

» Environmental management

Basic environmental policy

THK has contributed to social and economic progress through its pioneering role as a manufacturer of linear motion systems and machine components. THK recognizes that businesses have a vital responsibility to help maintain a healthy global environment for the benefit of

future generations. Accordingly, THK has undertaken a broad range of initiatives to steadily reduce its environmental impact and preserve and improve the natural environment.

The THK Group's basic environmental policy

(revised June 3, 2013)

1. Preserving the environment is one of our most important tasks. We will strive to accurately determine the environmental impact of our products, services, and overall business activities and to ensure that every unit within the Group establishes and observes appropriate environmental targets.
2. We will abide by all laws and regulations concerning environmental matters and establish and observe voluntary environmental standards, reviewing these whenever necessary in pursuit of more efficient and effective environmental management.
3. We will continually strive to develop products that help reduce environmental burdens.
4. We will continually strive to reduce our overall energy usage as well as specific energy consumption and reduce our greenhouse-gas emissions.
5. We will continually conserve and recycle resources, primarily by reducing and recycling waste from our manufacturing divisions, and strive to prevent environmental pollution.
6. To extend our environmental efforts throughout the entire Group, we will assist and help guide efforts by affiliates and partner businesses and cooperate and collaborate with the communities where THK conducts business.
7. This basic environmental policy will be communicated to every division in the THK Group through education, training, and other means of raising environmental awareness. We will disclose relevant environmental data to parties both within and outside the Group in a timely manner.

■ Environmental initiatives and objectives

Initiative	Objectives	Principal efforts
Conserving energy and inhibiting global warming	Reduce greenhouse-gas emissions	(1) Energy diagnostics (2) Energy conservation (3) Clean energy
Conserving resources and achieving zero emissions	Reduce environmental impact, achieve zero emissions	(1) Input controls on materials, parts, and supplies (2) Controls on emissions and waste (3) Reuse and recycling of resources
Controlling hazardous substances	Eliminate or restrict hazardous substances in production and distribution	(1) Replacement of PRTR-designated substances (2) Identification and replacement of substances subject to the REACH regulation (3) Green purchasing
Providing environmentally benign products and services	Develop products and services based on life-cycle assessments	(1) Expansion of Caged Ball product line (2) Efforts to extend service life and maintenance-free periods

» Environmental management system

Overview

THK production sites in Japan and overseas continue to acquire ISO 14001 certification for environmental management. The THK INTECHS MISHIMA and SENDAI Plants became certified in 2012. Both plants conducted training sessions for internal auditors, prepared environmental management manuals, and fulfilled other requirements to earn this distinction. Acquisition of certification will help make employees more aware of environmental issues and prompt further action to address them.

Because environmental management is an endeavor extending throughout the THK Group, the Risk Management Division's Environmental Management Department, located at THK Headquarters, coordinates environment-related efforts undertaken by THK plants, offices, and distribution facilities.

In 2012 THK achieved two of its three primary environmental objectives for the year, meeting numerical targets for conservation of resources, progress toward zero emissions (reduction of the volume of end waste), and reduction of PRTR-designated hazardous substances. The 2012 targets for energy conservation and reduction of CO₂ emissions, however, were not met.

