

Environmental Report

This section introduces environmental activities engaged in by JTEKT in FY2011 based on the 2015 Environmental Action Plan. We have paid consideration to providing readers with ongoing data and reports however some content has been moved to the Pick Up section. Also, like last year, environmental data by business area is available on JTEKT's website.

Environmental management	46
Environmentally considerate development and design	53
Prevention of global warming	54
Effective use of resources	56
Control and reduction of environmentally burdensome substances	59
Biodiversity conservation	61

Environmental management

Social background

In order to achieve a sustainable society, there is a demand for business activities to be less burdening on the environment. It is becoming more and more important for companies to assess both risks and opportunities when promoting environmental management. Such performance is attracting interest as an index in evaluating a company's financial condition.

JTEKT's concept

For sustainable development of the planet

To realize our corporate philosophy of "contributing to the happiness of people and the abundance of society through product manufacturing", the JTEKT group considers the environment to be an important management issue and promotes action to contribute to the development of a sustainable planet and society.

JTEKT Group Environmental Vision

▶ Figure-01

Based on the CSR policy, JTEKT established the JTEKT Group Environmental Vision comprised of an environmental philosophy and policy defining global environmental conservation action. We aim to achieve a sustainable society, establishing an action plan and promoting activities to achieve this goal.



Promotion structure

Under the Global Environmental Conservation Committee

▶ Figure-02

JTEKT engage in environmental management led by the Global Environmental Conservation Committee chaired by our company president. The committee is divided into six specialized environmental subcommittees to address issues relating to business activities. These subcommittees set targets based on company-wide policies as well as discuss and decide upon measures and control progress.

Environmental management

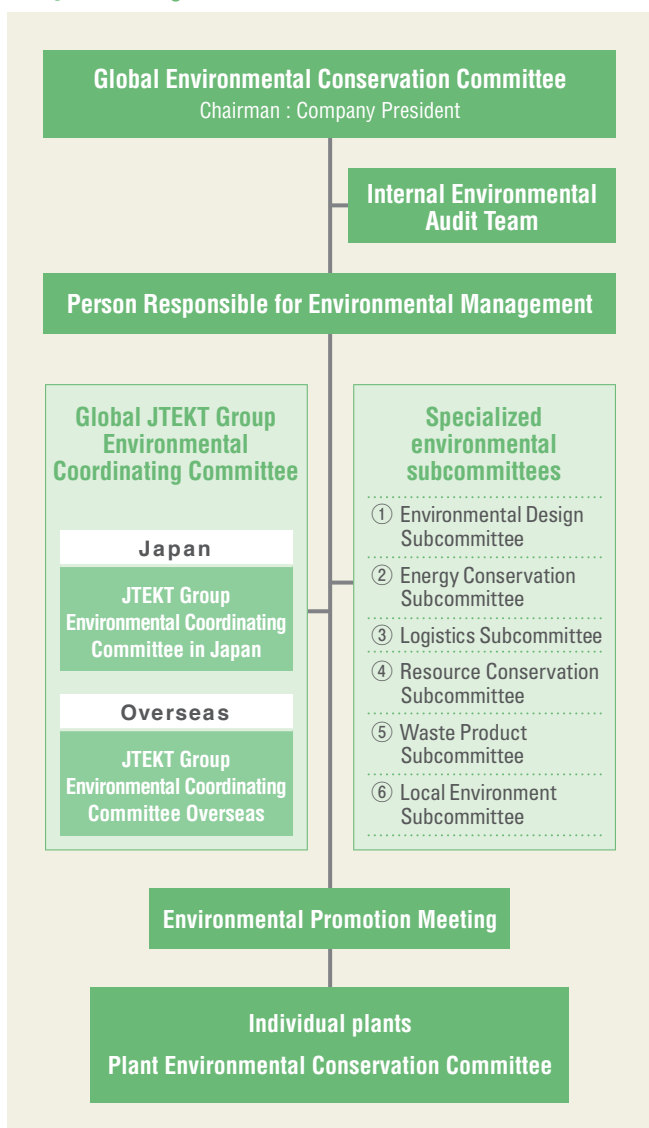
Forming of an Environmental Promotion Meeting

The Environmental Promotion Meeting was formed in April of 2011 in order to enhance and strengthen environmental activities. Every month, a video conference is held connecting all plants and improvement cases from individual plants are shared with other plants. In this way, JTEKT engages in activities to improve environment performance such as reducing CO₂ emissions and waste. At the same time we are also promoting activities to abide by environmental laws and regulations as well as ISO14001 activities.

Promotion of global environmental management

JTEKT has set up a Global JTEKT Group Environmental Coordinating Committee comprising of 18 affiliated companies within Japan and 32 overseas affiliates. This committee works to solve environmental issues.

▶ Figure-02 Organizational chart



▶ Figure-01 JTEKT Group Environmental Vision

Environmental Philosophy

The JTEKT group is aiming to reduce the environmental load of our business activities and products throughout their life-cycle in order to conserve the global environment for future generations and realize a sustainable society.

Environmental Policy

JTEKT, based on a deep awareness of the importance of global 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.

1. 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.
2. Comply with all requirements of environmental laws, regulations, treaties, agreements, etc., related to our business activities and strive to prevent environmental pollution. Also, contribute to society by accurately grasping technical needs related to global environmental conservation and developing products to meet such needs.
3. 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
 - (1) Develop and design environmentally friendly products
 - (2) Reduce CO₂ emissions through effective energy utilization
 - (3) Reduce waste
 - (4) Thoroughly control chemical substances and reduce environmentally burdensome substances
 - (5) Reduce primary materials and secondary materials
 - (6) Reduce CO₂ emissions in logistics
 - (7) Maintain and improve community environments
4. 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.
5. 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.

Environmental management

Targets and results

JTEKT Environmental Action Plan 2015 Environmental Action Plan

▶ Figure-01

JTEKT established a 2015 Environmental Action Plan which stipulates action policies and specific targets in order to promote environmental conservation activities which involve the entire JTEKT group and suppliers. This Action Plan has been live from FY2011. We are working towards cutting greenhouse gases to 25% of what they were in 1990 by the year 2020 and contributing to the realization of international society's goal of cutting greenhouse gases to half of what they were in 2000 by the year 2050.

▶ Figure-01 2015 Environmental Action Plan

Area	Action items
Environmental management	(1) Strengthen and promote consolidated environment management
	(2) Promote environmental activities in cooperation with business partners
	(3) Promote sustainable plant activities
	(4) Promote environmental education activities
Develop and design environmentally friendly products	(1) Develop new technology and new products leading to environmental burden reduction
	(2) Reduce resource consumption
	(3) Promote recycle design considering effective resource use
	(4) Roll out environmental assessments in the design and development phases
	(5) Control and reduce environmentally burdensome substances contained in products
Reduce CO ₂ emissions	(1) Reduce CO ₂ in production and logistics <ul style="list-style-type: none"> ● Global reduction of CO₂ ● Reduction of CO₂ in logistics
	(2) Promote reusable energy
Reduce waste	Production (1) Promote thorough reduction of waste through countermeasures focusing on the source of the waste (2) Achieve zero emissions in all JTEKT group plants (JTEKT itself achieved zero direct landfill waste in FY2009 and is continuing to aim for zero waste production in other areas)
	Logistics (1) Reduce packaging material consumption through simpler packaging, using more returnable containers, etc.
Reinforcement of chemical substance control and reduction of environmentally burdensome substances	(1) Reduce environmentally burdensome substances in production activities
Reduce primary materials and secondary materials	(1) Reduce waste and effectively use resources in production and logistics operations
Preserve and improve the global environment, forge communication	(1) Enforce preventative measures for environmental problems and observe regulations
	(2) Build good relationships with local residents
	(3) Proactive disclosure of environmental information and enhancement of communication activities
	(4) Action for biodiversity

* C-EPS, ITCC are registered trademarks of JTEKT Corporation.

