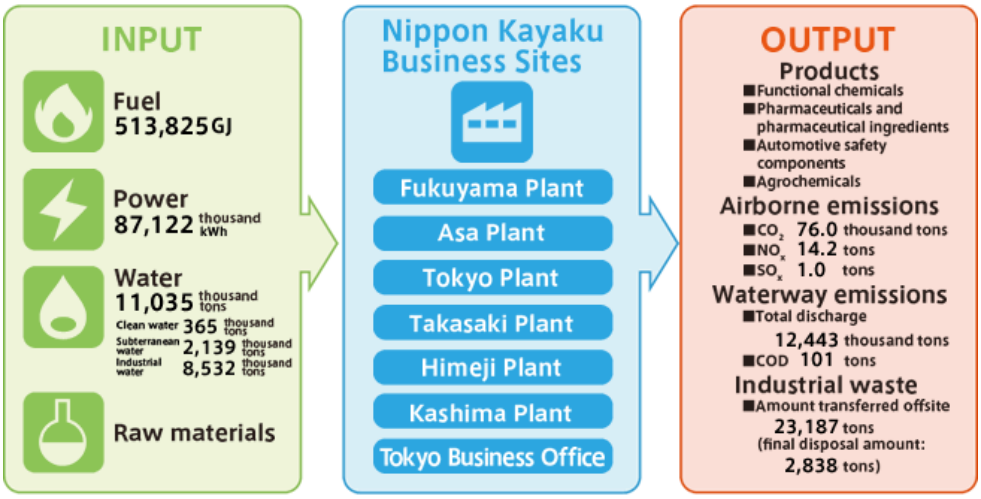
Reducing Our Environmental Impact

Energy and Material Balance

We are currently implementing initiatives that will help us achieve our mid-term environmental targets for fiscal 2020.
The scope of the reporting covers Nippon Kayaku only.

● Overview of business activities and environmental impacts



Results of the Mid-term Corporate Plan for the Environment

Nippon Kayaku has established a mid-term corporate plan for the environment for the period running from fiscal 2011 to fiscal 2020 that consists of six items covering three areas. Fiscal 2013 was the third year of this plan.

● Mid-term Corporate Master Plan for the Environment (FY 2011 - FY 2020)

		Target value	Fiscal 2013 results	
Reducing Our Chemical Substance Footprint	VOC*1 Emissions	Under 45 tons	54.5 tons	Reduced by 33.0% compared to fiscal 2012.
	COD*2 Emissions	Under 180 tons	101.4 tons	Reduced by 18.2% compared to fiscal 2012.
Prevention of Global Warming	Energy Derived CO_2 Emission*3 (Production Divisions+ Operation Divisions)	More than 15% reduction	76,000 tons	CO_2 emissions increased 4.2% compared to fiscal 2012, but this increase was caused by revisions to the conversion coefficient for CO_2 emissions. (Total energy usage declined about 2%.) This represents a 21.0% reduction compared to fiscal 1990.
Reduction of Waste	Total Waste Produced	Under 30,000 tons	23,187 tons	Increased by 13.5% compared to fiscal 2012, but this was caused by the cleanup of waste liquid sludge at certain spots of the Fukuyama Plant and an increase at caused by a rise in construction waste at the Takasaki Plant.
	Recycling Rate	More than 70%	71.7%	Increased by 9.9% compared to fiscal 2012. This was caused by an increase in emissions to waste processors with a high recycling rate.
	Zero Emission Rate*4	Under 3%	12.2%	Increased by 4.3% compared to fiscal 2012, but this was caused by the cleanup of waste liquid sludge at certain spots of the Fukuyama Plant and an increase at caused by a rise in construction waste at the Takasaki Plant.

*1 VOC: Volatile Organic Compounds (VOCs). This tally includes all chemical substances emitted into the atmosphere, including those derived from reactions involving chemical substances not subject to reporting regulations.

*2 COD: Chemical Oxygen Demand. An indication of the amount of oxygen needed to oxidize a subject compound under a predetermined condition using oxidizing agents.

*3 Energy-derived CO2 emissions: Fiscal 1990 has been set as the benchmark (96,200 tons)

*4 Zero emission rate: The amount of internal and external landfill waste produced as a percentage of total waste produced.

Results of Our Efforts to Reduce Environmental Impacts

As part of its effort to reduce environmental impacts, Nippon Kayaku focuses on preventing air, water and noise pollution as well as stopping global warming and reducing waste.

