

# Environmental Report



## Establishing a group environmental vision and broadening environment conservation activities.

JTEKT thought long and hard about what we can do and what future action we should take in order to contribute to the conservation of the global environment.

In FY2010, we established a guideline to lead us down the right path, the “JTEKT Group Environmental Vision”.

This guideline will bring the JTEKT group, our customers and our business partners together regarding approaches to environment conservation and make a specific environmental action plan our common goal.

For our FY2010 milestone, we incorporated biodiversity conservation and are promoting activities for the next generation.



# Environmental Report

## Summary of FY2010 activities

### Environmental management

⇒ P40  
Established the JTEKT Group Environmental Vision and 2015 Environmental Action Plan.

⇒ P45  
Implemented emergency drills to minimize damage in the event of a natural disaster.

### Prevention of global warming

⇒ P52  
Built companywide promotion framework by establishing working groups, etc., in response to the Energy Saving Act.

⇒ P53  
Introduced reusable natural and biomass energies including solar and wind power.

### Effective use of resources

⇒ P54  
Recycled and reused chips produced in aluminum forging through compression and solidification.

⇒ P55  
Changed our contracted treatment method of metal sludge to allow for the reuse of manufacturing waste.

### Environmentally-focused development and design

⇒ P49  
Our steering operations developed steering systems to best suit vehicle applications and objectives.

⇒ P50  
The Bearing and Driveline Operations Headquarters promoted optimal design of bearings and driveline components in an effort to contribute to the environment.

⇒ P51  
The Machine Tools & Mechatronics Operations Headquarters developed products with minimal environmental load to conserve energy and resources.

### Control and reduction of environmentally burdensome substances

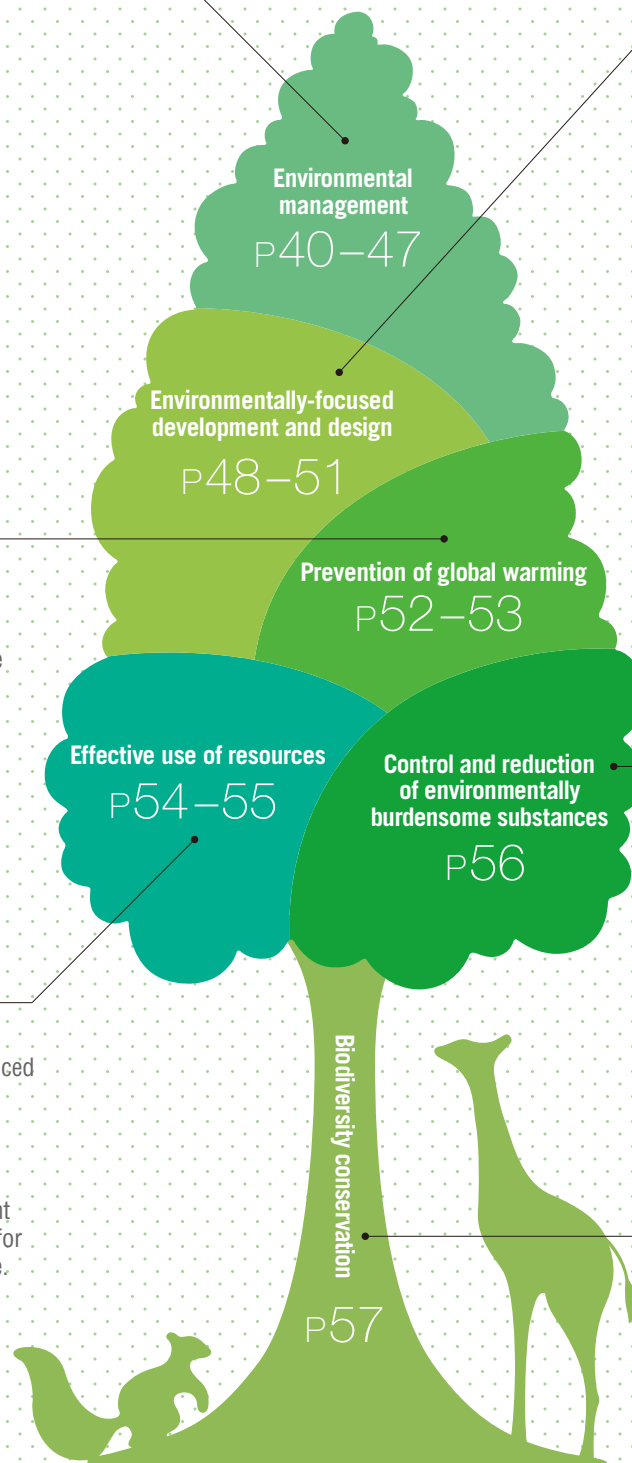
⇒ P56  
Decreased the release and transfer of substances subject to the PRTR act target substances to reduce the impact of chemical substances on the environment.

⇒ P56  
Aim for zero REACH regulation substances requiring authorization by January, 2014.

### Biodiversity conservation

⇒ P57  
Established a "Biodiversity Conservation Action Guideline" to reduce the environmental load created by business activities and to consider biodiversity.

⇒ P57  
Participated in the "Toyota Group Forest Management Experience", learning about the current status of forests and carrying out thinning.



# Environmental management

## Basic concept

### ● For development of a sustainable planet

The JTEKT group, to realize our corporate philosophy of “contributing to the happiness of people and the abundance of society through product manufacturing”, consider the environment to be an important management issue and promote action to contribute to the development of a sustainable planet and society.

## JTEKT Group Environmental Vision

### ● Establishment of the environmental vision

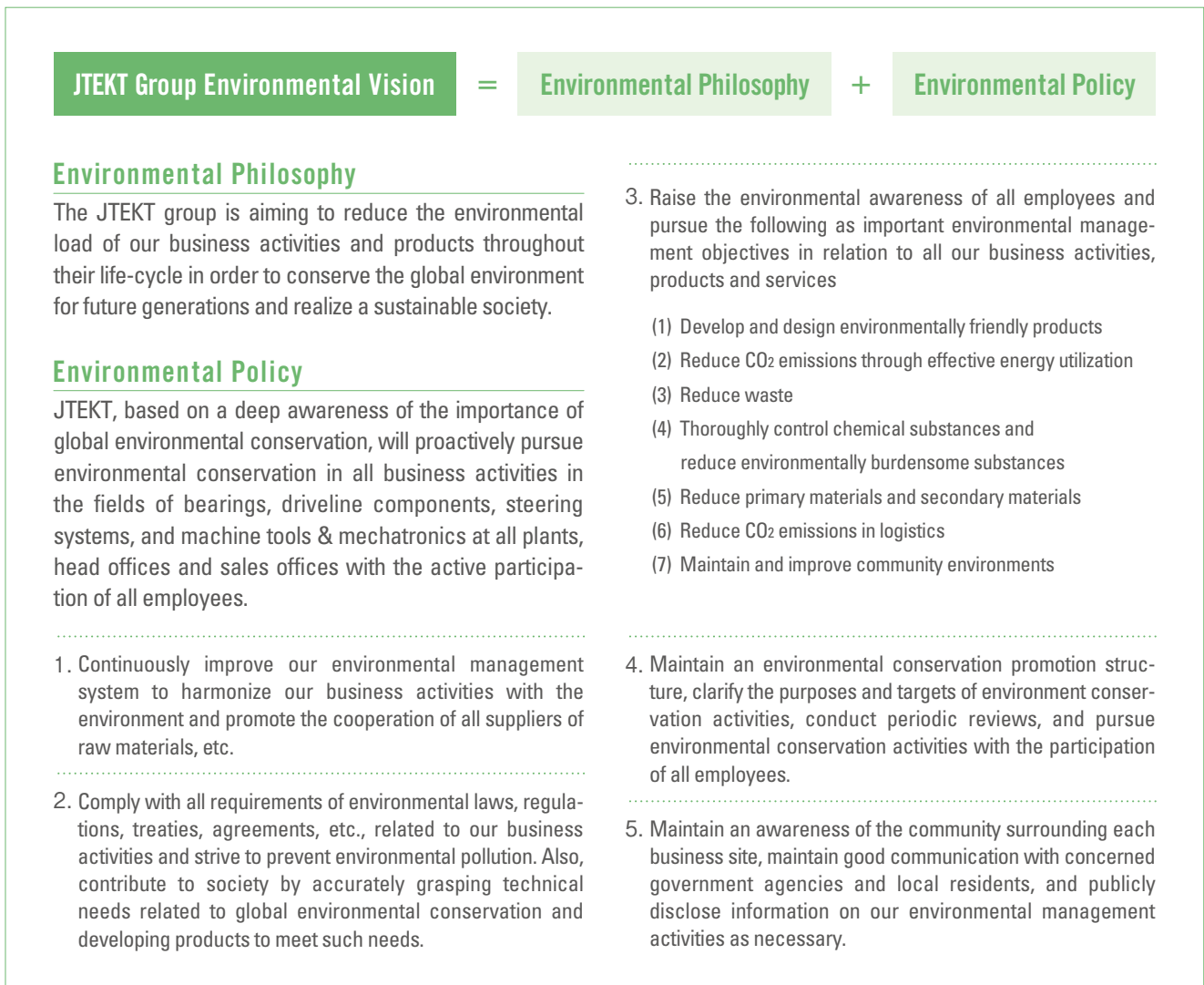
In March of 2011, JTEKT established the JTEKT Group Environmental Vision comprised of an environmental philoso-

phy and policy defining global environmental conservation action based on CSR policies. ▶ Figure-01