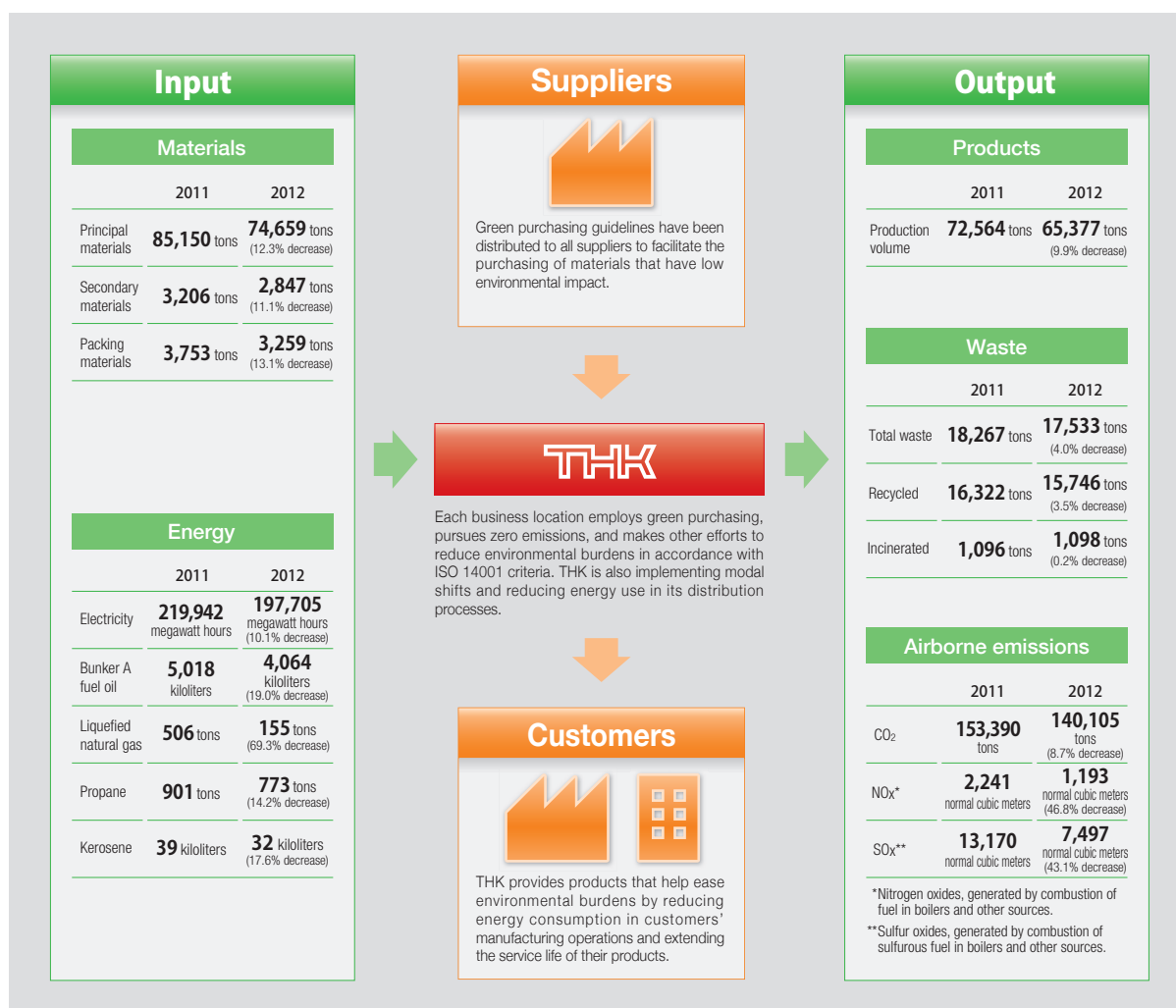
■ ISO 14001 certified facilities

Facility	Date certified	Certifying body
YAMAGATA Plant	Date renewed: Dec. 17, 2010	JQA
KOFU Plant		
YAMAGUCHI Plant		
MIE Plant		
GIFU Plant		
THK RHYTHM NORTH AMERICA	Jun. 13, 2001	SQA
THK RHYTHM Headquarters & HAMAMATSU Plant	Dec. 20, 2001	JIA
THK RHYTHM KYUSHU	Dec. 20, 2002	JIA
TMA (USA)	Jul. 14, 2003	QMI
TME (Europe)	Feb. 3, 2004	AFAQ
THK NIIGATA	Oct. 21, 2005	JQA
THK RHYTHM INASA Plant	Dec. 20, 2006	JIA
THK WUXI (China)	Jan. 7, 2008	CQC
DALIAN THK (China)	Dec. 18, 2008	TUV
THK LIAONING (China)	Jan. 12, 2010	TUV
THK INTECHS MISHIMA & SENDAI Plants	Mar. 21, 2013	ClassNK