Preventing Air Pollution | Preventing Water Pollution | Preventing Global Warming | Waste Reduction
Noise Prevention | Environmental Accounting

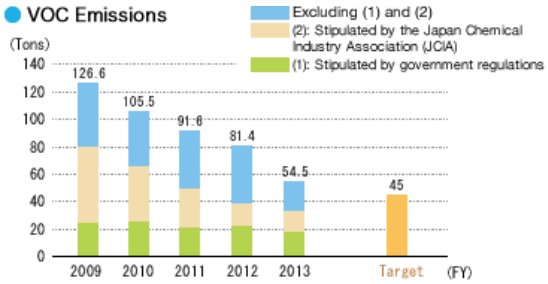
Preventing Air Pollution

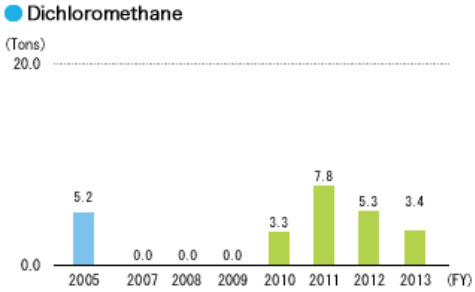
To help prevent air pollution, we carefully manage substances subject to Japan's Air Pollution Control Act, hazardous substances released into the air and other air pollutants.

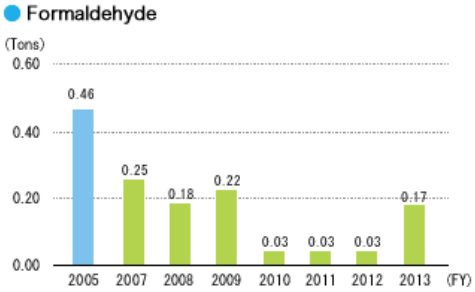
As for our VOC emissions reduction efforts, our new medium-term environmental targets established in fiscal 2011 expand the scope of data compilation to include all chemical substances discharged into the atmosphere. The new scope includes chemical substances that are produced through reactions as well as the chemical substances conventionally subject to government ordinances and the Japan Chemical Industry Association voluntary standards. The target for VOCs is to reduce emissions into the atmosphere to less than 45 tons by fiscal 2020. The Nippon Kayaku Group stands committed to making the self-initiated efforts needed to achieve this target.

Under the initiative of the Japan Chemical Industry Association, the industry is taking action to voluntarily manage and reduce emissions of 12 control substances *5 that are deemed to be harmful air pollutants. Of these 12 control substances, we used five after 1995, but stopped the use of benzene in 1995. Emissions of chloroform and ethylene oxide have been cut to zero since fiscal 2007. Dichloromethane emissions had been zero since fiscal 2007, but have risen slightly since fiscal 2010 because of their minor use in products. Formaldehyde emissions continue to occur, albeit in small amounts, because of its use in products and in sterilization and fumigation. Going forward we will focus particularly on reducing the use and emissions of dichloromethane and formaldehyde through production process improvements and other means.

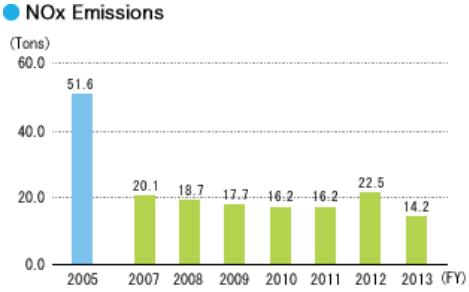
Air pollutants sulfur oxide (SOx) *6 and nitrogen oxide (NOx) *7 are emitted during boiler operations. To date, the Nippon Kayaku Group has gradually shifted the fuel for its boilers from Bunker C heavy oil with high sulfur content to other lower sulfur content fuels such as Bunker A, in addition to LPG and natural gas, which are sulfur free. We continued this transition in fiscal 2013 as well. As a result, since fiscal 2008, we have successfully made significant reductions in our SOx emissions, and in fiscal 2013 we made further reductions. The Nippon Kayaku Group has aggressively reduced its air pollutant emissions and will now strive to properly maintain air pollution prevention equipment, carry out regular inspections and upkeep, and reduce overall emission of air pollutants into the atmosphere.

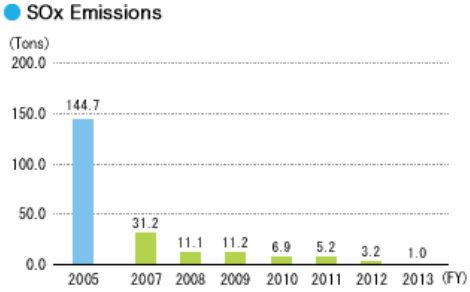


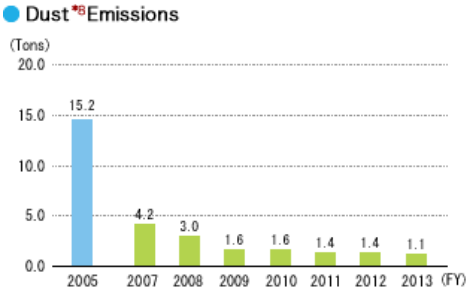




*5 12 control substances subject to voluntary controls: acrylonitrile, acetaldehyde, vinyl chloride monomer, chloroform, 1,2-dichloroethane, dichloromethane, tetrachloroethylene, trichloroethylene, 1,3-butadiene, benzene, formaldehyde, and ethylene oxide.







