

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 plan-do-check-act cycle is carefully applied in order to continually improve environmental management. The THK affiliate TRRC, located in the Chinese city of Changzhou, acquired ISO 14001 certification in 2014.

Because environmental management is an endeavor extending throughout the THK Group, the Risk Management Division's Environmental Management Department, located at THK Headquarters, coordinates efforts by THK plants, offices, and distribution facilities to reduce environmental burdens. The department monitors the progress of THK's environmental efforts and helps ensure that effective measures are put in place.

In 2014 THK achieved two of its three primary environmental objectives for the year, meeting numerical targets for energy conservation and reducing CO₂ emissions as well as for conserving resources and progressing toward zero emissions (reducing the volume of end waste). The 2014 target for reducing the use of PRTR-designated hazardous substances, however, was not achieved.

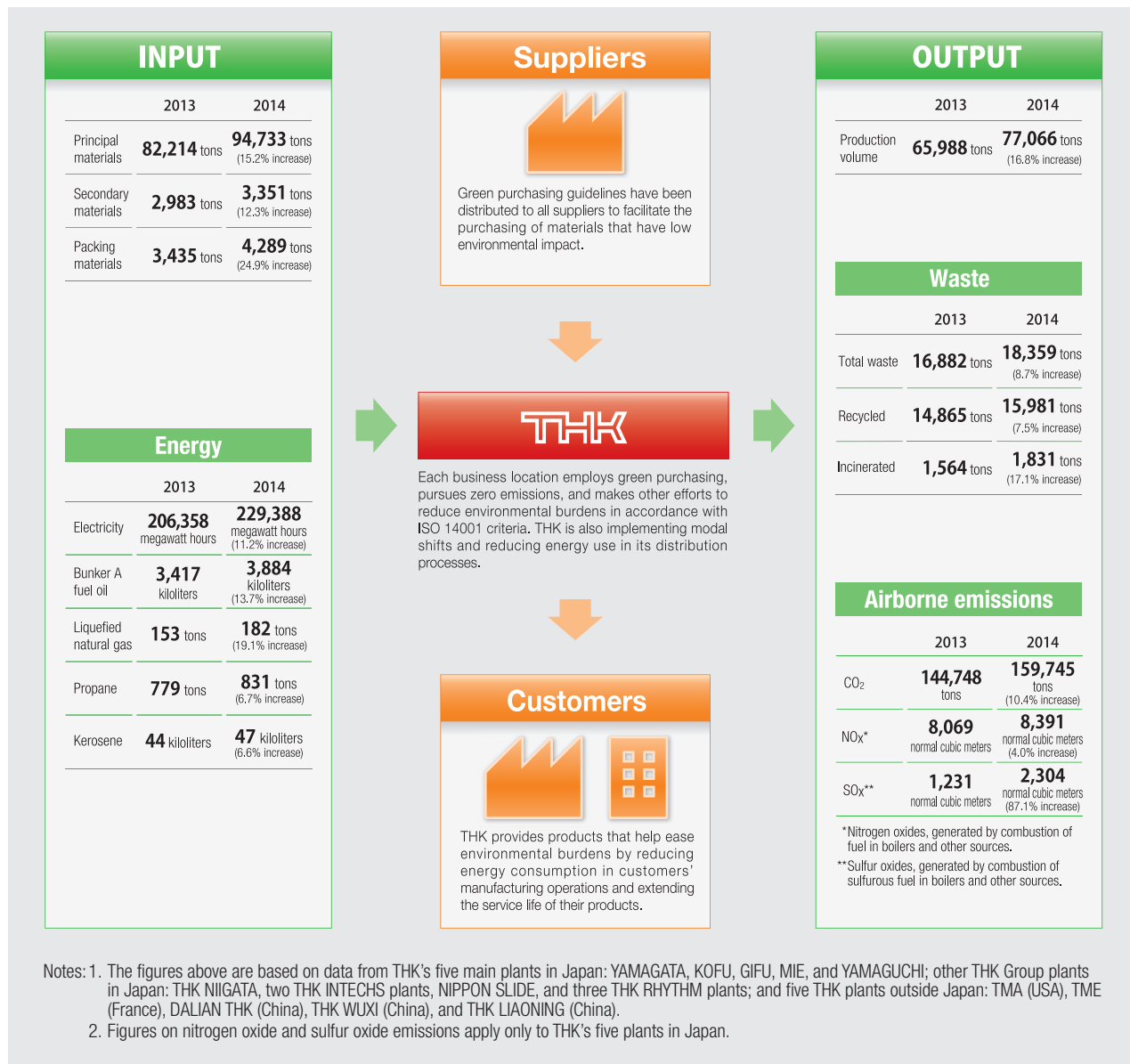
ISO 14001 certified facilities

Facility	Date certified	Certifying body
YAMAGATA Plant	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
TRTC (Thailand)	Jul. 9, 2010	URS
TRGC (China, Guangzhou)	Dec. 9, 2010	SGS
TRMS (Malaysia)	Oct. 25, 2011	DQS GmbH
THK INTECHS MISHIMA & SENDAI Plants	Mar. 21, 2013	Class NK
TRCC (China, Changzhou)	Mar. 17, 2015	BUREAU VERITAS

THK's environmental targets

No.	Task	Fiscal 2014 results & fiscal 2015 targets	Targets to be achieved by 2017
1	Conserving energy and inhibiting global warming	Reducing basic-unit CO₂ emissions (tons per ¥1,000,000) 2014 target: 1.03; 0.92 achieved (target met). 2015 target: 0.91 (1% lower than in 2014). Major efforts in 2015 (1) Switch to more energy-efficient heating and cooling systems (2) Switch to energy-efficient LED lighting (3) Switch to more energy-efficient power-receiving equipment	Reduce basic-unit CO₂ emissions by 1%. Baseline: 0.92 tons per ¥1 million (tons per ¥1 million) (Fiscal year) 2012 2013 2014 2015 2016 2017
2	Conserving resources and achieving zero emissions	Maintaining a minimal emissions rate 2014 target: Rate under 0.50%; 0.45 achieved (target met). 2015 target: Rate under 0.50%. Major efforts in 2015 (1) Recycling of grinding materials (2) Recycling of plastic waste (3) Reduced use of packing materials	Maintain zero emissions—less than 0.5% of waste undergoes final disposal. (%) (Fiscal year) 2012 2013 2014 2015 2016 2017