Environmental management

* Values in square brackets are comparisons with the base year

	FY2011 targets and initiatives	Results of activities	Evaluation	Related pages												
	(1) Share the JTEKT Group Environmental Vision	(1) Continued activities with group companies in Japan and overseas (2) Held Environmental Coordinating Committee sessions		46 47 51												
	(1) Further promote green purchasing (2) Roll out environmentally friendly purchasing guidelines to business partners	(1) Expanded Green Purchasing Guidelines	○	34 61												
	(1) Introduced reusable energy (2) Promoted plant greenification	(1) Introduced solar power generation (50kW) to our Tokyo plant (2) Installed green curtains at our Kariya plant	○	16 17												
	(1) Promote education with the objective of improving environmental awareness	(1) Environmental education in Environmental Month (2) Rank-specific education		52												
	(1) Reduce the environmental burden of new products through an environmental efficiency basic formula (2) Promote recycle design (3) Promote life cycle assessment (LCA) activities	(1) Steering ● Developed an ECU-motor integration type C-EPS system (2) Bearings and drive ● Developed an electric oil pump for idle reduction ● Developed an electronically controlled 4WD coupling (3) Machine tool and mechatronic ● Took action for energy-saving machine tools	○	12~16 53												
	(1) Promote response to chemical substance regulations	(1) Activities to eliminate substances identified under the European REACH regulation (2) Response to the Provisions on Environmental Administration of New Chemical Substances		59												
	Production (1) Promote CO ₂ reduction activities through the development and introduction of low CO ₂ production technologies and daily improvements (2) Horizontal deployment of energy-saving improvement cases (3) Visualization of energy		△	17 54 55												
	<table border="1"> <thead> <tr> <th>Item</th> <th>Target</th> </tr> </thead> <tbody> <tr> <td>CO₂ emissions</td> <td>236,367 t-CO₂ : Down 7% from FY1990</td> </tr> <tr> <td>Emissions by in-house production volume</td> <td>151.2 t/100 mill yen : Down 3% from FY2008</td> </tr> <tr> <td>Globally Emissions by in-house production volume</td> <td>100.2 t/100 mill yen : Down 3% from FY2008</td> </tr> </tbody> </table>	Item	Target	CO ₂ emissions	236,367 t-CO ₂ : Down 7% from FY1990	Emissions by in-house production volume	151.2 t/100 mill yen : Down 3% from FY2008	Globally Emissions by in-house production volume	100.2 t/100 mill yen : Down 3% from FY2008	<table border="1"> <thead> <tr> <th>Results</th> </tr> </thead> <tbody> <tr> <td>232,870t-CO₂ [Down 8.4%]</td> </tr> <tr> <td>157.5 t/100 mill yen [Up 1.0%]</td> </tr> <tr> <td>101.3 t/100 mill yen [Down 1.8%]</td> </tr> </tbody> </table>	Results	232,870t-CO ₂ [Down 8.4%]	157.5 t/100 mill yen [Up 1.0%]	101.3 t/100 mill yen [Down 1.8%]		
Item	Target															
CO ₂ emissions	236,367 t-CO ₂ : Down 7% from FY1990															
Emissions by in-house production volume	151.2 t/100 mill yen : Down 3% from FY2008															
Globally Emissions by in-house production volume	100.2 t/100 mill yen : Down 3% from FY2008															
Results																
232,870t-CO ₂ [Down 8.4%]																
157.5 t/100 mill yen [Up 1.0%]																
101.3 t/100 mill yen [Down 1.8%]																
	Logistics (1) Reduce CO ₂ through transportation improvements		○	55												
	<table border="1"> <thead> <tr> <th>Item</th> <th>Target</th> </tr> </thead> <tbody> <tr> <td>CO₂ emissions</td> <td>13,900 t-CO₂ : Down 12% from FY1990</td> </tr> <tr> <td>Emissions by sales</td> <td>2.54 t/100 mill yen : Down 10% from FY2006</td> </tr> </tbody> </table>	Item	Target	CO ₂ emissions	13,900 t-CO ₂ : Down 12% from FY1990	Emissions by sales	2.54 t/100 mill yen : Down 10% from FY2006	<table border="1"> <thead> <tr> <th>Results</th> </tr> </thead> <tbody> <tr> <td>13,396 t-CO₂ [Down 16%]</td> </tr> <tr> <td>2.28 t/100 mill yen [Down 19%]</td> </tr> </tbody> </table>	Results	13,396 t-CO ₂ [Down 16%]	2.28 t/100 mill yen [Down 19%]					
Item	Target															
CO ₂ emissions	13,900 t-CO ₂ : Down 12% from FY1990															
Emissions by sales	2.54 t/100 mill yen : Down 10% from FY2006															
Results																
13,396 t-CO ₂ [Down 16%]																
2.28 t/100 mill yen [Down 19%]																
	(1) Introduction of reusable energy	(1) Introduced solar power generation (50kW) to our Tokyo plant	○	16												
	Production (1) Reduction of emissions through countermeasures focusing on the source (2) Promotion of a shift to valuable resources (3) Reduction of emissions through using less and reusing		○	57												
	<table border="1"> <thead> <tr> <th>Item</th> <th>Target</th> </tr> </thead> <tbody> <tr> <td>Emissions by in-house production volume</td> <td>7.7 t/100 mill yen : Down 7.5% from FY2008</td> </tr> <tr> <td>Direct land-fill waste</td> <td>Zero</td> </tr> </tbody> </table>	Item	Target	Emissions by in-house production volume	7.7 t/100 mill yen : Down 7.5% from FY2008	Direct land-fill waste	Zero	<table border="1"> <thead> <tr> <th>Results</th> </tr> </thead> <tbody> <tr> <td>6.8 t/100 mill yen [Down 18%]</td> </tr> <tr> <td>Zero</td> </tr> </tbody> </table>	Results	6.8 t/100 mill yen [Down 18%]	Zero					
Item	Target															
Emissions by in-house production volume	7.7 t/100 mill yen : Down 7.5% from FY2008															
Direct land-fill waste	Zero															
Results																
6.8 t/100 mill yen [Down 18%]																
Zero																
	Logistics (1) Transition to returnable (2) Simplification of packaging by changing packing style		○	58												
	<table border="1"> <thead> <tr> <th>Item</th> <th>Target</th> </tr> </thead> <tbody> <tr> <td>Emissions by sales</td> <td>0.89 t/100 mill yen : Down 10% from FY2006</td> </tr> </tbody> </table>	Item	Target	Emissions by sales	0.89 t/100 mill yen : Down 10% from FY2006	<table border="1"> <thead> <tr> <th>Results</th> </tr> </thead> <tbody> <tr> <td>0.82 t/100 mill yen [Down 18%]</td> </tr> </tbody> </table>	Results	0.82 t/100 mill yen [Down 18%]								
Item	Target															
Emissions by sales	0.89 t/100 mill yen : Down 10% from FY2006															
Results																
0.82 t/100 mill yen [Down 18%]																
	(1) Substitution with parts that don't contain substances subject to PRTR	(1) Release and transfer of substances subject to the PRTR: 34.9t (down by 5.5% compared with last year)	○	59 60												
	Primary materials (1) Reduce stock removal, reduce amount of material used by changing design and methods Secondary materials (1) Reduce amount used through changes to specifications such as material and profile	(1) Primary material base unit: 10.64 (2) Secondary material base unit: 4.62	△	56												
	(1) Ongoing efforts for zero environmental regulation violations and claims from residents through the strengthening of daily control tasks	(1) Zero environmental violations and claims from residents		51 52												
	(1) Promote environmental conservation activities around plants (2) Build good relationships with local residents and councils	(1) Clean-up activities around plant (2) Held environmentally-related discussions with local community		42 43 60												
	(1) Enhance and continue issuance of CSR reports (2) Provide more environmental information	(1) Issued CSR report 2011	○	42												
	(1) Promote activities based on our Biodiversity Conservation Action Guideline	(1) Participated in a forest development project (2) Reviewed the Green Purchasing Guideline and promoted activities with suppliers		34 61												

2015 targets will be set by 2012.