### ● Establishment of the 2015 Environmental Action Plan

In March of 2011, JTEKT established an Environmental Action Plan targeting 2015. In this action plan, the base indicator of CO<sub>2</sub> and waste generated by production was changed from the conventional one based on sales to one based on in-house production volume, which better reflects production activities and results of production improvement activities. To promote environmental conservation activities encompassing the JTEKT group, consolidated companies and business partners, initiatives and concrete items and targets were defined with activities beginning in FY2011. ▶ Figure-02

▶ Figure-01



Environmental management

Figure-02 2015 Environmental Action Plan

Area	Action items	Concrete items/targets																								
Environmental management	(1) Strengthen and promote consolidated environment management	① All consolidated group companies to establish and promote their own environmental action plans based on the JTEKT Group Environmental Vision.																								
	(2) Promote environmental activities in cooperation with business partners	① Promote green purchasing aiming at all components and material suppliers <ul style="list-style-type: none"> <li>● Control and reduce environmentally burdensome substances included in components and material</li> <li>● Request the formation and operation of an environmental management system</li> </ul> ② Promote the purchasing of environmentally friendly products																								
	(3) Promote sustainable plant activities	① Build plants that utilize nature and are in harmony with it ② Promote development of low CO <sub>2</sub> production technologies, daily improvements, reusable energy and plant greenification																								
	(4) Promote environmental education activities	① Promote environmental awareness education with the objective of improving employee environmental awareness ② Promote rank-specific education ③ Roll out JTEKT Environmental Month (June)																								
Develop and design environmentally friendly products	(1) Develop new technology and new products leading to environmental load reduction	① Use the environmental efficient system established in JTEKT internally to assess all products and aim for improvement																								
	(2) Reduce resource consumption	① Promote designs which make products smaller, lighter and have less yield rate																								
	(3) Promote recycle design considering effective resource use	① Promote development of material such as resin, etc., contributing to carbon neutrality																								
	(4) Control and reduce environmentally burdensome substances contained in products	① Promote response to worldwide chemical substance regulations globally																								
	(5) Roll out environmental assessments in the design and development phases	① Promote activities to improve product performance and life-cycle assessments																								
Reduce CO <sub>2</sub> emissions	(1) Reduce CO <sub>2</sub> in production and logistics <ul style="list-style-type: none"> <li>● Global reduction of CO<sub>2</sub></li> <li>● Reduction of CO<sub>2</sub> in logistics</li> </ul>	<b>Production</b> ① Promote CO <sub>2</sub> reduction activities through the development and introduction of low CO <sub>2</sub> production technologies and daily improvements (Pursue production improvements and encourage activities including administration centers also) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Target</th> <th>Item</th> <th>Base year</th> <th>Target (2012)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">JTEKT</td> <td>Emissions</td> <td>1990</td> <td>7% down*</td> </tr> <tr> <td>Emissions by in-house production volume</td> <td>2008</td> <td>4% down</td> </tr> <tr> <td>Globally</td> <td>Emissions by in-house production volume</td> <td>2008</td> <td>4% down</td> </tr> </tbody> </table> <p style="text-align: right; font-size: small;">* Average from FY2008 to FY2012</p> <b>Logistics</b> ① Reduce CO <sub>2</sub> through transportation improvements <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Item</th> <th>Base year</th> <th>Target (2012)</th> </tr> </thead> <tbody> <tr> <td>Emissions</td> <td>1990</td> <td>15% down</td> </tr> <tr> <td>Emissions by sales</td> <td>2006</td> <td>12% down</td> </tr> </tbody> </table>	Target	Item	Base year	Target (2012)	JTEKT	Emissions	1990	7% down*	Emissions by in-house production volume	2008	4% down	Globally	Emissions by in-house production volume	2008	4% down	Item	Base year	Target (2012)	Emissions	1990	15% down	Emissions by sales	2006	12% down
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(2) Promote reusable energy	① Promote reusable energy considering characteristics of each region and locality																									
Reduce waste	<b>Production</b> (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 land-fill waste in FY2009 and are continuing to aim for zero waste production in other areas)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Item</th> <th>Base year</th> <th>Target (2012)</th> </tr> </thead> <tbody> <tr> <td>Emissions by in-house production volume</td> <td>2008</td> <td>10% down</td> </tr> <tr> <td>Direct land-fill waste</td> <td></td> <td>Zero</td> </tr> </tbody> </table>	Item	Base year	Target (2012)	Emissions by in-house production volume	2008	10% down	Direct land-fill waste		Zero															
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Reduction of chemical substances and environmental burdening substances	(1) Reduce environmentally burdensome substances in production activities	① Reduce release and transfer of substances subject to the PRTR <ul style="list-style-type: none"> <li>● Reduce through substitution</li> </ul>																								
Reduce primary materials and secondary materials	(1) Reduce waste and effectively use resources in production and logistics operations	① Reduce waste and effectively use resources by promoting the improvement of yield rate																								
Preserve and improve the global environment, forge communication	(1) Enforce preventative measures for environmental problems and observe regulations	① Strengthen and improve daily control tasks to promote ongoing efforts for zero claims from residents and regulation violations																								
	(2) Build good relationships with local residents	① Promote environmental conservation activities around plants ② Build good relationships through discussions with local residents and councils																								
	(3) Proactive disclosure of environmental information and enhancement of communication activities	① Issue CSR reports/Communicate well with government bodies and local residents																								
	(4) Action for biodiversity	① Promote environmental activities based on our Biodiversity Conservation Action Guideline																								

2015 targets will be set by 2012.

Environmental management

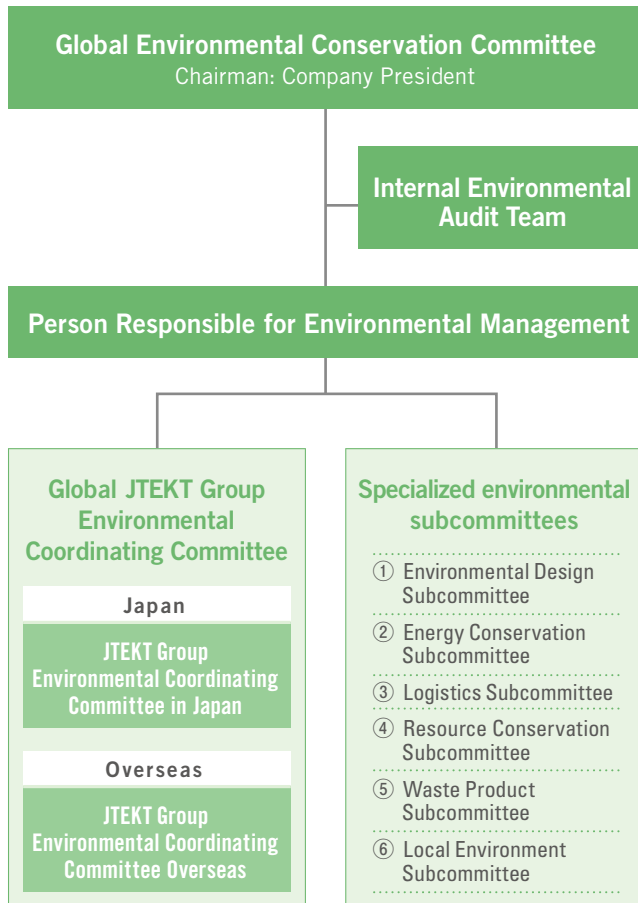
Promotion structure

Promotion by the Global Environmental Conservation Committee

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 who set targets based on companywide policies, discuss and decide upon measures and control progress.

