



Environment Report 2020

Shionogi & Co., Ltd.



Editorial Policy

■ Periods

The present Environment Report covers results achieved during the period of the fiscal year 2019 (from April 1, 2019 through March 31, 2020) in Japan and the calendar year 2019 (from January 1 through December 31, 2019) outside Japan. The report also covers our activities conducted immediately before or after these periods.

■ Organizations

The report covers the environmental activities of Shionogi & Co., Ltd. and the Shionogi Group companies within Japan. Sections of the report that concern a different set of organizations are clearly indicated as such in each instance. Since the previous year, the composition of the Shionogi Group companies has changed due to the establishment of a subsidiary that is charged with manufacturing and related functions of the Shionogi Group, while some establishments have changed their names. With regard to the Nanjing Plant of C&O Pharmaceutical Technology (Holdings) Limited, a non-Japanese Shionogi Group company and manufacturing base, the relevant data are disclosed separately from those of the Shionogi Group under “Site Data.”

Category	Companies/Operating sites	
Shionogi & Co., Ltd. (referred to as “Shionogi” in the report)	Head Office	Shionogi CMC Research Innovation Center (Hyogo Prefecture)*1
	Tokyo Branch Office (Tokyo)	Shionogi Pharmaceutical Research Center (SPRC)
	Pharmaceutical Commercial Division (including its sales offices across Japan)	Aburahi Research Center (Shiga Prefecture)*2
Group companies	Shionogi Healthcare Co., Ltd.	
	Shionogi Pharma Co., Ltd.*3	
	Settsu Plant, Kanegasaki Plant (Iwate Prefecture) Tokushima Plant (Tokushima Prefecture)	
	Shionogi Techno Advance Research Co., Ltd.*4	
	Shionogi Administration Service Co., Ltd.	
	Shionogi Business Partner Co., Ltd.	
	Shionogi Marketing Solutions Co., Ltd.*4	
	Shionogi Career Development Center Co., Ltd. (Hyogo Prefecture)	
	Shionogi Digital Science Co., Ltd.	
	Shionogi Pharmacovigilance Center Co., Ltd.*4	
	Aburahi AgroResearch Co., Ltd. (Shiga Prefecture)*4	
	Shionogi Smile Heart Co., Ltd.*4	
	Saishin Igaku Co., Ltd.*5	
	C&O Pharmaceutical Technology (Holdings) Ltd. (Nanjing Plant, China)	

The companies and operating sites with no indication of location are all situated in Osaka Prefecture.

*1: Formerly Kuise Site, the name was changed on April 1, 2020.

*2: Formerly Aburahi Facilities, the name was changed on April 1, 2020.

*3: Commenced operation on April 1, 2019 as Shionogi Pharma Co., Ltd., a wholly owned subsidiary of Shionogi & Co., Ltd. in charge of manufacturing and related functions of the Shionogi Group; Shionogi Pharma Chemicals Co., Ltd. and Shionogi Analysis Center Co., Ltd. were absorbed by and merged into Shionogi Pharma Co., Ltd.

*4: Located on the premises of Shionogi & Co., Ltd.

*5: Liquidation completed on March 27, 2020.

■ Numerical data and graphs

The numerical data provided in the report are obtained by rounding off digits smaller than the units indicated. Accordingly, the actual sums of the individual figures in the graphs and charts do not necessarily correspond to the total figures in the same graphs and charts. The CO₂ equivalent conversion of energy source is based on the numerical measures adopted in-house for the management of progress toward target attainment, namely adjusted emissions coefficients indicated in “Emission Factors by Power Suppliers (for the calculation of GHG emissions by specified emitters) (FY 2008 results),” published by the Ministry of Environment and the Ministry of the Economy, Trade and Industry of Japan.

To the Nanjing Plant, the coefficients indicated below are applied:

Up to FY 2017: Ministerial Guidelines for GHG Emissions Accounting and Reporting (Climate Change Agency of the Chinese National Development and Reform Committee) (2005 results)

Since FY 2018: International Energy Agency (IEA) Emissions Factors (2016 results)