Environmental management

Environmental impact on business activities

Reduction of environmental burden in all stages

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

Resource and energy input versus environmentally burdensome substance output

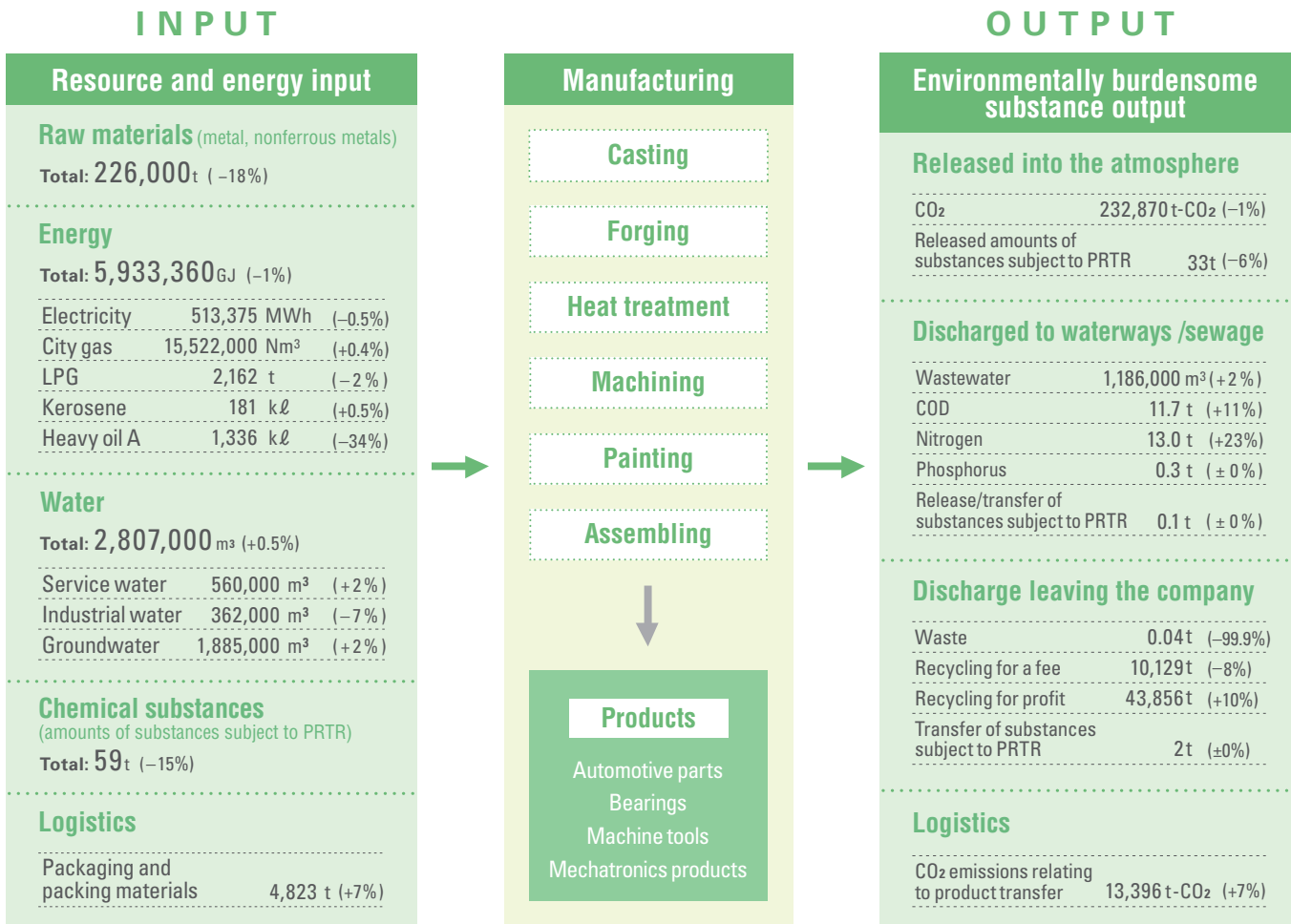
▶ Figure-01

The table below shows the resource and energy input versus envi-

ronmentally burdensome substance output for FY2011. To minimize the impact our business activities have on global warming, JTEKT is working to reduce the amount of energy used in all our processes, including casting, forging, heat treatment, machining processes and so forth. We also make efforts to convert to more efficient energy such as electricity and city gas.

In FY2011 we aimed for efficient production while responding to fluctuations in production volume caused by natural disasters and energy conservation requirements.

▶ Figure-01 Resource and energy input versus environmentally burdensome substance output



*Values in parenthesis are comparisons with the previous year

*Notes on the [Resource and energy input versus environmentally burdensome substance output]

CO₂ conversion coefficients to calculate CO₂ emissions volume

Electricity	0.3707 kg-CO ₂ /kWh
Heavy oil A	2.6958 kg-CO ₂ /ℓ
Kerosene	2.5316 kg-CO ₂ /ℓ
Propane gas	3.0040 kg-CO ₂ /kg
City gas	2.1570 kg-CO ₂ /Nm ³

The CO₂ conversion coefficients were set by Japan Federation of Economic Organizations (1990) and are used in Japan. Regions outside of Japan use 2001 published values. We fixed electrical conversion coefficients so that the results of our improvements could be evaluated.

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 (heat quantity unit), G=10⁹

PRTR regulation: "PRTR" is an abbreviation for Pollutant Release and Transfer Register, which is a system announced by the government for reporting the amount of chemical substances released or transferred.

COD: Chemical Oxygen Demand (water quality index)

Charged recycling: Pay a processing fee to recycle.

Environmental management

Environmental accounting

Cost and results appraisal

By quantitatively appraising the cost and results of environmental conservation activities, JTEKT is constantly making improvements effectively and efficiently. We use environmental accounting to provide information to our stakeholders on JTEKT's environmental conservation activities. The tally system is in accordance with the Ministry for Environment's Environmental Accounting Guideline.

Environmental conservation costs

(Million yen)

Type	Details	Investment	Cost
[1] Business on-site costs			
① Pollution prevention costs	● Service & upkeep of environmental equipment	159	229
② Environmental conservation costs	● Measures for energy conservation	306	52
③ Resource recycling costs	● Waste processing, recycling	25	371
[2] Upstream and downstream costs	● Green purchasing	—	38
[3] Management activity costs	● Environmental monitoring, measurements, etc.	3	153
[4] R&D costs	● R&D of environmentally friendly products	838	2,032
[5] Social activities costs	● Disclosure of environmental information, greenification, etc.	7	50
[6] Environmental damage costs	● Soil and groundwater restoration	—	4
Total		1,338	2,929
Gross amount		4,267	

Economic benefit of environmental conservation measures

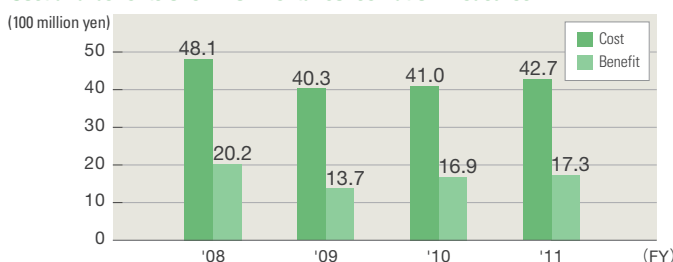
(Million yen)

Details of benefits	Economic benefit
Profit from recycled material sales	835
Energy-cost reduction from promoting energy conservation	879
Reduction of waste processing costs	15
Total	1,729

Benefits towards material amount reduction from environmental conservation measures

Details of benefits	Benefits towards material amount reduction
Energy consumption (t-CO ₂)	32,600
Waste output (t)	1,102

Cost and benefits of environmental conservation measures



It is not possible to calculate the economic benefits brought about by environmental conservation measures such as increased product value, avoiding environmental risk and improving corporate image. We have only calculated items which can be accurately appraised such as energy-savings benefits, etc.

