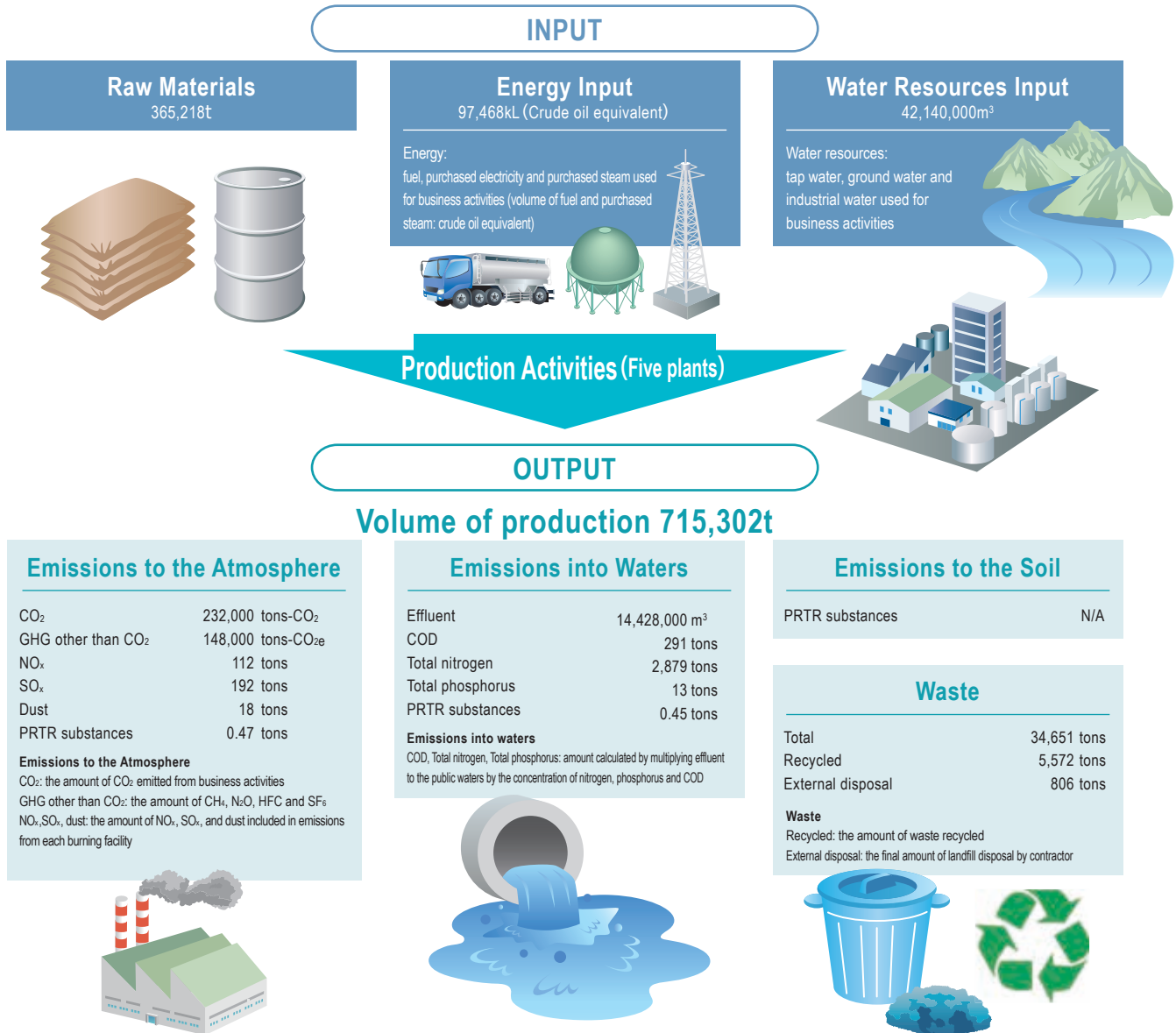


Environment Safety and Climate Change Strategy

Environmental Impact from Business Activities

The figure below shows the inputs of raw materials, energy and water for production and emissions to the atmosphere, waters, soil and waste. This is the summary of environmental impact yielded by the Company.

FY2017 Environmental Impact Results



Major Results in FY2017 Concerning Reduction of Environmental Impact



Energy consumption rate
(compared to FY2011)



GHG emissions
(compared to FY2016)



Sulfur oxide (SO_x) emissions
(compared to FY2016)

Environmental and Safety Accounting

We have made active investment in equipments and facilities such as conversion of the fuel from heavy oil to natural gas for melamine heating furnaces at Toyama plant to save energy and reduce GHG emissions. We also renovate aging facilities and implement constructions for occupational safety and work environment improvement measures in a well-planned manner to ensure safety and disaster prevention and maintain safe operation.