*6 SOx (sulfur oxide): SOx is emitted when fossil fuels that contain sulfur are burned. SOx reacts with water in the atmosphere to form sulfuric acid and sulfurous acid, which are causes of air pollution and acid rain.

*7 NOx (nitrogen oxide): NOx is produced when burned chemical substances react to nitrogen in the air and when fuels and chemical substances that contain nitrogen compounds such as coal are burned. Not only is it a major cause of air pollution including photochemical smog and acid rain, but NOx also has a harmful effect on the human respiratory system. In addition, NOx is also known to include the greenhouse gas dinitrogen monoxide.

*8 Dust: Dust mainly refers to fine particulate soot found in dust smoke produced when burning fossil fuels. In addition to a major cause of air pollution, humans can contract pneumoconiosis or other harmful health conditions when breathing dust in high concentrations.

Environment, Health and Safety at the Nippon Kayaku Group

An environmental, health and safety meeting was convened with the top leadership of every Nippon Kayaku Group company for the first time in order to discuss the Nippon Kayaku Group's policy on the environment, health and safety. During the meeting, all participants agreed that safety should be prioritized over all else and in addition to complying with related environmental and safety laws in Japan and preventing environmental and safety accidents, participants agreed that overseas subsidiaries must also comply with laws and make efforts to prevent environmental or safety accidents from every happening. The policy below was confirmed to ensure all Nippon Kayaku Group companies can carry out activities together under the Declaration on Health, Safety, Environmental Protection and Quality, with the ultimate goal of realizing the KAYAKU spirit.

Nippon Kayaku Group Companies: EH&S Policy Statement for FY2014

The Nippon Kayaku Group Companies shall carry out the fundamental policies stated in the "The Declaration on Health, Safety, Environmental Protection and Quality" using a proactive "Safety First" approach.

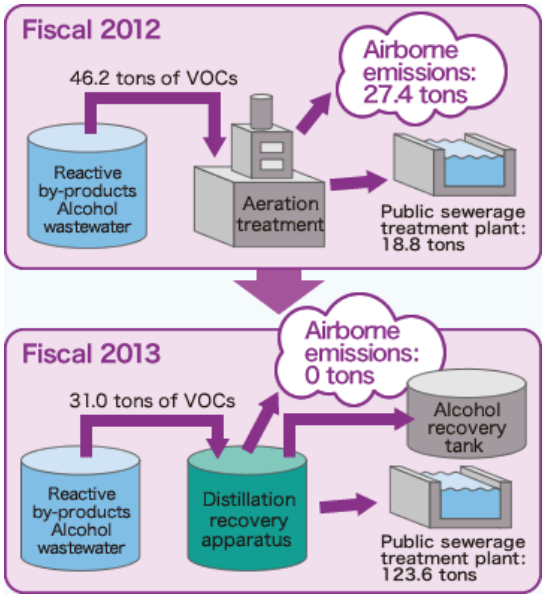
1. Group companies will drive EH&S performance to the target "Zero Accident and Injury" using proactive safety programs based on risk-assessments and fail-safe strategies that eliminate or reduce the risk of accidents, injuries or environmental release.
2. Group companies will establish mid-term environmental risk reduction targets based on analysis of the environmental data reported by each Group company.

Initiatives to Reduce VOCs at the Kashima Plant

The Kashima Plant released alcohol produced in large quantities from the agrichemical manufacturing processes into the air, but in order to become an eco-friendlier plant, it decided to launch an initiative to examine ways to recover alcohol produced during the manufacturing process based on theme reducing the amount of VOCs released into the air. Specifically, existing facilities were switched for use as alcohol distillation recovery apparatuses, which involves transforming alcohol in a gaseous state into a liquid for recovery in a tank. This method greatly reduces the amount of alcohol released into the air.

As a result, we completely eliminated our emissions of alcohol gas into the atmosphere, compared to fiscal 2012 when a total of some 27.4 tons were released.

We stand firmly committed to actively helping improve the environment with the goal of reduced impacts on the environment in the future.



Preventing Water Pollution

The Nippon Kayaku Group has set voluntary wastewater discharge control standards that are tougher than requirements laid out in national laws and local ordinances.