Calculated area : JTEKT Corporation (including some group companies within workplaces)
Calculated period : FY2011 (April 2011 to March 2012)

Environmental accounting results for FY2011

Environmental conservation costs for FY2011 were 1.34 billion yen in investments and 2.93 billion yen in management costs, adding up to a total of 4.27 billion yen. This was an increase of 170 million yen (4.1%) from the previous year. Updates to air conditioning units and visualization of energy were the main investments made with the objectives of preventing underground seepage of oils and establishing energy-saving countermeasures. Economic benefits of environmental conservation measures totaled 1.73 billion yen, which was a 40 million yen (2.4%) improvement over the previous year.

Major activities in FY2011

JTEKT Group Environmental Coordinating Committee in Japan

JTEKT holds Group Environmental Coordinating Committees twice a year with participation by all 18 domestic group companies. In these committees, activities for CO₂ and waste reduction as well as environmental disturbance prevention are advanced. In June of 2011, the previous year's results and current year's actions were reported and discussed. In December, 2011, a group-wide session was held, with progress reports and exchanges of opinions on problem areas, etc. A plant tour was conducted at the location hosting the event, and participants were able to see environmentally-orientated equipment, the status of energy-saving activities, earthquake measures and so on. JTEKT strive to improve our environment conservation countermeasures.

Environmental management system certification within the JTEKT group

The JTEKT group is working to acquire ISO14001 certification. ISO14001 is the environmental management system international standard. In FY2011, JTEKT group company, Nippon Needle Roller Manufacturing obtained certification. This makes a total of 44 of the 50 JTEKT Group Environmental Coordinating Committee companies (15 within Japan and 29 overseas) which have obtained certification and completed systems conforming to the standard.

Reducing environmental risk

Environmental accident prevention activities

To prevent environmental accidents, we share countermeasures implemented in response to incidents occurring both internally and externally for similar equipment. Moreover, we have set internal standards (*) more stringent than regulations in order to observe environmental legislation, treaties and convention levels and manage these standards thoroughly.

* **Internal standards** JTEKT's final affluent internal standards are 80% of regulatory requirements.

Environmental management

Legal compliance with environmental legislation

In FY2011, there were no cases of exceeding environmental regulation values and zero environmental accident complaints. There were also no environmentally-related lawsuits (fines, penalties). However, there were 3 environmental close-calls (*1) including a case where we went over our internal standard. We will identify the cause and take corrective action while at the same time roll out countermeasures to other plants.

***1 Environmental close-call** Incidents where impact on the environment was minor and confined within JTEKT grounds however could have resulted in an accident.

Environmental patrols by the plant manager

As part of our Environmental Month every June, managers of each plant conduct environmental patrols. In FY2011, ditches, oil/water separator tanks and environmental facilities within the plant grounds were inspected for defects and improvements made if any problems were found.



Environmental patrol (Nara plant)

Emergency drills

In preparation for various environmental accidents, emergency training is carried out regularly at each plant. In FY2011, emergency training assuming abnormal occurrences such as tank oil leaks, etc. was carried out. Emergency training was also carried out for nightshift workers assuming that emergency situations could also occur at night.



Emergency drills (Kagawa plant)

On-site checks of industrial waste processing and collection/transportation companies

JTEKT conduct annual on-site checks of all waste processing and collection/transportation companies. These on-site checks are done using a common check sheet and we check that the consigned waste is being appropriately processed.

Environmental audits

Internal audits

JTEKT conduct internal audits annually to confirm the operational status of our environmental management system and observance of legislation. We always correct the issues identified in this audit.

External audits (ISO14001)

JTEKT was subjected to an ISO14001 renewal survey in March of 2012. As a result, there were 4 cases identified with room for improvement however no cases of non-conformity procedures and our environmental management system conformed to standard requirements and was deemed as being carried out effectively. We were also evaluated to have improved our environmental performance based on targets and be making continuous improvements.

Environmental education

Environmental awareness education

JTEKT hold environmental awareness education every June for employees. In FY2011, 563 employees participated, deepening understanding of JTEKT's environmental activities, and heightening awareness of environmental abnormality prevention. Participants also rolled out training content to their own workplaces, and contributed to the awareness of all employees.

Environmental education by division

In FY2011, JTEKT began division-based education targeting the production engineering department. 86 people participated, gaining a better understanding of JTEKT's environment activities as well as learning about PRTR and waste reduction as environmental responses demanded of production engineering.

Environmental education by rank

Each year, as part of the companywide education program, JTEKT educate new students of our Technical Training Center, newly hired employees and recently promoted management staff about ISO14001, the JTEKT environmental management system and environmental actions.

In FY2011, a total of 400 people completed environmental training.



Hiroaki Matsuta
Production Headquarters
Environment Control Dept.

Raising environmental awareness of each individual and putting into practice

In recent years, needs relating to environmental problems and energy-saving countermeasures have arisen and there is a heightened interest in the environment. In environmental education, JTEKT introduce environmental conservation activities conducted by each department and instruct the types of activities we wish our employees to put into practice in the future. I would like to see environmental education contribute to raising individual employee's awareness of the environment and lead to various actions being put into practice.



Environmentally considerate development and design

Social background

Sustainable development requires the popularization of productions which consider environmental impact across their entire lifecycles. Environmental consideration is demanded from the development and design phases in order to develop technologies which reduce environmental burden and create designs that make reuse and recycling easy.

JTEKT's concept

Improve each product from every angle

JTEKT, in line with our corporate philosophy of "contributing to the happiness of people and the abundance of society through product manufacturing", develop and design environmentally friendly products. We believe that JTEKT's products and technologies provide environmental countermeasures for our customer's products and manufacturing processes and as such, greatly contribute to the environment. Therefore, we engage in activities to improve the environmental performance of all products and are producing results which will contribute to prevention of global warming and effective resource use.

Promotion structure

Promotion by the Environmental Design Subcommittee

Under the guidance of the Environmental Design Subcommittee, which unites companywide environmental conservation activities, Environmental Design Subcommittees are promoting the development of environmentally friendly products. Innovative technology is used in the development and design stages to make products smaller, lighter, more efficient, and reduce the amount of environmentally burdensome substances they contain. In this way, JTEKT is engaging in environmental conservation on a world scale.



Keitoku Higashiyama
Engineering Headquarters
Engineering Management Dept.
Engineering Management Office
Group 1



More environmentally friendly products to society

JTEKT pursues manufacturing with minimal environmental burden from the development stage by creating products which are resource and energy-saving, and consider reduction in life-cycle cost by designing parts which are easy to disassemble and recycle upon disposal. Our department aims to spread awareness of environmental design to engineers in the name of reducing CO₂ emissions through environmental design meetings and strives to provide society with more environmentally friendly products.

Assessment method

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.

Environmental efficiency basic equation and environmental efficiency value calculation

Environmental efficiency is a value calculated based on the degree of lightness, compactness, energy-savings, etc. The environmental efficiency value is calculated by dividing the environmental efficiency of the assessed product by that of the standard product.

Environmental efficiency

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

W : Mass T : Loss E : Energy

Calculation of environmental load reduction effect

As the environmental load reduction effect, it is possible to seek environmental load reduction ratio more than the environmental efficiency value. For example, if the environmental efficiency value was 1.25, that product's environmental load reduction benefit would be 20%. A reduced environmental load is sought as the reverse of the environmental efficiency value.

Environmental efficiency value

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

Environmental load reduction ratio

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

Evaluation of the 5 products featured in PICK UP (P12-16)

Developed product	Environmental burden reduction percentage
The ECU-motor integration type C-EPS system	41.5%
Electronically controlled coupling (ITCC)	35.8%
Electric oil pump for idle reduction	31.9%
Machine tool FA800S	41.2%
Continuous diffusion furnace for solar battery cell manufacturing	81.0%

3R (*2) activities

JTEKT's environmental design activities are not limited to JTEKT itself, but are also rolled out to all group companies. JTEKT group products contribute to the effective use of resources through environmental design.