■ THK's environmental targets

No.	Task	Fiscal 2013 targets	Targets to be achieved by 2015																					
1	Conserving energy and inhibiting global warming	<p>Reduce basic-unit CO₂ emissions to 1.08 kilograms per ¥1,000. (1% lower than in 2012) 2012 target was 1.09; 1.11 achieved (target not met).</p> <p>Major efforts in 2013</p> <p>(1) More energy-efficient heating and air-conditioning systems (2) Conversion to energy-efficient LED lighting (3) Continuation of all-out effort to reduce power consumption</p>	<p>Reduce basic-unit CO₂ emissions by 1%. Baseline: 1.10 tons per ¥1 million</p> <table><caption>CO₂ emissions per ¥1 million (Fiscal year)</caption><thead><tr><th>Year</th><th>Target</th><th>Actual</th></tr></thead><tbody><tr><td>2010</td><td>1.08</td><td>1.13</td></tr><tr><td>2011</td><td>1.08</td><td>1.12</td></tr><tr><td>2012</td><td>1.08</td><td>1.11</td></tr><tr><td>2013</td><td>1.08</td><td>1.08</td></tr><tr><td>2014</td><td>1.08</td><td>1.07</td></tr><tr><td>2015</td><td>1.08</td><td>1.06</td></tr></tbody></table>	Year	Target	Actual	2010	1.08	1.13	2011	1.08	1.12	2012	1.08	1.11	2013	1.08	1.08	2014	1.08	1.07	2015	1.08	1.06
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2	Conserving resources and achieving zero emissions	<p>Keep emissions rate under 0.50%. 2012 target was a rate under 0.50%; 0.48% achieved (target met).</p> <p>Major efforts in 2013</p> <p>(1) Recycling of grinding materials (2) Recycling of plastic waste (3) Reduction of nonindustrial waste</p>	<p>Maintain zero emissions—less than 0.5% of waste undergoes final disposal.</p> <table><caption>Emissions rate (%) (Fiscal year)</caption><thead><tr><th>Year</th><th>Target</th><th>Actual</th></tr></thead><tbody><tr><td>2010</td><td>0.50</td><td>0.58</td></tr><tr><td>2011</td><td>0.50</td><td>0.50</td></tr><tr><td>2012</td><td>0.50</td><td>0.48</td></tr><tr><td>2013</td><td>0.50</td><td>0.50</td></tr><tr><td>2014</td><td>0.50</td><td>0.50</td></tr><tr><td>2015</td><td>0.50</td><td>0.50</td></tr></tbody></table>	Year	Target	Actual	2010	0.50	0.58	2011	0.50	0.50	2012	0.50	0.48	2013	0.50	0.50	2014	0.50	0.50	2015	0.50	0.50
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2014	0.50	0.50																						
2015	0.50	0.50																						
3	Controlling hazardous substances	<p>Use 49,961 kilograms or less of PRTR-designated substances. 2012 target was 52,626 kilograms; 51,506 kilograms achieved (target met).</p> <p>Major efforts in 2013</p> <p>(1) Controlled usage of fuel-oil-powered equipment (2) Green purchasing (3) Reduced use of solvents, use of non-solvent alternatives</p>	<p>Reduce annual volume of PRTR-designated substances by 3%. Baseline: 54,254 kg</p> <table><caption>Annual volume of PRTR-designated substances (kg) (Fiscal year)</caption><thead><tr><th>Year</th><th>Target</th><th>Actual</th></tr></thead><tbody><tr><td>2010</td><td>49,961</td><td>68,939</td></tr><tr><td>2011</td><td>49,961</td><td>66,871</td></tr><tr><td>2012</td><td>49,961</td><td>52,626</td></tr><tr><td>2013</td><td>49,961</td><td>51,506</td></tr><tr><td>2014</td><td>49,961</td><td>48,462</td></tr><tr><td>2015</td><td>49,961</td><td>47,009</td></tr></tbody></table>	Year	Target	Actual	2010	49,961	68,939	2011	49,961	66,871	2012	49,961	52,626	2013	49,961	51,506	2014	49,961	48,462	2015	49,961	47,009
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» Environmental impact: The big picture



■ Environmental conservation: Costs

(¥ million per year)

Type	Investment	Cost	Principal efforts
1. Business costs			
Pollution controls	8.9	19.6	Monitoring air and water quality, maintaining scrubbers and septic tanks
Global environmental conservation	5.6	356.5	Use of energy-efficient fixtures and equipment, heat-resistant roof coating
Recycling	1.7	93.6	Disposal and recycling of waste, maintaining equipment
2. Upstream and downstream costs			
Green purchasing	0.0	11.0	
3. Management			
Acquisition of ISO certification, reduction of energy usage, management of chemical substances	3.7	166.5	
4. Research and development			
	157.9	184.0	
5. Community activities			
Planting and beautification, informational initiatives	0.0	7.1	
6. Repairing environmental damage			
	0.0	0.0	
Total	177.8	838.2	

Notes: 1. The figures above are based on data from THK's five main plants in Japan: YAMAGATA, KOFU, GIFU, MIE, and YAMAGUCHI; other THK Group plants in Japan: THK NIIGATA, two THK INTECHS plants, NIPPON SLIDE, THK RHYTHM, and THK RHYTHM KYUSHU; and seven THK plants outside Japan: TMA (USA), TME (France), DALIAN THK (China), THK WUXI (China), THK LIAONING (China), TMV (Vietnam), and TMI (Ireland).