3	Controlling hazardous substances	Reducing the use of PRTR-designated substances 2014 target: 50,645 kilograms; 62,862 kilograms achieved (target not met). 2015 target: 60,976 kilograms or less. Major efforts in 2015 (1) Controlled usage of fuel-oil-powered equipment (2) Promotion of green purchasing practices (3) Reduced use of solvents, use of non-solvent alternatives	Reduce annual volume of PRTR-designated substances by 3%. Baseline: 62,862 kg (kg) (Fiscal year) 2012 2013 2014 2015 2016 2017

Environmental impact: The big picture



■ Environmental conservation: Costs

(¥ million per year)

Type	Investment	Cost	Principal efforts
1. Business costs			
Pollution controls	5	45	Monitoring air and water quality, maintaining scrubbers and septic tanks
Global environmental conservation	156	25	Installation of energy-efficient fixtures and incidental equipment
Recycling	1	109	Disposal of waste materials, reducing recycling costs
2. Upstream and downstream costs			
	0	16	Green purchasing
3. Management			
	0	178	Acquisition of ISO certification, reduction of energy usage, management of chemical substances
4. Research and development			
	77	301	
5. Community activities			
	0	7	Planting and beautification, informational initiatives
6. Repairing environmental damage			
	0	0	
Total	239	681	

Environmentally friendly from the start



In their own words: Maintaining high quality and protecting the environment

Kazushige Ohno (President, DALIAN THK Co., Ltd.)



DALIAN THK became THK's first production facility in China when it began operations in 1996. Its business has expanded over time, and a new plant went into operation in February 2015. DALIAN THK's main product is the Ball Screw, a key component in machine tools, semiconductor-manufacturing equipment, and many other types of machines. The new plant was designed not only to improve productivity but also to be environmentally friendly. Everything about the plant, from the buildings, the heating and cooling systems, the lighting, and the production equipment, to the roads running through the grounds, the production processes and management techniques, the work environment for employees, and the impact on the surrounding area, was conceived with an emphasis on environmental considerations.