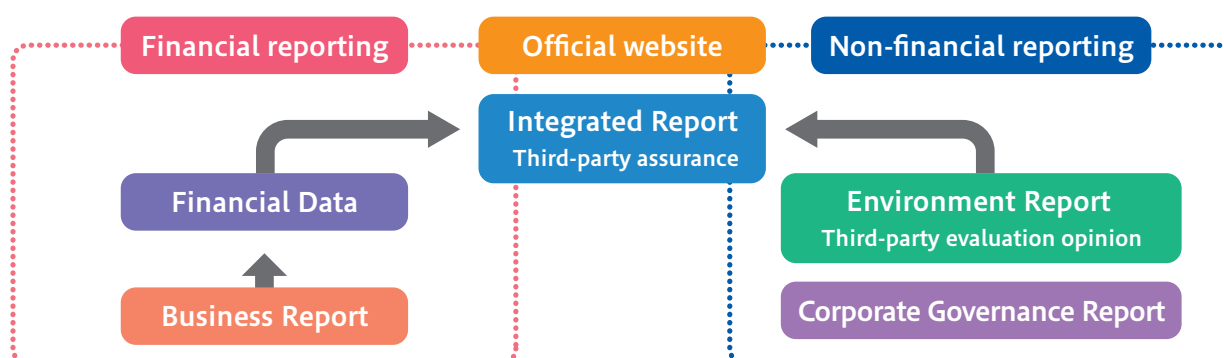
■ Reporting guidelines

The Environmental Reporting Guidelines of the Ministry of the Environment of Japan (edition 2018) are used as a reference.

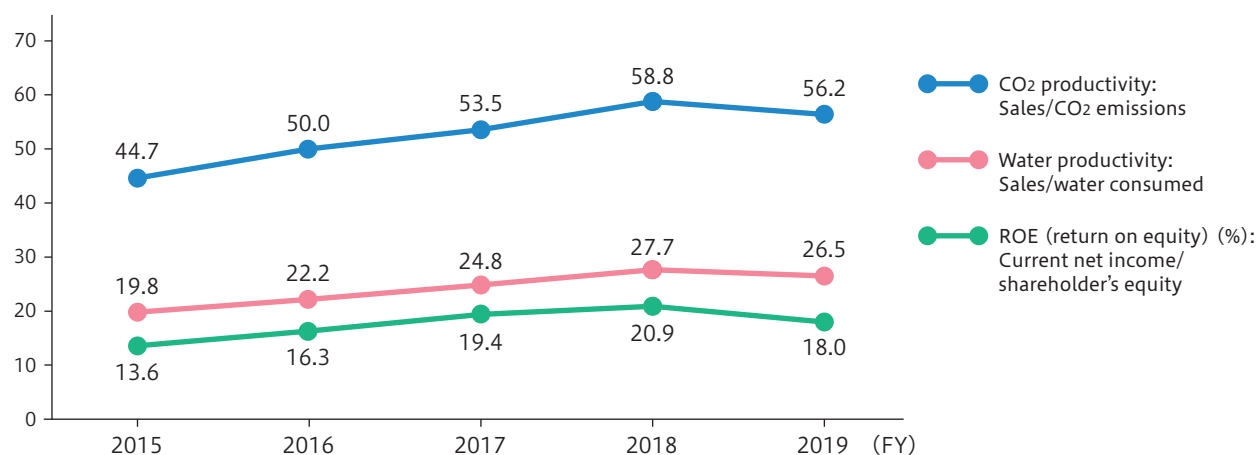
■ Overall reporting view

A copy of this report is made available on Shionogi's official website, while excerpts from the report are included in SHIONOGI Integrated Report. To ensure the reliability and transparency of our publicly disclosed information and receive advice and feedback for future improvement, the report was subjected to a third-party evaluation opinion by experts of the Institute for Environmental Management Accounting (IEMA).

The environmental data of FY 2019 marked ☒ on Page 95 of "SHIONOGI Integrated Report 2020," published separately from the present report, was subjected to third-party assurance by KPMG AZSA Sustainability Co., Ltd.



■ Trends of major performance assessment indicators



Front cover photographs

The photographs show the Botanical Gardens of the Aburahi Research Center and scenes from workshops held for local elementary school pupils by the Aburahi Research Center. For more detailed information, refer to Page 41.



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Message from the Leadership Team

EHS Policy and Shionogi's Approach to the Supply Chain

Shionogi Group EHS*1 Policy

In support of Shionogi's mission to supply the best possible medicine to protect the health and well-being of the patients we serve, Shionogi strives to conduct business activities in a manner that gives consideration to protection of the global environment, prevention of pollution, and support of the health and safety of our employees and the local communities in which Shionogi Group companies operate. Specifically, Shionogi is committed to:

1. Confirming the organization's commitment to building a high-quality EHS management system.
2. Complying with all relevant laws and regulations related to environmental health and safety and strive to maintain and improve the EHS level.
3. Striving to continuously reduce environmental impact and hazardous factors of Shionogi Group business activities, including impacts caused by research and development, production, distribution, and sale of Shionogi products.
4. Raising employees' awareness of EHS-related policies and topics through the prompt provision of information and regular training and practice.
5. Supporting the environmental protection and health and safety activities of the communities in which Shionogi Group companies are located, by acting in an environmentally-compatible way and by building a partnership of trust and accountability with the local community.