▶ Figure-01

▶ Figure-01 Organizational chart



Global environmental management

Promotion of global environmental management

JTEKT have set up a Global JTEKT Group Environmental Coordinating Committee comprising of 18 affiliated companies within Japan and 33 overseas affiliates. This committee works to solve environmental issues.

01 | JTEKT Group Environmental Coordinating Committee in Japan

In 2010, the 18 domestic members of the JTEKT Group Environmental Coordinating Committee held two sessions, and made progress in CO<sub>2</sub> and waste reduction activities. Furthermore, to make members aware of law and regulation amendments and prevent environmental abnormalities occurring, cases of environmental problems experienced by other companies were presented. In June of 2010, the previous year's results and present year's actions were reported and discussed. In December, 2010, 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 and the status of activities, which resulted in heightened mutual awareness towards the environment.

02 | 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 FY2010, 43 of the 51 companies on the JTEKT Group Environmental Coordinating Committee (14 within Japan and 29 overseas) had acquired certification, and built systems conforming to the standard.

Environmental impact of business activities

Reduction of environmental load in all business activity stages

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

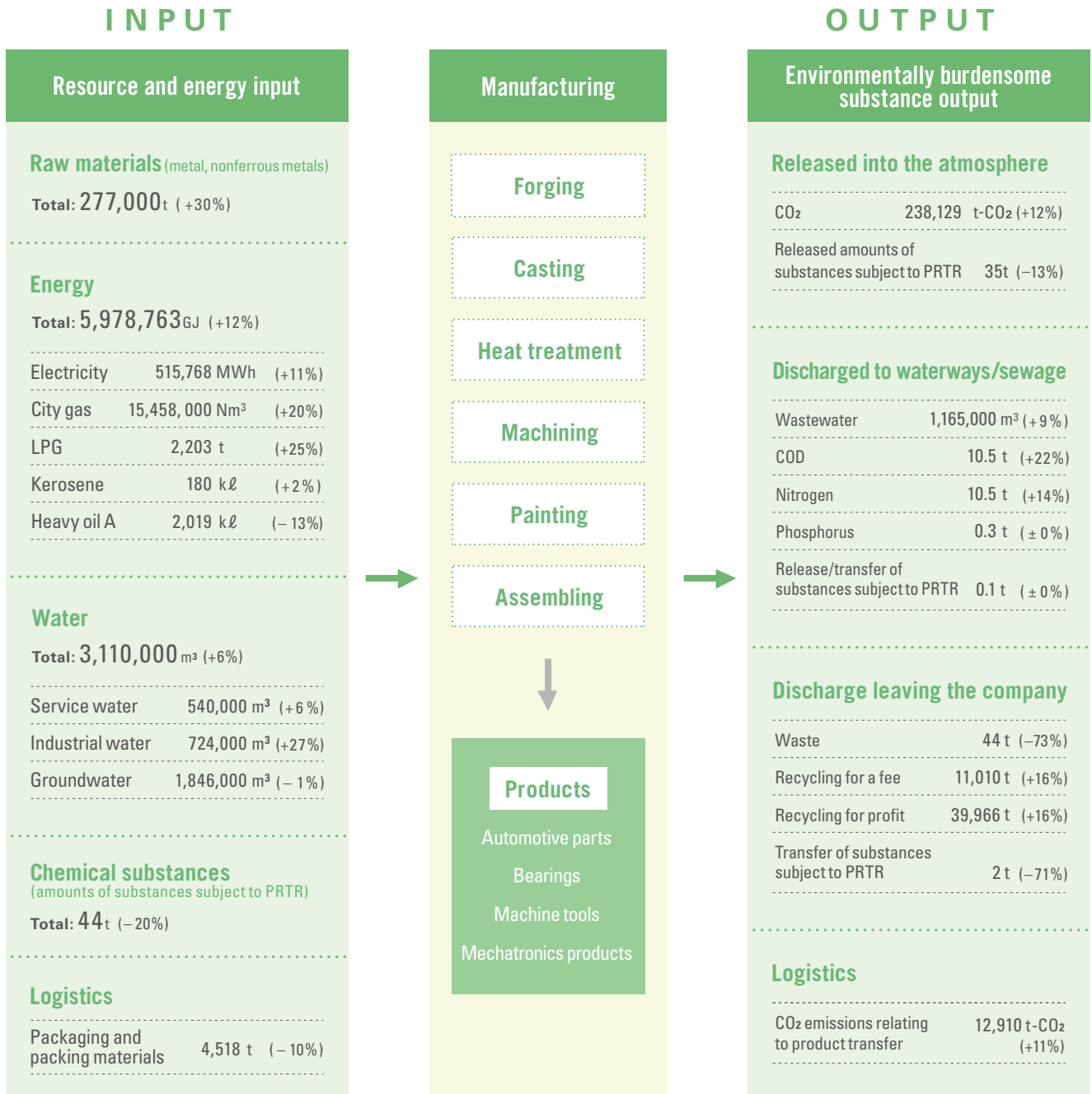
Resource and energy input versus environmentally burdensome substance output

The table to the right shows the resource and energy input versus environmentally burdensome substance output for FY2010. To minimize the impact our business activities on global warming, JTEKT are working to reduce the amount of energy used in all our processes, including forging, casting, heat treatment, machining and so forth. We also make efforts to convert to more efficient energy such as electricity and city gas. Due to the increase in production in FY2010, energy input was 12% higher than the previous year, however significantly less heavy oil A, which is highly burdening on the environment, was used.

▶ Figure-02

Environmental management

Figure-02 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]

CO<sub>2</sub> conversion coefficients to calculate CO<sub>2</sub> emissions volume

Electricity	0.3817 kg-CO <sub>2</sub> /kWh	The CO <sub>2</sub> conversion coefficients in the table to the left are used both in Japan and overseas. Regarding the conversions in this report, so that the results of our improvements could be evaluated, we fixed electrical conversion coefficients, and we converted cogeneration CO <sub>2</sub> reduction results using a thermal energy average and used this result to indicate emissions volume.
Heavy oil A	2.7000 kg-CO <sub>2</sub> /ℓ	
Kerosene	2.5308 kg-CO <sub>2</sub> /ℓ	
Propane gas	3.0094 kg-CO <sub>2</sub> /kg	
City gas	2.3576 kg-CO <sub>2</sub> /Nm <sup>3</sup>	

**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=10<sup>9</sup>

**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

Targets and results

● JTEKT Environmental Action Plan

JTEKT have established initiatives for environmental conservation and concrete targets, and are rolling out environmental conservation activities to all affiliated companies. FY2010 was the final year of the environmental plan begun in FY2006, and

as such we exerted all efforts and achieved our targets for every item.

FY2011 marked the first year of our newly established Environmental Action Plan aiming for 2015. This Action Plan aims for even higher targets through various activities from environmental management to preservation and improvement of the local environment.

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

\* Values in parenthesis are comparisons with the base year

Action items	FY2010 targets and initiatives		Results of activities	Evaluation	Challenges	Related pages																			
Promote measures to prevent global warming	(1) Promote activities for the thorough reduction of CO <sub>2</sub> emissions in production		(1) Visualization of energy (2) Follow-through activities with company wide themes (3) Improvement of efficiency through base unit management of heat treatment	○		52																			
	<table border="1"> <thead> <tr> <th>Action items</th> <th>Targets</th> </tr> </thead> <tbody> <tr> <td>CO<sub>2</sub> emissions</td> <td>241,373t-CO<sub>2</sub> : Down 5% from FY2003</td> </tr> <tr> <td>Emissions per sales</td> <td>55.4 t/100 mill yen : Down 7% from FY1990</td> </tr> <tr> <td>Emissions per global sales</td> <td>56.0 t/100 mill yen : Down 8% from FY2003</td> </tr> </tbody> </table>		Action items				Targets	CO <sub>2</sub> emissions	241,373t-CO <sub>2</sub> : Down 5% from FY2003	Emissions per sales	55.4 t/100 mill yen : Down 7% from FY1990	Emissions per global sales	56.0 t/100 mill yen : Down 8% from FY2003	<table border="1"> <thead> <tr> <th>Results</th> </tr> </thead> <tbody> <tr> <td>238,129 t-CO<sub>2</sub> (-6.3%)</td> </tr> <tr> <td>43.5 t/100 mill yen (-36%)</td> </tr> <tr> <td>50.3 t/100 mill yen (-17%)</td> </tr> </tbody> </table>	Results	238,129 t-CO <sub>2</sub> (-6.3%)	43.5 t/100 mill yen (-36%)	50.3 t/100 mill yen (-17%)	○	<table border="1"> <thead> <tr> <th>Challenges</th> </tr> </thead> <tbody> <tr> <td>199,600 t-CO<sub>2</sub></td> </tr> <tr> <td>40.5t/100 mill yen</td> </tr> <tr> <td>42.6t/100 mill yen</td> </tr> </tbody> </table>	Challenges	199,600 t-CO <sub>2</sub>	40.5t/100 mill yen	42.6t/100 mill yen	53
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Strengthen control of environmentally burdensome substances and reduce usage	(1) Substituting with products lower in PRTR		(1) Coolant substitution (2) Paint thinner substitution	○		56																			
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Reduce waste and promote resource conservation	(1) Reduction of material usage (2) Recycling of metal chips (3) Reduction of material being outsourced for recycling		(1) Reduction of stock removal and rejects (2) Recycling of grinding sludge by solidification (3) Reduction of waste with treatment equipment (4) Reduction of incinerated waste	○		54																			
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Promote logistics streamlining	(1) Improvement of transportation routes (2) Improvement of remote area logistics		(1) Use trailers on main routes (2) Use larger trucks between logistic bases (3) Roll out remote area logistics	○		53																			
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[2] Develop and design environmentally friendly products