Environmental Accounting

Our investment plans in equipments and facilities were categorized according to Environmental Accounting Guidelines 2005 published by the Ministry of the Environment, and the amount of investment and expenses were calculated.

Category		FY2017		Effect	Content
		Investment (million yen)	Expenses (million yen)		
Business Area	Pollution Prevention	226	86	Compliance	Waste water measures, leakage prevention, and improvement of pollution control equipment
	Global Environmental Conservation	560	626	Economic benefit : 398 million yen Energy consumption rate : Improving by 24% from FY2011 level GHG emissions : Reducing by 53,000 tons-CO ₂ e from FY2016 (Reducing by 15% from FY2011 level), Reducing SO _x (by 50% from FY2016 level)	Conversion of fuel and feedstock for ammonia, and fuel for melamine heating furnaces Downsizing nitric acid plants
	Resource Circulation	20	358	Reducing final disposal volume of waste	Costs for the transportation and disposal of industrial waste
Upstream / Downstream		0	1	Supply chain management	EHS audit travel expenses for suppliers
Administration		0	228	ISO14001: Acquired certification in 2015 version	ISO activities expenses—certification, training, personnel and business travel expenses
R&D		54	559	Promotion of R&D related to environment and energy	R&D expenses related to environment and energy
Social Activity		0	21	Information disclosure and contribution to local communities	Publication of annual report and maintain of biotope
Environmental Remediation		0	1	Compliance	Expenses on countermeasures against soil contamination
Total		859	1,880		

Safety Accounting

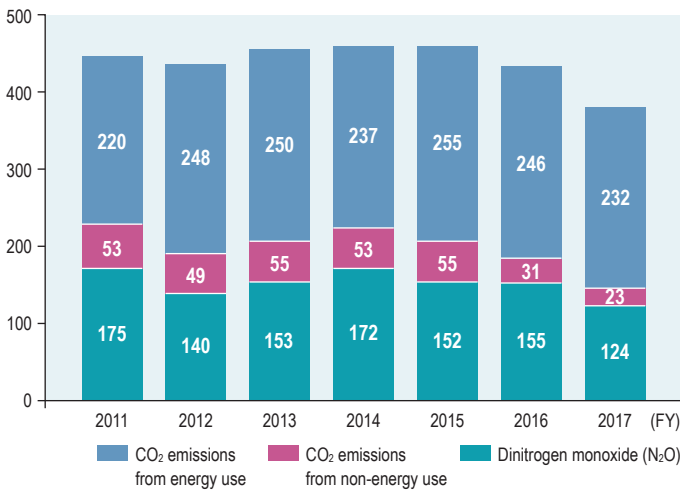
Our investment plans in equipments and facilities related to safety were categorized into “Safety and Disaster Prevention”, “Occupational Safety”, “Administration”, and “Social Activity” and the amount of investment and expenses were calculated.

Category		FY2017		Effect	Content
		Investment (million yen)	Expenses (million yen)		
Safety and Disaster Prevention		1,723	748	Zero accident of fire / explosion / leaking chemicals, and prevention of trouble at manufacturing	Leakage prevention, facility deterioration measures, and maintenance
Occupational Safety		235	29	Prevention of occupational accident	Improvement of unsafe areas
Administration		0	226	Prevention of occupational accident	Personnel and business travel expenses
Social Activity		0	14	Information disclosure	Publication of annual report
Total		1,958	1,017		

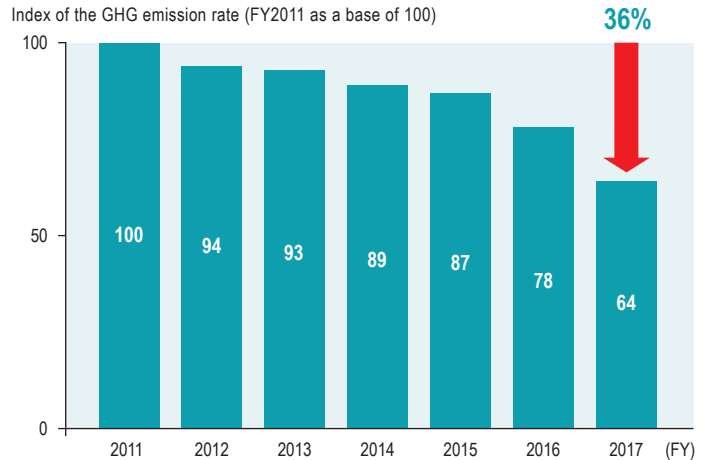
Reduction of GHG Emissions (scope 1, 2)

