has adopted the “JTEKT Eco-Scale” as a uniform index. JTEKT will continue promoting groupwide activities that all stakeholders can understand and appreciate.

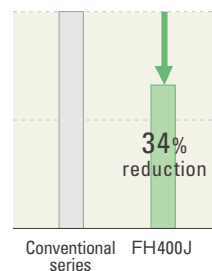
⇒ Figure -01 ①

Small-scale machining center series FH400J



⇒ Figure -01 ②

JTEKT Eco-Scale (*)



*JTEKT Eco-Scale

JTEKT expresses environmental load reduction ratios using 2002 products as a standard based on the environmental load reduction benefit calculation (page 40).



JTEKT Eco-Scale mark

⇒ Figure -02

Eco-Challenge of the JTEKT Group



TOPICS

JTEKT received the 2008 Technology Award from the Japan Society for Precision Engineering for grinding process technology enabling low-volume coolant supply (EcoLoG Grinding TYPE II)

Because grinding generates more heat than cutting and must achieve high precision and quality, large quantities of coolant are required. Reducing coolant usage is important from the viewpoints of both environmental protection and energy conservation. In view of these needs, JTEKT strove to develop technology to reduce the volume of coolant supply and succeeded in

creating the EcoLoG Grinding TYPE II, which reduces coolant flow and grinding wheel power loss due to the coolant by about half while maintaining conventional grinding performance. It received this award because of its new environmentally friendly grinding technology contributing to energy conservation.



Conventional grinding



EcoLoG Grinding TYPE II

Activities related to production and logistics

JTEKT is reviewing its production processes and transport methods in order to reduce CO₂ emissions as a means of preventing global warming. We also are working to utilize materials effectively, reduce waste, and control and reduce the use of chemical substances in order to achieve production and transport activities that don't place a burden on the environment.

CO₂ emissions reduction

→ Figure -01

Reducing CO₂ emissions in production

JTEKT promotes energy conservation and reduction of CO₂ emissions at production sites by working to raise the energy efficiency of current equipment, switching to more efficient devices, etc. In FY2008, although the target for per-sales-unit CO₂ emissions was not reached, we reduced overall CO₂ emissions about 10% more than the target of 266,800t-CO₂, in part thanks to reduced production volumes, and have already reached the FY2010 target of 241,400t-CO₂. We have set higher "challenge" targets and are pursuing activities on a companywide basis to reduce CO₂ emissions and promote energy conservation.

01 | Main activities

- (1) Improve heat-treatment processes
- (2) Improve production machinery and ancillary equipment
- (3) Pursue energy savings by combining low-load lines
- (4) Achieve high-efficiency operation of in-house power generators
- (5) Pursue energy switching and CO₂ emissions reduction
- (6) Promote energy-saving activities at all workplaces

02 | Status of main activities

Nara Plant | Electric heat-pump type heating /cooling system installed

The Nara Plant changed from A-type heavy oil direct-flame heaters to an electric heat-pump system. It also installed centralized control to carry out blow-temperature control and demand control. Conversion from A-type heavy oil to electricity resulted in an annual reduction of about 30t-CO₂. The Nara Plant now uses very little A-type heavy oil and is working to abolish it in the future.

Reduction of global CO₂ emissions

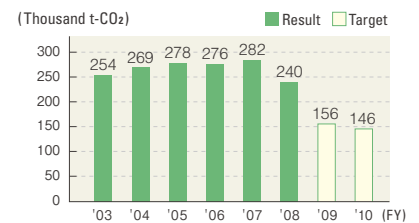
→ Figure -02

Aiming to minimize the contribution of its global production operations to global warming, JTEKT is working to reduce CO₂ emissions not only within JTEKT but also at its group companies in Japan and overseas. JTEKT set a target of reducing CO₂ per-sales-unit emissions by 30% by FY2010 in comparison with FY2003 levels at all group production sites in Japan and overseas and is pursuing activities to achieve this target. Thanks in part to sharply declined production, CO₂ emissions in FY2008 were 23% below the FY2003 level, although per-sales-unit emissions were about the same as in FY2007. We will continue promoting improvements on a groupwide basis in order to raise production efficiency and reach the targets for FY2010.