Action items	FY2010 targets and initiatives	Results of activities	Evaluation	Related pages	
Promote efforts in the development and design stages	(1) Reduce environmental load of new products by the environmental efficiency basic equation	(1) E-VGR single-unit type RD-EPS	○	48	
		(2) Needle roller bearing with low torque and minimal lubrication			49
		(3) High performance sealed bearing			50
		(4) Cutting machines, grinding machines (e series)			51
Strengthen cooperation with business partners	(1) Further promote green purchasing (2) Formulate environmentally friendly purchasing guidelines to share with business partners	(1) Expansion of Green Purchasing Guidelines	○	24	

## Environmental management

## [3] Strengthen environmental management system responding to consolidated management

Action items	FY2010 targets and initiatives	Results of activities	Evaluation	Related pages
Develop structures and enhance activities	(1) Share basic policy and conduct guidelines	(1) Continuing activities with group companies in Japan and overseas (2) Environmental Coordinating Committee sessions	○	40 41 42

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

Action items	FY2010 targets and initiatives	Results of activities	Evaluation	Related pages
Promote socially contributing activities	(1) Participate in environmental conservation activities	(1) Cleaning activities around plant (2) Forest management action	○	34 35 57
Maintain close communications with local communities	(1) Cooperate with and support local community groups	(1) Hold environmentally-related discussions with local community	○	33
Promote public relations activities and information disclosure	(1) Provide more environmental information via our website (2) Enhance and continue issuance of our environmental reports (3) Promote volunteer activities in local communities	(1) Issued CSR report 2010	○	36

## Reducing environmental risk

## ● Enforcement of environmental accident prevention

At JTEKT, we assume environmental risks such as accidents and violation of regulations and therefore engage in risk reduction and preventative measures.

We have set internal standards(\*) for water quality, atmosphere and so on, more stringent than regulations and manage daily inspections, monitoring and measurements to prevent abnormalities from occurring. We also conduct emergency drills to be prepared for environmental accidents if they occur.

Furthermore, we disseminate information internally regarding cases which did not result in accidents or violation of regulations, but came close. This is done as a preventative measure.

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

## ● Legal compliance with environmental laws and regulations

In FY2010 there were no cases of exceeding regulation values and our internal standard, and there were zero environmental accidents and complaints. There were also no environmentally-related lawsuits (fines, penalties).

## ● Implementation of emergency drills

To prepare for environmental accidents such as wastewater or waste gas exceeding our internal standard or oil spills, etc., we keep emergency procedures for each piece of equipment.

To minimize damage, we conduct regular emergency drills, revising procedures afterwards if necessary.



Oil spill prevention drill (Kariya plant)

## ● Environmental patrols by the plant manager

Every June is our Environmental Month, and as such from FY2008 managers of each plant have conducted environmental patrols. With the objective of preventing environmental abnormalities, in FY2010 we focused on confirming the status of management at environmentally related facilities.



Environmental patrol (Hanazono plant)



## Environmental management

### ● On-site confirmations of industrial waste processing and collection/transportation companies

JTEKT conduct annual on-site checks of all waste processing and collection/transportation companies to ensure that the consigned waste is being appropriately processed.

## Environmental audits

### ● Action for continuous improvement

JTEKT conduct effective internal and external audits in an effort to continue operating our environmental management system efficiently.

#### 01 | Internal audits

JTEKT use a common checklist and conduct internal audits annually to confirm the operation status of our environmental management system. We revise checklist items each year and exert all efforts to ensure this internal audit is effective.

#### 02 | External audits (ISO14001)

JTEKT were surveyed in April of 2011. As a result, we were given 3 proposals to improve the efficiency of our management review method, non-conformity correction procedures and internal environment audits (where there was room for improvement). On the other hand, we had zero non-conformities, JTEKT's environmental management system conformed to standard requirements and was deemed as being carried out effectively.



External survey (April 2011)

## Environmental education

### ● Multifaceted training

At JTEKT, while raising environmental awareness among each and every employee, in order to promote activities as an organization, we take a multifaceted approach to environmental training, targeting individuals, departments and specific ranks.

#### 01 | Environmental awareness education

JTEKT hold environmental awareness education every June for employees. In FY2010, 487 employees participated, achieving a better understanding of JTEKT's environmental activities, rolling out training content to their own workplaces, and contributing to the awareness of all employees.

#### 02 | Environmental education by division

In FY2010, JTEKT began division-based education targeting the production engineering department. 62 people participated, gaining a better understanding of JTEKT's environment activities and learning about issues which should be handled by the production engineering department.

#### 03 | 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 on ISO14001, the JTEKT environmental management system and environmental actions.

In FY2010, a total of 326 people completed environmental training.



**Naoki Miyagawa**

Production Engineering / Production / Logistics Division  
Environment Control Dept.



**“Environmental activities are the foundation of CSR”**

We engage in activities to observe environmental regulations and reduce environmental risk. These activities are the foundation of CSR activities which contribute to the development of a sustainable society and planet and as such we go about them with a sense of worth and responsibility. It is my hope that through our efforts, society will come to trust the JTEKT group all the more.

## Environmental management

## Environmental accounting

## ● Cost and results appraisal

JTEKT quantitatively appraise the cost and results of environmental conservation activities and ensure that effective and efficient improvements are constantly being made. 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 accounting results for FY2010

Environmental conservation costs for FY2010 were 1.23 billion yen in investments and 2.84 billion in management costs, adding up to a total of 4.1 billion yen. This was an increase of 70 million yen (2%) from the previous year. An update to a cooling tower method from air drying aiming to prevent underground seepage and global warming was the main investment made. Economic benefits of environmental conservation measures totaled 1.69 billion yen, which was a 320 million yen (23%) improvement over the previous year.

## Environmental conservation costs

(Millions of yen)

Type	Details	Investment	Cost
[1] Business on-site costs			
① Pollution prevention costs	● Service & upkeep of environmental equipment	129	223
② Environmental conservation costs	● Measures for energy conservation	288	58
③ Resource recycling costs	● Waste processing, recycling	28	381
[2] Upstream and downstream costs	● Green purchasing	—	36
[3] Management activity costs	● Environmental monitoring, measurements, etc.	24	152
[4] R&D costs	● R&D of environmentally friendly products	792	1,929
[5] Social activities costs	● Disclosure of environmental information, greenification, etc.	—	45
[6] Environmental damage costs	● Soil and groundwater restoration	—	12
Total		1,261	2,836
Gross amount			4,097

## Economic benefit of environmental conservation measures

(Millions of yen)

Details of benefits	Economic benefit
Profit from recycled material sales	1,043
Energy-cost reduction from promoting energy conservation	638
Reduction of waste processing costs	7
Total	1,688

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)

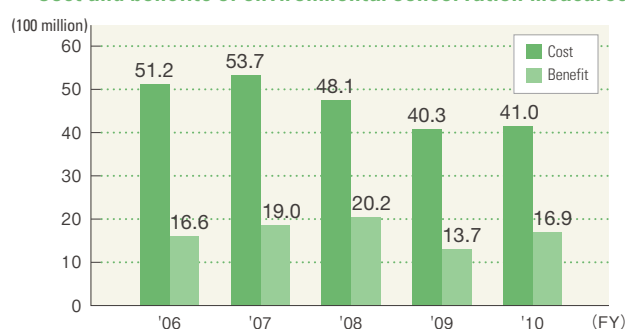
Calculated period : FY2010 (April 2010 to March 2011)

\* Calculated period has been changed from previous year.