Established on October 5, 2015



Isao Teshirogi, Ph.D.
President and CEO
Shionogi & Co., Ltd.

Shionogi's Approach to the Supply Chain

We are keenly aware that our collaborations with suppliers, our valued business partners, are as essential as the Shionogi Group's actions in fulfilling our social responsibilities. We therefore join the Pharmaceutical Supply Chain Initiative (PSCI)*2 and require our suppliers to endorse the PSCI Principles for Responsible Supply Chain Management, a set of action principles established by the PSCI.

PSCI Principles

【Ethics】

1. ANTI-BRIBERY AND CORRUPTION
2. FAIR COMPETITION
3. ANIMAL WELFARE
4. DATA PRIVACY AND SECURITY
5. PATIENT SAFETY AND ACCESS TO INFORMATION
6. CONFLICTS OF INTEREST

【Human Rights and Labor】

1. FREELY CHOSEN EMPLOYMENT
2. CHILD LABOR AND YOUNG WORKERS
3. NON-DISCRIMINATION
4. FAIR TREATMENT
5. WAGES, BENEFITS AND WORKING HOURS
6. FREEDOM OF ASSOCIATION

【Health and Safety】

1. WORKER PROTECTION
2. PROCESS SAFETY
3. EMERGENCY PREPAREDNESS AND RESPONSE
4. HAZARD INFORMATION

【Environment】

1. ENVIRONMENTAL AUTHORIZATIONS AND REPORTING
2. WASTE AND EMISSIONS
3. SPILLS AND RELEASES
4. RESOURCE USE
5. SUSTAINABLE SOURCING AND TRACEABILITY

【Management Systems】

1. COMMITMENT AND ACCOUNTABILITY
2. LEGAL AND CUSTOMER REQUIREMENTS
3. RISK MANAGEMENT
4. DOCUMENTATION
5. TRAINING AND COMPETENCY
6. CONTINUAL IMPROVEMENT
7. IDENTIFICATION OF CONCERNS
8. COMMUNICATION

(Items of the Principles only)



*1: EHS stands for "Environment, Health and Safety."

*2: The Pharmaceutical Supply Chain Initiative (PSCI) is a global non-profit organization that advocates CSR procurement in the pharmaceutical industry and requires pharmaceutical companies to have their business partners engage in CSR initiatives. <https://pscinitiative.org/home>

Commitment by the EHS Corporate Officer



Takeshi Shiota, Ph.D.

Corporate Officer in
charge of EHS

To create a sustainable society

Since the adoption of the Sustainable Development Goals (SDGs) by the United Nations in 2015, these goals to be achieved by 2030 worldwide have been drawing an increasing amount of attention. In Japan, Shionogi's home, in the same spirit of seeking a sustainable society, expectation is growing stronger for corporations to adequately address challenges related to the environment ("E"), society ("S") and governance ("G") and to expand their ESG investment*1. In response, we at Shionogi are reinforcing our efforts to work on environmental and other challenges so as to continue our active participation in the construction of a sustainable society while realizing our own corporate growth. We believe that by so doing we can be and remain a business group that all our stakeholders find valuable and indispensable.

