Environmental Report

- The CSR Report 2017 PDF is published with the aim of conveying the concept and activities pertaining to JTEKT's CSR in an easily understood manner. This report emphasizes objectiveness, completeness and continuity.
- Please refer to the JTEKT REPORT 2017 for information about JTEKT's business performance, business activities, planning, and strategy.
- For related articles:

M = JTEKT's CSR Management F = Special Edition
S = Social Report E = Environmental Report
J = JTEKT REPORT 2017

- This section, the Environmental Report, summarizes environmental aspects of FY2016 based on the JTEKT Environmental Action Plan 2020.

Target period and target organizations/scope

Target period

FY2016 (April 2016 - March 2017)
* Some items include content from other periods.

Target organizations and scope

All activities of the JTEKT group

For items for which there is no criteria uniform across the JTEKT group, the unconsolidated results of JTEKT are displayed. As a general rule, if there are changes in the tallying scope, we revise data dating back to the past.

Reference guidelines

- The 4th edition of Sustainability Reporting Guidelines (G4 Guidelines)
- Japan's Ministry of the Environment "Environmental Reporting Guidelines" (2012 edition)
- ISO26000 (International Standard for corporate responsibility)
- A calculation standard stipulated by GHG Protocol Initiative
- Ministry of the Environment and Ministry of Economy, Trade and Industry "General Guidelines on Supply Chain GHG Emission Accounting"

New! This mark is used to indicate new actions begun in FY2016 and information disclosed for the first time in this year's report.

Environmental data for each operation base of the JTEKT group can be viewed on the JTEKT website.
http://www.jtekt.co.jp/e/csr/env_data.html

Environmental management

Social background

Sustainable Development Goals (SDGs) were adopted in September 2015 at the UN Sustainable Development Summit. Of the 17 goals aimed to be achieved by 2030, many are related to the environment. A company's business activities affect the planet environment in various ways. Not only are companies expected to comply with the environmental regulations of each country, but also set targets and policies autonomously and proactively, as well as promote initiatives for conserving the planet environment throughout all business activities.

The way of thinking by JTEKT

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 that wins the trust of society." we as a group have positioned the environment as one of our main management issues and are involved in actions which contribute to the sustainable development of society and the planet. We are greatly aware of the impact corporate activities have on the environment, and are working proactively to tackle matters of high importance.

JTEKT Group Environmental Vision

▶ Figure-01

In March 2011, JTEKT established the JTEKT Group Environmental Vision, comprising of an Environmental Philosophy and Environmental Policy, which sets out our initiatives towards conserving the global environment. We aim to achieve a sustainable society, establishing an action plan and promoting activities to achieve this goal.

JTEKT Group Environmental Vision = **Environmental Philosophy** + **Environmental Policy**

Promotion structure

Under the Global Environmental Conservation Committee

▶ Figure-02

JTEKT has established a Global Environmental Conservation Committee chaired by President and with the aim of implementing environmental management. The Committee sets target values based on company policies, as well as discusses and determines measures, then manages the progress thereof. Currently, in order to flexibly respond to issues relating to business activities, six specialized environmental subcommittees have been established and are proactively working to achieve the goals defined in Environmental Challenge 2050.

Promotion of global environmental management

We are working to further strengthen our environmental management for 19 group companies in Japan, and 38 group companies overseas.

→ E_26 Appendix

Environmental management

Figure-01 JTEKT Group Environmental Vision

Environmental Philosophy

The JTEKT group is aiming for “zero“ environmental burden of 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

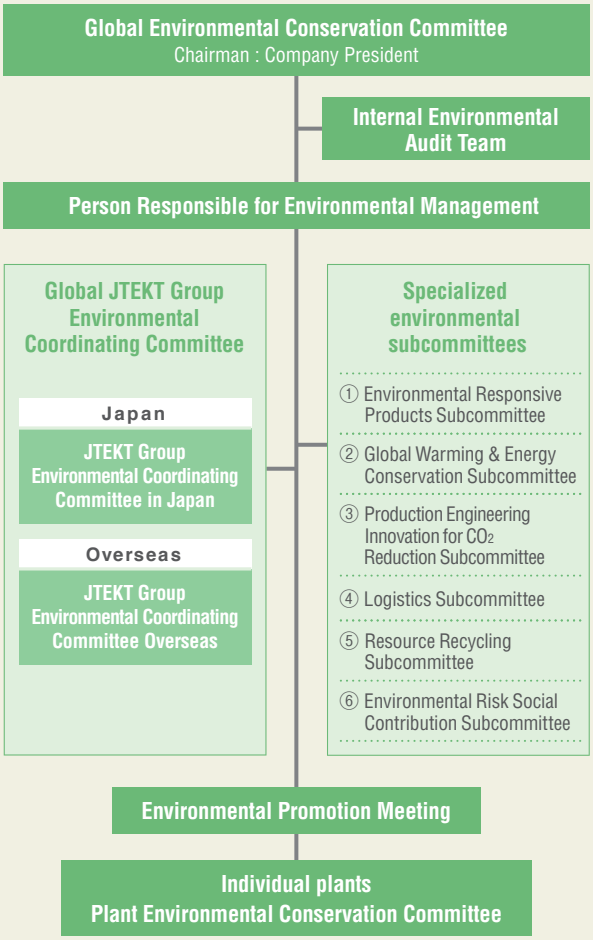
(Date of establishment: January 1st, 2017)

Based on our corporate philosophy, all JTEKT employees share the JTEKT GROUP VISION and JTEKT WAY in promoting global environmental conservation activities autonomously and proactively in accordance with JTEKT's management strategy, including both internal and external issues.

1. Make a continuous improvement in our Environmental Management System to enhance environmental performance.
2. Comply with environment related laws, regulations, treaties, agreements and other requirements related to our business activities. Promote harmony with community environments, maintain/improve environmental conservation and strive to prevent environmental pollution.
3. Conduct environmental management activities designed to the lifecycle of our products, and pursue the following:
   (1) Develop and design environmentally friendly products
   (2) Procure raw materials with low environmental burden, and control/reduce CO_2 emissions, waste and chemicals etc. at every manufacturing stage
4. Protect biodiversity considering of locational conditions of each JTEKT site and establish a society in harmony with nature through ecosystem conservation.

Figure-02 Organizational chart

J_33 Related article



Environmental management

Targets and results

Initiatives of Environmental Challenge 2050

In May 2016, in line with the slogan of "*For future children*," JTEKT formulated and announced Environmental Challenge 2050 as new initiative guidelines to minimize environmental load by the year 2050.

Guidelines of Environmental Challenge 2050

Area	Guidelines
Product/ Technology	Contribute to an environmental society using our capabilities in the development of products and technologies ・Proactively promote development of products, such as parts for fuel cell vehicles, anticipated to contribute to reducing environmental burden.
Creation of a low-carbon society	Minimize the amount of CO_2 emitted throughout the entire life cycle of our products, from material/part procurement to design and manufacture, and even including disposal.
	Minimize the CO_2 emitted from plants when products are manufactured by the year 2050 ・Develop, introduce and diffuse innovative processes and equipment ・Daily improvement and higher efficiency equipment at plants ・Switch to reusable energy, hydrogen energy, etc.
Creation of a recycling-based society	Minimization of discharged materials and expansion of recycling in the production phase ・Implement countermeasures targeting point of origin (improve yield, etc.), improve value of waste material through strengthened separation practices, etc. (creating valuable resources) ・Utilize recycled materials, increase company recycling
	Recycle water used at plants, minimize water consumption Make water cleaner before discharging from plants
Society in harmony with nature, biodiversity	In addition to JTEKT-wide activities, promote activities to achieve society in harmony with nature and protect the ecosystem through collaborating with the Toyota group, government offices and NPOs.
Environmental management	Build a corporate culture and professionals to proactively promote global environment conservation ・Improve employee environmental awareness and develop human resources able to contribute both internally and externally to the company ・Expand environmental activities on a global basis

JTEKT's Environmental Initiative Environmental Action Plan 2020

Figure-01

As part of our effort to achieve Environmental Challenge 2050, in order to promote the JTEKT group and our environment conservation activities, we formulated the Environmental Action Plan 2020 which sets out our initiatives and specific targets, and share this throughout the entire JTEKT group.

In FY2016, JTEKT group's overall global CO_2 emissions basic unit had improved 8.3 percent compared with FY2012, meaning we had accomplished our target. We also reached our target regarding JTEKT's individual CO_2 emissions basic unit, which was 2.1 percent less than last fiscal year (8.3 percent reduction compared to FY2008). Moving forward, we will work on establishing CO_2 emissions targets with scientific basis as our contribution to keeping global temperature rise below 2 degrees Celsius, as decided upon in the Paris Agreement. At the same time, in order to realize Environmental Challenge 2050 formulated last fiscal year, JTEKT is aiming to minimize CO_2 emitted throughout the entire life cycle of its products and is promoting and strengthening activities on a groupwide scale.

Environmental management

Figure-01 Environmental Action Plan 2020

Values in square brackets are comparisons with the base year

<table>
<tr><th colspan="2">Area</th><th>Action items</th><th>Targets and initiatives</th><th>FY2016 results of activities</th><th>Evaluation</th><th>Related pages</th></tr>
<tr><td rowspan="5">Product / Technology</td><td rowspan="5">Develop and design environmentally friendly products</td><td>(1) Develop new technology and new products leading to environmental burden reduction</td><td>① Evaluate all JTEKT products using the environmental efficiency formula set by JTEKT and aim to improve</td><td>(1) Rack parallel type electric power steering (RP-EPS)
(2) Next-generation super-low friction torque tapered roller bearing LFT-IV
(3) Low friction torque deep groove ball bearing for motors</td><td rowspan="5">○</td><td rowspan="5">E_11
F_02
F_05
F_06</td></tr>
<tr><td>(2) Promote 3R (reduce, reuse, recycle) design considerate of effective resource utilization</td><td>① Design products which are easily recycled
② Reduce resource consumption by making products smaller, lighter and longer-lasting</td></tr>
<tr><td>(3) Control and reduce environmentally burdensome substances contained in products</td><td>① Promote groupwide response to worldwide chemical substance regulations</td><td>Response to individual country's chemical substance regulations</td></tr>
<tr><td>(4) Roll out environmental assessments in the design and development phases</td><td>① Promote improvements to product performance and conduct life cycle assessments (LCA)</td><td rowspan="2">Contribution to CO_2 reduction through products: 726,000 t</td></tr>
<tr><td>(5) Contribute to CO_2 reduction through products</td><td>① Develop and design environmentally-considerate products which contribute to reducing CO_2 emissions
② Contribute to reduction of CO_2 emissions from product usage by 800,000 t or more by FY2020</td></tr>
<tr><td rowspan="2">Creation of a low-carbon society</td><td rowspan="2">Reduce CO_2 emissions</td><td>(1) Reduce CO_2 in production and logistics
• Global reduction of CO_2
• Reduction of CO_2 through improvements to logistics</td><td>Production
① Promote CO_2 reduction through daily improvement activities at plants
② Develop and introduce low-CO_2 production technologies through production engineering innovation (Seek to improve productivity, roll-out activities including offices, etc.)
Logistics
① Reduce CO_2 emissions by improving logistics efficiency and enhancing fuel economy</td><td>Results
226,596 t-CO_2 [—]
143.2 t/100 million yen [8.3% decrease]
158.0 t/100 million yen [8.3% decrease]
2.15 t/100 million yen [4.4% decrease]</td><td>○</td><td>E_07
E_13
～15</td></tr>
<tr><td>(2) Promote reusable energy</td><td>① Promote reusable energy that considers the unique characteristics of each individual area and region</td><td>(1) Amount of reusable energy introduced: 1,168 kW (cumulative)
(2) Installation of JASI solar power generation (220 kW)</td><td></td><td>E_14</td></tr>
<tr><td rowspan="3">Creation of a recycling-based society</td><td rowspan="2">Reduce waste</td><td>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 FY 2009 and is continuing to aim for zero waste production in other areas)</td><td>Item / FY2016 target
Emissions by in-house production volume: 7.25 t/100 million yen (13% reduction compared to FY 2008)
Direct landfill waste: Zero
Emissions by global in-house production volume: 9.9 t/100 million yen (4% reduction compared to FY 2012)
Direct landfill waste: Accomplishment of Zero Emissions *
*Make direct landfill waste less than 1% of emissions</td><td>Results
7.12 t/100 million yen [14.8% decrease]
Zero
10.2 t/100 million yen [1.3% decrease]
Zero</td><td rowspan="2">○</td><td>E_16
E_17</td></tr>
<tr><td>Logistics
(1) Reduce use of one-way packaging material</td><td>① Reduce packaging material consumption through simpler packaging, using more returnable containers, etc.
Item / FY2016 target
Emissions by sales: 0.78 t/100 million yen (4% reduction compared to FY 2012)</td><td>Results
0.77 t/100 million yen [4.9% decrease]</td><td>E_18</td></tr>
<tr><td rowspan="2">Effective use of resources</td><td>(1) Reduce waste in production</td><td>① Reduce stock removal and improve yield through design and technique changes
② Countermeasures targeting point of origin, reduction</td><td>(1) Initiatives for reduction of primary material consumption
(2) Initiatives for reduction of secondary material consumption</td><td rowspan="2">○</td><td>E_16
～18</td></tr>
<tr><td>(2) Reduce water consumption in production</td><td>① Promote recycling, water conservation and waste reduction
Item / FY2016 target
Emissions by in-house production volume: 1,740 m^3/100 million yen (4% reduction compared to FY 2012)
Emissions by global in-house production volume: 2,150 m^3/100 million yen (4% reduction compared to FY 2012)</td><td>Results
1,480 m^3/100 million yen [18.7% decrease]
1,140 m^3/100 million yen [49.1% decrease]</td><td>E_19</td></tr>
</table>