## Benefits towards material amount reduction from environmental conservation measures

Details of benefits	Benefits towards material amount reduction
Energy consumption (t-CO <sub>2</sub> )	24.4
Waste output (t)	362

## Cost and benefits of environmental conservation measures



# Environmentally-focused development and design

## Basic 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.

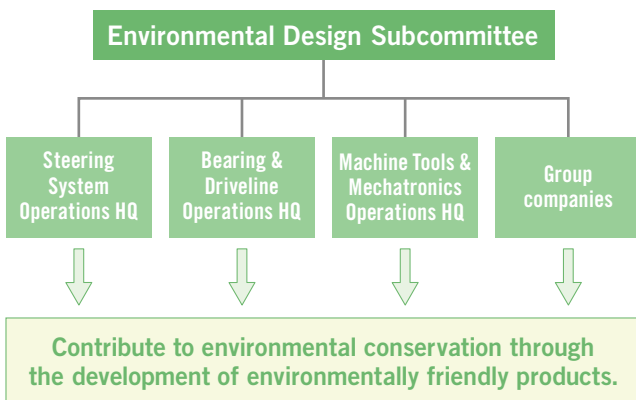
Each operation engages in activities to improve the environmental performance of all products, and are producing results which will contribute to global warming prevention and effective resource use. To convey the actions undertaken in an easy-to-understand way, in FY2010 we reported on each operation (product) individually.

## 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 material they contain. In this way, JTEKT is engaging in environmental conservation on a world scale.

#### Environmental design promotion framework



### ● 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.

▶ Figure-01

▶ Figure-01

#### 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.

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

W:Mass T:Loss E:Energy

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

#### 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%.

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

A reduced environmental load is sought as the reverse of the environmental efficiency value.

## Product recycling

### ● Reuse and recycling

Concerning the reuse of used products, based on the automobile recycling law, our customers have cooperated and returned ball-screw type and rack & pinion type hydraulic steering, which we have processed as rebuild steering. In the future we plan to consider rebuilding electric power steering also, depending on the needs of the market.

As for the recycling of material and products, we design and develop our products following the environmental regulations of the relevant country and region, and recycle as much material as possible, in particular steel.

From here on, the need for energy-saving electronic and multi-purpose unit products will grow even greater, and JTEKT will promote development and design of products that are easily disassembled and use material that can be easily recycled rather than prioritize individual cost.

Environmentally-focused development and design

Efforts of the Steering System Operations Headquarters

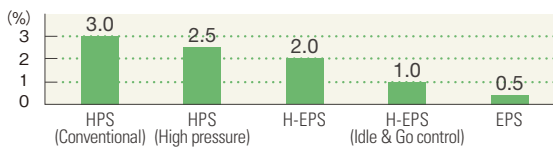
Pursuing optimal steering

As a total manufacturer of the No. 1 environmentally contributing steering system in the world(\*1), JTEKT pursue the optimal steering which satisfies vehicle application and purposes, offering products superior in not only quality, cost and delivery, but also in environment, safety and comfort features.

**\*1 No. 1 environmentally contributing** JTEKT have top share of the electric power steering (EPS) market. EPS is better in fuel efficiency and contributes to the environment more than any other steering system. JTEKT also work to improve the environmental efficiency of the conventional hydraulic power steering.

Comparison of power steering energy consumption

Percentage of energy used for power steering of the entire vehicle energy consumption



Reduction of product transport mileage (\*2)

Our steering operations promote local purchasing and production with the goal of reducing CO<sub>2</sub> emissions created during product transport.

**\*2 Product transport mileage** The concept of reducing CO<sub>2</sub> emissions by reducing the resources and energy consumed by product transport. The figure obtained by multiplying product transport quantities by transport distance is assessed.

Improvement in fuel efficiency through environmental design

JTEKT continued efforts in FY2010 to downsize, lighten and improve torque loss of each steering system. Consequently, we were able to reduce energy consumption, mass and torque loss in more systems than last year. As a result of pursuing environmentally-orientated designs, environmental efficiency increased and fuel efficiency improved.

FY2010 development achievements 01

System		Development points	Developed product	Results	Environmental efficiency value
Electric power steering	C-EPS (Column assist type)	● Optimization of plastic material (lightening)		Mass 31% reduction Torque loss 27% reduction Energy consumption 83% reduction	1.70
	P-EPS (Pinion assist type)	● Reducer efficiency improvement (torque loss reduction)		Mass 30% reduction Torque loss 32% reduction Energy consumption 83% reduction	1.75
	R-EPS (Rack assist type)	● Optimization of housing (lightening)		Mass 34% reduction Torque loss 45% reduction Energy consumption 83% reduction	1.98
Electro-hydraulic power steering		● Optimization of control features (torque loss reduction)		Mass 19% reduction Torque loss 16% reduction Energy consumption 67% reduction	1.43
Hydraulic power steering		● Optimization of hydraulic circuit (torque loss reduction)		Mass 15% reduction Torque loss 17% reduction Energy consumption 17% reduction	1.19

\*RC-EPS, C-EPS, P-EPS, R-EPS, H-EPS are registered trademarks of JTEKT Corporation.

Steering types and applicable vehicles

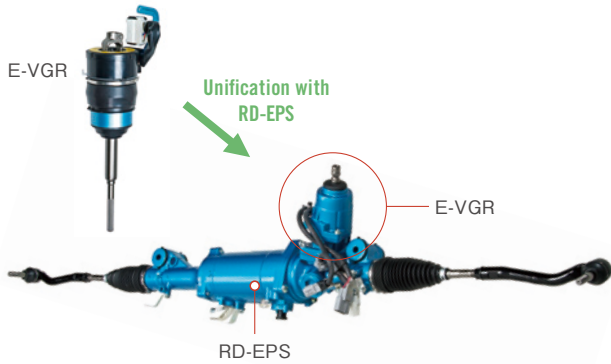
		Applicable vehicles					Installed location
		Passenger cars				Heavy vehicles	
		Mini	Small	Medium	Large		
EPS (electric power steering)	C-EPS (column assist type)	○	○	○			Passenger compartment
	P-EPS (pinion assist type)		○	○			Engine room
	R-EPS (rack assist type)			○	○		Engine room
H-EPS (electric-hydraulic power steering)			○	○	○		Engine room
HPS (hydraulic power steering)		○	○	○	○	○	Engine room

Environmentally-focused development and design

FY2010 development achievements 02

Improvement of E-VGR single-unit type RD-EPS

JTEKT's E-VGR single-unit type RD-EPS is a product high in performance and quality, as well as being environmentally friendly, manufactured for premium class vehicles. This year we made improvements to the design to make it even more environmentally friendly. These were reducing size and weight of the product through optimizing the shape and reducing size and increasing output through improved motor efficiency. We were able to reduce environmental load by half compared with conventional products.



Environmental efficiency value	1.98
--------------------------------	------

Efforts of the Bearing and Driveline Operations Headquarters

Contributing through optimal design

Bearings supporting the rotation of all mechanical devices and driveline components without which vehicles wouldn't run. While meeting the demand for high functionality, we have engaged in activities to effectively use resources through downsizing and lightening these products and reducing friction loss through optimal profile design. As a result we have improved durability.

FY2010 development achievements 01

Needle roller bearing with low torque and minimal lubrication

Of all the roller bearings, thrust needle roller bearings have the most sliding contact, making friction loss reduction a major issue. Moreover, in recent years low viscosity oils have been used in devices for vehicles in order to improve fuel efficiency, and how to countermeasure wear on the rolling contacting portions has become an issue.

In response, we now machine the sliding contact portions of the roller, retainer and rolling contacting portion, making it the

ultimate shape, reducing friction loss and suppressing wear with minimal lubrication.

Developed product

① Improvement of roller and retainer sliding contact parts

- : Roller end-face curved surface contact
- : Roller special crowning (\*1)

② Improvement of race and retainer sliding contact parts

- : Retainer ID crowning

③ Improvement of race and roller sliding contact parts

- : Roller special crowning (\*1)

Friction resistance	50% reduction
Environmental efficiency value	1.15

\*1 Crowning Processing edges to make them mid-strength and soften impact with other parts.