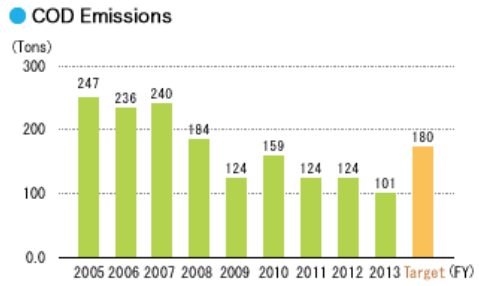
The Nippon Kayaku Group has made efforts to reduce its COD emissions by employing activated sludge treatment equipment at plants with high levels of COD emissions. In fiscal 2013, the amount was 101 tons, which marks an 18% increase year on year.

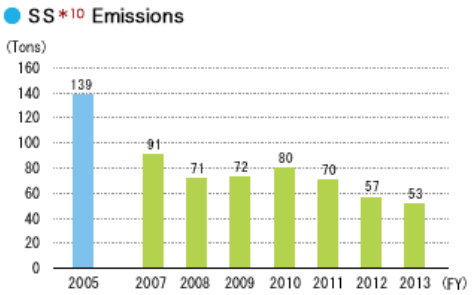
The Nippon Kayaku Group produces color material-related products including dyes and ink jet printer ink, among others. Our Tokyo and Fukuyama plants, where color material-related products are manufactured, fully decolorize colored wastewater before it is discharged.

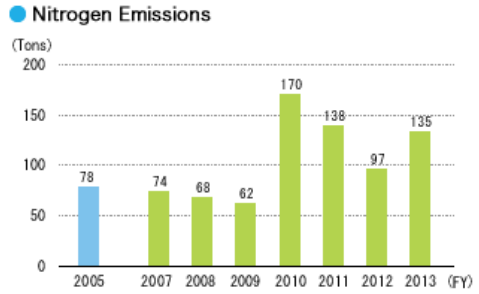
PRTR*9 Initiatives

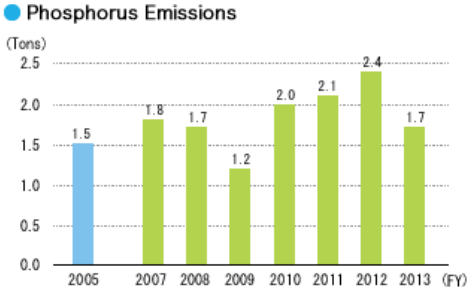
Since 1995, the Nippon Kayaku Group has participated in the Japan Chemical Industry Association led initiative to reduce compounds identified in the PRTR regulation, working to reduce its emissions of PRTR controlled compounds into the environment. In fiscal 2013, our emissions of PRTR controlled substances totaled 23 tons, which marked a 33% decrease from 35 tons in the previous year. Although toluene continues to represent the

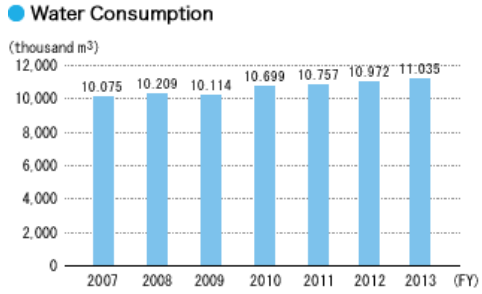
largest source of PRTR controlled emissions, toluene emissions decreased from 17.4 tons in fiscal 2010 to 9.5 tons in fiscal 2013. This was 41% of all emissions of compounds identified in the PRTR regulation.

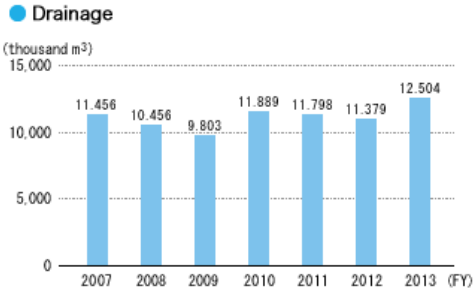


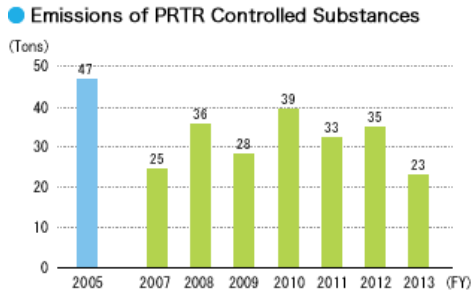












*9 PRTR: Pollutant Release and Transfer Register. The PRTR regulation is designed to prevent occurrences of environmental safety incidents by encouraging businesses to improve their own chemical substance management.