Main measures

Reduction and reuse of packaging material (Group company: Koyo Electronics Industries Co., Ltd)

By revising the structural design of the cushioning material used in the packaging of programmable display units, Koyo Electronics Industries succeeding in reducing packaging material by approximately 15%. Moreover, this cushioning material was improved so it could be reused by the customer as a temporary stand during set-up, increasing convenience.



*2 3R Originating from the first letters of Reduce, Reuse and Recycle, 3R is a concept expressing the order of priority for waste handling.

*C-EPS, ITCC are registered trademarks of JTEKT Corporation.

Prevention of global warming

Social background

With frequent worldwide occurrences of abnormal weather feared to be the effects of global warming, countermeasures addressing global warming are urgently needed. Greenhouse gases such as CO₂ are emitted through various corporate activities and countermeasures combining many different techniques are necessary to reduce such emissions. Moreover, due to nuclear power plants going out of operation in the wake of the Great East Japan Earthquake in 2011, a nationwide power shortage problem has arisen and not only corporations, but the entire nation of Japan, now needs power-conserving countermeasures.

JTEKT's concept

Reducing CO₂ emissions across all processes

In order to help prevent global warming, JTEKT engage in activities to reduce CO₂ emissions in the production and transportation of products. All group companies, both in Japan and overseas, promote energy-saving methods and the use of reusable energy throughout all processes from product design to delivery.

Stabilization of power supply and demand

In order to continuously countermeasure power shortages, JTEKT proactively engages in energy-saving activities such as introducing even better energy-saving equipment in addition to introducing our own power generation based on a plan up until 2015. By supplying our own power, we can continue stable business activities, suppress demand for purchased power, as well as contribute to the stabilization of supply and demand.

Reducing CO₂ emissions in production

Reducing domestic CO₂ emissions

▶ Figure-01

2011 was a year which caused production volume to fluctuate significantly due to disasters such as the Great East Japan Earthquake in March and the Thailand floods in November. Despite this, CO₂ emissions were much lower than 2010 and, as was the case last year, the base unit had improved compared with the previous year.

Main measures

Reduction of heating energy through waste heat utilization

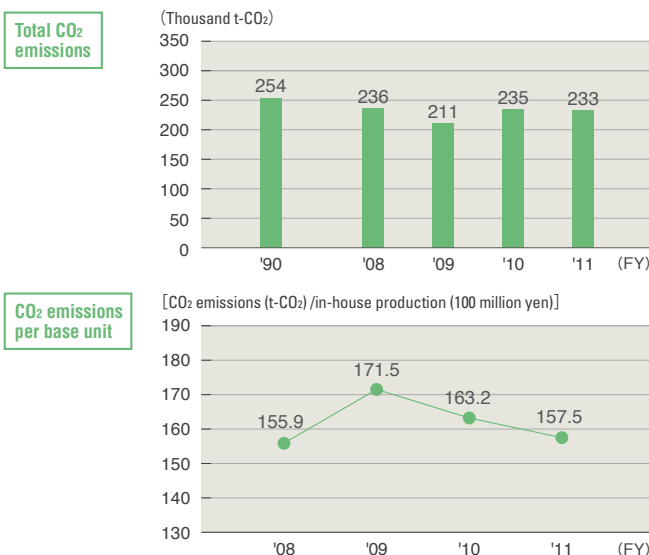
Previously, 60°C to 70°C waste heat emitted from the air compressor for our forging processes in the new south plant on our Tadomisaki site was released into the open air. We redirected this waste heat to keep it inside the plant and use it as heating energy, stabilizing the indoor temperature at 22°C and abolishing air conditioning. As a result, we were able to reduce the 2,000m³ of air conditioning gas normally used every month down to zero, and reduced winter CO₂ emissions to 24.6t. We will investigate utilizing waste heat from the warm-forging process in the future.



Installed a duct on the compressor (New south plant on our Tadomisaki site)

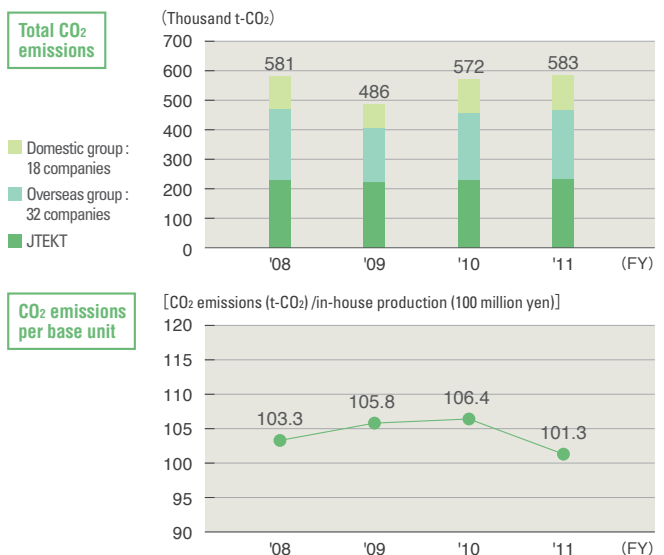
▶ Figure-01

Transition of total and per base unit CO₂ emissions in production



▶ Figure-02

CO₂ emissions (global and base unit)



*Past performance has been revised due to a change in conversion coefficients. Refer to page 50 for CO₂ conversion coefficients used in calculating CO₂ emissions

Prevention of global warming

Reduction of global CO₂ emissions

Figure-02

With an aim to minimize the impact of our global production operations on global warming, JTEKT is working to reduce CO₂ emissions not only within JTEKT but also at its group companies in Japan and overseas.

In FY2011, we achieved a 4.8% base unit reduction. We will continue to improve productivity in order to prevent global warming and improve production efficiency as a group on the whole.

Improvements in energy-saving through visualization

JTEKT saves energy through productivity improvements such as higher yield rate. Valid examples of energy-saving improvement cases are rolled out to all JTEKT plants through conversion into a matrix and visualization so that the type and location of the plant where the improvement was made is clear.

In-house power generation activities

JTEKT has introduced in-house power generation focused on cogeneration in order to stabilize the supply and demand of power and provide an off-grid power source for emergencies. Our in-house power generation percentage (*) for FY2011 was 4.3% (overall power-generation: 23.3 million kWh). In FY2012 we plan to install a 3,000kW cogeneration system in our plants located in the west of Japan, where the concern for power shortages is particularly high.

*In-house power generation percentage In-house power generation/power usage (purchased power + in-house power generation)

Introduction performance

FY2001	Kagawa plant 3,535kW
FY2003	Okazaki plant 4,900kW (cogeneration)
FY2004	Tokushima plant 4,960kW

Introduction schedule

FY2012	Kokubu plant 3,000kW (cogeneration)
FY2013	Tokyo plant 1,000kW (cogeneration)

Reducing CO₂ emissions in logistics

Reaching total emission and per base unit targets

Figure-03

FY2011 was a year shaken by severe natural disasters such as the Great East Japan Earthquake and the Thailand floods. JTEKT responded in some cases by operating on weekends to meet our customers' needs. Despite this, we still reached total and per base unit targets for CO₂ emissions by improving packing style and transportation on the whole. Moreover, we have succeeded in reducing emissions by around 16% since FY1990.