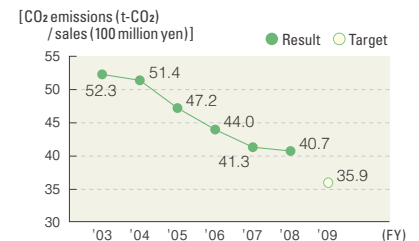
→ Figure -01

Transition of total and per-sales-unit CO₂ emissions

Total CO₂ emissions



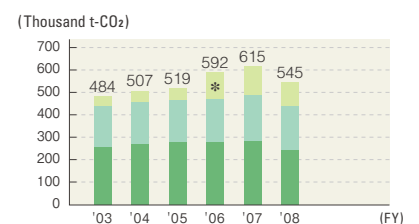
Per-sales-unit CO₂ emissions



→ Figure -02

Global CO₂ emissions

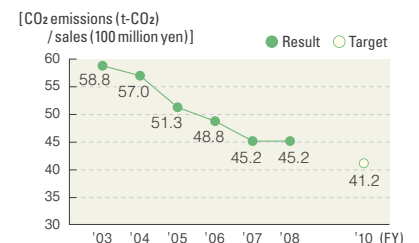
Total CO₂ emissions



■ JTEKT
 ■ Overseas group: 32 companies
 ■ Domestic group: 18 companies (10 companies in FY2003-FY2005)

* Currently reviewing scope of domestic group coverage.

Per-sales-unit CO₂ emissions



Reducing CO₂ emissions in logistics

→ Figure -01

JTEKT had set a target of lowering CO₂ emissions to the 1990 level by FY2010, but it reached this target in FY2008 and therefore has set a more challenging target and is working to reach this.

01 | Main efforts

- (1) Expand long-distance transport improvements to other routes
- (2) Switch to trailer-type trucks
- (3) Reduce transport frequency to cope with sudden cargo decrease

02 | Status of main activities

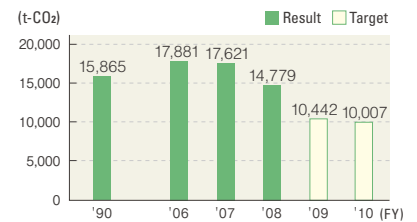
Expansion of logistics improvements to the Kyushu area

In FY2007, we improved our packaging and transport methods for long-distance transport to the Iwate region in northern Japan, and in FY2008 we applied these improvements to shipments to the Kyushu region in western Japan as well. Specifically, JTEKT ships products from each of its domestic plants packaged in small forms that can be loaded without wasted space to a location nearby the customers in Kyushu, where the packaging form is changed to that desired by the customer. This greatly improves the loading efficiency of long-distance transport. Further, we changed the transport means from boat to railways and also began shipping products directly from the Shikoku area directly to Kyushu. These improvements resulted in an annual reduction in CO₂ emissions of 229 tons.