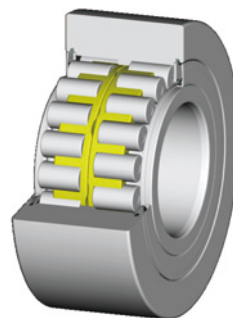
FY2010 development achievements 02

Sendzimir roller machine (\*2) High performance sealed bearing for backup

Backup rolls of roller machines which produce magnetic steel sheets used in hybrid car motors, wind power generators, etc., are used in high load, high temperature environments and therefore need to be high in durability.

As such, JTEKT has adopted a sealed style of configuration and improved material to improve product durability even under high temperatures and low lubrication conditions.

Developed product



Life	Approx. 4 fold
Environmental efficiency value	1.21

\*2 Sendzimir rolling machine A roller machine invented by Tadeusz Sendzimir in the 1930s. Its multilayered roll configuration made a smaller work roll diameter possible thereby allowing the high pressure rolling of hard material and rolling of ultra-thin steel plate.

Environmentally-focused development and design

Efforts of the Machine Tools & Mechatronics Operations Headquarters

● Assessment of the entire life-cycle

Machine tools are developed with the awareness that activities to save resources and reduce power consumption are vital to protecting the global environment. We conduct product assessments which look at the impact of a product on the environment throughout its entire life-cycle, from manufacturing to disposal and offer our customers products with minimal environmental load.

● Close cooperation with group companies

The Machine Tools & Mechatronics Operations Headquarters engage in environmentally-orientated activities together with group companies with whom products are being jointly developed and designed. We use an independent index, the JTEKT Eco-Scale (\*3) to match product features and show how our environmental actions have progressed.



JTEKT Eco-Scale mark (example)

\*3 JTEKT Eco-Scale JTEKT have set 12 items including power capacity, standby mode power consumption, footprint, machine mass and so on, and created an internal standard assessment point system using indexes (the smaller the value in the top of the displayed mark is, the better). The amount reduced from the 2003 product assessment point is expressed as the environmental load reduction ratio (% value at the bottom of the displayed mark).

FY2010 development achievements

Cutting machines, grinding machines (e series)

As an alternative to special-purpose machines, we have developed universal machine tools with high added value and high-efficiency machines able to combine multiple processes based on the SSC (Simple, Slim, Compact) concept.

On machining centers, we achieved reductions in energy used both for operation and transportation of machines through weight reduction. We also contributed to space reduction with a maintenance-easy design. On grinders, we integrated processes conventionally carried out on multiple machines and reduced power consumption and oil usage.



Katsuhiko Takeuchi

Machine Tools & Mechatronics Operations Headquarters  
Development Dept.  
Product Planning Group



“Improving the environment is the most important development issue”

People have been consumed by sudden prosperity and development, already destroying much of the environment and causing the loss of life. “Preserving an environment where life can continue to exist.” That is the most important issue in our work and development. Machine tools mainly comprise of metal such as forged steel and are therefore recyclable. We have continue to engage in activities to save energy and resources by lightening moving parts, reducing machining time through new techniques and reducing oil and coolant use. It is my intention to continue activities with a renewed passion to ensure we do not create products that destroy our invaluable environment.



◎Vertical machining center e640V

Eco-Scale	52% reduction
Power	68% reduction
Machine size/ machining area	48% reduction



◎CNC cylindrical grinder e300G

Eco-Scale	18% reduction
Power	63% reduction
Oil usage	80% reduction

# Prevention of global warming

## Basic concept

### ● Reducing CO<sub>2</sub> emissions across all processes

In order to help prevent global warming, JTEKT engage in activities to reduce CO<sub>2</sub> 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.

## Efforts made for energy-saving

### ● Response to the revised Energy Saving Act

Due to revisions made to the Energy Saving Act in FY2010, energy management which was conventionally done by each operation location, is now centralized by the operator and energy-saving actions are required to be holistic.

In response, apart from the conventional production improvements and merging processes, JTEKT have built a framework to allow companywide promotion of activities by establishing working groups which develop equipment that can manufacturer products at low energy consumption, improve efficiency of source power facilities and promote the energy-saving activities of indirect management divisions.

## Reducing CO<sub>2</sub> emissions in production

### ● Improvements through energy visualization

JTEKT have reduced energy consumption by promoting CO<sub>2</sub>

emission reduction mainly through productivity improvements such as higher yield rate and process integration, as well as through identifying eliminating wasteful power usage through visualization processes.

Particularly in the heat treatment process, which consumes a large amount of energy, we implement heat loss prevention measures and do our best to operate equipment efficiently monitoring energy usage in relation to weight of steel subjected to heat treatment.

▶ Figure-01

### Main measures

#### Efficient operation of once-through boilers by removing moisture in steam

Once-through boilers lose heat due to the steam being sent losing coolness (draining) in the pipeline. To solve this, we have changed the set up to use a unit which removes the surplus moisture in steam (bison cyclone), improving boiler efficiency. This has reduced city gas consumption by 7% and energy costs by 3.1 million yen per year.

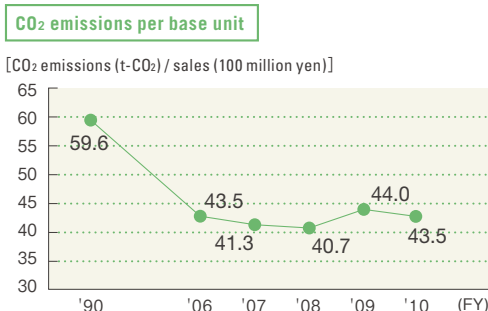
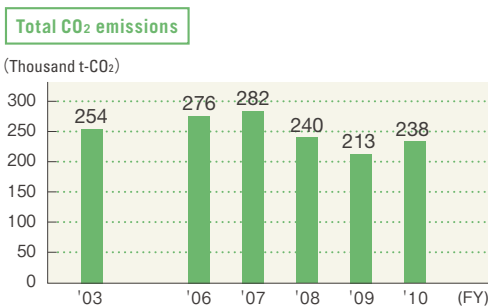


Bison cyclone (Kokubu plant)

### ● Reduction of global CO<sub>2</sub> emissions

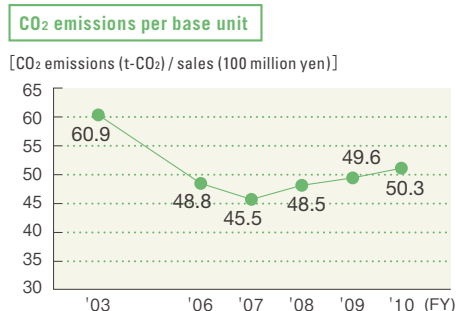
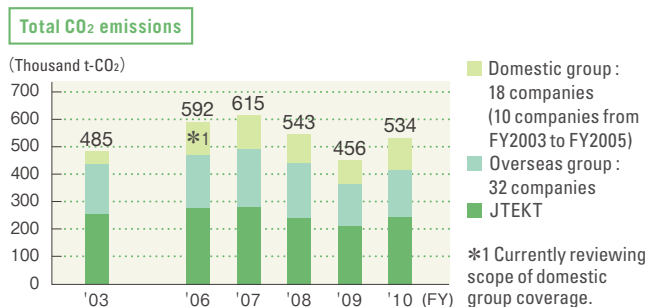
With an aim to minimize the impact of our global production operations to global warming, JTEKT is working to reduce CO<sub>2</sub> emissions not only within JTEKT but also at its group compa-

▶ Figure-01 Transition of total and per base unit CO<sub>2</sub> emissions in production



\* Refer to page 43 for CO<sub>2</sub> conversion coefficients used in calculating CO<sub>2</sub> emissions

▶ Figure-02 CO<sub>2</sub> emissions (global and base unit)



Domestic group : 18 companies (10 companies from FY2003 to FY2005)  
 Overseas group : 32 companies  
 JTEKT  
 \*1 Currently reviewing scope of domestic group coverage.

Prevention of global warming

nies in Japan and overseas.

As a result of activities which aimed to meet an 8% reduction in CO<sub>2</sub> emission base unit compared to FY2003 by FY2010 at all our group company production bases both in Japan and overseas, we achieved a 17% base unit reduction, above and beyond what was originally set. We will continue to promote production efficiency improvements and prevent global warming here on into the future. **▶ Figure-02**

● Introduction of reusable energy

JTEKT are also proactively involved in the introduction of natural and biomass energies such as solar and wind power, etc.. By FY2020 we aim to introduce 500kW of reusable energy and create plants which are in harmony with nature.