*RP-EPS is a registered trademark of JTEKT Corporation. *LFT(Low Friction Torque) is a registered trademark of JTEKT Corporation.

Environmental management

Values in square brackets are comparisons with the base year

Area		Action items	Targets and initiatives	FY2016 results of activities	Evaluation	Related pages
Society in harmony with nature, biodiversity	Enforce chemical substances controls and reduce environmentally burdensome substances	(1) Reduce environmentally burdensome substances in production activities	① Reduce the discharge and transportation of PRTR substances ・Reduce through promoting substitute materials	Release/transfer of substances subject to PRTR: 40 t	○	E_20
	Biodiversity conservation	(2) Action for biodiversity	① Promote activities based on our Biodiversity Conservation Action Guidelines ② Promote conservation of biodiversity through "connecting activities" in the JTEKT group and across all Toyota group companies	(1) Activity to conserve little tern nesting sites (2) Tree-planting activity		E_22 ～24
Environmental management	Environmental management	(1) Strengthen and promote consolidated environment management	① All affiliate companies to formulate and roll out their individual environment activity plans based on the JTEKT Group Environmental Vision ② Establish strategic environmental management which considers the management issues of business activities	(1) Continued activities with group companies in Japan and overseas (2) Held JTEKT Group Environmental Coordinating Committee sessions	○	E_01 E_02 E_08
		(2) Promote environmental activities in cooperation with business partners	① Promote green purchasing by all parts/materials suppliers ・Control and reduce environmentally burdensome substances included in parts and materials ・Request the creation and operation of environmental management systems ② Promote purchasing of environmentally-considerate products	Expanded Green Purchasing Guidelines		S_05
		(3) Promote sustainable plant activities	① Promote plant greenification and plants which utilize and harmonize with nature	Activity to conserve little tern nesting sites		E_24
		(4) Promote environmental education activities	① Promote environmental awareness education aimed at improving employee environmental awareness ② Promote rank-based education ③ Implement JTEKT Environment Month (June)	(1) Environmental education during Environmental Month (2) Rank-based education (3) Environment hazard prediction sheets		E_10
	Preserve and improve the global environment, forge communication	(1) Enforce preventative measures for environmental problems and observe regulations	① Promote ongoing zero legal violations and complaints from residents by strengthening and improving daily management tasks	(1) Environmental accidents: 1 (2) Held Workshop on Environmental Issues and Near Misses	×	E_09
		(2) Build good relationships with local residents	① Promote environmental conservation activities around plants ② Build good relationships through discussions with local residents and local government	(1) Clean-up activities around plant (2) Held environmentally-related discussions with local community		E_21 S_27
		(3) Proactive disclosure of environmental information and enhancement of communication activities	① Promote release of the JTEKT Report Establish communication with government agencies and local residents ② Improve the JTEKT brand image and external evaluation through proactive disclosure of information	Issued CSR report 2016		S_24

Environmental management

Environmental load caused by business activities

Reduction of environmental load in all stages

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

Resource and energy input versus environmentally burdensome substance output

The table below shows the resource and energy input versus environmentally burdensome substance output for FY2016. In order to minimize the impact of business activities on global warming, JTEKT strives to reduce energy consumption with a focus on those processes with high energy consumption, such as casting, forging, heat treatment and machining.

Resource and energy input versus environmentally burdensome substance output

INPUT

Resource and energy input		
Raw materials (metal, nonferrous metals) **Total:** 399,000 t		■
Resource recycling volume	27,000 t	■
Energy **Total:** 16,712,902 GJ*1		■
Electricity	1,458,481 MWh	■
City gas	43,967,000 Nm³	■
LPG	4,708 t	■
Kerosene	704 kℓ	■
Heavy oil A *2	598 kℓ	■
Water **Total:** 5,543,000 m³		■
Recycled water volume	863,000 m³	■
Chemical substances (amount of substances subject to PRTR *3) **Total:** 117 t		■
Logistics		
Packaging and packing materials	25,000 t	■

Manufacturing

Casting
Forging
Heat treatment
Machining
Painting
Assembling

Products
Automotive parts
Bearings
Machine tools
Mechatronics business

OUTPUT

Environmentally burdensome substance output		
Released into the atmosphere		
CO_2	769,000 t-CO_2	■
SOx	55.2 t	■
NOx	26 t	■
Toluene, Xylene	69 t	■
Other substances subject to PRTR	13.8 t	■
Discharged to waterways / sewage		
Wastewater	4,241,000 m³	■
COD *4	17 t	■
Nitrogen	9 t	■
Phosphorus	0 t	■
Release/transfer of substances subject to PRTR	0.1 t	■
Discharge leaving the company		
Waste	31,000 t	■
Recycling for a fee *5	19,000 t	■
Recycling for profit	147,000 t	■
Transfer of substances subject to PRTR	7.2 t	■
Logistics		
CO_2 emissions relating to product transfer	15,000 t-CO_2	■

■ Tally of the 19 JTEKT and domestic group companies and the 38 overseas group companies
■ Tally of the 19 JTEKT and domestic group companies
■ JTEKT independent

*1 **GJ** Giga-joule (heat quantity unit), G=10^9
*2 **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.
*3 **PRTR regulation** "PRTR" is an abbreviation for Pollutant Release and Transfer Register, which is a system created by the government for reporting the amount of chemical substances released or transferred.
*4 **COD** Chemical Oxygen Demand (water quality index)
*5 **Recycling for a fee** A processing fee is payed in order to recycle.

Environmental management

CO_2 emissions for the overall supply chain

Based on guidelines established by the Ministry of the Environment and Ministry of Economy, Trade and Industry (*1), JTEKT calculates then endeavors to reduce the amount of CO_2 emitted through its business activities, including its supply chain, as well as the use and disposal of products sold. Results for the entire JTEKT group in FY2016 are shown in the below table.

→ E_13 Related article
→ E_25 Appendix

*1 **Guidelines established by the Ministry of the Environment and Ministry of Economy, Trade and Industry** General Guidelines on Supply Chain GHG Emission Accounting.

CO_2 emissions for the overall supply chain

Scope (*2)	Emissions (t-CO_2)	Remarks
Scope 1 (Self-produced direct emissions)	111,000	Self-produced emissions through using city gas and other fuels
Scope 2 (Indirect emissions produced by own energy source)	658,000	Emissions produced due to using electricity purchased by JTEKT
Scope 3 (Other indirect emissions)	7,633,000	Emissions produced by related activities such as raw material purchasing, disposal and distribution

*2 **Scope** The calculation scope for greenhouse gas emissions stipulated by the GHG Protocol Initiative which prepares the global guidelines for calculating and reporting greenhouse gas emissions.

Environmental accounting

Assessment of cost and results

▶ Figure-01

By quantitatively assessing the costs and results of environmental conservation, we continue to make both effective and efficient improvements. We use environmental accounting to help familiarize our stakeholders with our environmental conservation activities, and publicly disclose related information. The tally system is in accordance with the Ministry of the Environment's Environmental Accounting Guideline.

Environmental accounting results for FY2016

Environmental conservation costs for FY2016 were 2.5 billion yen in investments and 3.94 billion yen in management costs, adding up to a total of 6.44 billion yen. This was an increase of 950 million yen (17.3 percent) from the previous year. In order to meet our targets defined in Environmental Action Plan 2020, we implemented measures such as the visualization of energy and shift to LED lighting. As a result, environmental conservation costs increased by 1.05 billion yen compared with the previous year.

▶ Figure-01

Environmental conservation costs

(Million yen)

Type	Details	Investment	Cost
[1] Business on-site costs ① Pollution prevention costs	● Service & upkeep of environmental equipment	223	261
② Environmental conservation costs	● Measures for energy conservation	1,174	141
③ Resource recycling costs	● Waste processing, recycling	—	402*
[2] Upstream and downstream costs	● Green purchasing	—	37
[3] Management activity costs	● Environmental monitoring, measurements, etc.	—	151
[4] R&D costs	● R&D of environmentally friendly products	1,108	2,863
[5] Social activities costs	● Disclosure of environmental information, greenification, etc.	—	76
[6] Environmental damage costs	● Soil and groundwater restoration	—	—
Total		2,505	3,931
Gross amount		6,436	

*Includes PCB waste processing cost

Economic benefit of environmental conservation measures

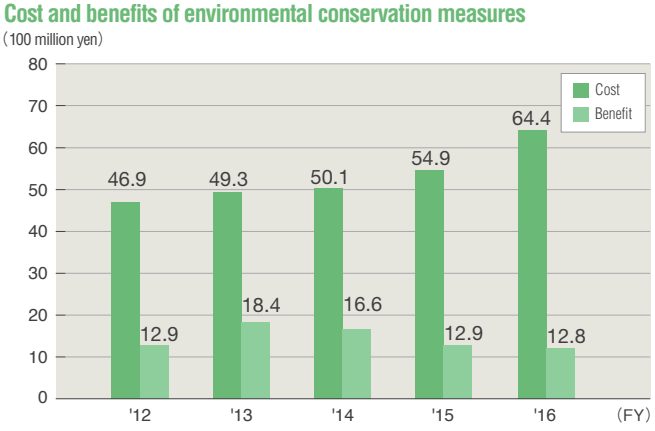
(Million yen)

Details of benefits	Economic benefit
Profit from recycled material sales	769
Energy-cost reduction from promoting energy conservation	468
Reduction of waste processing costs	40
Total	1,277

Benefits towards material amount reduction from environmental conservation measures

Details of benefits	Benefits towards material amount reduction
Energy consumption (t-CO_2)	17,300
Waste output (t)	1,991

Cost and benefits of environmental conservation measures



*We have not calculated 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.
*Depreciation costs are not included. Expenses with multiple purposes are proportionately distributed.
*Scope of calculation: JTEKT independent (including some group companies working at JTEKT)
*Calculated period: FY2016 (April 2016 to March 2017)

Environmental management

Main activities FY2016

JTEKT Group Environmental Coordinating Committees

In order to share policies and targets with the entire group and strengthen initiatives, the JTEKT Group Environmental Coordinating Committee is held every year and is attended by representatives of both domestic and overseas group companies.