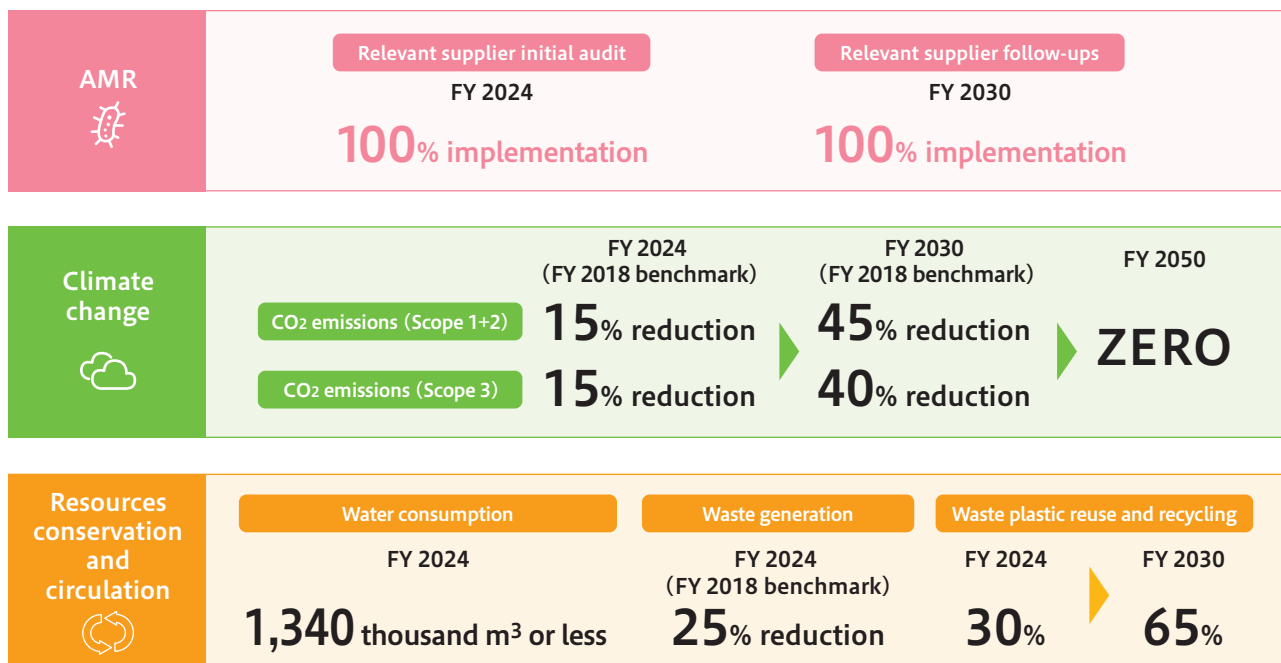
In April 2020, we established the Sustainability Management Office under the Corporate Planning Department of the Corporate Strategy Division, as a section comprehensively charged with ESG-related affairs. The addition of this section to our organization allows us to operate a more efficient company-wide system for promoting sustainability initiatives while ensuring Shionogi's growth.

In June 2020, we announced our New Medium-Term Business Plan, "Shionogi Transformation Strategy 2030 (STS2030)," to realize the vision of "Building Innovation Platforms to Shape the Future of Healthcare" by 2030. Toward this goal, we must begin our own innovation, transforming ourselves into a business group that continues to enjoy society's trust and the privilege of working with our many valued partners. To do so, we are fully aware that it is essential to work in harmony with, and for the benefit of, society at large, particularly in the area of global environmental protection. Accordingly, we have adopted new EHS action targets, including medium- and long-term environmental targets (2020-2024/2030/2050), with regard to three global challenges that need to be overcome to build a sustainable society: AMR,*2 climate change, and resources conservation and circulation.

We regularly disclose relevant information to gain understanding from our stakeholders about our efforts for the environment. Through our activities relating to the environment, we are striving to further enhance our corporate value and reinforce our engagement with our stakeholders.

*1 ESG investment: Investment in shares on the basis of companies' performance in terms of environmental ("E"), social ("S") and governance ("G") aspects

*2 AMR: Antimicrobial Resistance



Medium-Term Business Plan “Shionogi Transformation Strategy 2030 (STS2030)”

2030 Vision - What we want to achieve by 2030 - Building Innovation Platforms to Shape the Future of Healthcare

As Shionogi family we promise to:

Imagine new ways to deliver innovation, and catalyze the formation of new healthcare platforms

Create innovative products and deliver them worldwide compliantly with high quality at a fair price

Embrace social responsibility and contribute to longer, healthier lives everywhere



Shionogi Group’s Material Issues(Integrated Report)

Material issues to create new value for customers and society

Material issues to realize a sustainable society and support Shionogi’s growth

Impact on stakeholders
Sustainability of global ecosystem

Business continuation and
corporate value enhancement
(Impact on the Company)

Identification of
Environmental Materiality (p. 17)

Environmental risk management (p. 14)

Shionogi Group EHS Action Targets (Environment) (p. 21)

Contribute to the global sustainability through biodiversity conservation and other initiatives, by working on AMR, climate change, and resources conservation and circulation, three of the most important environmental challenges.

AMR

Management of release of
antimicrobials into the
environment



Climate change

CO₂ emissions reduction,
water risk mitigation



Resources conservation and circulation

Waste reduction,
water consumption reduction



Protection of the global
environment and
biodiversity



Contribution to a
sustainable society
Shionogi’s growth



Topics

CDP: Rated “A-” in Climate Change Category and “A” (Highest Evaluation) in Water Security Category

In the Climate Change Report 2019 of CDP,*1 an international NPO promoting environmental information disclosure, Shionogi was rated “A-” in recognition of its excellent efforts for fighting climate change and related information disclosure. In CDP Water Security 2019, Shionogi was rated “A” (the highest evaluation) in recognition of its significant contribution to sustainable water management through initiatives regarding water resources and water risk management and related information disclosure.