Kagawa plant (solar and wind power generation)

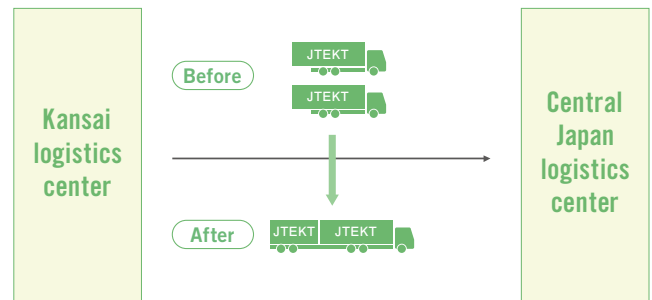
and per base unit targets for CO<sub>2</sub> emissions in our logistics operations. Regarding emissions, we set and achieved an extra high target of a 10% reduction from FY1990. **▶ Figure-03**

Main measures

Complete shift to trailer usage on main Japanese routes

In FY2010, as well as expanding model shift activities made to date, we also promoted the use of trailers on transportation trucks between logistic bases. We trialed a complete shift to trailer usage between Kansai and Toyota city in Aichi prefecture, and found we could reduce CO<sub>2</sub> emissions by 62t per truck per annum.

Complete shift to trailer usage

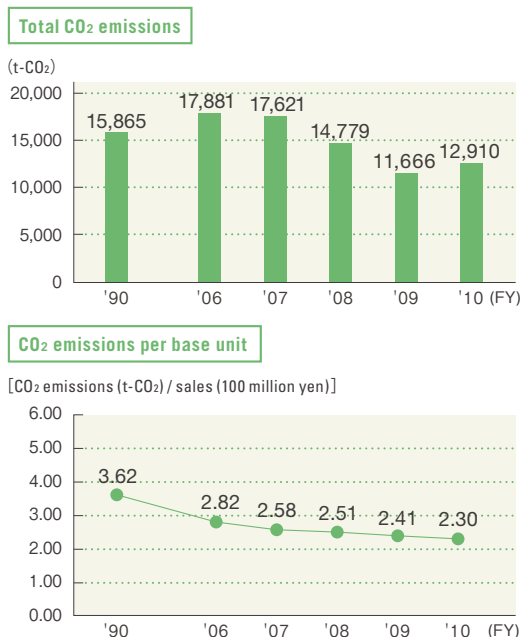


Reducing CO<sub>2</sub> emissions in logistics

● Reaching total emission and per base unit targets

FY2010 saw high fluctuation in demand, yet we still reached total

▶ Figure-03 Transition of total and per base unit CO<sub>2</sub> emissions in logistics



**Tatsuya Kuga**  
Production Engineering / Production / Logistics Division  
Logistics Dept.  
Planning Group



“Accumulation of little improvements matter”

I am in charge of logistics-related global environment conservation and carry out activities to reduce CO<sub>2</sub> emissions created in logistics and the use of wood and paper in packaging. To date, I have been able to produce results with major improvement items such as shifting from road transportation (trucks) to rail. However, I think that changes will not be all that obvious and it will be the accumulation of little improvements that will matter. With the cooperation of each plant, we will continue to advance step by step, little by little, to realize logistic operations with minimal environmental load.



# Effective use of resources

## Basic 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 coming up with 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

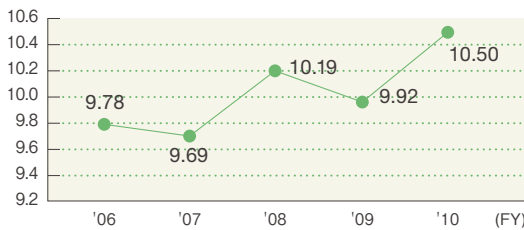
### ● Reduction of primary material usage amount

JTEKT do our best to reduce material usage through changing design and techniques and reducing stock removal. 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.

#### Primary materials usage per base unit

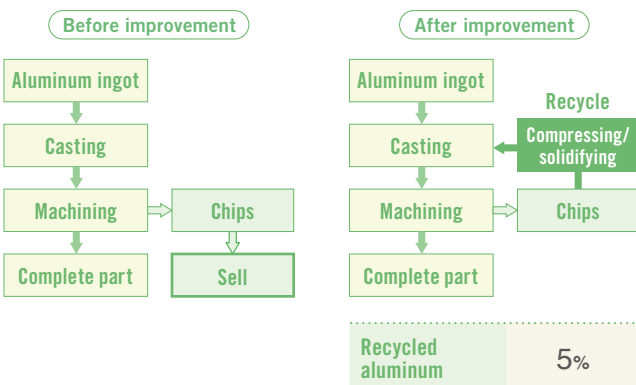
[Primary material usage amount (million yen) / plant production amount (100 million yen)]



#### Main measures

### Recycling through the compression and solidification of aluminum chips

Aluminum forged products are machined after forging to create the finished product however up until now JTEKT sold the chips produced in the machining phase. Now, by compressing and solidifying these chips, we are able to re-melt them in the forging furnace and recycle them.



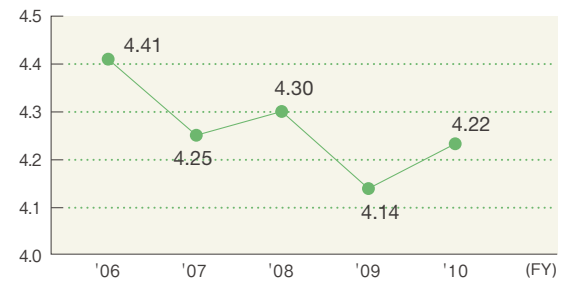
### ● Reduction of secondary material usage amounts

We succeeded in reducing usage 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.

#### Secondary materials usage per base unit

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



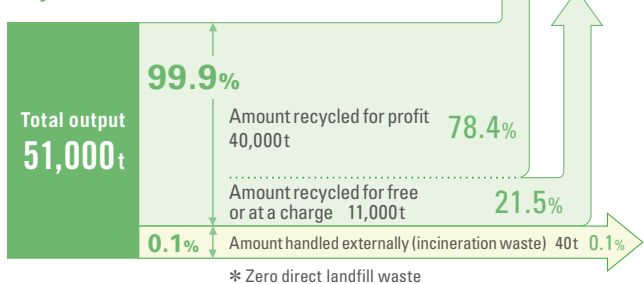
## Waste reduction

### ● Aiming for overall emissions reduction

In an effort to efficiently use resources and response to the depletion in landfill sites, JTEKT have 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 landfill waste and have, as a result, reduced it to zero. We were also able to reduce the amount of incinerated waste significantly through recycling and improving treatment methods.

We will continue to exert efforts in the reduction of waste overall, including that recycled for profit. ▶ Figure-01

#### Processing of industrial waste and recycled materials



Effective use of resources

Main measures

Promotion of more effective recycling

From FY2010, in order to more effectively recycle waste produced from manufacturing processes, we now request our contractor to combine and solidify the metal sludge produced from the grinding process with lime and coke. This has allowed us to sell 300t of processed steelmaking raw material with reduction properties, achieving more effective utilization. We will continue to switch to treatment methods that will allow the effective utilization of waste.

Reduction of packaging material

Reducing packaging and packing material

In order to effectively use resources, JTEKT have established targets for packaging and packing material individually for wood and paper, and promote simpler and returnable packag-

ing. In wooden packaging, we have increased our use of returnable wooden crates. In paper packaging, through leaner packing methods we have changed from cardboard to returnable plastic containers. ▶ Figure-02

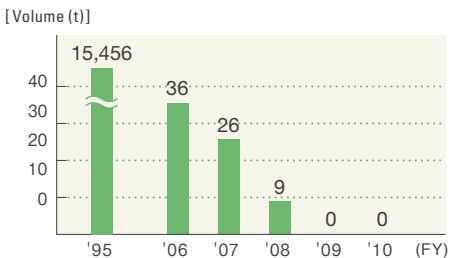
Reduction of water usage

Effective water usage

The securing of water resources is a major issue the world over and amidst this, JTEKT is also making efforts to reduce water usage. Until date we have promoted effective water usage such as reusing wastewater and our water usage in FY2010 was 7,663,000m<sup>3</sup>. We will continue to make every effort to reduce water usage even further in the future. ▶ Figure-03