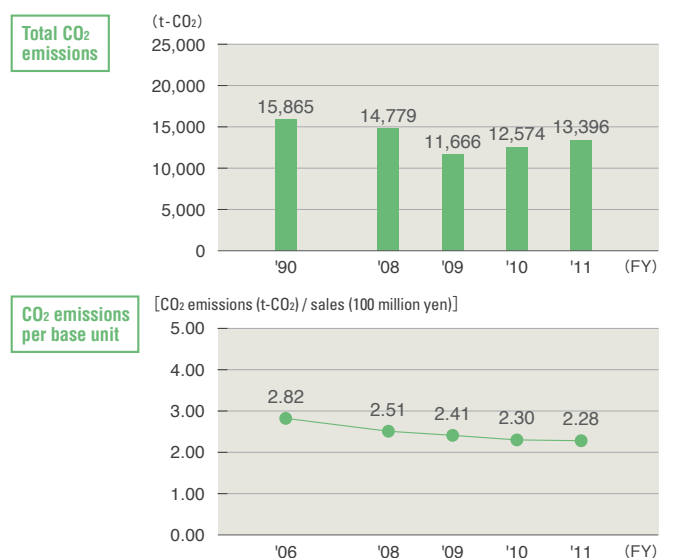
Main measures Improved capacity

In the transportation of products, we changed from packaging with cardboard cases to plastic cases, achieving both a shift to reusable material and reducing cushioning material. In addition to improving capacity, we shifted from road to rail transportation. By shortening the logistics route, we reduced the number of trucks used and cut annual CO₂ emissions by 55t.



Figure-03

Transition of total and per base unit CO₂ emissions in logistics



Effective use of resources

Social background

The effective use of our planet's limited resources is essential to creating a recycling society. In order to achieve this, JTEKT is committed to minimizing waste, reusing parts, etc., and recycling.

JTEKT's concept

Responsibility as a manufacturer

At JTEKT, we consider the effective use of resources as one of the responsibilities of an environmentally friendly manufacturer. Through making improvements and devising ideas for the production processes of each product, we strive to reduce material usage and waste output, reuse and save resources.

Saving resources in production

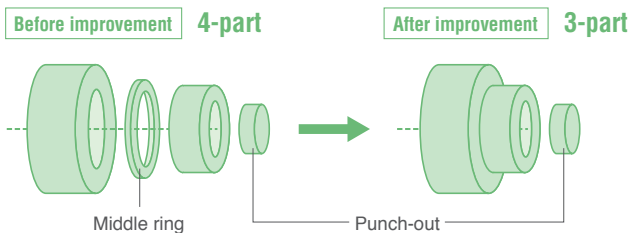
Reduction of primary material consumption

Figure-01

JTEKT do our best to reduce material consumption through changing product design and techniques and reducing stock removal. In addition to efforts to reduce waste, we also make other products from the material left in a mold once the product has been removed in an effort to reuse waste material. However, due to the rise in material costs, our base unit is worse than the previous year and we will strive to improve further in the future.

Main measures Improving material yield rate through changed forging processes

In the hot forging of single ball bearings, operations were conventionally broken into 4 parts - the inner ring, outer ring, middle ring and punch-out, with the middle ring and punch-out being disposed of. However, by adding cold rolling which can enlarge the diameter, we have changed to a 3 part hot forging process and have succeeded in improving material yield rate.



Material consumption 15% reduced

Reduction of secondary material consumption

Figure-02

We succeeded in reducing consumption by revising the material, shape, hardness and other specs of secondary material such as grinding wheels, cutting tools and dies and further increasing their durability. Also, we strove to promote recycling by reusing oil, grinding wheels, cutting tools and jigs. However, due to the rise in the cost of oil, etc., our base unit is worse than the previous year and we will strive to improve further in the future.

Main measures Reducing tool consumption through re-sharpening and re-coating machining drills

A 3.4 dia. drill is used to machine the centers of electric power steering. In the past we would dispose of the drills after they had machined 600 parts, however, by establishing technologies to re-sharpen and re-coat, in-house we were able to significantly reduce our tool consumption.

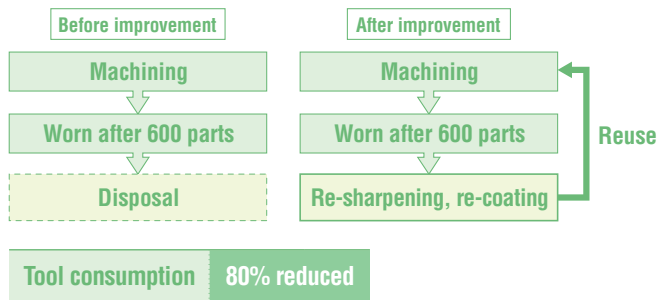


Figure-01

Primary materials usage per base unit

[Primary material usage amount (million yen) / plant production amount (100 million yen)]

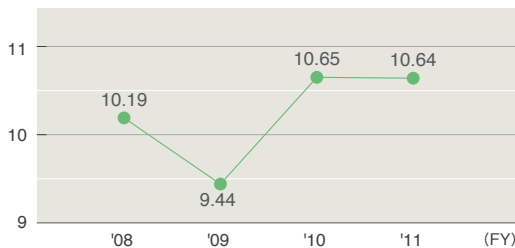
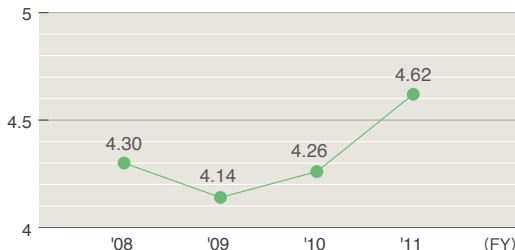


Figure-02

Secondary materials usage per base unit

[Secondary material usage amount (million yen) / in-house production amount (100 million yen)]



*Past performance has been revised due to revision of appraisal area

Waste reduction

Aiming for overall emissions reduction ▶ Figure-03

In an effort to efficiently use resources and respond to the depletion in landfill sites, JTEKT has defined waste reduction targets including waste recycled either for free or at a charge and are rolling out activities. From FY2009 we began a shift to recycling all direct landfill waste and will also be able to recycle all incinerated waste from FY2012. We will continue efforts to reduce waste overall, including waste recycled for profit.

Main measures

Our casting operation uses sand molds. When we extract moldings, we disassemble the sand molds and reuse the sand internally to create new molds however some of the sand is recycled for use in cement material as industrial waste (tailings). In order to reduce the amount of tailings which account for around one-quarter of all JTEKT waste, from FY2011 we have sold part of our waste to a casting sand dealer who can reuse it as casting sand, reducing annual wastage to 700t.

Waste reduction 700t/year

My
CSR

Masayuki Yamanaka
Production Headquarters
Environment Control Dept.

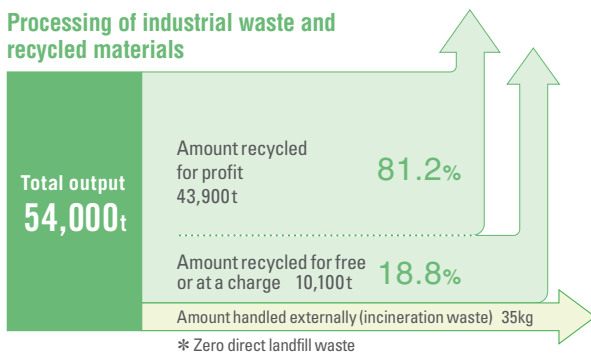
Always keeping
“Waste not, Want not”
in mind



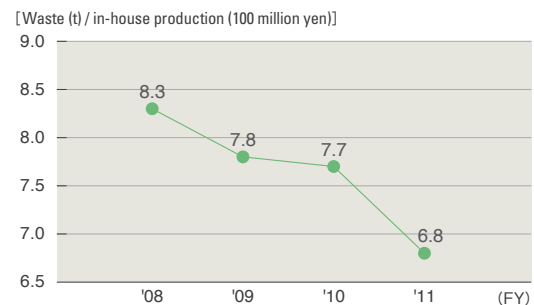
My main responsibility is engaging in waste reduction activities. Actions that value our planet’s limited resources are absolutely imperative to protecting the global environment. It is my job to use my knowledge to its fullest and think of ideas to repeatedly use what can be reused and treat what must be classed as waste as a resource. I go about my waste improvement duties constantly conscious of “Waste not, want not” and the fact that if materials are mixed, they become waste, if they are separated, they are resources.