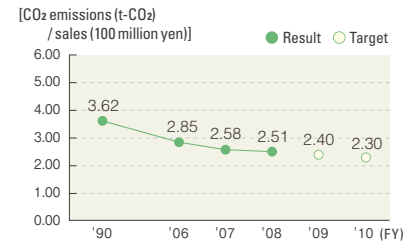
→ Figure -01

CO₂ emissions in logistics

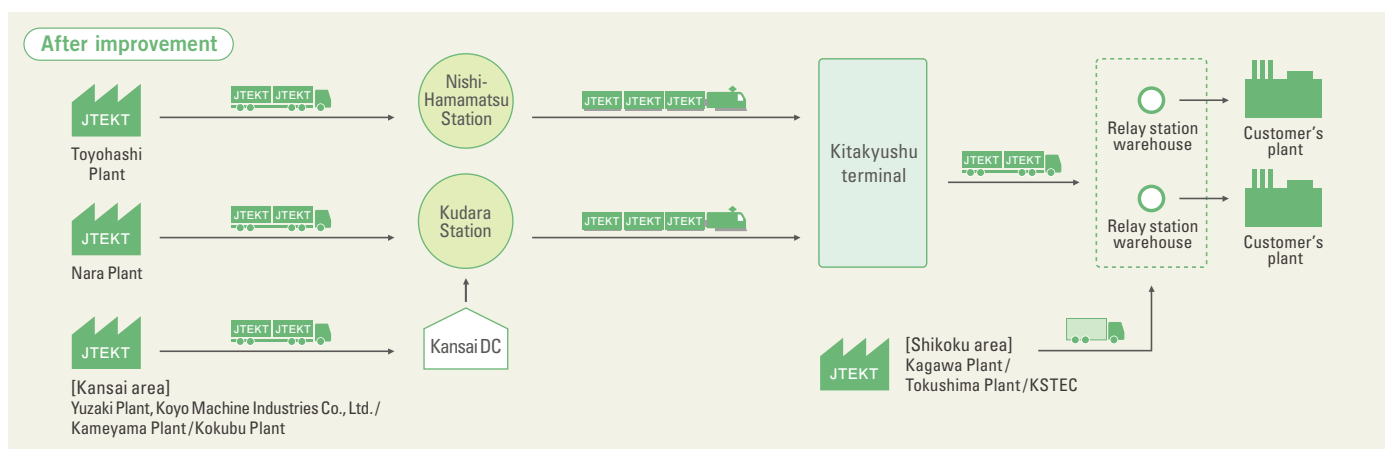
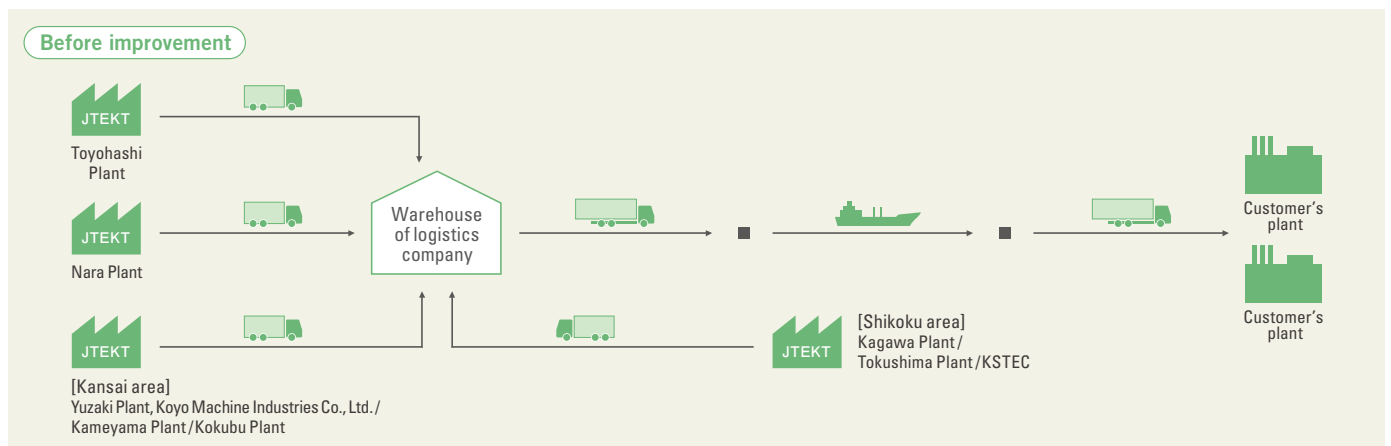
Total CO₂ emissions



Per-sales-unit CO₂ emissions



(See page 36 for CO₂ conversion coefficients used in calculating CO₂ emissions.)



Reduction of materials usage

JTEKT, mainly through its Energy Saving Subcommittee, one of several specialized environmental committees, strives to reduce the amounts of primary materials such as raw materials and secondary materials such as cutting tools and grinding wheels that it uses. By improving material types, machining methods, etc., we have steadily reduced usage amounts.

Reduction of primary material usage amounts

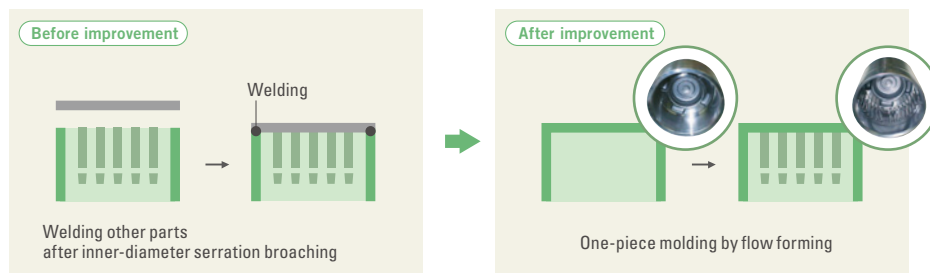
→ Figure -01

We have reduced material usage amounts by changing product designs, changing manufacturing methods, and improving yield. We also are striving to reuse product waste, for example by using product parts removed during die cutting for use in smaller products.