Domestic JTEKT Group Environmental Coordinating Committee

The Environmental Coordinating Committee is held three times a year with all 19 group companies in Japan to promote activities for CO_2 reduction, waste reduction, and environmental disturbance prevention. In April 2016, a Coordinating Committee was held by environment managers from domestic group companies and discussion was had regarding the status of each company's FY2015 environment initiatives and plans for FY2016. In July and December of 2016, in addition to reporting and discussing our performance up until now and future efforts, risk countermeasures for environmental equipment and the like were checked during plant tours as a means of improving environmental conservation countermeasures.

JTEKT Group Environmental Coordinating Committee in Japan held on July 22nd

JTEKT Group Environmental Coordinating Committee for overseas affiliates New!

European Health Safety Environment (HSE) Management Forum

In March 2017, the first Health Safety Environment (HSE) Management Forum was held at JALY (France). The Forum was attended by all safety and environment managers in the European region and the European headquarters (JEO). It was a good opportunity to share awareness of health and safety topics and deepen understanding of Environmental Action Plan 2020 targets. A plant tour was also included in the gathering, and participants shared information on daily activities and improvement examples. Moving forward, we will endeavor to hold the Forum bi-annually, establish a framework for cooperation between plants and achieve JTEKT group's environmental targets.

European HSE Forum (JALY: France)

Fernanda Dolberth (Left)
Marcela Oliveira (Right)
JABR (Brazil)

Effective utilization of limited natural resources

Water resources are absolutely essential to human life. Although there is an abundance of fresh water in rivers, lakes and underground reservoirs, it is a fact that, currently, water is not being evenly distributed throughout society. According to a United Nations report, there is a risk that two-thirds of the population will suffer from water shortages by the year 2050. As countermeasures to this type of situation, it is important that we make efforts to secure the safety of drinking water and food.

The JTEKT group has established an environmental target for water consumption reduction with the aim of protecting natural resources. In order to meet this target, JABR prepared a 200m^3 large-capacity tank and uses rainwater accumulated in this tank for the cooling towers of its production equipment. Using rainwater as an alternative to water resources has a major impact on environmental protection responsibility and reduction of water consumption within JABR.

Moreover, JABR runs various environmental protection campaigns all year long. One activity is having employees grow tree seedlings to expand environmental consciousness. Also, one major activity is JABR's Recycle Fair. The aim of the Recycle Fair is for employees to make handcraft items using recyclable waste produced by the plant for the purpose of waste recycling and reducing environmental impact. In FY 2016, JABR ran a "Use a Mug" campaign. The company provided all employees in the management department with mugs they could use while at work in order to reduce plastic waste (disposable plastic cups). Through activities such as these, JABR is raising peoples' awareness of the environment at the same time as promoting the reduction of waste, as well as the reduction of raw material, water, energy and fuel used in the manufacturing and transportation of products.

Environmental management

China Safety and Health Environment (EHS) Section Meeting

JTEKT held a meeting in China concerning safety, health and the environment in June 2016 at YKS and March 2017 at KLF. Representatives of JTEKT group companies in China reported environmental activities and issues at their respective company. At the KLF meeting, case examples of improvements as a result of the visualization of plant energy consumption were introduced. Through on-site inspection of the site, we enhanced the specialized knowledge and skills of employees involved in safety and environment duties and improved environmental awareness.

China Safety and Health Environment (EHS) Section Meeting (KLF: China)

Reducing environmental risk

Environmental accident prevention activities

To prevent environmental accidents, we share countermeasures implemented in response to incidents occurring both inside and outside the company for similar equipment. Moreover, in order to comply with environmental legislation, treaties and convention levels, we have set internal standards (*1) more stringent than regulations, which we manage thoroughly.

*1 JTEKT's internal effluent standards are 80 percent of regulatory requirements.

Legal compliance with environmental legislation

In FY2016, an incident occurred where contaminated water leaked from the sewage system into rainwater drains and flowed outside the JTEKT group site.

In addition to reporting to the concerned government authority, investigating causes and implementing countermeasures for each incident, JTEKT also shares information and countermeasures with all group companies and plants through its JTEKT Group Environmental Coordinating Committee and the Workshops on Environmental Issues and Near Misses mentioned later in an effort to prevent recurrence of similar incidents.

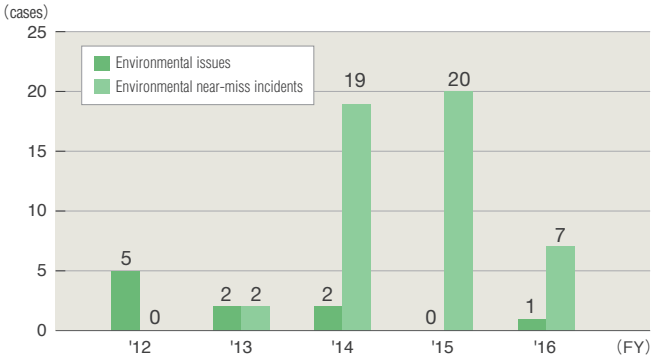
Workshops on Environmental Issues and Near Misses

Once every two months, JTEKT holds an Workshop on Environmental Issues and Near Misses in order to highlight case experiences of environmental near-miss incidents (*2) that have occurred other than environmental accidents and thoroughly share countermeasure content and implementation items companywide. In this workshop, environmental managers from all JTEKT plants gather at the plant where the environmental near-miss incident occurred and verify the case experience of the near-miss using the *genchi genbutsu* approach. Then, the efficacy of countermeasures is examined, and items to be rolled out companywide are discussed with all employees as a means of recurrence prevention. Unfortunately, in FY2016, JTEKT had one environmental issue, but we were able to significantly reduce the number of environmental near-miss incidents to seven cases.

Workshop on Environmental Issues and Near Misses (Tadomisaki Plant)

*2 Incidents that had only a slight impact on the environment and were handled within the area they occurred in.

Shift in no. of environmental issues and case experiences of environmental near-miss incidents



Environmental patrol by Plant Managers

As part of our Environmental Month every June, Plant Managers of each plant conduct environmental patrols. FY2016 environmental patrols involved confirming the status of rainwater drains and waste laydown areas.

Environmental patrol (Nara Plant)

Emergency drills

JTEKT performs regular emergency drills to prepare for the occurrence of various environmental accidents. Every plant also conducts emergency drills for nightshift workers, assuming the occurrence of an accident at night.

Emergency drills (Sayama Plant)

Environmental management

Environmental audits

Internal audits

JTEKT conducts internal audits annually to confirm the operational status of our environmental management system and compliance with legislation. We corrected all issues identified in this audit.

External audits (ISO14001)

In April 2017, JTEKT was subjected to an ISO14001 surveillance audit based on the 2015 revision of the same standard. As a result, there were zero cases of non-conformity, and our environmental management system was deemed as congruent with standard requirements and having been effectively implemented. However, twelve cases were identified as having room for improvement, and therefore the departments in charge of handling these cases have been specified and corrections are being made.

ISO14001 external audit

Environmental audits of overseas group companies

The JTEKT group has constructed a consolidated auditing system and has been conducting environmental audits on overseas group companies since FY2014. These audits focus on legal compliance activities aimed at preventing environmental issues and complaints. In FY2016, audits were conducted at three bases in North America, one base in China and three bases in India.

Environmental audit (KBNA Richland plant: U.S.)

Environmental audit (KBIN: India)

Environmental education

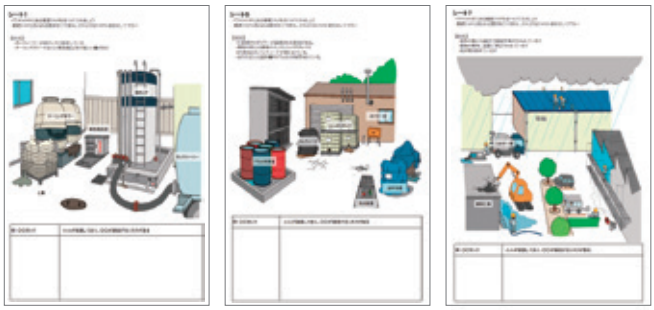
Environmental awareness education

During Environment Month in June of 2016, environmental awareness training was held for all employees through e-learning. The theme this year was “Eco Change! Each Employee Must Change their Awareness!” and 7,193 employees completed the training.

Preparation of environment hazard prediction sheets New!

In FY2016, as an initiative aimed at improving employee awareness of the environment, JTEKT prepared environment hazard prediction sheets.

These consist of eleven types of illustrative sheets promoting understanding and improvement of environmental risk in the workplace. These environment hazard prediction sheets came into effect during the Environment Month of June 2017 and we plan to implement them companywide in the future.



Environment hazard prediction sheets (example)

Environmental communication

Interaction with other companies

JTEKT promotes environmental communication activities through interaction with other companies aimed at being mutually beneficial by serving as opportunities to both acquire skills and know-how, and leverage solutions to environmental issues as well as introduce other companies to JTEKT’s environmental initiatives. In FY2016, this interactive activity was held with Panasonic Industrial Devices SUNX Tatsuno Co., Ltd. JTEKT visited the company’s plant and observed how to install an actual measuring instrument for energy visualization operation of the company’s energy management system and improvement examples thereof. On this occasion, meaningful interaction was had through the exchange of opinion regarding the focus and progress of environmental activities, etc.

Plant tour
(Panasonic Industrial Devices SUNX Tatsuno Co., Ltd.)
http://panasonic.net/id/pidsxtn/

Community discussions

All JTEKT plants regularly invite local residents and government members to community discussions. This is an opportunity to introduce JTEKT’s environmental initiatives, have participants take a plant tour and voice their opinions in order to facilitate communication with the local community.

→ S_24 Related article

Environmentally considerate development and design

Social background

The influence of product usage on the environment is deeply related to the development and design phases of the product. To lower our environmental burden, our company must oversee products from material purchase through usage by the customer, all the way until disposal. We must also work on developing environmentally friendly designs which can be easily reused and recycled.

The way of thinking by JTEKT

Improve each product from every angle

We JTEKT, in line with our Corporate Philosophy of "contributing to the happiness of people and the abundance of society through product manufacturing that wins the trust of society. " develop and design environmentally friendly products. We believe that our products and technologies provide environmental countermeasures for our customer's products and manufacturing processes and as such, greatly contribute to the environment. Therefore, we strive to improve the environmental performance of each product throughout the entire product life cycle, and are producing results which will contribute to the prevention of global warming and the effective use of resources.

Promotion structure

Promotion by the Environmental Responsive Products Subcommittee

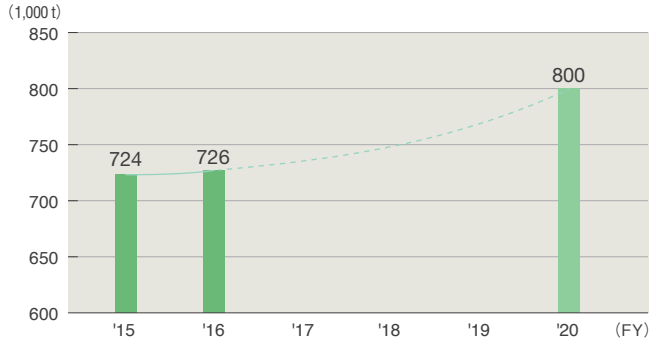
Under the guidance of the Global Environment Conservation Committee, which unites companywide environmental conservation activities, the Environmental Responsive Products Subcommittee is promoting the development of environmentally friendly products together with group companies in Japan. Innovative technology is used in the development and design stages to make products smaller, lighter, and more efficient, and reduce the amount of environmentally burdensome substances and raw material usage. In this way, JTEKT is engaging in environmental conservation on a global scale.