*10 SS: Suspended Solids. SS is a water-quality indicator generally referring to insoluble substances of 2 mm or less in diameter suspended in water. The organic matter and metal originating in particulate-like mineral, animals-and-plants plankton and its corpse, a sewer, factory effluent, etc. are contained. The increase in SS worsens transparency, and influences underwater photosynthesis by preventing light penetration.

Initiatives in China to Reduce COD Emissions

Wuxi Advanced Kayaku Chemical's wastewater treatment facility

Wuxi Advanced Kayaku Chemical Co., Ltd. was established in Wuxi, China in 1996 in order to manufacture synthetic dyes for paper and textiles.

Since last spring there has been a sharp increase in the production of dyes with extremely large COD emissions. Therefore, in addition to increasing the capacity of our wastewater treatment facilities, we made fundamental changes to the manufacturing process to cut back on COD emissions. First we identify the pollutant causing COD in wastewater and then we analyze the mechanisms behind its occurrence. We are trying to eliminate such COD emissions through every step possible, including the use of synthetic compounds and examine synthesis requirements that do not pose any problems to quality.

This process has started to yield positive results and current measures have helped to reduce COD emissions to an expected 45 tons per year. This initiative has also helped to reduce the amount of chemicals needed for wastewater treatment and reduce personnel.

We will continue with similar efforts moving forward with the goal of becoming a company with a high efficiency

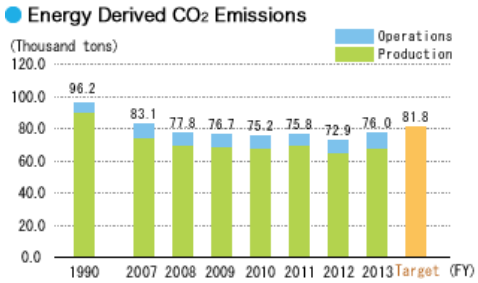
production system.

Preventing Global Warming

Each of our business sites has implemented various energy conservation activities that have helped to reduce our total energy consumption annually. This, in turn, has reduced our energy derived CO2 emissions as well, with such emissions totaling 76.0 thousand tons in fiscal 2013, which can be broken down into 68.7 thousand tons from production divisions and 7.3 thousand tons from operating divisions. Overall emissions increased 4.2% over fiscal 2012. Although the amount of oil converted energy decreased, the coefficient for electricity, which represents about 60% of our energy usage, worsened due to the ongoing effects from the shutdown of Japan's nuclear power plants.

Nippon Kayaku has instituted a third-party logistics system (3PL) as part of its distribution reforms started in fiscal 2003. Today, we are working closely with our 3PL provider to change the modes in which our products are transported. We also began collecting data on CO2 emissions emitted during product transport in April 2009. This modal shift will enable us to continue to reduce our energy consumption as well as CO2 emissions.

As part of its efforts to help reduce CO2 emissions from homes, the Nippon Kayaku Group has established two programs to encourage employees to conserve energy at home called My Family's Environmental Impact Budget and My Home is Currently Conserving Electricity, which focuses exclusively on electricity usage.



CO_2 Emissions during Product Transport and Distribution Volume

	CO_2 Emissions (tons)	Distribution Volume (1,000 tkm)
Fiscal 2012	3,090	16,809
Fiscal 2013	2,980	16,100

- Ton-kilometer: weight (tons) x transport distance (kilometers)

Aiming to be a Company that uses Less Energy

Nippon Kayaku established the Energy Conservation & Global Warming Prevention Committee led by the president to roll out company-wide initiatives to help it achieve the provisional mid- to long-term environmental target of reducing greenhouse gas emissions 15% compared to 1990 by fiscal 2020. As part of this effort, we are working diligently to further reduce energy-derived greenhouse gas emissions.

Furthermore, the power supply problems caused by the Great East Japan Earthquake that struck on March 11, 2011 have inspired us to promote a company-wide project with the goal of becoming a company that uses less energy and can withstand power supply instability.
This project was recently concluded after a specific framework for initiative was developed. The next step of this process will be to promote activities as part of the efforts of the Energy Conservation & Global Warming Prevention Committee.

Study on Energy Conservation Activities from Fiscal 2013

Themes of Initiatives

1. Change power systems to build a stronger foundation for energy conservation

The Takasaki Plant installed and began operating a CGS* in June 2013 that can produce about one-third of its electricity needs from Tokyo Electric Power Company.
We completed the review process for emergency back-up generators at our other plants.
In addition, we changed electricity suppliers at certain business sites, excluding plants, to achieve a stable power supply unaffected by the operating situation of Japan's nuclear power plants.

*CGS: Co-generation system that produces electricity using gas as well as collects and reuses resulting heat emissions

2. Promote existing energy conservation and global warming prevention theme

In fiscal 2013 we improved our specific energy consumption by 4.0% compared to fiscal 2012 and total energy usage was down 2.0% year on year thanks to our promotion of these energy conservation themes.