To protect the environment, the plant is equipped with large-scale mist collectors and water-purification equipment, an LPG-fueled steam boiler, and chip-processing equipment, which greatly reduces the environmental impact on the air and land around us. This kind of equipment also keeps the work environment clean, providing pleasant conditions for our employees. It's also intended to reduce waste and improve recycling and resource-recovery rates.

To conserve resources, the plant roof has been insulated to reduce the amount of energy required for air conditioning. The heating system uses an inverter-equipped turbo refrigerator as a heat source, and all interior units can be controlled by inverters, for effective temperature control amid Dalian's intense summer heat and winter cold. LED lighting is used virtually everywhere in the plant, offices, and dormitories, and bathrooms and seldom-used corridors are equipped with sensors to prevent unnecessary lighting. DALIAN THK uses a great deal of cutting and grinding machinery, but semi-intensive temperature management (separate from coolant equipment) of the coolants used in these machines keeps the workplace clean and also reduces power consumption.

I don't have adequate space here to describe them all, but many other devices have been incorporated in the effort to address the full range of environmental concerns. We have a central monitoring system that keeps track of the equipment operating all over the plant, which enables efficient usage of electric power, water, gas, and other resources.

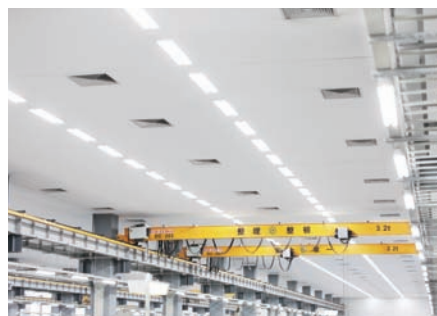
DALIAN THK is a highly advanced production facility, and the use of advanced machinery makes a big difference in the products we turn out. In addition to incorporating all this sophisticated equipment, we have also made the greatest possible effort to incorporate and utilize information technology in our production processes. We intend to use the resulting data to identify the most effective ways of protecting the natural environment.



A massive water-purification tank. Some of the purified water is used to feed nearby vegetation.



Solar power is collected to heat the plant's water. Some of the water is used for the plant's showers and heating system.



LED lights in a grinding facility. LED lighting consumes only one-third of the electricity required for mercury lights.

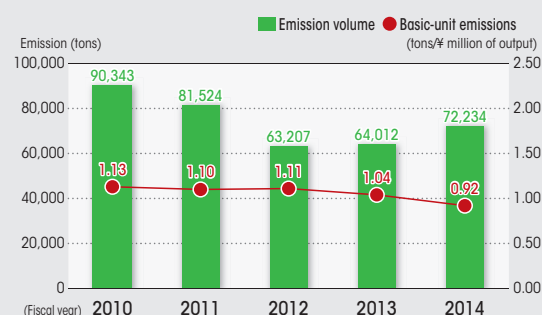
Conserving energy and combating global warming

CO₂ emissions

THK's targets for reducing CO₂ emissions are expressed in basic units (CO₂ emissions divided by the value of goods produced). The 2014 target was 1.03 and the actual result was 0.92, an impressive 10.7% improvement. Thus, the target was achieved. In terms of absolute quantities, however, increased production resulted in a rise in CO₂ emissions from 64,012 tons in 2013 to 72,234 tons in 2014, an increase of 12.8%.

In 2014, THK upgraded its power-receiving equipment; installed energy-efficient heating and cooling equipment; replaced fluorescent and mercury lights with LED lights, metal halide lamps, and motion sensors; installed solar panels; upgraded and used fewer air compressors; had thermal paint applied to factory walls; and installed inverters on coolant equipment. Despite all these efforts, no reduction in absolute-quantity CO₂ emissions was achieved. THK will continue to upgrade its facilities in 2015 with the expectation of reducing such emissions.

Trends in CO₂ emissions



Award for energy conservation

The KOFU Plant was honored by Yamanashi Prefecture in 2014 for its energy-saving efforts. Each year a business or public institution within the prefecture is selected to receive its "energy-smart" award in recognition of dedicated efforts to conserve energy and achieve greater energy efficiency.