Contribution to CO_2 reduction through products

Figure-01

JTEKT is working to improve product efficiency to meet its target of making its contribution to CO_2 reduction through products for the year 2020 either equivalent to or greater than the current CO_2 emissions of the entire JTEKT group.

Figure-01 Contribution to CO_2 reduction through products



*Contribution to CO_2 reduction through products figures are the contribution calculated globally for each fiscal year.
*In FY2016, the method for calculating reduction contribution was partially changed.

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 within product development.

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

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

Assessment of products mentioned in the PICK UP section

Developed product name	Percentage of environmental burden reduction	
Rack parallel type electric power steering (RP-EPS)	4.9%	→ F_02 Related article
Next-generation super-low friction torque tapered roller bearing LFT-IV	13.0%	→ F_05 Related article
Low friction torque deep groove ball bearing for motors	29.0%	→ F_06 Related article

Environmentally considerate development and design

Group company activities

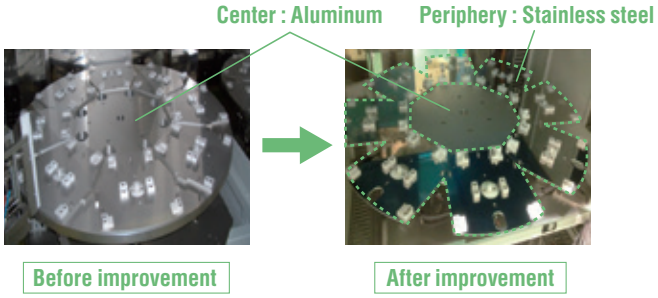
JTEKT conducts environmental design activities with intimate interaction between each operations headquarters and all group companies. Through creative ideas from the design stage, products of the JTEKT group are contributing to the world environment.

Main measures

Group company in Japan	Koyo Thermo Systems Co., Ltd.

Reducing the amount of aluminum used in vertical furnace turntables

Conventionally, the workpiece conveyance turntables of vertical furnaces for manufacturing semiconductors were made out of large, circular sheets of aluminum, however, the production of aluminum parts requires high power consumption therefore the design was changed to use stainless steel plate on the periphery of the turntable. As a result, the company succeeded in reducing the amount of aluminum used by 68 percent.



Before improvement　　After improvement

Prevention of global warming

Social background

In November 2016, the Paris Agreement entered into force as the new international rules for combating global warming. The common global long-term target of the Paris Agreement is to suppress the increase in the global average temperature to well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 degrees Celsius above pre-industrial levels. The Agreement also clearly states its goal of achieving net zero emissions by the second half of this century. Companies are also being required to step up their initiatives to reduce CO_2, both directly and indirectly.

→ E_07 Related article

The way of thinking by JTEKT

Reducing CO_2 emissions within all processes

In order to help prevent global warming, JTEKT engages in activities to reduce emissions of CO_2, a major greenhouse gas, 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.

Reducing CO_2 emissions in production

Reducing domestic CO_2 emissions

Figure-01

JTEKT set the target of reducing our CO_2 emissions basic unit to 15 percent compared to FY2008 by FY2020 and engages in activities to achieve this. We reduced our CO_2 emissions by 3,000 t during FY2016 due to improved energy saving methods, and reached our target basic unit of CO_2 emissions, achieving 143.2 t/100 million yen. In order to proactively promote CO_2 reduction during production, we are engaging in activities to consecutively reach our goal such as visualizing energy consumption on each line in our plants, having variable fixed costs and reducing standby power during non-operating times.

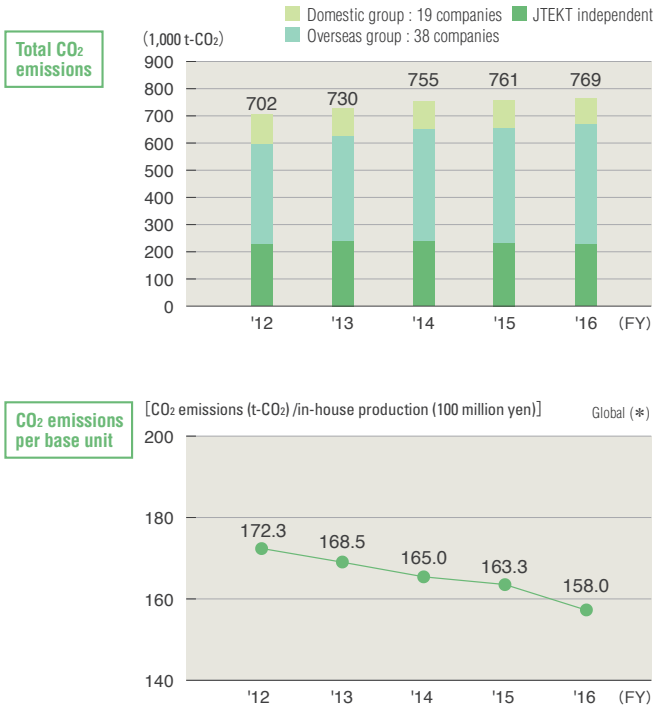
Reduction of global CO_2 emissions

Figure-02

With an aim to minimize the impact of global production operations on global warming, JTEKT is working to reduce CO_2 emissions not only within the company but also at all JTEKT group companies in Japan and overseas. The CO_2 emissions basic unit for FY2016 was 8.3 percent less than the FY2012 level, meaning that we had met our target for FY2016. We will continue to improve productivity in order to prevent global warming and improve production efficiency as an entire group.

Figure-01 Transition of total and per base unit CO_2 emissions in production

Figure-02 CO_2 emissions (global and base unit)



*JTEKT + 19 domestic group companies + 38 overseas group companies
*Past results have been partially revised after reconfirming CO_2 emissions.

Prevention of global warming

Main measures

Initiatives for realizing Environmental Challenge 2050

Based on the Environmental Action Plan 2020 drawn up as the first step towards achieving the goals set out in Environmental Challenge 2050, JTEKT is pushing ahead with changing all of the lights used in its administrative offices and plants to LED. In FY2016, 15,266 lights were changed to LED, and 8,586 more are planned for FY2017.

Main measures

Overseas group company	KBNA (U.S.)

Energy-saving by controlling no. of compressor units

Previously, in order to expand production lines at KBNA's Richland Plant, it was necessary to increase the number of compressors however the current compressor system has no backup function, therefore there was a risk of production stopping during a breakdown. Additionally, compressors are stopped and started frequently, leading to increased power consumption. As a way to avoid this, KBNA adopted a system to control the number of compressor units. This system reduces power consumption and achieves energy-saving by using both a compressor that performs inverter operation to suit load variation and a high-efficiency compressor for base load which operates constantly.

Moreover, two compressors were stopped and one is used as backup in case of breakdown. This move has resulted in an annual reduction of CO_2 emissions of 10,800 t (45 t/day) and 94,000 USD (393 USD/day).

David Green
(KBNA Richland plant：U.S.)

Initiatives for energy visualization New!

In FY2016, as part of efforts to achieve the goals set out in Environmental Challenge 2050, JTEKT asked Panasonic Environmental Systems & Engineering Co., Ltd. to conduct an energy-saving diagnosis with the aim of creating new energy-saving items and developing professionals capable of performing energy-saving diagnosis. Power meters are being installed on each line of all JTEKT plants in order to first create the right environment to achieve goals through visualization of energy consumption. 733 power meters were installed in FY2016, with a further 1,054 planned for FY2017, which will complete installation on all lines.

Introduction of renewable energy

In 2016, JSAI (India) introduced 220 kW of electric power by installing a solar power generation system, bringing the total power introduced up until now to 270 kW. In 2017 it plans on introducing a further 170 kW, which will compensate for around 10 percent of the company's overall electric power consumption. JTEKT's independent introduction of renewable energy amounts to 685 kW to date, meaning we have achieved our target of 500 kW or higher. Including group companies both within Japan and overseas, the total amount of renewable energy introduced by the entire JTEKT group up until FY2016 equals 1,168 kW. In FY2016, we generated 1,271 MWh of power and reduced CO_2 emissions by 470 t. In ongoing efforts to minimize CO_2 emissions in line with our Environmental Challenge 2050, JTEKT will continue proactively introducing renewable energy with low environmental burden.

Solar power generation (JSAI: India)

Activities for production technology innovation

Figure-01

In order to achieve our CO_2 reduction target for FY2020, JTEKT is engaging in efforts to improve productivity and reduce CO_2 emissions through production technology innovation. In FY2016, we promoted technological development with focus on the four areas of :

(1) Reduce production processes and equipment number
(2) More compact equipment
(3) Introduce high-efficiency devices and equipment following load fluctuation
(4) Energy loss reduction and energy recycling

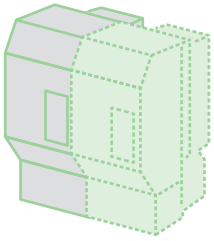
Prevention of global warming

Figure-01

Reduction of equipment number through high-speed cutting of shafts and screws

Shorter cycle time through machining conditions and tool technology development
2 conventional units → 1 newly developed unit

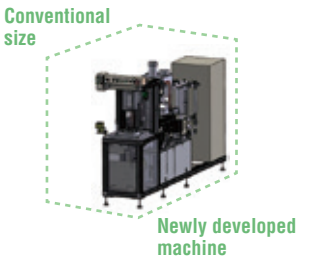
Energy comparison 30% decrease



Downsizing of equipment through development of a cup-type washing machine

Reduced washing water and tank volume due to a smaller washing volume (cup-type).
Volume comparison: 30-50% decrease

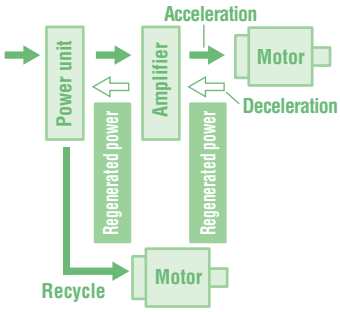
Energy comparison 20% decrease



Load variation following and reduced loss with high-efficiency devices and power regeneration

Assess waste (*muda*) through measurement of actual power in machining cycle and absorb energy through power regeneration.
Improved power control for processing equipment

Energy comparison 10~30% decrease



Reducing CO_2 emissions in logistics

Reducing CO_2 by integrating product delivery shipments

Figure-02

In FY2016, JTEKT reduced the basic unit for CO_2 emissions by around 1 percent compared to the previous year, or 2.15 t/100 million yen by integrating product delivery shipments. In FY 2017, we will continue our efforts to reduce CO_2 through further integrating product delivery shipments, modal shift (*) and the use of electric fork lifts in plants, etc.

***Modal shift** A shift from transporting goods by large trucks, etc. to transportation by rail or sea.

Main measures

Shorter transportation distance

In FY2016, hub unit manufacturing was transferred from Kokubu Plant to Kameyama Plant. This shortened the distance product had to be transported to major customers in the Aichi region, and resulted in an annual reduction in CO_2 emissions of 220 t.

Promoting battery-drive fork lifts

Through using battery-driven forklifts (logistics vehicles), JTEKT succeeded in reducing CO_2 emissions by 15 t annually. We will continue promoting adoption of battery-driven forklifts in FY2017 also.

Battery reinstallation-type forklift

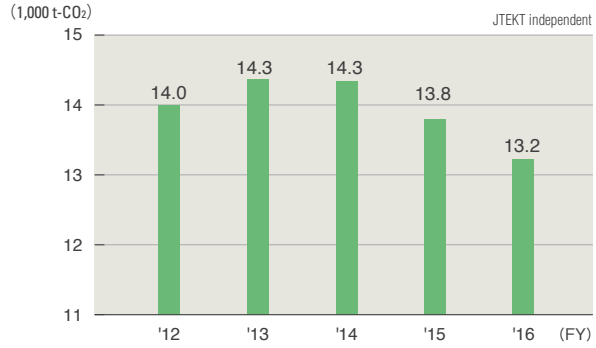
Holding of environment and safety meetings New!