We believe that CDP’s favorable evaluation has resulted from our dedicated efforts to reduce greenhouse gas emissions, protect water resources, mitigate flooding risks, and adequately manage wastewater within the framework of our AMR management, intended to reduce antimicrobials release into the environment not only from Shionogi’s but also the suppliers’ operations.

*1: What is CDP?

CDP is a non-profit organization whose main activities involve requesting corporations and municipalities to disclose information on their actions for climate change control, water resources protection, forest conservation, and other environmental issues, based on the request of institutional investors and major corporate clients particularly interested in environmental issues. Such information disclosure is expected to further prompt actions for the environment by the entities concerned.

For more detailed information, visit the CDP website: <https://www.cdp.net/en>



Endorsing the Declaration of Biodiversity by Keidanren (Japan Business Federation) and Action Policy

Shionogi endorses the “Declaration of Biodiversity by Keidanren and Action Policy”. Shionogi thus publishes its ambitious action policies for and specific activities on biodiversity as part of the “Initiative based on the Declaration of Biodiversity by Keidanren”.

Initiative based on the Declaration of Biodiversity by Keidanren:
<http://www.keidanren.or.jp/en/policy/2020/055.html>

Shionogi & Co., Ltd.

<https://www.shionogi.com/global/en/sustainability.html>



Policy for the future:

Shionogi & Co., Ltd. benefits from the ecosystem in all of our business activities, including R&D, production, and sales. On the back of an increase in the global population and economic development, Shionogi recognizes the effect to the natural environment such as climate change and shortage of water resources caused by resource and energy consumption as an urgent issue. Based on our policy of constantly supplying the best possible medicine to protect the health and well being of the patients we serve, Shionogi has set targets that include strategies for climate change and resource recycling in an effort to promote biodiversity protection and achieve a sustainable society. Such efforts also embrace our suppliers. As a developer, manufacturer, and seller of antibiotics over the years, Shionogi will not only promote proper use of antibiotics but also strive to reduce the environmental impact in our manufacturing process, to prevent AMR (antimicrobial resistance).

< Examples of activities >

• AMR

AMR is a global threat that is life-threatening to patients of infectious diseases caused by resistant bacteria and could potentially pose high direct and indirect cost to society. To “protect the world from the threat of infectious diseases,” Shionogi has signed the Davos Declaration at the World Economic Forum in January 2016 and works constantly to prevent the emergence of new drug-resistant bacteria and viruses, as well as to ensure that patients can continue to receive treatment both now and in the future, by creating new drugs against emerging and re-emerging infectious diseases, for which therapies are yet to be established, and simultaneously promoting proper use of anti-infectives.

• Supporting education through a botanical garden

Since 2014, Shionogi has been supporting local community education through collaboration between local government, academia, and industry as an effort to support the education of the children who are our future.



< Future issues >

Climate change may not only have a devastating impact on the economy and social systems on a global scale but could also affect biodiversity through global warming and extreme meteorological phenomena. In order to alleviate the impact of climate change, it is necessary to introduce renewable energy as well as reduce greenhouse gas emissions throughout product life cycles, together with our suppliers.

< Message for society >

“Protect the health of the planet to protect the health and wellbeing of the patients we serve.”



Strategies for the reuse and recycling of plastic waste

The problem of marine plastic waste has been growing in urgency. At the G20 Summit held in Osaka in June 2019, the governments agreed on the goal of reducing additional plastic inflow to the ocean and to completely eliminate it by the year 2050. A report by the World Economic Forum stated that by 2050 there could be more plastic in the ocean than fish.

At the Shionogi Group, we have been making active efforts to reduce negative environmental impact related to the products we sell. We have adopted measures to reduce the actual volumes of containers and packaging materials while switching to materials made of more environmentally responsible components. Specifically, we have been promoting a switch to carbon-neutral biomass plastic and the use of reused plastic of assured quality, always in consideration of product quality and stable supply.

■ 3R (Reduce, Reuse and Recycle) initiative concerning containers and packaging materials

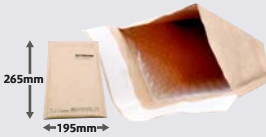


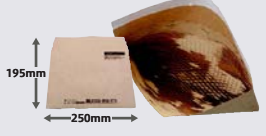


By FY 2019, we completed the measures summarized in the table below.

For “Reduce,” the volume of plastic we used dropped by 3.2 tons in FY 2019.