Yield increased by flow forming

Regarding the front housings of ITCC couplings, previously we broached the inner diameter serrations and then welded other parts. We changed this to a flow forming method of one-piece molding that shortens the process and raises material yield.

Material usage 15% reduction



Reduction of secondary material usage amounts

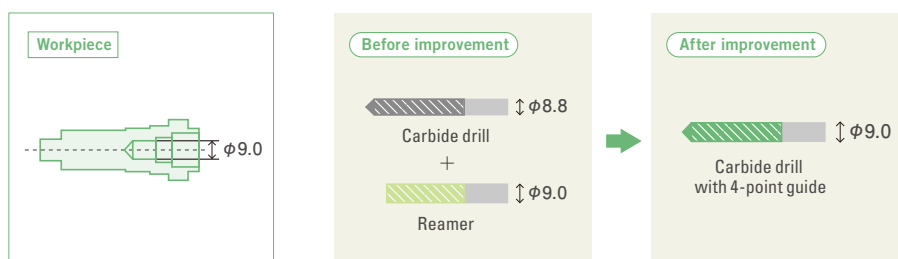
→ Figure -02

We succeeded in reducing usage amounts by revising the size, hardness and other specs of grinding wheels, cutting tools, dies, etc. in order to prolong their service life. Also, we strove to promote recycling by reusing oil, grinding wheels, cutting tools and jigs.

Reduction of cutting tool usage by one-shot drilling

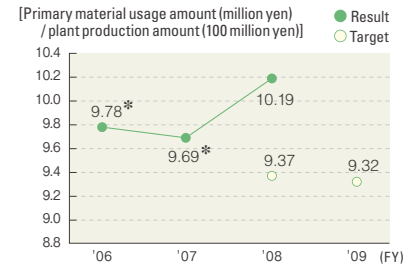
Previously, after drilling an initial hole with a super-hard drill, the drilling process was completed using a reamer. By switching to a new carbide drill capable of drilling the entire hole in a single shot, the reaming process was eliminated, and furthermore the life of this drill was improved. These improvements resulted in reduced cutting tool usage.

Cutting tools usage 72% reduction



→ Figure -01

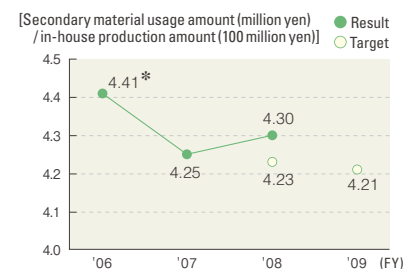
Primary materials usage per sales unit



* FY2008 results worsened from FY2007 because of increased prices of oil, etc., but if we exclude such factors, the target was reached.

→ Figure -02

Secondary materials usage per sales unit



* FY2008 results worsened from FY2007 because of increased prices of oil, etc., but if we exclude such factors, the target was reached.

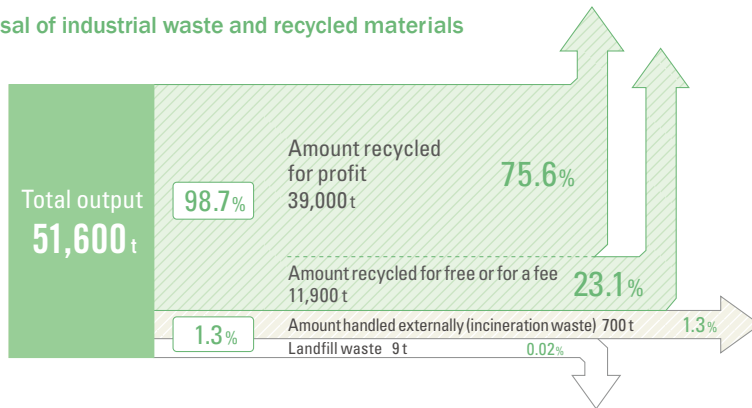
* Three figures in the above two graphs differ from those in the CSR Report 2008. This is because the figures were revised. The figures in the above graphs are correct.