3. Create energy conservation master plan to achieve ideal vision for plants

We are preparing mater plans to reduce energy usage with an eye on the future vision for our plants. Going forward, we will periodically revise these plans as part of our ongoing efforts to reduce our specific energy consumption and greenhouse gas emissions.

4. Formulate new energy conservation themes based on a statistical analysis of energy usage at our plants

We performed a statistical analysis on plants that have completed the collection of necessary data and verified the main factors behind their use of energy in order to begin a review into ways that we can reduce this energy usage. As for plants still collecting this data, we will perform a statistical analysis as soon as it becomes available and work to narrow the scope of this theme.

5. Devise evaluation method for energy usage at the time of research and development when developing new environmentally friendly products

We have created a system during the initial research and development stage where researchers perform energy usage evaluations on the manufacturing process under development. Although this system is still in its infancy, the fact that researchers are performing these evaluations has raised their awareness of energy conservation, which is expected to have positive effects on the development of energy efficient production processes.

Initiatives of Wuxi Polatechno Optics Co., Ltd.

Wuxi Polatechno Optics Co., Ltd. (WPLC) was established in Wuxi, China in 2003 to assemble components for LCD projectors made by Polatechno Co., Ltd. Starting in 2010 Polatechno carried huge capital investments and relocated its production and today WPLC is responsible for a majority of the fabrication necessary for LCD project parts and the fabrication of polarized film chips for use in automobiles. However, the increase in production led to a large increase in electricity and materials usage. In 2012, WPLC set up the Energy Saving Committee and under this organization the company has worked diligently to conserve energy and resources. Energy conservation activities have included changing the layout of the clean room, modifying the interior temperature settings, and conserving electricity by adjusting surrounding street light. Resource conservation activities have included deploying staff in an optimal manner, improving work efficiency by cross-training workers, reducing deficiencies through production process changes, and reducing the use of paper. Moving forward, all of WPLC's workers will collectively work together to make continual improvements so that the company is more environmentally friendly and socially responsible.

Rolling Out Eco-friendly Sales Vehicles

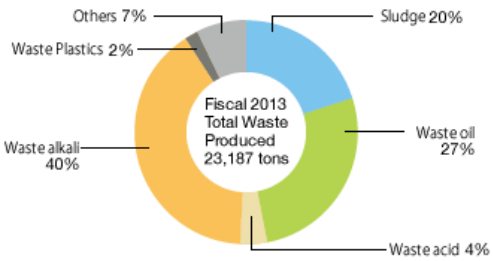
Information on efficacy and safety is essential to ensuring that patients use our pharmaceutical products correctly. Nippon Kayaku stations medical representatives (MR) throughout Japan in order to gather and provide information on our proprietary pharmaceuticals by visiting medical institutions in person. All of the 327 company-owned sales vehicles used by these MR in their daily visits were recently switched over to eco-friendly hybrid vehicles, with the exception of colder weather areas requiring all-wheel drive.

Waste Reduction

In fiscal 2013, the Nippon Kayaku Group produced 23,200 tons of waste, which represents a 13.5% increase compared to fiscal 2012. Landfill waste in fiscal 2013 amounted to 2,838 tons, or a zero emissions rate of 12.2%, marking a 4.3% drop compared to fiscal 2012. Going forward, we will continue with activities aimed at increasing our recycling rate and achieving zero emission.

● Total Waste Produced and Ratio of Landfill Waste

● Breakdown of Waste by Type



Noise Prevention

We conduct our business with a conscious effort toward minimizing noise pollution in the areas surrounding our factories. We regularly measure noise levels around our factories, making every effort to be a positive member of the local community. As such, any feedback or requests that we receive from local residents at company-sponsored events such as community round-tables are treated with the utmost priority. We also conduct regular work environment measurements in the factory to protect our employees from excessive noise.

Environmental Accounting

Nippon Kayaku has tracked and shared all cost data associated with its environmental protection initiatives since fiscal 2000. Also, from fiscal 2003, we began calculating the returns from our environmental protection initiatives. Calculation of environmental costs and returns are made according to Environmental Accounting Guidelines (2005 Version) published by the Ministry of the Environment of Japan, and Environmental Accounting Guidelines for Chemical Companies published by the Japan Chemical Industry Association.