The KOFU Plant has upgraded its heating and cooling equipment, installed inverters, replaced fluorescent with LED lights, and established a system for monitoring temperature and humidity as well as heating and cooling equipment around the clock. These efforts resulted in a 21.8% reduction in basic-unit energy consumption (energy usage divided by the value of goods produced) compared to the previous year. In addition, to help them maintain a heightened awareness of

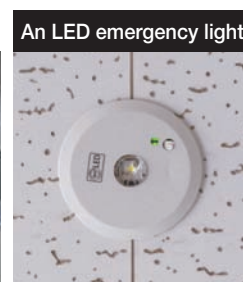
the need to save energy, employees were provided with portable energy-conservation checklists. The plant held periodic energy-efficiency workshops as well as general meetings on energy strategy attended by all employees, where successful efforts at other plants were introduced. All these actions helped make the KOFU Plant an "energy-smart" operation.



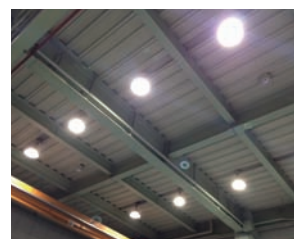
Yamanashi Lieutenant Governor Wataru Hiraide (left) congratulates then Plant Manager Masanobu Mori at the award ceremony on January 19, 2015.

Installing LED lighting

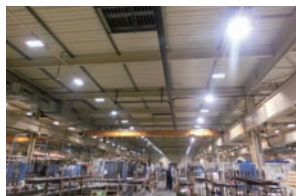
The office at the YAMAGATA plant was formerly lit by 161 fluorescent light fixtures, which have been replaced with LED fixtures, lowering power consumption by around 13,000 kilowatt-hours per year. Further energy savings were achieved by converting incandescent emergency lights to LED. Future plans call for replacing the many mercury lights currently installed on the plant's high ceiling with LED lights.



At the THK INTECHS MISHIMA Plant, 39 sets of mercury lights in the production area have been replaced with LED lights, reducing power consumption by approximately two-thirds. LED fixtures have also replaced 244 fluorescent lights in the plant's office, reducing energy use by about half. Thanks to these measures, the MISHIMA Plant has reduced its annual power consumption by 43,000 kilowatt-hours.



At THK Manufacturing of Europe, 260 mercury lights inside Factory 1 have been replaced with LED lights, reducing annual energy use by 40,000 kilowatt-hours. This has also improved visibility by increasing the average brightness measured at 45 locations within the factory from 231 to 368 lumens. The lights in Factory 2 are scheduled to be converted to LED in 2015.



Rooftop insulation

At THK NIIGATA, improvements have been made to the roof to enhance the efficiency of the plant's air conditioning and thereby reduce power consumption. A layer of insulation has been installed on the 2,800 square-meter roof of Factory 1 in the plant's old wing, which occupies about 20% of the entire plant. This has lowered the summertime temperature on the roof's inner surface by as much as 17°C, resulting in a 2.0% reduction in energy use compared to 2013 and decreasing peak power-consumption, which is especially important in summer, when demand is high. Other sections of the roof are expected to undergo similar improvements, which will result in further energy savings.

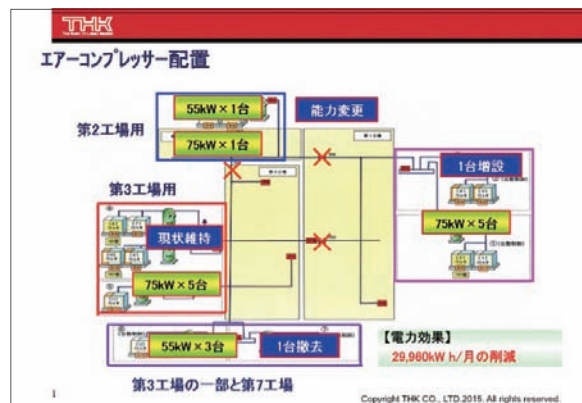


The NIIGATA Plant, where rooftop insulation has reduced energy consumption.

Newly insulated section.

Efficient use of air compressors

At the YAMAGUCHI Plant, the addition of a second and third factory has been accompanied by changes in production and production equipment. In some cases, production areas were located far from the plant's air compressors, which made it difficult to supply adequate pressure and resulted in excessive power consumption. To resolve these problems, air compressors have been relocated and their numbers have been adjusted to accommodate the new arrangement more efficiently. In addition, valves have been installed on air pipes, and narrower piping has been installed. All the compressors are run by a control system that was already in use, ensuring optimal operation. The aforesaid improvements have resulted in a 14% reduction in air-compressor power consumption.