2. Figures on nitrogen oxide and sulfur oxide emissions apply only to THK's five plants in Japan.

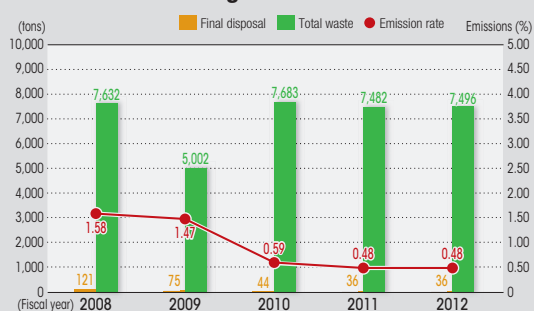
» Conservation of resources and zero emissions

Status of current efforts

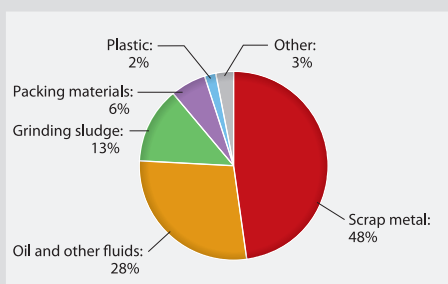
THK sets waste-reduction targets based on its emission rate—the volume of waste undergoing final disposal, expressed as a percentage of the total volume of waste generated. The 2012 target was a rate below 0.50%. For the second consecutive year, THK reached its target, achieving an emission rate of 0.48%. Total waste generated in 2012 amounted to 7,496 tons, slightly more than in 2011, while the 36 tons of waste undergoing final disposal by burial or incineration was exactly the same volume as in 2011. THK was once again able to meet its target thanks to improved techniques for separating waste materials, implementation of thermal recycling, and a reduction in the amount of plastic and rubber discarded.

Through efforts such as recycling discarded grinding materials and plastic and reducing the volume of nonindustrial waste, THK will once again record an emission rate of less than 0.50% in 2013.

Trends in waste generation



Waste by type



Recycling electronics

As a way of reducing waste, THK Manufacturing of America has begun recycling old computers, printers, production machinery control panels, and other devices. The volume of discarded electronic devices has more than doubled in the United States over the past decade

and, amid the continual upgrading of such devices, is expected to increase even more in the future.

TMA used to simply store old computers, printers, and the like in a warehouse, but the company now works with a recycling contractor in the state of Ohio to ensure that materials such as the substrates used in control panels, which used to be discarded as nonindustrial waste, are recovered and recycled.

In terms of energy savings, the volume of materials recycled to date is equivalent to 5,321 pounds (2,416 kilograms) of CO₂ emissions or 902 gallons (3,428 liters) of gasoline.



Sorting discarded devices in preparation for recycling.

THK LIAONING honored for waste management

THK LIAONING was honored by the city of Dalian in 2012 as a leader in solid-waste management. The company scored higher than any other business in Dalian's Jinzhou district in environmental inspections conducted by the city for the purpose of improving solid-waste management. The head of THK LIAONING's Materials Section was honored as well.

THK LIAONING's Environmental Safety Section and Corporate Planning Department routinely monitor the status of the company's waste emissions, promptly addressing any problems that arise in cooperation with the departments involved. The city-sponsored environmental inspection was unannounced, but the company's environmental management system nevertheless received a highly positive review.

The honor conferred on THK LIAONING has provided encouragement to its employees as well as a renewed awareness of environmental issues. THK LIAONING will live up to this honor by continuing its efforts to protect the environment.



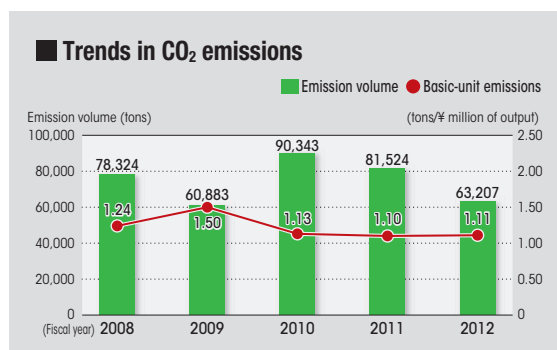
The staff of THK LIAONING's award-winning Materials Section.