Environmental Protection Costs

(Millions of yen)

Category			Investment	Total	Main Activities
Cost Incurred in the Workplace	Pollution Prevention Cost	Air Pollution Prevention	84.2	111.8	Replaced waste fluid incinerator, reinforced VOC countermeasures, shifted heating medium furnace to gas-fired unit
		Water Pollution Prevention	36.0	204.9	Replaced bio-decolorization tower and waste water treatment facilities Replaced pumps, piping and flow meters
		Underground seepage prevention	34.2	22.7	Switched to aboveground waste liquid storage tank, lined pit underground water supply pit, made improvements to drainage channel
		Noise and Vibration Prevention	0.0	0.0	Installed silencer on isolation tower
		Other		267.7	Disposal costs of facilities and pollution charges
	Global Environment Cost	Global Warming Prevention and Energy Conservation	221.0	14.7	Replaced HVAC, switched transformers to top runner, installed brine chiller unit
	Resource Recycling Cost	Waste treatment	0.0	567.5	In-house processing costs and processing outsourcing costs
Up- / Down-Stream Cost	Container Recycling Outsourcing		–	0.4	Outsourcing costs for repackaging products and cleaned and recycled product containers
	Sewage Processing Cost		–	45.0	Sewerage treatment costs
Management Activity Cost	System Maintenance and Operation		–	129.9	Internal auditor development cost and ISO14001 renewal costs
	Environmental Stress Monitoring		–	44.5	Analysis costs and outsourcing costs
	Information Disclosure		–	9.5	Outsourcing costs for preparing information disclosure documents on the environment
	Education, Training and Other		–	53.7	Workplace training, etc.
	Greening		11.3	181.4	Added plants and improved some greenery along the roadway
R&D Cost				440.2	Environmentally friendly R&D costs and wastewater treatment technology development costs
Social Activity Cost			–	7.0	Plant tours, community event sponsorship, responsible care, ICCA special committee, LRI research meeting costs
Environmental Damage Cost			–	0.0	
Total			386.7	2,101.1	

Return from Environmental Protection Initiatives

(Millions of yen)

Sources of Return			Cost Reduction Return	Main Activities
Workplace	Pollution Prevention Return	Air Pollution Prevention	0.0	Boilers and deodorizing furnace fuel was switched to LNG, reducing VOC emissions
		Water Pollution Prevention	0.0	Reduced the amount of color pollution from the treatment of each item
		Pollution Load Levy Reduction	0.3	
		Noise and Vibration Prevention	0.0	Reduced onsite noise by changing the direction of the exhaust fan
	Global Environment Return	Global Warming Prevention and Energy Conservation	131.2	Installed a gas cogeneration system, upgraded to the latest high-efficiency boiler, reduced the amount of heat lost from steam
	Resource recycling return	Reduction of Waste	9.0	Recycled waste oil as an auxiliary fuel
		Sale of Recycled Resources	13.4	Collected metals, sold paper products outside the group, and sold plastics outside the group
		Other	44.9	Made changes to in-house recycling and the waste processing provider
Up- / Down-Stream	Container Recycling		83.6	Reused plastic drums
Others			0.0	
Total			282.4	

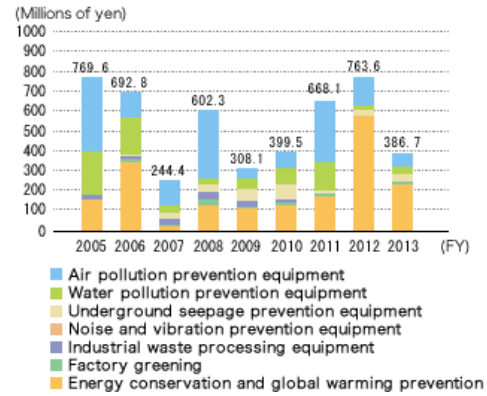
- Scope: Nippon Kayaku (non-consolidated)
- Capital expenditure: Compilation of capital appropriated for orders in fiscal 2012 (June 2012 to May 2013)
- Management cost: Any cost increase resulting from change in fuel type or change in waste processing method that are deemed appropriate from an environmental perspective are recorded under this category each year for a period of five years from the date the change is first administered.
- From a financial accounting standpoint, earnings realized from environmental protection initiatives are recorded in the fiscal year in which such earnings are realized.
- Earnings such as expense reduction and environmental impact reduction that are not considered from a financial accounting standpoint are reported for five years from the date it is first realized.

Investments Related to the Environment, Health and Safety

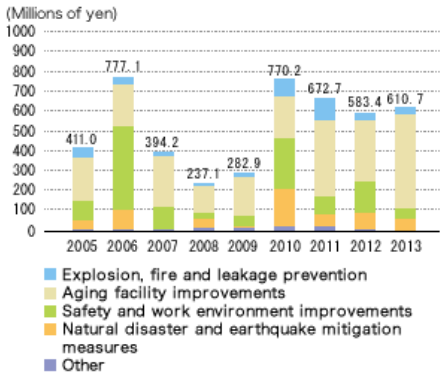
The Nippon Kayaku Group makes well planned and continual investments in environment, safety and health related projects. In fiscal 2013, investments related to the environment totaled 386.7 million yen, marking a 49% decrease compared to fiscal 2012. This sharp decrease in investments was attributed to fiscal 2011 measures for preventing air pollution and fiscal 2012 measures for energy conservation and global warming prevention running their course, respectively. Energy conservation and global warming prevention accounted for 57% of the total.