Relocated air compressors at the YAMAGUCHI Plant.



In their own words: Improvements at the MIE Plant

Masami Fujita (Manager, General Affairs Section, MIE Plant)

The MIE Plant acquired ISO 14001 certification for environmental management in September 2002 and OHSAS 18000 certification for occupational health and safety in December 2010. We run a safe, environmentally conscious operation. We practice energy conservation, pursue zero emissions, and control environmentally burdensome substances. To conserve energy, we have switched to LED lighting and electric-powered forklifts, and we've also upgraded the air conditioning in one of our grinding facilities, which was a longstanding concern.

The air-conditioning project, which began in December 2014 and finished in January 2015, yielded a 20% reduction in electricity consumption and a 40% decrease in the volume of liquid-petroleum gas used. The new system has an exhaust-air treatment

mechanism, which allows that powerful air stream to be recycled, improving the overall efficiency of the system. Any mist that gets generated is dispelled by roof fans, so there has been a tremendous improvement in the work environment as well.

To contribute to the local community, we send employees to Matsusaka Technical High School to lead special classes there, and we also hold energy-conservation workshops for local businesses. We try to help people better understand the environmental situation.



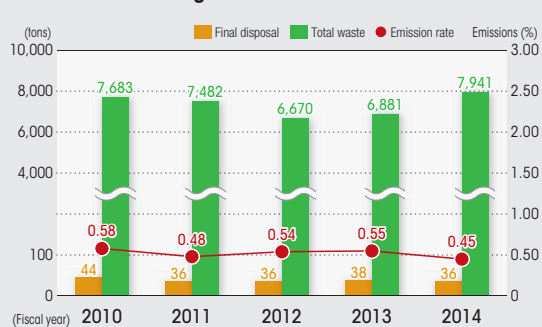
Conserving resources, pursuing zero emissions, and managing hazardous substances

Status of current efforts

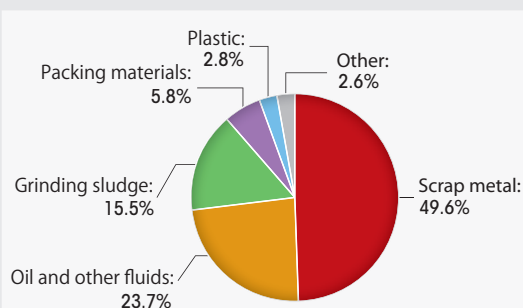
Not content to merely manage waste, THK has established comprehensive production systems designed to comply with societal expectations concerning recycling. In addition to improving its extraction rate for components and materials and greatly reducing the volume of waste generated, THK promotes conservation and pursues zero emissions by thoroughly sorting waste materials and recycling those that are reusable. As shown in the graph below, a variety of waste materials are generated but most are recycled in the form of raw materials for metals, paving materials, and fuel.

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 2014 target was a rate below 0.50%, and THK recorded an emission rate of 0.45% for the year, meeting the target. The emissions target was achieved largely because discarded grinding materials, some of which could not be recycled and had to be buried or incinerated the previous year, were successfully recycled in 2014 with the assistance of an outside contractor.

Trends in waste generation



Waste by type



PRTR-designated substances

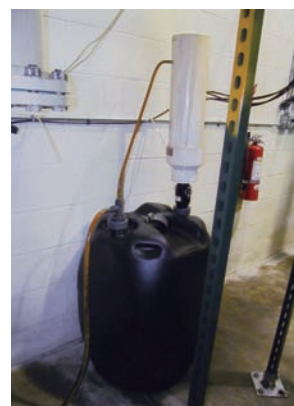
In order to reduce the use of hazardous substances—substances that can adversely affect human health and damage ecosystems—THK continues to decrease its use of chemical substances subject to the PRTR Law (formally known as the Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture), with the goal of lowering the volume of these substances by 3% annually. THK's use of such substances in 2014 greatly exceeded that for 2013, however. Total volume for the year was 62,862 kilograms, which was 10,650 kilograms more than the 2013 total of 52,212 kilograms, for an increase of 20.4%. The increase is attributable to an unavoidable return to cogeneration as a means of balancing power consumption in the cold and hot seasons, which led to much greater reliance on fuel oil.