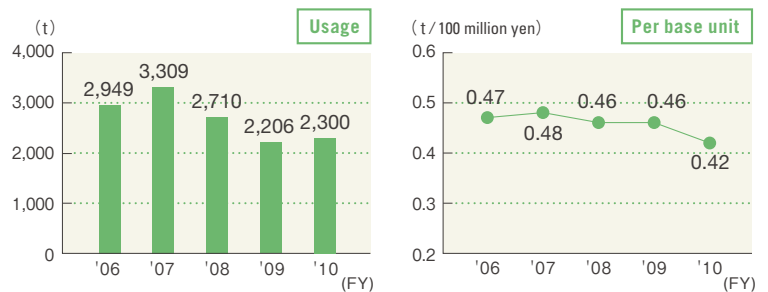
▶ Figure-01

Yearly transition of landfill waste output

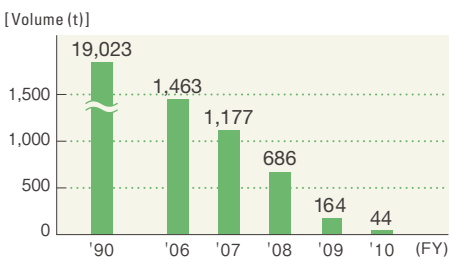


▶ Figure-02

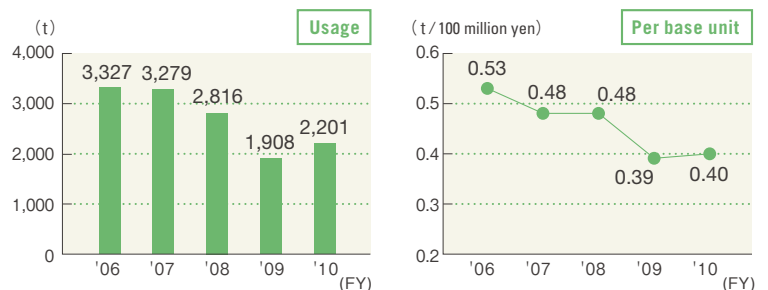
Transition of wood packaging usage and per base unit



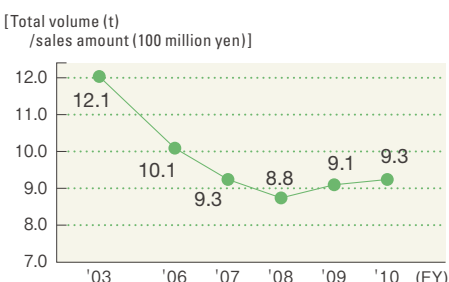
Yearly transition of incineration waste



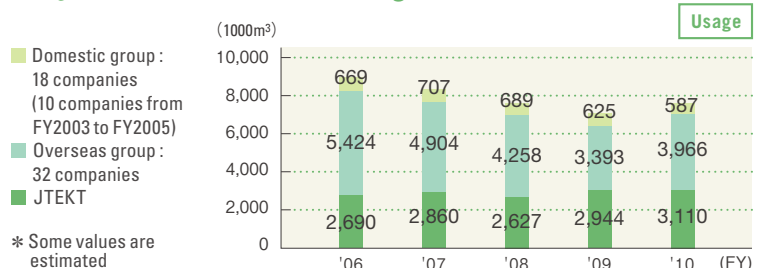
Transition of paper packaging usage and per base unit



Yearly transition of discharge per base unit



▶ Figure-03 Transition of water usage



# Control and reduction of environmentally burdensome substances

## Basic 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 challenges. 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 reduce our impact on the environment as much as possible.

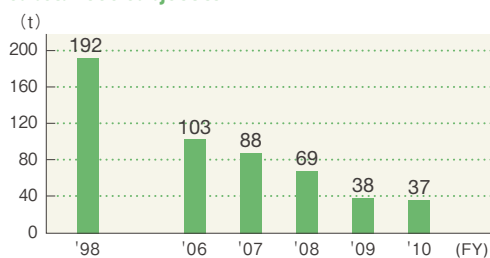
## Control and reduction of chemical substances

### ● Reduction of substances subject to PRTR

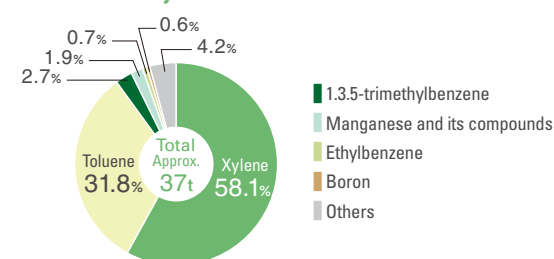
In order to decrease the health and environmental impacts of chemical substances released into the environment from production activities, JTEKT work to reduce the release and transfer of substances subject to PRTR regulation(\*1). Revisions were made to the PRTR regulation, and from FY2011 different substances will apply. JTEKT is changing our tally system in response to this.

\*1 **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.

### Yearly transition release and transfer breakdown of substances subject to PRTR



### Release and transfer breakdown of substances subject to PRTR for FY2010



### ● Response to REACH regulation

REACH(\*2) is a European regulation concerning chemical substances issued in June of 2007. REACH had identified 46 “Substances of Very High Concern”(SVHC)(\*3) as at December, 2010. In February of 2011, for the first time, it became necessary to seek authorization for products and components if they

contained any of the six identified SVHC substances. JTEKT 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.

### ● Soil and groundwater measures (continued report)

Since 1998, JTEKT’s Kariya and Okazaki plants have implemented 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(\*5). In addition, since FY2004, the Okazaki plant have used a microbial purification system(\*6) which injects nutritional supplement as part of their purification measures and had achieved better than the standard by FY2009. JTEKT report our groundwater measurement results to government agencies and provide local residents with explanations in community discussions.

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\*5 **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.

\*6 **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

Plants	Maximum measurement value in groundwater		
	FY2009	FY2010	Status
Kariya	0.933	0.378	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.

### ● Proper storage and control of PCM 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 store such devices and notify government agencies in accordance with this Act. In addition, by FY2010 we had rendered 55 high pressure condensers with highly concentrated PCB levels, harmless through PCB treatment at JESCO (Japan Environmental Safety Corporation). We intend to complete this on the remaining 191 units we currently have in storage.



Status of PCB device treatment (Tokushima plant)

# Biodiversity conservation

## Basic concept

### ● Protecting the planet's ecosystem

The conservation of our ecosystem is a global challenge, a fact which is evident from the adoption of the Convention on Biological Diversity (CBD) in 1992 and the COP10 (tenth meeting of the Conference of the Parties) held in Aichi Prefecture in 2010.

JTEKT believe conserving biodiversity to be a critical social issue supporting life and lifestyle and as such make efforts to achieve harmony between our business activities and biodiversity through the actions of each and every employee.

## Consideration towards biodiversity

### ● Establishment of a Biodiversity Conservation Action Guideline

In order to reduce the environmental load created by our business activities and consider biodiversity, JTEKT established a Biodiversity Conservation Action Guideline in March of 2011 based on the JTEKT Group Environmental Vision. We will continue to engage in activities relating to biodiversity in accordance with this guideline. The guideline refers to the Ministry for the Environment's Guidelines for Private Sector Engagement in Biodiversity.

## Action Guideline

Item	Description
Relationship with business activities	<b>Raw material procurement</b> <ul style="list-style-type: none"> <li>● Liaise with business partners to protect biodiversity.</li> </ul>
	<b>Soil usage</b> <ul style="list-style-type: none"> <li>● Through greenifying our plants, etc., we are engaging in activities to protect ecosystems which contribute to biodiversity.</li> </ul>
	<b>Production activities</b> <ul style="list-style-type: none"> <li>● 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.</li> <li>● We work hard to quantitatively appraise the impact had by our business activities on biodiversity.</li> </ul>
	<b>Product development</b> <ul style="list-style-type: none"> <li>● Based on life-cycle assessment approach, JTEKT develop and design top-class environmentally friendly products and reduce impact on biodiversity.</li> </ul>
Promotion of socially contributing activities benefiting biodiversity conservation	<ul style="list-style-type: none"> <li>● Proactively participate in socially contributing activities through cooperation with councils and affiliated companies.</li> </ul>
Training, awareness activities and information-sharing	<ul style="list-style-type: none"> <li>● Raise employee awareness of biodiversity conservation through environmental training.</li> <li>● Use the CSR report as a tool to communicate our activities towards biodiversity conservation with our stakeholders and communities.</li> </ul>

## Activities in FY2010

### Toyota Group Forest Management Experience

In May and October of 2010, the "Toyota Group Forest Management Experience" was held at Kise (Toyota, Aichi). A total of seven JTEKT employees participated and tried their hand at forest thinning. They learnt about the current status of forests and the importance of thinning and by actually getting their own hands dirty, increased their awareness of environmental protection.

JTEKT also proactively engage in activities such as the Kameyama City Eco-Forest project, which contribute to biodiversity.



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