Environment and safety meetings were held in three distribution centers in Kanto, Chubu and Kansai. JTEKT asked the logistics companies that participated to focus on fuel-efficient driving by utilizing drive recorders and digital tachometers. Various viewpoints were also exchanged in these meetings.

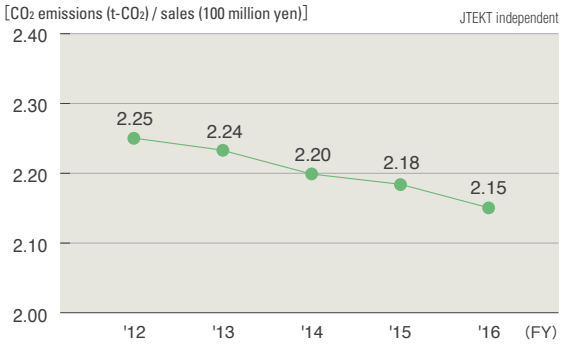
Environment and safety meeting (Kansai Distribution Center)

Figure-02 Transition of total and per base unit CO_2 emissions in logistics

Total CO_2 emissions



CO_2 emissions per base unit



Effective use of resources

Social background

Preservation of the world's resource foundation is a major theme of ISO26000, the 4th edition of Sustainability Reporting Guidelines (G4 Guidelines) and Sustainable Development Goals (SDGs). There is a strong demand on companies to reduce their usage of raw materials and recycle parts. In addition, due to the concern of global water shortages in the future, it is becoming increasingly important for companies to engage in activities for the effective utilization of water resources.

The way of thinking by JTEKT

Responsibility as a *monozukuri* company

At JTEKT, we consider the effective use of resources as one of the responsibilities of an environmentally friendly *monozukuri* company. By making improvements and devising ideas for the production processes of each product, we strive to reduce material usage and waste output, as well as recycle and save valuable resources.

Saving resources in production

Initiatives for reduction of primary material consumption

JTEKT is working to transition to net shape (reduction of machined portions) by improving casting and forging formation technologies, in order to reduce the amount of materials used.

Main measures

Material reductions through improving forging accuracy ▶ Figure-01

Through high accuracy forging, it is possible to achieve thinner dimensions for the diameter of the sleeve yoke used in joints of propeller shafts, which reduces the portions that require cutting and other machining. This has led to a significant reduction in material consumption.

Initiatives for reduction of secondary material consumption

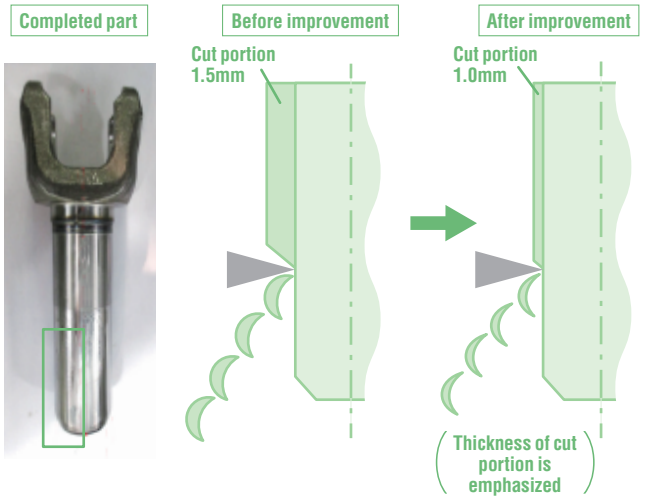
We succeeded in reducing consumption by revising the material, shape, hardness and other specs of secondary material for products such as dies, grinding wheels and cutting tools and further increasing their durability. Also, we strove to promote recycling by regenerating and recycling waste oil, grinding wheels, cutting tools and jigs.

Main measures

Extended mold life through surface nitriding ▶ Figure-02

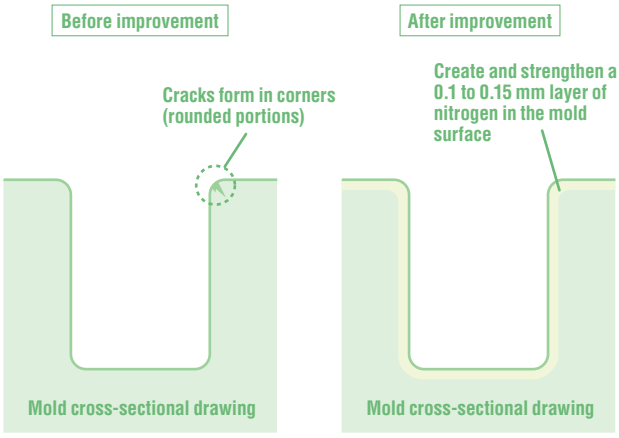
Due to heavy load applied to the inside corners of molds (rounded portions) used in warm forging, cracks form and mold life is reduced. However, by nitriding the mold surface, life is extended. This improvement has resulted in an annual reduction of material consumption by around 0.1 t per mold.

▶ Figure-01 Material reductions through improving forging accuracy



Material consumption	Annual decrease of approx. 17 t

▶ Figure-02 Extended mold life through surface nitriding



Mold life	3 times

Effective use of resources

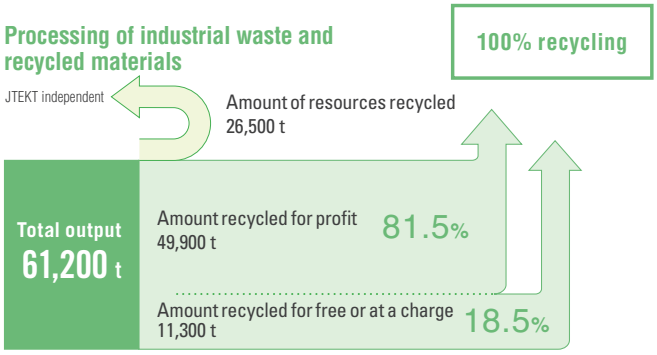
Waste reduction

Initiatives for achieving Zero Emissions

JTEKT has been engaging in activities based on 3R (Reduce, Reuse, Recycle) to achieve a 100 percent recycling rate for the effective use of resources regarding all discharged materials, including waste. The result was the achievement of a 100 percent recycling rate in November 2012, which has been maintained ever since. We are currently promoting various initiatives to achieve Zero Emissions (*) at all JTEKT group plants.

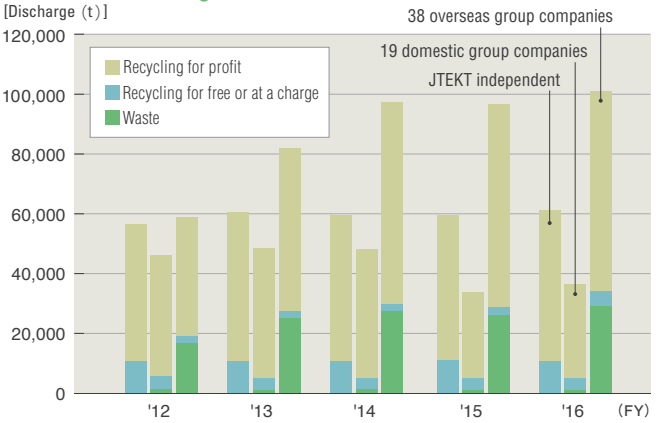
*Zero Emissions The practice of utilizing waste and byproduct created through industrial activities as resources for other industries in an attempt to avoid releasing waste into the natural world on the whole. Proposed by the United Nations University in 1994.

Processing of industrial waste and recycled materials



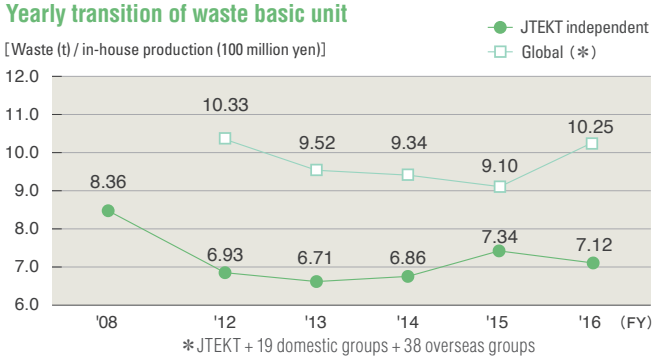
*Amount handled externally (incineration waste) *Zero direct landfill waste

Transition in discharge amount



* 21 domestic group companies prior to FY2014
* JTEKT's independent direct landfill waste has remained at 0 tons since FY2009.
* JTEKT independent incineration waste has been 0 t since FY2013

Yearly transition of waste basic unit

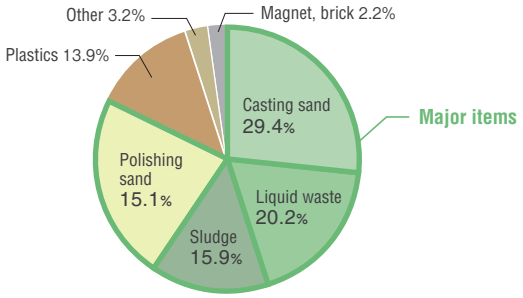


*JTEKT + 19 domestic groups + 38 overseas groups
*Past results have been partially revised after reconfirming emissions.

Initiatives for realizing Environmental Challenge 2050

Based on the Environmental Action Plan 2020 drawn up as the first step towards achieving the goals set out in Environmental Challenge 2050, JTEKT is engaging in efforts to categorize waste (recycling items for free or at a charge) and implementing countermeasures with a focus on waste for which there is a high discharge volume.

FY2016 waste ratios (JTEKT independent)



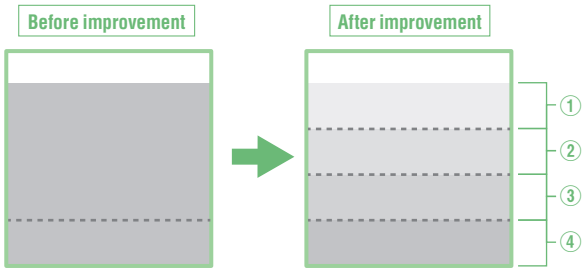
Main measures

Reduction of coolant and mold lubricant changes

Up until now, when there was a need to change the coolant used in turning and polishing processes or mold lubricant used in forging processes, JTEKT requested an external service provider to dispose of all the liquid in the tank as waste. However, by implementing the following initiatives, JTEKT has successfully reduced liquid waste by 80 percent:

(1) reduce the overall amount of liquid in the tank by not adding new coolant or oil for a number of days prior to the change,
(2) store the relatively cleaner liquid at the top layer of the tank in a separate tank and recycle after the rest of the tank content has been changed,
(3) process the bottom layer of the liquid in an internal condenser and reduce volume to around one-tenth,
(4) outsource the contaminated contents that have sunk to the very bottom of the tank to an external service provider.

Reduction of waste liquid by layer



Outsource to external service provider and dispose of entire tank's contents.

① reduce the overall amount of liquid in the tank by not adding new coolant or oil
② Upper layer – temporarily store in a separate tank and recycle after oil, etc. change
③ Bottom layer – reduce to around one-tenth in a JTEKT condenser.
④ Sunken contaminated contents – outsource to external service provider together with the one-tenth that remaining at step ③.