In accordance with the “Act on Promotion of Global Warming Countermeasures”, we collect data on the emissions of carbon dioxide (CO₂) and other GHG from all of our business establishments, including our plants, laboratories, and head office and submit this data to the national government. In FY2017, the conversion of the fuel of melamine heating furnace from heavy oil to natural gas, which generates less GHG, helped to reduce GHG emissions from energy use and non-energy use. The volume of reduction of emissions was 53,000 tons-CO₂e compared to FY2016 levels. By reducing emissions by 15% from FY2011 level, the energy consumption rate calculated as a ratio of emissions and sales (emissions / sales) significantly improved by 64% compared to that of FY2011.

GHG emissions (1,000 tons-CO₂e)



Index of the GHG emission rate (FY2011 as a base of 100)

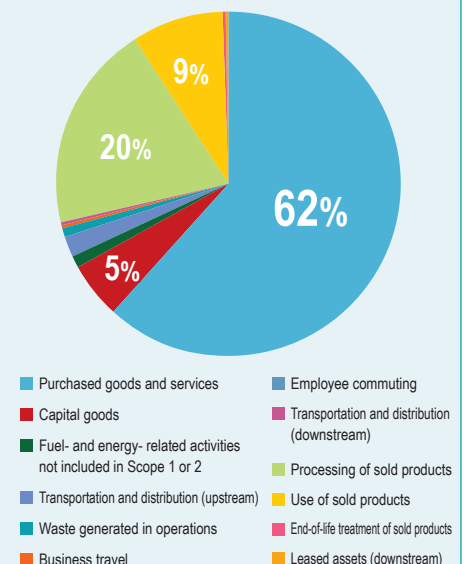


Reduction of GHG Emissions (Scope 3)

To discover our GHG emissions throughout the supply chain, from the purchase of raw materials to use and disposal by customers, we calculated our indirect GHG emissions via the supply chain (Scope 3) in addition to our direct GHG emissions (Scope 1) and indirect emissions derived from energy (Scope 2). We also participated in the Ministry of the Environment’s SC (Supply Chain) emissions calculation support project, and the results of these initiatives are available on the Green Value Chain Platform website at https://www.env.go.jp/earth/ondanka/supply_chain/gvc/en/. Scope 3 was calculated and found to be accounted for 62% of purchased products and services.

Scope 3

No.	Item	Calculated value (tCO ₂ e)
1	Purchased goods and services	472,635
2	Capital goods	39,028
3	Fuel- and energy- related activities not included in Scope 1 or 2	8,610
4	Transportation and distribution (upstream)	14,921
5	Waste generated in operations	6,458
6	Business travel	1,606
7	Employee commuting	392
8	Leased assets (upstream)	Included in Scope 1 or 2
9	Transportation and distribution (downstream)	1,579
10	Processing of sold products	149,410
11	Use of sold products	65,832
12	End-of-life treatment of sold products	2,617
13	Leased assets (downstream)	183
14	Franchises	Not applicable
15	Investments	Not applicable



Amount of Energy Consumption and Energy Consumption Rate

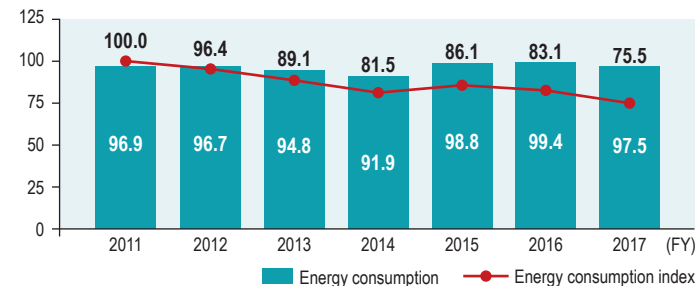
Production, research and office

In accordance with the "Act on the Rational Use of Energy", we collect data on the amount of energy consumed at all of our business establishments and submit this data to the national government, along with data on our energy consumption rate. Our energy consumption (crude oil equivalent) in FY 2017 reduced compared to that of previous fiscal year. We have a product matrix that covers a wide range of products, from commodity chemicals to agrochemicals, pharmaceuticals and functional products for electronic materials. This is why we calculate it not based on simple quantity of production but based on sales. This consumption rate improved from the previous fiscal year by 7.6%. This is attributed mainly to conversion of the fuel from heavy oil and naphtha to natural gas. In FY2018, our head office was relocated to a highly energy-saving-efficient building (PAL / ERR Stage 3).