» Conserving energy and combating global warming

CO₂ emissions

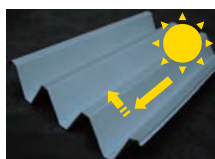
THK's targets for reducing CO₂ emissions are expressed in basic units (CO₂ emissions divided by the value of goods produced). The 2012 target was 1.09, but the actual figure was 1.11, which exceeded the target by roughly 2%. In terms of absolute quantities, however, THK reduced CO₂ emissions from 81,524 tons in 2011 to 63,207 tons in 2012, a decrease of roughly 22.5%.

In 2012 THK had inverters installed in its heating and cooling equipment, incorporated energy-efficient lighting fixtures and other equipment, and introduced compressors powered by waste heat. A variety of measures were enacted to curb energy consumption, including reducing standby power consumption by production machines and increasing the efficiency of heating and cooling systems through intermittent operation and careful management of indoor temperatures. Due to the impact of decreased production, however, these efforts were not sufficient to lower CO₂ emissions to the target level.



Heat-resistant roof coating

In July and August a heat-resistant coating was applied to the 21,600-square-meter corrugated metal roof of Building 1 at THK's YAMAGATA Plant. The result was an 8.1°C decrease in the roof's surface temperature and a 3.5°C decrease below the roof. Reducing the amount of heat transmitted by the roof both improved the work environment inside the facility and reduced energy consumption by lessening the load on the building's air-conditioning system.



Heat-resistant coating.



Coating the roof. The white substance is an anticorrosive base coat.

The YAMAGATA Plant will continue to conserve energy and reduce both CO₂ emissions and the overall environmental impact of its operations.

Inverter-equipped pumps

In the past, all 15 coolant pumps at the YAMAGUCHI Plant's Building 1 were kept running at full power regardless of the number of production machines that were actually in operation and being supplied with coolant, an arrangement that consumed 91,170 kilowatt-hours of electricity each month.

The amount of coolant required constantly varies with the number of machines in operation. To reduce power consumption by creating a system that activates only those pumps needed to provide the required volume of coolant, the pump motors were equipped with inverters. As a result, power consumption declined to 49,837 kilowatt-hours of electricity per month—a 45% decrease.



Coolant pump motors.



Inverter control panels.

Acclaimed for energy management

In February 2013, as part of the Chugoku district's fiscal 2012 Energy Conservation Month, THK's YAMAGUCHI Plant was honored by the director of the Chugoku Bureau of Economy, Trade and Industry for excellence in the area of energy management.

The honor was based primarily on two significant achievements. The first was an energy-saving initiative involving the installation of timers on air-conditioning units, enabling their motors to run for only 10 minutes per hour. The second was the conversion of the plant's interior lighting system from reliance on 400-watt mercury-vapor lamps to high-efficiency 270-watt fixtures, which resulted in a 32% reduction in power consumption and a 20% increase in illumination.



YAMAGUCHI Plant Manager Katsunori Yamamura with the plant's commendation for excellence in energy management.

Plant manager honored

In February 2013 the Japan Electric Association Chubu Branch's committee on efficient power usage awarded a commendation to THK RHYTHM executive and HAMAMATSU Plant Manager Yokota, as a person of merit in the area of energy management.

The award ceremony, held in conjunction with the Tokai district's fiscal 2012 Energy Conservation Month, took place in Nagoya. The annual event, sponsored by the Energy Conservation Center of Japan, is held to honor individuals and businesses for particularly notable contributions to the cause of energy conservation. The year before, THK RHYTHM's GOKYU Plant was recognized by the Kanto Bureau of Economy, Trade and Industry for its efforts in fiscal 2011. The 2012 award conferred on Yokota reflects THK RHYTHM's continuing long-term efforts to conserve energy.



THK RHYTHM executive and HAMAMATSU Plant Manager Yokota receives his award.