▶ Figure-03

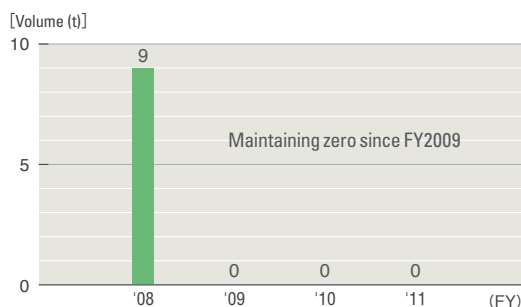
Processing of industrial waste and recycled materials



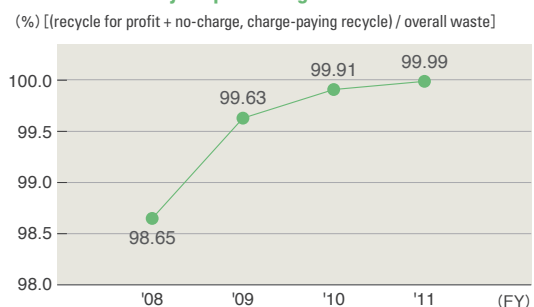
Yearly transition of waste base unit



Yearly transition of direct landfill waste output



Transition of recycle percentage



Effective use of resources

Reduction of packaging material

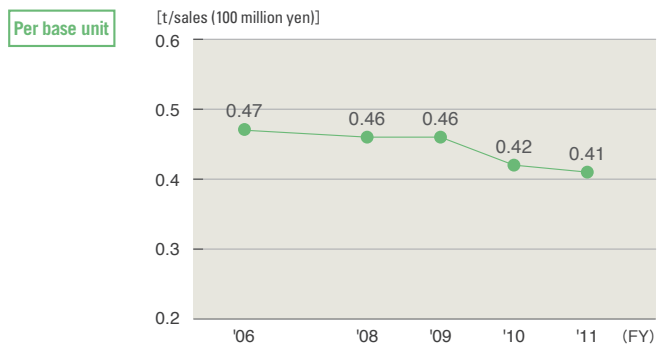
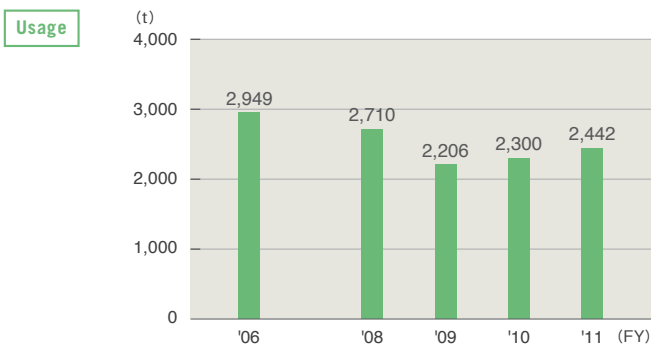
Reducing packaging and packing material

Figure-01

In order to effectively use resources, JTEKT has established targets for packaging and packing material individually for wood and paper, and promotes simpler and returnable packaging. In wooden packaging, we have increased our use of returnable pallets. In paper packaging, we are encouraging a shift from cardboard to returnable plastic containers through improved packing style.

Figure-01

Transition of wood packaging usage and per base unit



Transition of paper packaging usage and per base unit

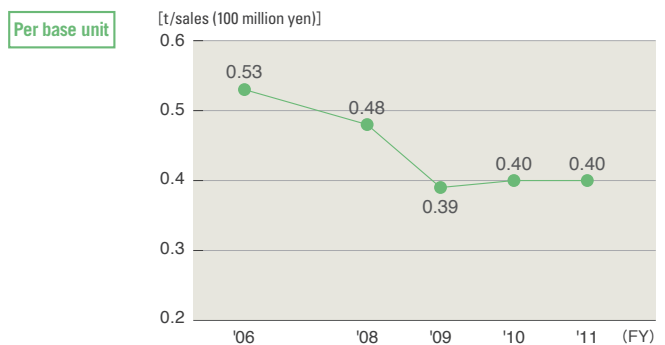
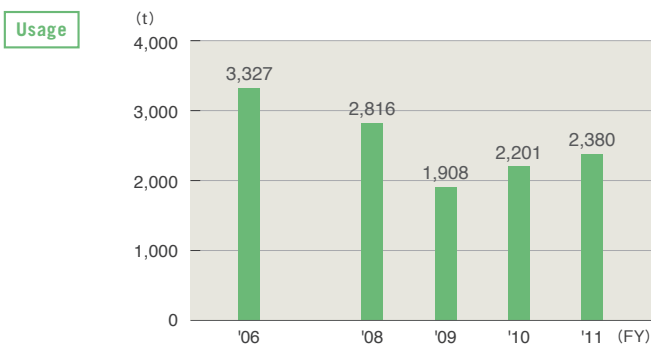
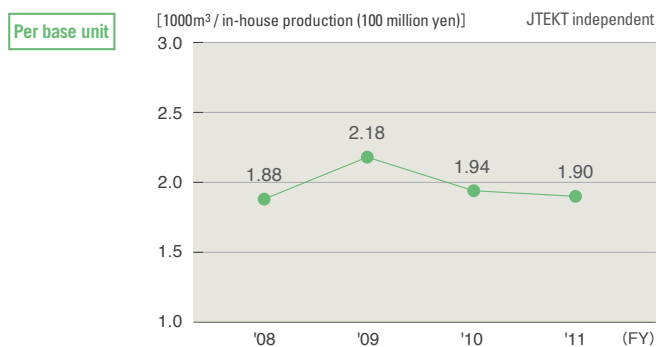
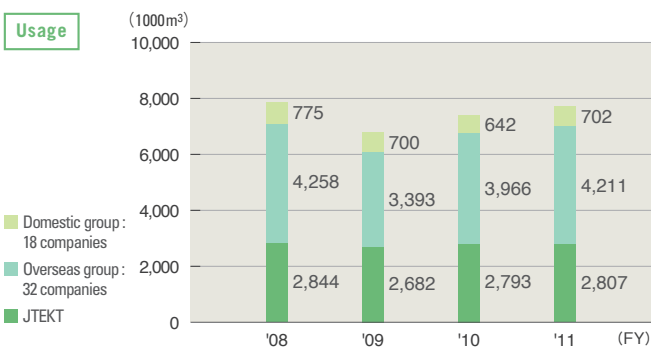


Figure-02

Yearly transition of overall and base unit water usage



* Past performance has been revised due to revision of water usage appraisal area

Control and reduction of environmentally burdensome substances

Social background

More and more action is being taken to reduce the usage and discharge of environmentally burdensome substances which can negatively impact the planet's environment and people's health. Society demands that corporations not only abide by various laws and regulations concerning environmentally burdensome substances but also take autonomous action.

JTEKT's concept

For the reduction of environmentally burdensome substances

For JTEKT, who aims to be a "monozukuri company gentle on the planet", reduction of environmentally burdensome substances in production activities is one of our greatest social commitments. It goes without saying that we will respond to and observe revised regulations as promptly as possible, but we are also working to reduce output of environmentally burdensome substances to alleviate our impact on the environment as much as possible.

Control and reduction of chemical substances

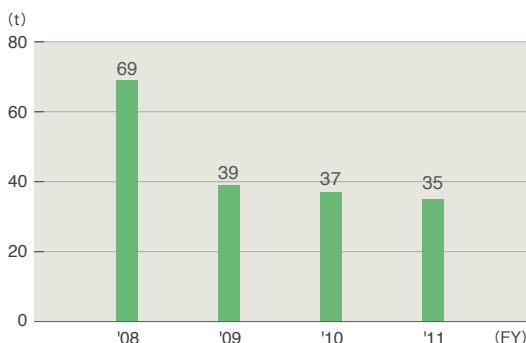
Reduction of substances subject to PRTR ▶ Figure-01

JTEKT is taking action to reduce the impact of chemical substances released into the environment from production activities on people's health and the environment. By promoting substitution to paint, grinding fluid, cleaning agent and so on that do not contain PRTR substances (low content) JTEKT is promoting reduction of the release and transfer of PRTR (*1) recognized substances.