Waste reduction

→ Figure -01

JTEKT, in order to utilize resources effectively and in view of limited landfill space, has set reduction targets for waste, including waste disposed of for free and for a charge, and carries out activities to reach these targets. In FY2008, we gained confidence that we could completely change landfill waste to recycled waste. Regarding incineration waste, we already reached the FY2010 target, being helped by the drop in production, and have set a more challenging target. We will continue efforts to reduce overall waste leaving our plants, including activities to sell certain waste for profit.

Disposal of industrial waste and recycled materials



Main efforts

Ozone treatment technology adopted to reduce waste fluid handling by subcontractor

Previously, we had disposed of coolants, cleaning solvents, etc. in-house by an evaporation and condensation method, but because of insufficient capacity, we had outsourced a part of this work to subcontractors. However, we introduced ozone treatment equipment at our Tadomisaki and Hana-zono plants, eliminating the need for handling by subcontractors, and were able to reduce amounts of secondary waste created in the previous disposal process. In addition, CO₂ emissions during equipment operation are lower with this new method.



Ozone generator

Subcontracted volume reduction	28 t/month
Secondary waste reduction	8 t/month
CO ₂ emissions reduction	20 t/month

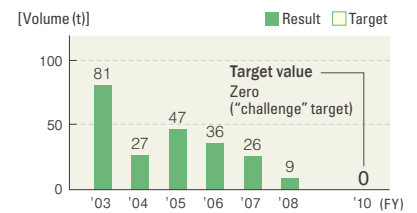
Control and reduction of chemical substances

→ Figure -02

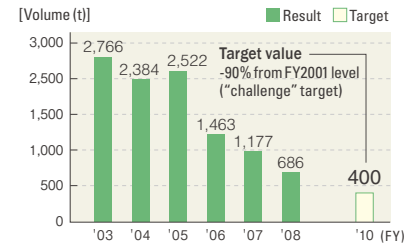
JTEKT has established a Chemical Substance Control Standard regarding the control of chemical substances. Also, in regard to the output of substances subject to PRTR (*), JTEKT had been working to achieve levels by FY2010 that are 60% less than the 1998 levels, but it reached these levels in FY2008. We have set more challenging targets for FY2009 and are continuing efforts to reduce the use of chemical substances.

→ Figure -01

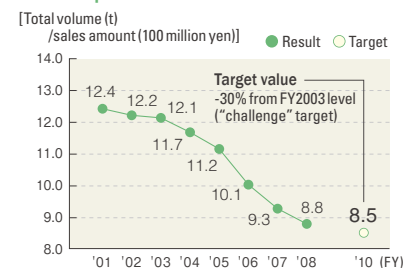
Landfill waste



Incineration waste

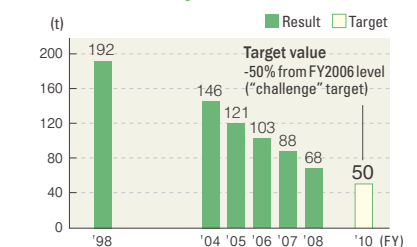


Wastes per sales unit

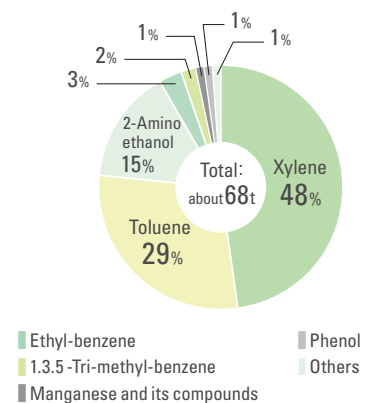


→ Figure -02

Discharge and transfer of substances subject to PRTR



Discharge and transfer breakdown of substances subject to PRTR for FY2008



*PRTR regulation

Pollutant Release and Transfer Register is a system to collect and disseminate information on environmental releases and transfer of toxic chemicals from industrial and other facilities.