Green curtains

In an effort to reduce summertime power consumption, in 2011 the office building at THK's MIE Plant was equipped with "green curtains" consisting of shade plants and vines. The result was a 16% decrease in power usage compared to the previous year. In 2012 the project was extended to the plant's production facilities, where green curtains totaling about 100 meters in combined length were created in five locations. Morning glory vines, bitter melon and cucumber plants, and other types of vegetation planted by employees in March 2012 grew to two or three meters in length by midsummer, yielding a 9.5% reduction in power consumption compared to 2011. The MIE Plant's green curtains were featured in a contest sponsored by the city of Matsuzaka, where the plant is located, and received coverage in the local newspaper.



MIE Plant office building's green curtain.



Bitter melon seedlings.

Reducing stand-by and peak power usage

At THK NIIGATA, concern arose over the fact that coolant pumps and other peripheral equipment stayed on even when production machines were in stand-by mode. To reduce power consumption to the minimum possible level, the system was reconfigured so that peripheral equipment is switched off by a timer after production machines stop running. This innovation has greatly reduced power consumption, especially at night and on off days, providing energy savings of 82,600 kilowatt-hours per year.

In addition, THK NIIGATA has begun reducing its power demand through measures such as using its own generators during the summer months. This effort has cut the company's peak power usage by 15%.



Electric power generator used at THK NIIGATA.

Energy-saving lighting

At THK Manufacturing of Ireland, 30 incandescent light fixtures inside the plant were replaced with 180 T5 fluorescent lights. The result was a 30% decrease in power consumption and a major increase in illumination, significantly improving the work environment.

In addition, motion-sensor-activated lighting was installed in seven locations, including the reception area, corridors, and bathrooms. This enables lighting to be activated only when it's needed and ensures that no energy is wasted when someone forgets to turn off the lights.



Energy-efficient lighting at TMI.

Individually timed air-conditioners

At THK's GIFU Plant, a separate timer was installed on each of the plant's air-conditioning units, enabling plant officials to individually manage the air-conditioning hours for each area of the plant. In the past, all the air-conditioning units for various areas were operated under a centralized control scheme. The use of individual timers makes it possible to automatically have each unit switched on or off as needed.

As a result, overall air-conditioning time has been reduced by 42 hours per day. The ability to switch units on or off automatically has led to monthly energy savings of about 43,000 kilowatt-hours, or approximately 240 tons of CO₂ emissions.

» Management of hazardous substances

Green purchasing training

In 2011 THK conducted green purchasing training sessions at 11 business locations in Japan, including its plants and head office. The duties of each division and department were explained and instruction was provided in the use of software for managing chemical substances. In 2012 green purchasing training was begun at THK's overseas production facilities.

As laws and regulations concerning chemical substances become increasingly strict in Japan and elsewhere and the task of managing required data becomes increasingly diverse and complex, THK is faced with the need for a uniform worldwide green purchasing system. The overseas training sessions provide opportunities for both local employees and those from Japan to learn about operations and conditions in each respective country, understand the significance of green purchasing, and ask questions and offer suggestions.



Green purchasing seminar at THK LIAONING.

Reducing PRTR emissions

At the GIFU Plant, materials used in THK products undergo a cleaning process. In the past the cleaning liquid was discarded after use, but each year the plant now recycles and reuses 4.6 kiloliters of used cleaning liquid, which is half the amount of fresh liquid used.

The Pollutant Release and Transfer Register system is a legal regimen established to enable control over and reporting of emissions of designated chemical substances. To reduce emissions of PRTR-designated substances, the GIFU Plant switched from petroleum-based fuels to propane gas to power the plant's two forklifts, resulting in a 12% reduction in xylene emissions—which account for 38% of total PRTR-designated emissions—compared to the previous year.

The GIFU Plant will continue to introduce new measures, including the use of water-soluble coating materials, to reduce its emissions of PRTR-designated substances.



Propane-powered forklift.

Poster campaign

To raise awareness of environmental issues at THK LIAONING, employees were invited to submit posters aimed at boosting efforts to reduce waste emissions, protect the environment, and observe environmental rules and regulations. Out of 41 posters submitted, 5 were selected as the best entries. The employees who created the winning posters were presented with awards.

Virtually every entry revealed a distinctive personal touch. Many posters featured endearing mascots calling for action on environmental issues, and some of them could easily have passed for the work of professionals.

THK LIAONING had previously held poster campaigns concerned with product quality and safety. This campaign appealed to the company's many younger employees, in particular, and succeeded in focusing their attention on environmental issues. It will pave the way for further efforts to raise environmental awareness.



Employee-made environmental posters on display.



The award-winning employees.