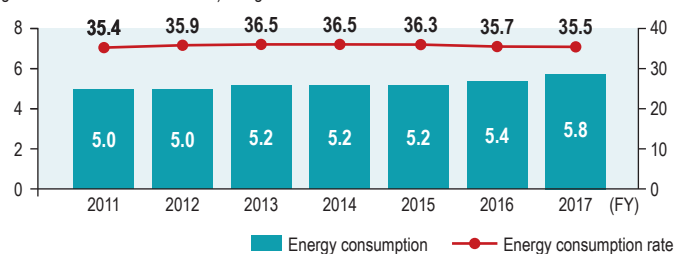
Logistics

As a cargo owner, we work together with Nissan Butsuryu Co., Ltd., a group company which handles our logistics operations, to promote the rational use of energy for transportation. In FY2017, the amount of energy consumption in crude oil equivalent increased from the previous fiscal year. However, the energy consumption rate was improved. We will continue striving to improve our energy consumption rate through measures such as promoting modal shifts, replacing vehicles with energy-saving and practicing eco-driving.

Energy consumption (crude oil equivalent 1,000kL) and energy consumption index (FY2011 as a base of 100) in production, research and office



Energy consumption (left axis: crude oil equivalent 1,000kL) and energy consumption rate (right axis: kL / one million ton kilo) in logistics



TOPICS

Efforts for Reducing GHG Emissions

At the Toyama Plant, fuel and feedstock for ammonia were converted from naphtha and heavy oil to natural gas in August 2016 and fuel for melamine heating furnace in August 2017. This contributed to a major achievement in reducing emissions of not only carbon dioxide but also sulfur oxides (SO_x). We also contributed to reduction of GHG emissions by making effective use of carbon dioxide, which is a by-product of the manufacturing process.

On the other hand, in July 2017, production capacity of nitric acid was optimized to reduce nitrous oxide (N₂O) emissions generated from reactors by approximately 30,000 tons as CO₂ equivalent per annual. This year, we plan to switch fuel used in heating furnaces using cyanuric acid as a heating medium. We will continue to expand the use of natural gas for other boiler fuels and consider ways to reduce the amount of GHG emissions in order to reduce our environmental impact.



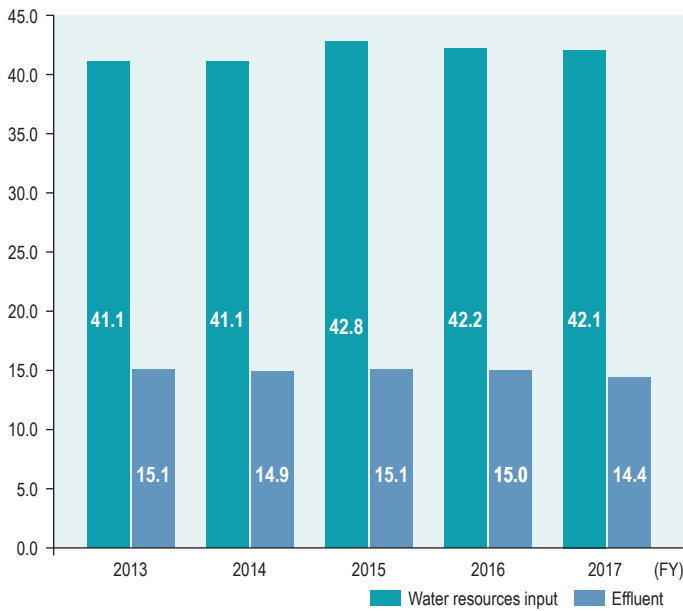
▲ Melamine heating furnace

Efficient Use of Water Resources

At each plant, we carry out exhaustive water-saving activities by observing environmental laws and regulations and cooperating with local organizations. These activities ensure that our operations do not place an impact on natural water circulation. We also clean waste water before returning it to nature to prevent it from negative impact on the environment.

At the Toyama Plant, we have been promoting the rational use of groundwater as a member of the groundwater use council in the Toyama area, a local council that works to protect the local natural environment and promote the sound development of local communities. At the Onoda Plant, we have been taking measures to maintain the quality of waste water discharged from the plant in line with the "Act on Special Measures concerning Conservation of the Environment of the Seto Inland Sea".