Investments related to health and safety totaled 610.7 million yen in fiscal 2013, which is up 5.0% compared to fiscal 2012 Investments in measures to address aging facilities accounted for 79% of the total.

Environment Related Capital Investments



Safety and Health Related Investments



FY 2013 Energy Efficiency Survey

＊High-load machinery: refrigerators/freezers, blowers, air compressors, steam boilers

	Business site/Company name	"Green curtains" (bitter gourd plants)	Adjustments to work styles	Management of thermostat settings	Electricity /water saving and conservation awareness	Thined out fluorescent lighting; LEDs, etc.	Controlled operation of high-load machinery*	Limits on refrigerator use, etc.	Heat barrier film/paint,water dispersement	Surveys, etc. of efficiency measure efficacy
1	Head Office, NIPPON KAYAKU CO., LTD.		—	●	●	●	—	●	—	●
2	Fukuyama Plant/ NIPPONKAYAKU FUKUYAMA CO., LTD.	●	●	●	●	●	●	●	●	●
3	Asa Plant	●	—	●	●	●	●	●	●	●
4	Tokyo Plant/ NIPPON KAYAKU TOKYO CO., LTD.	●	—	●	●	●	●	●	●	●
5	Takasaki Plant	●	—	●	●	●	●		●	—
6	Himeji Plant	●	●	●	●	●	●		●	●
7	Kashima Plant	●	—	●	●	●	●			●
8	Tokyo business CENTER/ Tokyo business district	●	—	●	●	●	●		●	●
9	POLATECHNO CO., LTD.		—	●	●	●	●			●
10	MOXTEC, INC.		—			●	—			
11	WUXI POLATECHNO OPTICS CO., LTD.		—	●	●	●	—			●
12	Dejima Tech B.V.		—	●	●	●	—			
13	POLATECHNO (HONG KONG) CO., LIMITED		—	●	●		—		●	●
14	NIKKA FINE TECHNO CO., LTD.		—	●	●		—			
15	Nippon Kayaku Korea Co., Ltd.		—	●			—			
16	Euro Nippon Kayaku GmbH		—	●	●		—			
17	KAYAKU CHEMICAL (WUXI) CO., LTD.		—	●	●					
18	MicroChem Corp.		—	●	●		●			
19	Wuxi Advanced Kayaku Chemical Co., Ltd.		●		●	●	●		●	
20	Zhaoyuan Advanced Chemical Co., Ltd.		●	●	●	●	●		●	●
21	NIPPON KAYAKU FOOD TECHNO CO., LTD.	●	—	●			—			
22	Tumor Diagnosis Support Co., Ltd.	●	—		●	●	—		●	
23	Nippon Kayaku Medical Care Co., Ltd.	●	—	●	●	●	—			
24	NAC Co., Ltd.		—	●	●		—			
25	Taiwan Nippon Kayaku Co., Ltd.		—	●			—			
26	INDET SAFETY SYSTEMS a.s.		—	●	●		—			
27	Kayaku Safety Systems (Huzhou) Co., Ltd.		—	●	●	●	—		●	●
28	Kayaku Safety Systems de Mexico, S.A. de C.V.			●	●	●			●	●
29	Nishiminato Driving School Corporation		—	●	●	●	—		●	●
30	Kayaky (Shanghai) Co., Ltd.		—	●	●		—			●
31	Wako Toshi Kaihatsu Co., Ltd.		—	●	●	●	—		●	●
32	NIKOS CO., LTD.		—	●	●	●	—			
33	JHMS Co., Ltd.		—			●	—			
34	Okiura Golf Center Co., Ltd.		—	●	●	●	—			●
35	Kouwa Sangyo Co., Ltd.	●	—	●	●	●	—	●	●	●
36	Gunnan Sangyo Co., Ltd.	●	—	●	●	●	—	—	●	—
37	Head Office, KAYAKU AKZO CORPORATION		—	●	●	●	—			
38	Asa Plant, KAYAKU AKZO CORPORATION		—	●	●	●	—			
39	Head Office, Kayaku Japan Co., Ltd.		—	●	●	●	—			
40	Asa Plant, Kayaku Japan Co., Ltd	●	—	●	●	●	—	●	●	●
41	Sanko Kagaku Kogyo Co., Ltd.	●	—	●	●	●	—			