Measures	Description	Products concerned
Reduce	Change of packaging materials used for delivery of products in mail order business (from plastic to paper)	All healthcare goods through Shionogi Health Mail-order Service
	Change of material of trays (from plastic to paper)	All drugs provided in ampoules, vials and tubes
	Change of thickness of eye drop containers (made thinner)	All eye drops
	Change of thickness of PTP packaging materials (made thinner)	Flomox etc.
	Discontinuation of use of plastic cushioning materials for bottles	Irbetan etc.
Reuse	Inscription of plastic container/packaging material identification marks	All products
Recycle	Adoption of mechanically recycled PET film	Intuniv
Renewable	Adoption of biomass bottles (plant-derived polyethylene bottles)	Cymbalta, Irbetan, Pirespa

Initiatives by Shionogi Healthcare Co., Ltd.

In FY 2019, Shionogi Healthcare Co., Ltd. began reviewing and modifying the materials used for the delivery of goods in mail order business. Through a thorough switch from plastic to paper, we have become even more environment-friendly. This also frees customers from the chore of separating the packaging materials into different types for reuse and recycling.

Change 1	Change 2	Change 3
<p>Conventional padded envelopes</p>  <p>265mm 195mm</p> <p>We used to use envelopes padded with protective plastic bubble wrap.</p>	<p>Air bubble bags</p>  <p>We used to put goods in plastic air bubble bags.</p>	<p>Air cushions</p>  <p>We used to use plastic air cushions.</p>
<p>Paper padded envelopes</p>  <p>195mm 250mm</p> <p>We replaced plastic bubble wrap with corrugated paper padding.</p>	<p>Corrugated cardboard boxes</p>  <p>We replaced air bubble bags with cardboard boxes with corrugated sides.</p>	<p>Recycled paper</p>  <p>We replaced plastic air cushions with recycled paper fillers.</p>

■ Biomass bottles

In 2020, we adopted the use of biomass bottles (plant-derived polyethylene bottles) for the new product Cinal EX Pro chewable tablets.

We have already been using biomass bottles for Cymbalta, Irbetan, and Pirespa. Biomass bottles are packaging containers made of polyethylene derived from materials left over in sugarcane processing. By switching from conventional petroleum-derived polyethylene bottles to biomass bottles, we can reduce CO₂ emissions, also conserving fossil fuel resources (6.9 tons-CO₂ reduced in FY 2019).

Since our biomass bottles are more than 90% made of sugarcane-derived polyethylene, they conform to the standards established by the Japan BioPlastics Association for biomass plastic identification labeling (the corresponding product containers bear the label).

We are currently conducting a technical study to expand the use of biomass polyethylene to other product containers.

Biomass plastic identification labeling

Biomass plastic products are those that contain organic (such as plant-derived) materials in excess of a specified percentage as their plastic component. The Japan BioPlastics Association certifies products that meet the criteria and permits them to bear the label.



■ Mechanically recycled PET film

Shionogi uses mechanically recycled PET (polyethylene terephthalate) film in the packaging (aluminum bags) of Intuniv.

Mechanically recycled PET film derives from used PET bottles that undergo several steps: selection, crushing, cleansing, and high-temperature decompression.

The replacement of virgin PET film in the outermost layer of the aluminum bags with mechanically recycled PET film results in reduced CO₂ emissions and fossil fuel conservation while maintaining the quality of the packaged products (90kg-CO₂ reduced in FY 2019).



Environmental Management

Governance

Corporate Governance Structure

The Shionogi Group has developed a corporate governance system to act out its Company Policy (the Group's corporate management philosophy) on a global scale. The Group defines corporate governance as a structure for transparent, fair, timely, and resolute decision making that takes into full consideration the needs, conditions and perspectives of shareholders, customers, employees, local communities, and other stakeholders. Based on this definition, in October 2015, the Board of Directors formulated the Group's Basic Views and Guidelines on Corporate Governance so as to realize the best possible corporate governance.