PRTR-designated substances

In order to reduce the use of hazardous substances—substances that can adversely affect human health and damage ecosystems—THK is steadily decreasing its use of chemical substances subject to the PRTR Law (formally known as the Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture), with the goal of lowering the volume of these substances by 3% annually. This target was achieved and surpassed in 2012: total volume for the year was 51,506 kilograms, 2,748 kilograms less than the 2011 total of 54,254 kilograms, for a decrease of approximately 5%. The reduction is attributable to an all-out drive to cut back on the use of fuel oil in co-generation systems, part of an overall effort to reduce electric power consumption.

■ Substances subject to the PRTR Law (kg)

Substance	Amount used	Airborne emissions
Xylene	2,753	26
Toluene	6,336	2,479
Ethyl benzene	917	13
Benzene	227	28
Methyl naphthalene	37,492	169
Other	3,781	-
Total	51,506	2,715

» Green distribution

Overview

THK's Distribution Division, which operates facilities in various locations, continues to practice green distribution in an effort to reduce environmental impact throughout the distribution process. THK is implementing modal shifts, consolidating truck shipments, and pursuing a variety of other initiatives in accordance with two key principles of green distribution: reducing CO₂ emissions and making transport operations more efficient.



Meeting to discuss green distribution.

Reducing transport emissions

THK's KOFU Plant has collaborated with its distribution facility to ensure that the facility is informed of the plant's production schedule well in advance, which permits more precise and accurate shipping schedules. This arrangement has enabled large trucks to be replaced with mid-size trucks on regular transport routes, resulting in a 6% reduction in basic-unit CO₂ emissions in 2012, compared to the previous year.

Consolidating deliveries

The CHUBU Distribution Center used to dispatch delivery trucks to customers within its delivery area on a daily basis. In an effort to make its shipping system more efficient, the facility negotiated with customers and obtained approval to limit deliveries to Mondays, Wednesdays, and Fridays. This resulted in an approximately 40% reduction in transport-generated CO₂ emissions.

Shortening shipping distances

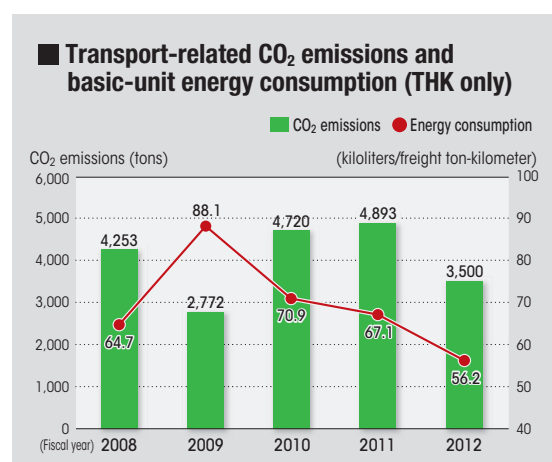
THK has arranged for finished goods from all THK production facilities in China to be shipped to a single destination, the port of Nagoya, eliminating shipments to Osaka. This has decreased the overland shipping distance to the CHUBU Distribution Center, resulting in an approximately 30% reduction in transport-generated CO₂ emissions.



Truck carrying cargo from the port of Nagoya.

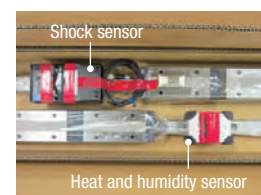
Transport-related CO₂ emissions

Due to a decrease in transport volume, transport-related CO₂ emissions declined from 4,893 tons in 2011 to 3,500 tons in 2012, a major decrease of 1,393 tons, or approximately 28%. In addition, the implementation of modal shifts and introduction of returnable shipping containers, along with improved load ratios, resulted in a decrease in basic-unit energy consumption (energy consumption divided by freight ton-kilometers) from 67.1 to 56.2, an approximately 16% reduction—and a major improvement.



Post-shipping quality and safety

THK has improved its product packing procedures to ensure that its energy-saving linear motion systems and other products reach customers safely and securely. As part of this effort, sample products en route between distribution facilities are monitored by means of shock sensors and heat and humidity sensors to determine whether products incur damage due to the method of transport or while in transit. The findings have prompted improvements, including the use of rust-preventing lubricants and shock-absorbent packing and packaging materials. Because THK has selected recyclable materials that protect products from damage while exerting little environmental impact, this effort has also helped reduce waste.



Sensors used to monitor sample products.