Substances subject to the PRTR Law (kg)

Substance	Amount used	Airborne emissions
Xylene	3,393	1,129
Toluene	7,307	3,854
Ethyl benzene	1,221	15
Benzene	212	32
Methyl naphthalene	46,788	205
Other	3,941	—
Total	62,862	5,235

Purifying waste water from compressors

As part of an ongoing effort to address water pollution, officials at THK Manufacturing of America are using a filtering mechanism to prevent oil mixed in with waste water produced by air compressors from reaching the outside. To protect the environment, the waste water is run through the filtering device before being introduced into the municipal sewer system, from which it emerges at a water-treatment facility where it is purified and then routed into a nearby river. The waste water is tested every quarter to monitor the content and ensure compliance with municipal standards for water-borne emissions.



Green distribution

Overview

THK's Distribution Center, 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, improving packing methods, and pursuing other initiatives in accordance with three key principles of green distribution: reducing transport-related CO₂ emissions, making transport operations more efficient, and reducing waste.

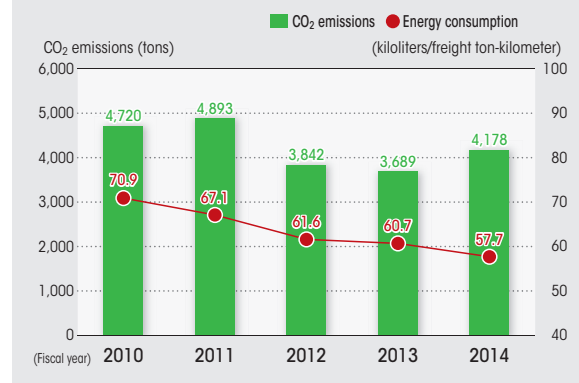
Revised distribution scheme In the past, products manufactured at the LIAONING Plant and WUXI Plant that were destined for Japan were transported by ship to the port of Nagoya and then by truck to the CHUBU Distribution Center. Following a revision of overall distribution arrangements, those products are now transported by truck from the port of Kita Kyushu to the YAMAGUCHI Distribution Center, reducing the distance from the port to the distribution center and cutting CO₂ emissions by 1,232 tons.

Reducing waste The YAMAGUCHI Distribution Center used to use polypropylene bands and plastic wrap to pack products stacked on pallets, to prevent load shifting. By using the right packing tools to ensure that there are no spaces between the products, it has become possible to conserve on packing materials and reduce waste. In addition, when shipping units that incorporate multiple products, THK has complied with customer requests to reduce packing materials by using carefully designed cushioning material to protect products from damage during shipping and by effectively using fabric belts. Thus, THK is applying its accumulated expertise to reduce the volume of packing materials.

Transport-related CO₂ emissions

CO₂ emissions generated by the shipping of products and parts jumped from 3,689 tons in 2013 to 4,178 tons in 2014, a major increase of 489 tons, or approximately 13.3%. Basic-unit energy consumption (the volume of energy consumed divided by ton-kilometers of freight) declined by roughly 4.9%, however, from 60.7 to 57.7. Despite a modal shift toward greater reliance on ships and railways, improved load ratios for trucks, and more consolidated shipments, THK did not succeed in reducing transport-related CO₂ emissions in 2014.

Transport-related CO₂ emissions and basic-unit energy consumption (THK only)



Reduction in packing materials

THK RHYTHM has reduced the volume of items sent to THK plants in the United States by packing more products inside small boxes, thereby reducing packing materials, and reducing the number of shipping containers required. Redesigned packing arrangements enabled 20-unit trays to replace 10-unit trays, increasing box capacity. As a result, boxes that used to fit five 50-unit tray configurations can now fit three 60-unit configurations, for a 20% increase in small-box capacity. This has led to a major reduction in packing materials, transport hours, and overall work hours.

These developments have been accomplished with no decline in quality or function. Thanks to the reduction of materials required, it has been possible to conduct repeated trials involving THK production lines in Japan and the United States, and cooperative efforts have enabled further improvements in packing and transport methods. As a result, THK has attained a safe-volume maximum capacity of 15 kilograms for small boxes.

THK RHYTHM will keep working to protect the environment, not only in product packing but throughout the production process.