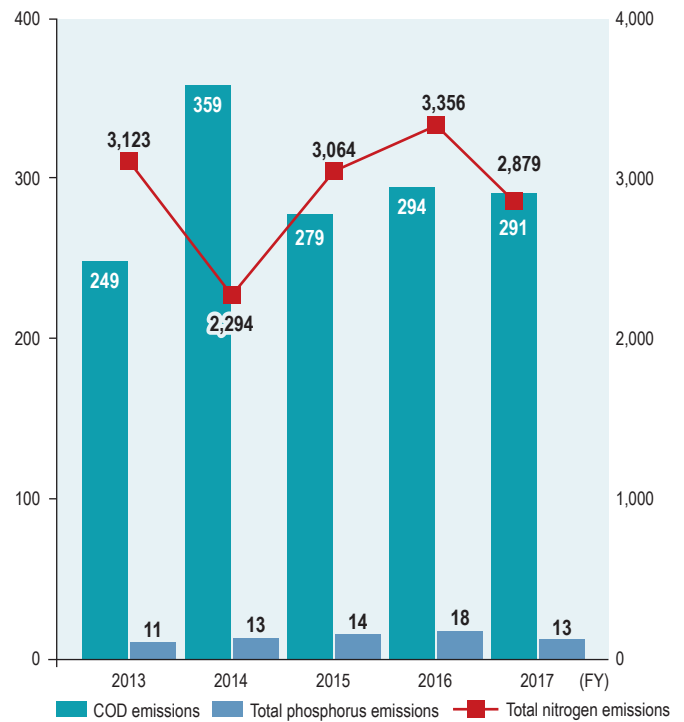
Water input / Effluent (Million m³)



Control of Waste Water

Our plants observe the discharge standards stipulated in the "Water Pollution Control Act" and regulatory values based on agreements with local communities. We monitor the chemical oxygen demand (COD), the total nitrogen and total phosphorous concentration in waste water. In FY2017, the emissions of all of them decreased compared to that of previous fiscal year.

COD (left axis) / Total phosphorus (left axis) / Total nitrogen (right axis) emissions (ton)



TOPICS

Use of Renewable Energy

The Toyama Plant mainly produces ammonia-based products and performance materials. It makes the plant consume a large amount of purchased electricity in the manufacturing process. This electricity is supplied by electric power corporations and Toyama Kyodo Jikahatsuden Co., Ltd., which was established through investment by companies in the Toyama Prefecture, including the Company. Toyama Kyodo Jikahatsuden Co., Ltd. uses the abundant water from the Jinzu River System to generate hydroelectric power at the Miza / Kuzuyama Power Station in Takayama City, Gifu Prefecture. At the Toyama Plant, purchased electricity generated at these hydroelectric power station is used at approximately one-third of the entire electricity consumption. We will continue to use environmentally friendly natural energy in the future.



▲ Miza Power Station

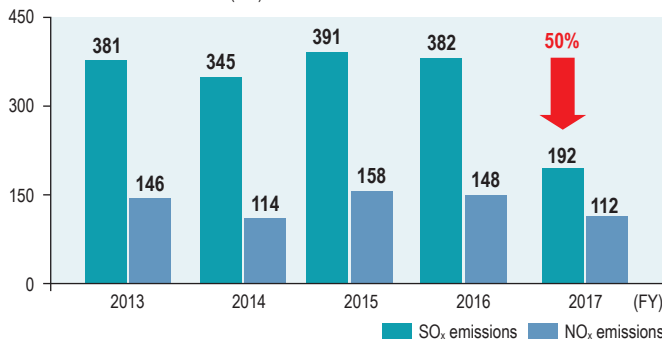


▲ Kuzuyama Power Station

Control of Exhaust Gas

We control exhaust gas by observing the discharge standards in the "Air Pollution Control Act" and regulatory values based on agreements with local communities. We maintain the proper conditions in our desulfurization facilities and denitrification facilities in an effort to control the emissions of air pollutants such as sulfur oxide (SO_x) and nitrogen oxide (NO_x). In FY2017, SO_x emissions were reduced by 50% compared to that of previous fiscal year by boiler fuel conversion to natural gas.