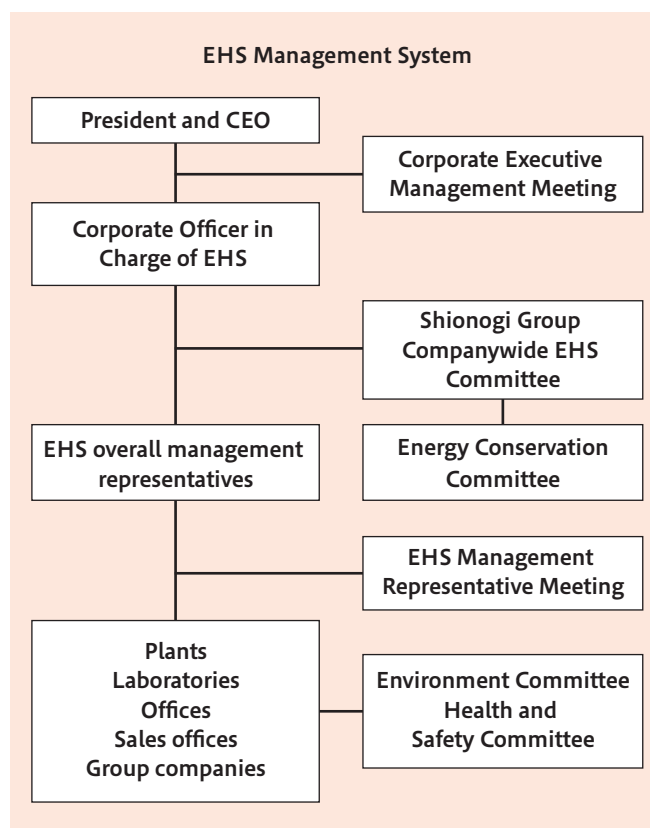
With regard to sustainability governance, the Shionogi Group pursues its activities, striving as a pharmaceutical company to tackle social challenges through innovative drug discovery, thereby fulfilling its corporate responsibilities in the economic, social, environmental and other domains. Such activities of the Shionogi Group, essential for sustainable development on a planetary scale, perfectly resonate with major global frameworks of actions and values as represented by the Sustainable Development Goals (SDGs) of the United Nations. The Board of Directors regularly receives activity reports and advises on further promotion.

Shionogi's basic views on corporate governance are viewable on the website:
<https://www.shionogi.com/global/en/company/business.html>

Environmental Management System

The Shionogi Group pursues integrated management of the environment ("E"), health ("H") and safety ("S"), with a Corporate Officer, who supervises overall EHS management. The Corporate Officer in Charge of EHS heads the Shionogi Group Companywide EHS Committee, comprising representatives of Shionogi's respective divisions and the Group company presidents, who are responsible for EHS at the respective companies. The Companywide EHS Committee sets targets, identifies future environmental challenges of importance, and conducts management reviews, thereby promoting EHS activities. A system is in place that allows the Corporate Executive Management Meeting to deliberate on Shionogi Group-wide EHS initiatives before the Board of Directors makes final decisions about them.

With regard to measures for energy conservation and global warming control, the Energy Conservation Committee, chaired by the Corporate Officer in Charge of EHS and placed under the Shionogi Group Companywide EHS Committee, assumes duties such as setting medium-and long-term targets, managing progress, and assessing the status of legal and regulatory compliance.



■ Management Systems

The Shionogi Group uses management systems established in-house in conformity with ISO 14001.

The Shionogi Group's EHS activities, including risk management, are reviewed as a whole once a year by the Shionogi Group Companywide EHS Committee to verify their efficacy and suitability. Important matters are deliberated on by the Corporate Executive Management Meeting before final decisions are made by the Board of Directors.

The acquisition status of certification of our management systems is summarized in the table below.

	Settsu Plant	Kanegasaki Plant	Tokushima Plant
ISO14001	Acquisition expected (within FY 2020)	Acquisition expected (within FY 2021)	○
OHSAS18001	○*1	○*1	To be acquired

○: Acquired

*1: Switch to ISO 45001 expected within FY 2020

Shionogi's acquisition of ISO 14001 certification commenced in 2002. On the occasion of the establishment of a manufacturing subsidiary in October 2018, the scope of certification was reviewed, and we expect new certifications for Shionogi Pharma Co., Ltd., the Settsu Plant and the Kanegasaki Plant in the near future. The Tokushima Plant will also be eventually ISO 45001 certified.

■ Audits

Shionogi conducts the following audits.

Audit	Description
External audits	Conducted by external accreditation organizations to verify that Shionogi's ISO 14001- and OHSAS 18001-certified management systems are operated in conformity with the standards
Internal audits	In-house self-inspection required under ISO 14001 and OHSAS 18001 conducted to confirm system suitability and status of conformity
EHS audits	Conducted by the division that supervises the Shionogi Group's EHS initiatives, as directed by the management team, separately from internal audits, to check whether EHS activities at Shionogi's operating sites and Group companies are appropriately implemented and maintained in compliance with the management systems while pursuing continuous improvement
EHS audits of suppliers	Audits of Shionogi's suppliers of raw materials, intermediates, products, etc. conducted in compliance with the PSCI Principles

■ Emergency Preparedness

Shionogi's response to emergencies, including earthquakes, pandemics and corporate scandals, is based on its risk management policy, which places utmost importance on respect for human lives, consideration for and contribution to local communities, and business continuity. Shionogi has emergency response guidelines and manuals also based on the risk management policy.