Waste volume	80% decrease

Effective use of resources

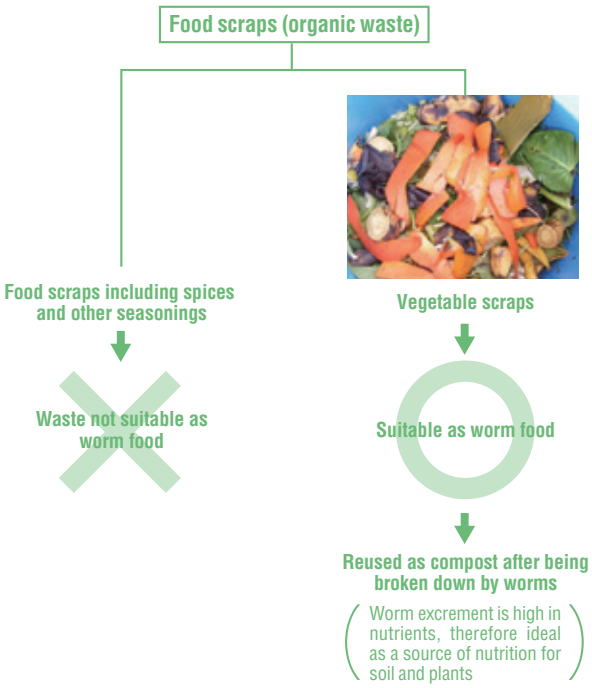
Main measures

Overseas group company	JTC (Thailand)

Initiatives to reduce food waste New!

From May 2016, JTC (Thailand) has been engaging in an activity at its Gateway Plant to break down food scraps produced from its canteen using worms and reduce the overall amount. As a result, the company succeeded in reducing food scraps down to around one-tenth a week. The food scraps broken down by worms are rich in nutrients and helps to improve soil, therefore the solid portions can be recycled as compost for increasing greenery within the plant. The liquid portions are distributed to nearby elementary schools and other companies within the industrial park, who express appreciation for the contribution.

Breaking down food with worms and creating compost



Containers with holes are used for better ventilation.

Twice a week, the worms are fed with food scraps. Worms are easily affected by dehydration therefore must be kept in soil with constant humidity, so inspections are conducted every morning and evening.

Solid portion

Liquid portion

VOICE Making compost with worms

After asking ourselves what we can do to help protect the environment, we decided to try and recycle the food scraps produced at the plant, even if the amount was small, by using worms to create compost. Through this activity, we succeeded in significantly reducing the amount of organic waste (food scraps) significantly, and this gave us great joy. We will continue environment protection activities with the goal of eliminating organic waste entirely.

From right
Suree Kongchai
Thanatchaporn Wannachai
Peartip Jantaranuwat
Nuntraputt Poolsawat
JTC (Thailand)

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 (both wood and paper), and promotes simpler, returnable and reusable packaging. For wooden packaging and packing material, we expanded the scope of returnable pallets and simplified wooden boxes. We also promote various initiatives for paper packaging and packing material, such as switching from disposable cardboard to returnable plastic cases, reviewing excessive packaging, using cardboard boxes to suit product size to reduce cushioning material, etc.

Main measures

Making packing for products shipped overseas returnable

In FY2016, we changed the packing material used when shipping products to Thailand from disposable cardboard boxes to reusable plastic cases, resulting in a reduction of packing material amounting by 1.2 t.

Before improvement

One-way (disposable) cardboard boxes

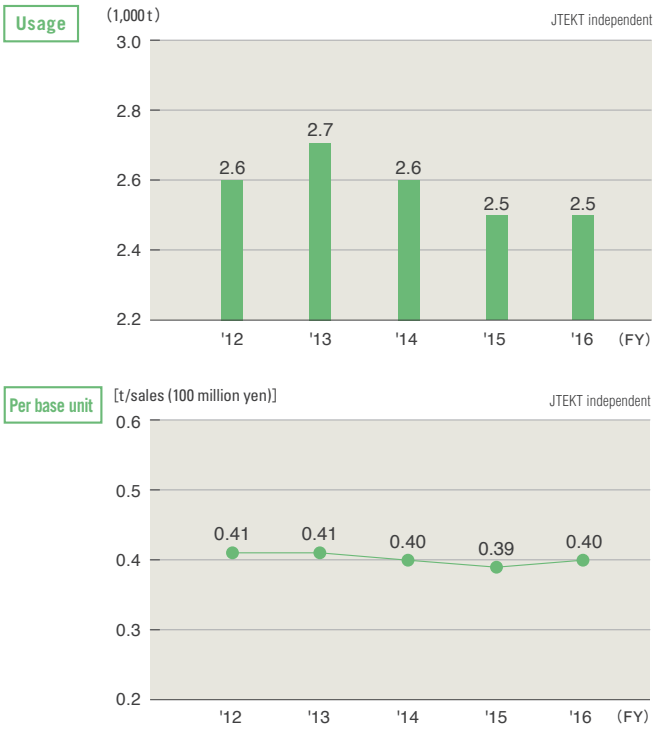
After improvement

Returnable (reusable) plastic cases

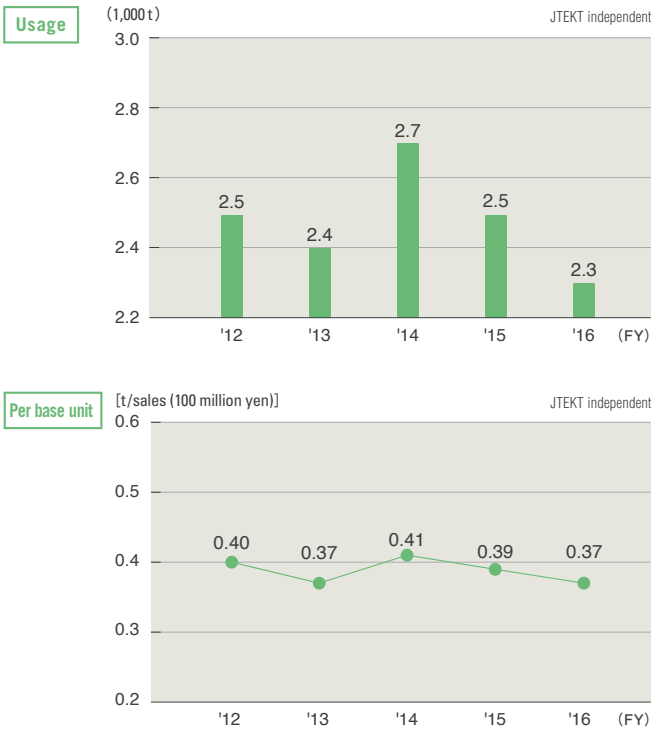
Effective use of resources

Figure-01

Transition of wood packaging usage and per base unit



Transition of paper packaging usage and per base unit

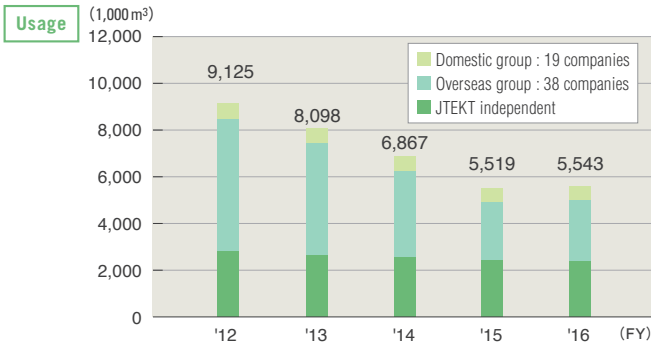


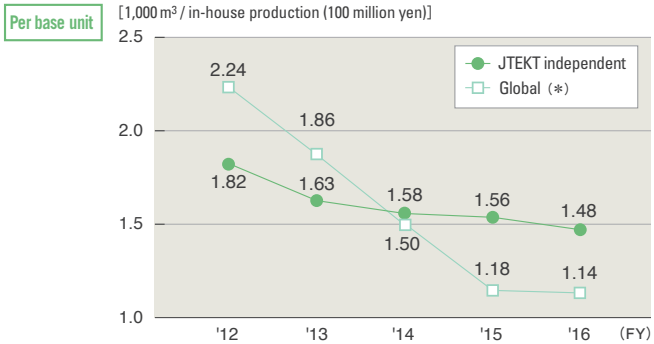
Reduction of water usage

Promoting efficient water usage

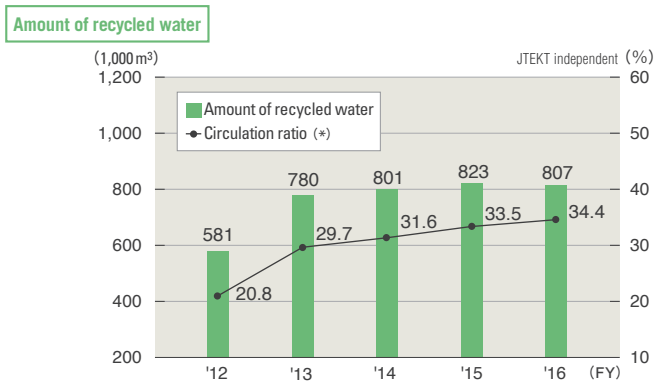
To reduce the usage of water, a precious resource, we engage in internal activities to decrease wasteful usage and recycle water. In FY2016, we had at first planned on improving our basic unit and usage amount of water by 4 percent or more compared with FY2012, however we achieved this goal ahead of schedule in FY2015 therefore, we set our sights on improving the figure compared to FY2015 by 0.5 percent or more. As a result, we achieved a 5-percent (80 m³/100 million yen) improvement in basic unit and reduced usage by 4.5 percent (110,000 m³). We have already achieved our planned target for FY2017, an improvement of 5 percent or higher compared to FY2012 therefore we will continue efforts to improve the figure by 0.5 percent or higher compared with FY2016 results.

Water usage / Basic unit transition / Amount of recycled water





*JTEKT + 19 domestic groups + 38 overseas groups
21 domestic group companies prior to FY2014
*Past results have been partially revised after reconfirming emissions.



*Circulation ratio The percentage of water recycled against the amount of water consumed

Control and reduction of environmentally burdensome substances

Social background

There are tightening restrictions on the usage and release of environmentally burdensome substances which adversely impact ecosystems and human health. Companies are expected to implement measures to thoroughly control and reduce environmentally burdensome substances in all stages of production and observe all regulations.

The way of thinking by JTEKT

Reducing environmentally burdensome substances

As we JTEKT aim to be an "environmentally friendly *monozukuri* company", the reduction of environmentally burdensome substances throughout the entire product life cycle is one of our social responsibilities. It goes without saying that we will lower consumption and discharge amounts, in addition to assessing and controlling environmentally burdensome substances within products.

Control and reduction of chemical substances included in products

▶ Figure-01

A Product and Environment Committee has been established among related departments as part of JTEKT's efforts to limit the environmentally burdensome substances included in products. This committee collects information, manages data, holds company training and so on, and then incorporates its activities in the activities of Section Meetings for implementation.