***1 PRTR** 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.

▶ Figure-01

Yearly transition release and transfer breakdown of substances subject to PRTR



Response to chemical substance regulations

Response to the European REACH regulation

REACH (*2) is a European regulation relating to chemical substances issued in June of 2007. 27 new "Substances of Very High Concern" (SVHC) (*3) were added to REACH in 2011 making a total of 73 SVHC as of December, 2011. In February of 2012, for the first time, it became necessary to seek authorization for 8 additional products and components if they contained any of the identified SVHC substances, making 14 in total.

JTEKT appraises information on REACH regulation substances, rolls out this information within the company and is working to free (*4) our products of the three substances necessitating authorization by January, 2014.

***2 REACH regulation** REACH is a regulation that deals with the Registration, Evaluation, Authorization and Restriction of Chemical substances.

***3 Substance of Very High Concern (SVHC)** SVHC refers to the approximate 1,500 substances identified by the European Chemicals Agency (ECHA) as likely to impact upon the health and environment.

***4 Free** "Free" in this case refers to having less than 0.1wt% of a substance requiring authorization in a given product or material.

Response to the Provisions on Environmental Administration of New Chemical Substances

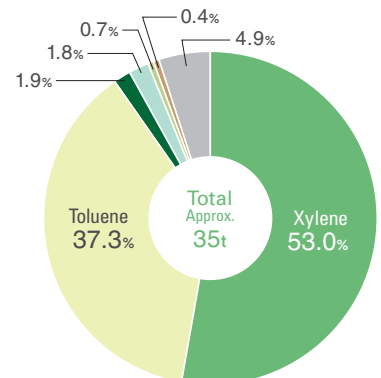
All secondary materials purchased in Japan and supplied to our JTEKT group companies located in China have been investigated in response to the revised Provisions on Environmental Administration of New Chemical Substances (*5) which came into effect in China in October of 2010. Procedures are underway to declare identified new chemical substances. JTEKT will continue action to respond to the chemical substance regulations of each country.

*5 Revised Provisions on Environmental Administration of New Chemical Substances

With the objective of controlling the environmental risk of new chemical substances, these provisions regulates those substances not listed in the "Inventory of Existing Chemical Substances" as new chemical substances and stipulates the control and tracing control system of these new chemical substances through a declaration system and categorization.

Release and transfer breakdown of substances subject to PRTR for FY2011

- 1,3,5-trimethylbenzene
- Manganese and its compounds
- Ethylbenzene
- Boron
- Others



Control and reduction of environmentally burdensome substances

Chemical substance control training

Amidst acceleration of a movement to regulate chemical substances for the entire lifecycle of products, action from the development and design stages to minimize environmental burden is becoming increasingly important.

That is why, in FY2011, JTEKT set up a technical course on chemical substance control aimed at all employees involved in design and development. 70 people including employees of our group companies participated in the first course. They learned about the type of action that is necessary during the development and design of products and the importance of Japanese and overseas chemical substance regulations. We plan to hold ongoing training sessions to deepen employees' understanding of chemical substance control.

Training text

許容濃度 '02 '03	物質名	備考
鉛(Pb)	0.1 wt%	鉛酸バッテリー、鉛酸バッテリー、鉛酸バッテリー
カドミウム(Cd)	0.01 wt%	鉛酸バッテリー
水銀(Hg)	0.1 wt%	鉛酸バッテリー
六価クロム(Cr ^{VI})	0.1 wt%	鉛酸バッテリー

Proper storage and control of PCB devices

The Act on Special Measures concerning the Proper Treatment of Polychlorinated Biphenyl Waste requires the storage and notification of devices containing PCB (polychlorinated biphenyl), widely used as an insulating oil. JTEKT appropriately stores such devices and notifies government agencies in accordance with this Act. In addition, by April of FY2012 we rendered 100 high pressure condensers with highly concentrated PCB levels harmless through PCB treatment at JESCO (Japan Environmental Safety Corporation). We plan to perform this treatment on another 48 units in FY2012 and complete this on all 146 units we currently have in storage by 2014.



Status of PCB device treatment (Okazaki plant)

Soil and groundwater measures (continued report)

Since 1998, JTEKT's Kariya and Okazaki plants have implemented ongoing measures to prevent external leaks and to purify groundwater of trichloroethylene, a substance previously used in detergent, etc. They do this using a pumping and aeration system (*1). In addition, since FY2004, the Okazaki plant have used a microbial purification system (*2) which injects nutritional supplement as part of their purification measures.

JTEKT report our groundwater measurement results to government agencies and provide local residents with explanations in community discussions.

→ P42 Related article

***1 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.

***2 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.

Trichloroethylene measurement values

Environmental standard: 0.03mg/ℓ

(mg/ℓ)

Plants	Maximum measurement value in groundwater		
	FY2010	FY2011	Status
Kariya	0.378	0.382	Purifying
Okazaki	Less than 0.001	Less than 0.001	Purifying

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

Biodiversity conservation

Social background

As more and more nature is destroyed, the diversity of living creatures which can survive on this planet is rapidly depleting. Corporate activities are possible thanks to the blessings of nature but at the same time impact greatly upon biodiversity. That is why it is important that corporations are proactively involved in biodiversity conservation activities.

JTEKT's concept

Protecting the planet's ecosystem

JTEKT believe conserving biodiversity to be a critical social issue supporting life and lifestyle. As such, based on the JTEKT Group Environmental Vision, we are making efforts to achieve harmony between our business activities and biodiversity through the actions of each and every employee.

Actions for Biodiversity Conservation

Under the Biodiversity Conservation Action Guideline

▶ Figure-01

In order to reduce the environmental burden created by our business activities and consider biodiversity, JTEKT established a Biodiversity Conservation Action Guideline in March of 2011 based on the 2015 Environmental Action Plan of the JTEKT Group Environmental Vision. In addition to promoting this action, we will investigate making quantifiable evaluations of biodiversity in the future. The guideline refers to the Ministry for the Environment's Guidelines for Private Sector Engagement in Biodiversity.

▶ Figure-01

Action Guideline

Item	Description
Relationship with business activities	Raw material procurement ● Liaise with business partners to protect biodiversity.
	Soil usage ● Through greenifying our plants, etc., we are engaging in activities to protect ecosystems which contribute to biodiversity.
	Production activities ● With activities such as preventing global warming by developing innovative techniques and equipment, effective resource usage, reduction of environmentally burdensome substances and so on, we aim to succeed at both biodiversity and corporate activities. ● We work hard to quantitatively appraise the impact had by our business activities on biodiversity.
	Product development ● Based on life-cycle assessment approach, JTEKT develop and design top-class environmentally friendly products and reduce impact on biodiversity.
Promotion of socially contributing activities benefiting biodiversity conservation	● Proactively participate in socially contributing activities through cooperation with councils and affiliated companies.
Training, awareness activities and information-sharing	● Raise employee awareness of biodiversity conservation through environmental training. ● Use the CSR report as a tool to communicate our activities towards biodiversity conservation with our stakeholders and communities.

Major activities in FY2011

Participation in the Tokushima Cooperation Forest Development Project

In August of 2011, JTEKT entered a partnership with Tokushima prefecture in relation to their Tokushima Cooperation Forest Development Project. This project is modeled after the carbon offset scheme whereby corporations and general households compensation for the CO₂ that they can't reduce themselves through forestation management such as thinning and tree planting. In May of 2012, 9 JTEKT employees from our Tokushima plant were involved in forestation activities, helping through such tasks as thinking 1.5ha of forest and so on.



Agreement Signing Ceremony (August, 2011)



Thinning work

Revision to the Green Purchasing Guidelines

In 2011, we added the Biodiversity Conservation Action Guideline to our Green Purchasing Guidelines and we are promoting action in liaison with our suppliers. In January of 2012, JTEKT introduced the 2015 Environmental Action Plan in a JTEKT Supplier Association Workshop attended by 212 business partners and rolled out the revised guidelines.



Green Purchasing Guidelines (Edition 2)

→ P34 Related article