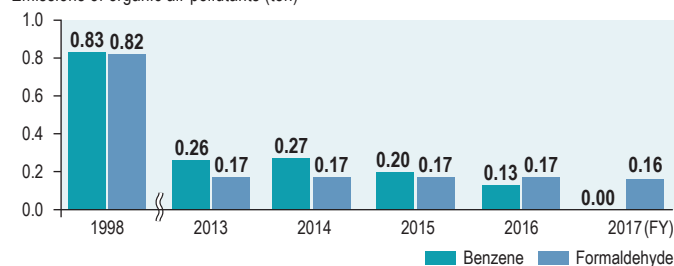
SO_x emissions / NO_x emissions (ton)



Reduction of Emissions of VOCs

We regularly take initiatives to reduce emissions of volatile organic compounds (VOCs), which cause the formation of photochemical oxidants. Among the twelve substances of VOCs which were selected, formulated voluntary management plan, and worked on reduction by chemical industry, three (1,2-dichloroethane, benzene, and formaldehyde) were handled in the Company. As a result of measures such as the introduction of VOC removal equipment, 1,2-dichloroethane has not been discharged to the atmosphere since 2006. In addition, emissions of benzene have been eliminated since FY2017 due to the conversion of naphtha to natural gas as a fuel and feedstock. We are also reducing emissions of formaldehyde through measures such as sealing facilities and combustion treatment of exhaust gases.

Emissions of organic air pollutants (ton)



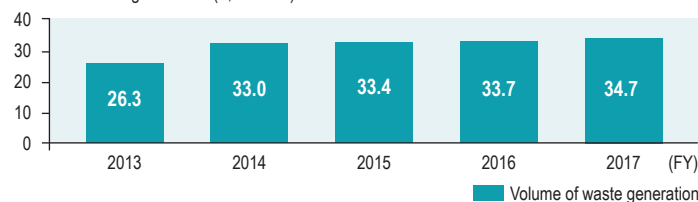
Reduction of Waste

We thoroughly implement control measures to ensure the proper disposal of waste, while also are striving to reduce industrial waste. We also applied electronic manifests using legal compliance system for waste.

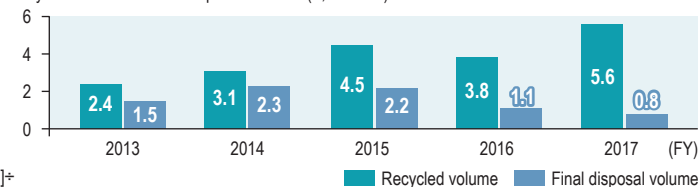
Waste water discharged in the manufacturing process accounts for the majority of our industrial waste. We treat this waste internally by means of combustion. The amount of waste generated began to rise in FY2014 due to an increase in the production volume of organic fine chemicals and flame retardants attributed to their new uses. As for solid waste, we reuse sludge as feedstock for the base course material of roads and cement. In addition, at the Toyama Plant, we promote the recycling of waste plastics and the conversion of such plastics to valuables, and we have changed the method of their intermediate processing to increase the recycling volume. As a result, the final disposal volume reduced compared to that of FY2016. The recycling rate* was calculated and confirmed to be 97.9% in FY2017. Our goal is to achieve a recycling rate of 99.5% or higher.

*Recycling rate (%) = $\frac{[\text{Recycled volume (ton)} + \text{Volume of valuable regenerative (ton)} + \text{Volume of reduction (ton)}]}{[\text{Volume of waste generation (ton)} + \text{Volume of valuable regenerative (ton)}]} \times 100$

Volume of waste generation (1,000 tons)



Recycled volume / Final disposal volume (1,000 tons)



Reduction of Emissions of PRTR Substances

In FY2017, we emitted 60 chemical substances whose emissions must be registered in accordance with the "Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR law)". The main substances emitted were formaldehyde and n-hexane. Formaldehyde is used as a reaction solvent. n-Hexane has been greatly reduced by switching fuel and feedstock from naphtha to natural gas. As a result, the total emissions have been significantly reduced by half emissions to the atmosphere and waters totaled 0.92 tons, of 0.47 tons and 0.45 tons, respectively. We will continue to take steps to control the emissions. We did not emit these substances into the soil.

Emissions of PRTR substances (ton)

Substance	FY2013	FY2014	FY2015	FY2016	FY2017
Formaldehyde	0.5	0.4	0.5	0.3	0.4
n-Hexane	1.4	1.4	1.3	1.1	0.2
Others	0.4	0.5	0.4	0.4	0.3
Total	2.3	2.3	2.2	1.8	0.9

Breakdown of emissions of PRTR substances (ton)