Control and reduction of chemical substances within production

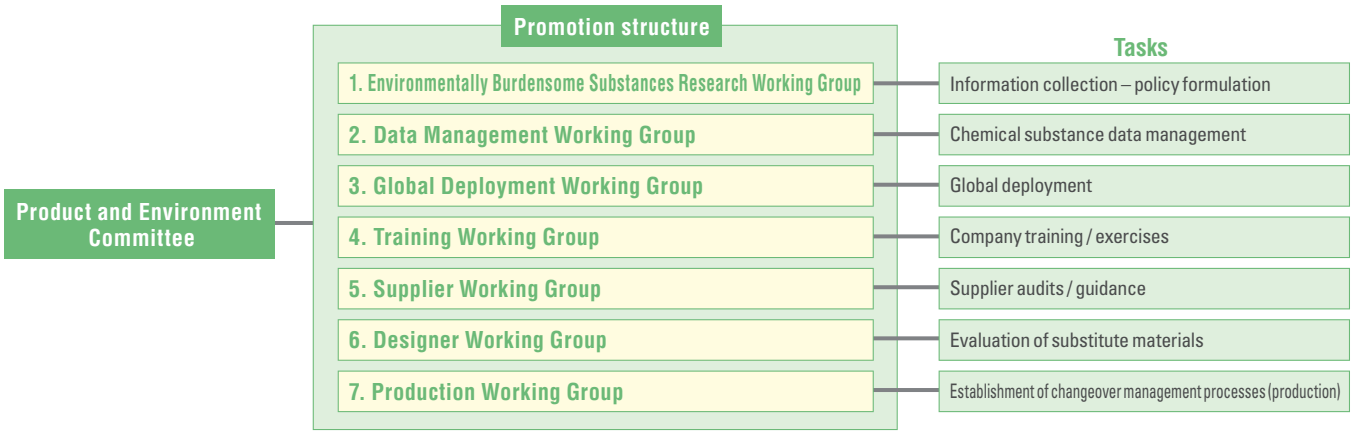
Reduction of substances subject to PRTR

▶ Figure-02

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. In FY2016, we succeeded in reducing the amount of PRTR substances (*) released and transferred through promoting control of paint coating efficiency, etc.

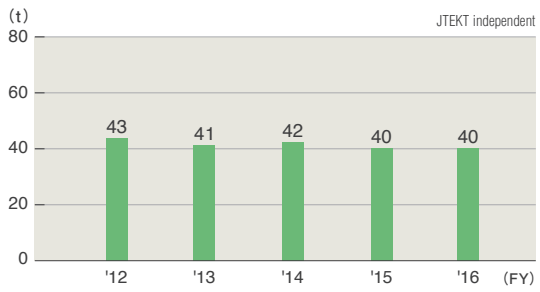
* **PRTR** A system to collect and disseminate information on environmental release and transfer of toxic chemicals reported to government agencies. PRTR is an abbreviation of "Pollutant Release and Transfer Register".

▶ Figure-01 **Organizational chart of the Product and Environment Committee**



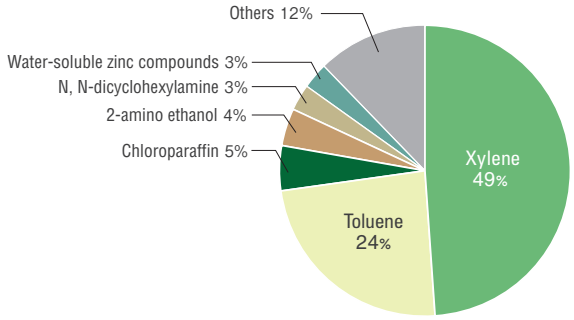
▶ Figure-02

Yearly transition release and transfer breakdown of substances subject to PRTR



*Past results have been partially revised after reconfirming release and transfer amounts.

Release and transfer breakdown of substances subject to PRTR for FY2016



Control and reduction of environmentally burdensome substances

My CSR

Sayuri Suemitsu
Bearing Operations Headquarters
Engineering Planning Dept.
Planning Office Group 1

Raising awareness of environmentally burdensome substances

I am currently involved in investigating environmentally burdensome substances for the Bearing Operations Headquarters. Up until now, I thought that "environmentally considerate manufacturing" was mainly about reducing CO_2 and industrial waste but since I became involved in my current work, I have realized there are many laws and regulations relating to environmentally burdensome substances in the world. If JTEKT does not comply with these laws and regulations, it would be a major risk in terms of company management, as we could be prevented from delivering products to customers or damage our brand reputation. With legal compliance as a given, I'd like to make designers with responsibility for drawings more aware of the importance of managing environmentally burdensome substances.

Proper storage and control of PCB devices

The Act on Special Measures concerning Promotion of Proper Treatment of PCB Wastes requires the storage and notification of devices containing PCB (polychlorinated biphenyl), widely used as an insulating oil. Here at JTEKT, we properly store such devices and notify government agencies in accordance with this act. In addition, all high-pressure condensers with highly concentrated PCB levels in storage were rendered harmless in FY2016.

Measures for devices with low PCB concentration

In addition to devices with highly concentrated PCB levels, JTEKT properly stores electrical devices that were previously judged as not containing PCB, but in which minute amounts of PCB have in fact been detected. We are continuing appropriate processing of such devices systematically.

Measures for soil and groundwater (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 detergents and other materials. They do this using a pumping and aeration system (*1). In addition, since FY2004, the Okazaki Plant has used a microbial purification system (*2) which injects nutritional supplements as part of their purification measures. JTEKT reports groundwater measurement results to government agencies and provides local residents with explanations in community meetings.

→ S_24 Related article

*1 **Pumping and aeration system** Groundwater is pumped up and sprayed and air is blown from below to aerate and separate organic solvents, which are made to adhere to activated carbon for removal.

*2 **Microbial purification system** 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: 0.03 mg / ℓ (mg / ℓ)

Plants	Maximum measurement value in groundwater		
	FY2015	FY2016	Status
Kariya	0.939	0.794	Purifying
Okazaki	0.016	0.011	Purifying

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

Biodiversity conservation

Social background

The diversity of living creatures on this planet is rapidly depleting, for reasons such as habitat loss resulting from the spreading destruction of nature. Even one of the UN's SDGs aims at preventing biodiversity loss. Corporate activities are made possible thanks to the blessings of nature, but at the same time impact biodiversity greatly. This is why it is important that corporations are proactively involved in biodiversity conservation activities such as protecting the natural habitat.

The way of thinking by JTEKT

Initiatives leveraging regional characteristics

JTEKT believes biodiversity conservation to be a critical social issue supporting life and lifestyle. Based on the JTEKT Group Environment Vision, each plant promotes initiatives which leverage the regional characteristics of its location and broaden the scope of activities aimed at conservation of biodiversity.

Under the Biodiversity Conservation Action Guideline

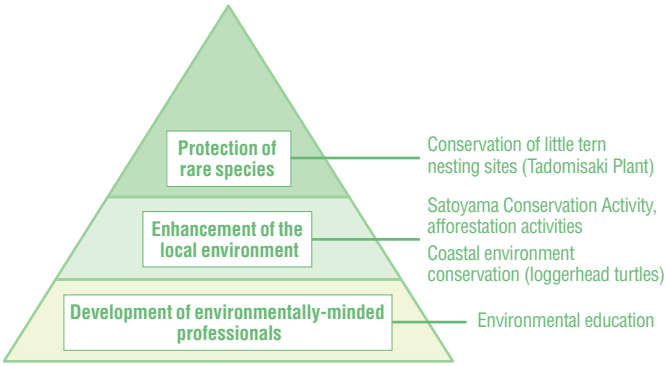
▶ Figure-01

In order to reduce the environmental load created by our business activities and be mindful of biodiversity, JTEKT formulated the Biodiversity Conservation Action Guideline in March of 2011 based on the Environmental Action Plan 2015 of our JTEKT Group Environmental Vision.

JTEKT's aspiration

JTEKT's biodiversity conservation activities focus on the three main initiatives of 1) protecting the rare living species that inhabit or grow at each plant, 2) enhancing the local natural environments surrounding each plant and 3) developing environmentally-minded professionals in order to achieving conservation of biodiversity on an ongoing basis. We engage in activities to protect the rare living species at each plant based on objective evaluations incorporating the viewpoints of experts and academics.

Conceptual image



Map of JTEKT biodiversity conservation activities

▶ Figure-02

Due to operating plants across a broad area in both Japan and overseas, JTEKT endeavors to expand our biodiversity conservation initiatives through connecting the activities of individual plants. We will continue promoting activities to broaden such connection both domestically and internationally.

→ S_27 Related article

▶ Figure-01 **Biodiversity Conservation Action Guideline**

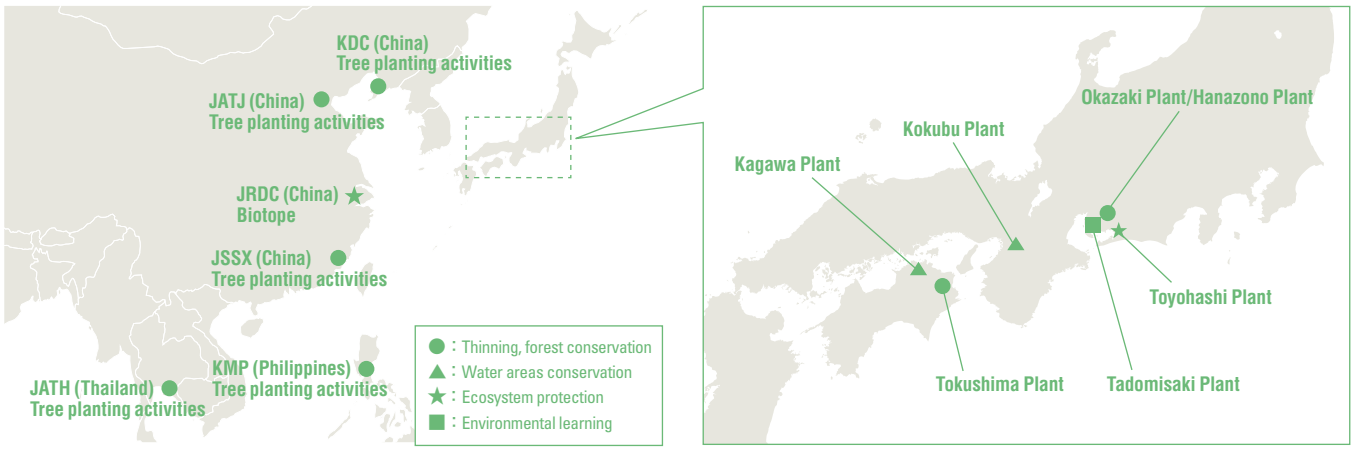
Relationship with business activities	
Raw material procurement	● Liaise with business partners to protect biodiversity.
Soil usage	● Through greenifying our plants, etc., we are engaging in activities to protect ecosystems which contribute to biodiversity.
Production activities	● With activities such 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 assess the impact our business activities have on biodiversity.
Product development	● Based on life-cycle assessment approach, JTEKT develops and designs top-class environmentally friendly products and reduces impact on biodiversity.

Promotion of social contribution activities benefiting biodiversity conservation
● Proactively participate in social contribution 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 with the community.

Biodiversity conservation

Figure-02 Map of JTEKT biodiversity conservation activities



Initiatives of domestic plants

Okazaki Plant/Hanazono Plant

Participation in "Okazaki Nature Experience Forest" Satoyama Conservation Activity

Aim

Preserve the abundant nature of our region for future generations through the Okazaki Nature Experience Forest, an activity to conserve our local satoyama (semi-natural woodlands).

Content

Tend to the woodlands within the facility. Upkeep of the bamboo groves, cutting the undergrowth, maintaining the walking paths, etc.

(No. of participants) 41

Toyohashi Plant

Held an activity called "Sandy Beach Fureai Walk" to protect loggerhead turtle spawning grounds

Aim

Protection of the spawning grounds for loggerhead turtles, which have been designated as an endangered species.

Content

• Collected garbage from sand dunes.
• Held environmental learning on loggerhead turtles for local children.

(No. of participants) 140

Tadomisaki Plant

Making nests using scrap material

Aim

Promoting environmental learning for local children.

Content

Held a workshop to make nests from recycled scrap material.

(No. of participants) 180 (26 families)

Kokubu Plant

Participation in "Ishikawa Cleanup Operation in Yamatogawa River."

Aim

Improve water quality of Yamatogawa River to restore it to its former clear state.

Content

Clean-up activity around both Yamatogawa River and its tributary, Ishikawa River.

(No. of participants) 12

Kagawa Plant

Participation in "Building Kagawa's Vibrant Sea."

Aim

Maintain a healthy sea by considering the ocean area and land area as one.

Content

Activity to eliminate rubbish on land and an activity to clean the sand dunes.

(No. of participants) 16

Tokushima Plant

Participation in "Tokushima Collaborative Forest-Building Project."

Aim

Maintain forests and create environments in which a wide variety of living creatures can inhabit.

Content

•Entered a partnership agreement with Tokushima Prefecture and the National Land Afforestation Promotion Organization in Tokushima.
•Carried out thinning, felling and planting in untended forest areas since 2011.

(No. of participants) About 40

Biodiversity conservation

Activity to conserve little tern nesting sites (Tadomisaki Plant) New!

The little tern species of bird has chosen Tadomisaki Plant as its nesting site, therefore the plant has been engaging in an activity to conserve such sites since 2015. The little tern is a rare, migratory bird that comes to Japan in summer to build colonies along rivers and coastlines, then breed. The little tern has been designated by Japan's Ministry of the Environment and Aichi Prefecture's Red Data Book as being an endangered species (*). The plant will continue this activity into the future and contribute to the conservation of biodiversity.

* Designated as "Endangered Species Cat. 2" in the 4th Version of the Japanese Red Lists (2012) issued by the Ministry of the Environment and "Endangered Species Cat. IB" in the 3rd Version of the Aichi Red Lists (2015) issued by Aichi Prefecture.

Little terns (fully grown)

Little terns (hatchlings)

\\ VOICE // For the co-existence of humans and nature

Yoshifumi Osawa
Driveline Systems Business Headquarters Tadomisaki Plant Administration Dept. General Affairs Section

In 2015, Tadomisaki Plant became aware that little terns were using the plant as their nesting sites so, with the cooperation of the Wild Bird Society of Nishi-Mikawa Area, we began maintaining nesting sites and implementing measures to attract more of the species. In FY2017, we felt our efforts had paid off as we confirmed a higher number of little terns were building their nests within our plant grounds. We will continue these activities in an effort to realize co-existence between humans and nature under the Environmental Challenge 2050 slogan of "*For future children.*"

Mr. Osawa passed away on April 28th, 2017. We have included this message from him out of deep respect for the activities he promoted during his life and with the consent of his family and other concerned parties.

TOPICS

A biotope initiative to restore habitats of various flora and fauna

In the winter of 2015, Tadomisaki Plant consulted with Aichi Prefecture's Natural Environment Department regarding how to attract little terns to nest within its plant grounds, and although preparations were made in spring of 2016, the measures were unsuccessful. In 2017, as a result of expanding bare land, scattering seawater, using bird cries and setting up decoys, we successfully attracted little terns on April 30th. On May 28th, we counted 500 birds however the majority of the hatchlings were eaten by birds of prey, and by June 6th, the colony had been abandoned. It is not rare for little terns to abandon their breeding ground as a result of their natural enemies or adverse weather. The bird maintains its species by successful breeding once every few years, therefore JTEKT considers the successful enticement of the birds in 2017 as a major step forward. Biotope (*) activities are not about spending money to build miniature gardens, but rather restoring the natural environments that living creatures choose to inhabit. JTEKT believes this initiative is a pioneering and authentic example of an environmental activity.

* "Biotope" is derived from the two words "bio" and "topos" (meaning "place") and refers to the habitat of living creatures.

Mr. Nobuo Takahashi
(Wild Bird Society of Nishi-Mikawa Area secretariat, Chief Director of the Aichi Biological Research Council NPO, Aichi Prefecture wildlife protection staff, Ministry of the Environment's rare species conservation promoter)

Tree-planting activity (KDC: China) New!

In April 2016, employees of KDC and their families participated in a tree-planting event in Dalian, China.
With the support of local government, 100 trees were planted. It was an excellent opportunity for the children who participated to sense the importance of protecting the environment through tree-planting and get close to nature. The activity also helped to improve participants' awareness of the environment.
KDC will continue its tree-planting activities in order to further contribute to the protection of China's environment.

Tree-planting activity (KDC: China)

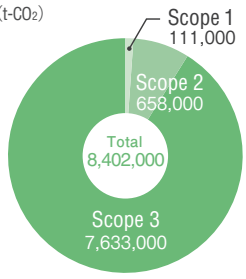
Appendix

CO_2 conversion coefficients to calculate CO_2 emissions volume

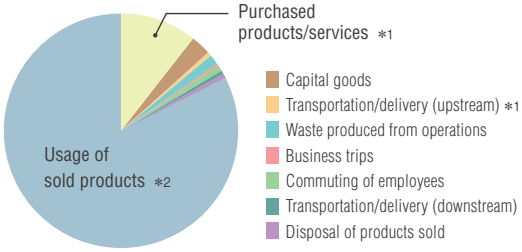
Electricity	0.3707 kg-CO_2/kWh
Heavy oil A	2.6958 kg-CO_2/ℓ
Kerosene	2.5316 kg-CO_2/ℓ
Propane gas	3.0040 kg-CO_2/kg
City gas	2.1570 kg-CO_2/Nm^3

The CO_2 conversion coefficients were set by the 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.

CO_2 emissions by scope



Scope 3 CO_2 emissions (percentage) by category



Scope 3 CO_2 emissions by category (FY2016) ∗3

Classification	Category	Emissions	Calculation method
Upstream	Purchased products/services ∗1	727,000	Calculated based on the amount of steel purchased (price) multiplied by emissions per basic unit
	Capital goods	195,000	Calculated based on equipment investment amount related to capital goods multiplied by the cost per unit
	Fuel and energy-related activities not included in Scope 1 and 2	—	N/A
	Transportation/delivery (upstream) ∗1	27,000	Calculated as emissions due to purchasing/distribution of raw materials, parts, etc., based on the amount of steel purchased (price) multiplied by emissions per basic unit
	Waste produced from operations	107,000	Calculated based on amount of waste multiplied by emissions per basic unit
	Business trips ★	18,000	Calculated based on travel expenses multiplied by emissions per basic unit; estimated based on employee number for overseas group companies
	Commuting of employees ★	47,000	Calculated based on commuting expenses multiplied by emissions per basic unit; estimated based on employee number for overseas group companies
	Leased assets (upstream)	—	Leased assets calculated as Scope 1 and 2 emissions
Downstream	Transportation/delivery (downstream)	30,000	Calculated based on product transportation amount and distance multiplied by emissions per unit; calculated based on distribution expenses multiplied by emissions per unit for overseas group companies
	Fabrication of sold products	—	Due to the difficulty of calculating emissions due to the processing of products by customers using a reasonable method, this criteria has been excluded from the scope of calculation at this time
	Usage of sold products ★ ∗2	6,450,000	Calculated based on the amount of energy consumption for annual production volume for steering, driveline components, and machine tools (calculated based on a 10-year usage period)
	Disposal of sold products	33,000	Calculated by deriving the masses of each material used from the material content of all steering, driveline parts and machine tools manufactured annually then multiplying this amount by the emissions basic unit.
	Leased assets (downstream)	—	N/A
	Franchise	—	N/A
	Investment	—	N/A
Total		7,633,000 (t-CO_2)	

★ Portion subjected to third party verification ∗1 Calculated based on steel purchase volume ∗2 Calculated based on steering, driveline products and machine tools
∗3 Calculated using emissions basic unit stipulated in the guideline

Third party verification

In order to increase the reliability of CO_2 emissions data, we asked SGS Japan Inc. to verify our FY2016 results as a third party. The scope of the verification covered all JTEKT production sites and domestic group companies' bases as well as some overseas group companies, and the CO_2 emissions by scope were Category 6 (business trips), Category 7 (commuting by employees) and Category 11 (usage of sold products).

Certificate of verification

Appendix

The scope of consolidated environmental management

Europe

● 12 production companies

JTEKT AUTOMOTIVE UK LTD. (England)
KOYO BEARINGS (EUROPE) LTD. (England)
JTEKT TORSEN EUROPE S.A. (Belgium)
KOYO BEARINGS DEUTSCHLAND GMBH (Germany)
JTEKT HPI S.A.S. (France)
JTEKT AUTOMOTIVE LYON S.A.S. (France)
JTEKT AUTOMOTIVE DIJON SAINT-ETIENNE S.A.S. (France)
KOYO BEARINGS VIERZON MAROMME SAS (France)
JTEKT AUTOMOTIVE CZECH PLZEN, S.R.O. (Czech Republic)
JTEKT AUTOMOTIVE CZECH PARDUBICE, S.R.O. (Czech Republic)
KOYO BEARINGS CESKA REPUBLIKA S.R.O. (Czech Republic)
KOYO ROMANIA S.A. (Romania)

Asia / Oceania

● 8 production companies

JTEKT (THAILAND) CO., LTD. (Thailand)
JTEKT AUTOMOTIVE (THAILAND) CO., LTD.(Thailand)
KOYO MANUFACTURING (PHILIPPINES) CORPORATION (Philippines)
JTEKT AUTOMOTIVE (MALAYSIA) SDN. BHD. (Malaysia)
JTEKT SONA AUTOMOTIVE INDIA LTD. (India)
KOYO BEARINGS INDIA PVT.LTD (India)
PT.JTEKT INDONESIA (Indonesia)
KOYO JICO KOREA CO., LTD. (Korea)

China

● 10 production companies

JTEKT AUTOMOTIVE (TIANJIN) CO., LTD.
JTEKT AUTOMOTIVE (FOSHAN) CO., LTD.
JTEKT STEERING SYSTEMS (XIAMEN) CO., LTD.
JTEKT DALIAN INNOVATION AUTOMOTIVE CO., LTD.
WUXI KOYO BEARING CO., LTD.
DALIAN KOYO WAZHOU AUTOMOBILE BEARING CO., LTD.
KOYO BEARING DALIAN CO., LTD.
KOYO LIOHO (FOSHAN) AUTOMOTIVE PARTS CO., LTD.
KOYO AUTOMOTIVE PARTS (WUXI) CO., LTD.
KOYO NEEDLE BEARINGS (WUXI) CO., LTD.

Japan

● 13 JTEKT bases
● 19 domestic group production companies

Koyo Machine Industries Co., Ltd. (Osaka)
Toyooki Kogyo Co., Ltd. (Aichi)
Koyo Sealing Techno Co., Ltd. (Tokushima)
CNK Co., Ltd. (Aichi)
Koyo Thermo Systems Co., Ltd. (Nara)
Koyo Electronics Industries Co., Ltd. (Tokyo)
Daibea Co., Ltd. (Osaka)
Utsunomiya Kiki Co., Ltd. (Tochigi)
HOUKO Co., Ltd. (Aichi)
Toyoda Van Moppes Ltd. (Aichi)
Koyometaltec Co., Ltd. (Mie)
KJK Co., Ltd. (Tokushima)
NIPPON NEEDLE ROLLER MFG. Co., Ltd. (Mie)
Koyo Heat Treatment Co., Ltd. (Osaka)
FORMICS Co., Ltd. (Aichi)
Taiho Co., Ltd. (Kagawa)
Eiko Seimistu Co.,Ltd. (Kagawa Prefecture)
Tokio Seiko Corporation (Tokyo Prefecture)
Yamato Seiko Co.,Ltd. (Nara Prefecture)

North America / South America

● 8 production companies

JTEKT AUTOMOTIVE TENNESSEE-VONORE LLC (U.S.A.)
JTEKT AUTOMOTIVE TENNESSEE-MORRISTOWN, INC. (U.S.A.)
JTEKT AUTOMOTIVE TEXAS, L.P. (U.S.A.)
JTEKT AUTOMOTIVE SOUTH CAROLINA, INC. (U.S.A.)
KOYO BEARINGS NORTH AMERICA LLC (U.S.A.)
KOYO BEARINGS CANADA INC. (Canada)
JTEKT AUTOMOTIVA BRASIL LTDA. (Brazil)
JTEKT AUTOMOTIVE ARGENTINA S.A. (Argentina)