In anticipation of earthquakes, floods, fires, the leakage of toxic substances, and other eventualities, we have established communication and reporting systems and regularly carry out emergency responsiveness training and review response procedures. In FY 2019, a disaster mitigation drill was conducted at the respective operating sites, following a simulated scenario of an earthquake-triggered fire or tsunami.

The Settsu Plant has renewed its registration as a community life-saving support station and a site marked on Osaka Prefecture's AED (automated external defibrillator) location map. Five Settsu Plant employees participated in a fire responsiveness drill organized by Settsu City. The Aburahi Research Center has been working with local residents to draw up a hazard map related to reservoirs.



Fire preparedness drill in Settsu City

■ Education

Shionogi believes it essential that each and every employee be fully aware of the challenges of EHS initiatives in connection with his or her respective work and actively participate in them. Accordingly, Shionogi provides employees with training programs on environment-related subjects, as well as preliminary education for those involved in operations with high environmental impacts, such as the management of waste materials and the handling of chemical substances. At each operating site, personnel are clearly informed of the target and actual figures of CO₂ emissions and the quantities of waste materials generated so as to effectively motivate employee involvement.

In FY 2019, e-learning programs were organized twice for the entire body of employees, numbering some 5,000. The program themes and attendance rates are indicated in the table below.

Theme	Attendance rate	Period
SDGs, ESG investment	98.3%	Friday, November 1 – Friday, December 13, 2019
Climate change	97.6%	Wednesday, January 29 – Friday, March 6, 2020

Risk Management

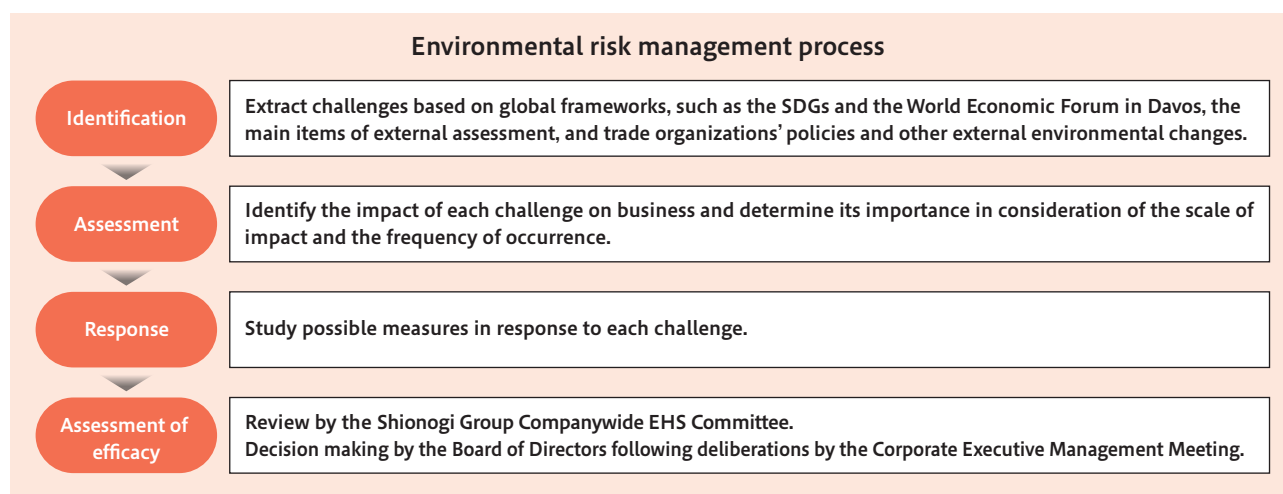
Risk management is essential for corporations, given the myriad risks involved in corporate life, to prevent risks from developing into incidents and, in the case of an incident, to handle it so as to minimize damage.

At Shionogi, we vigorously strive to optimally manage all types of conceivable risks to prevent incidents and recurrence, in compliance with risk management regulations formulated based on the Shionogi Group Risk Management Policy.

Shionogi's risk management is viewable on the page indicated below:

<https://www.shionogi.com/global/en/company/policies/shionogi-group-risk-management-policy.html>

The diagram and tables below illustrates how Shionogi identifies risks from among environment-related challenges, assesses them, and makes relevant decisions.



Identification, assessment results, and responses

Materiality (risks and opportunities)	Impact	Frequency of occurrence		Assessment	Measures
	On the Company	Actual	Predicted		
AMR • Lowered reputation due to pollution caused by wastewater	Large	Small	Large	◎	• Pollution control during production at Shionogi and suppliers • Publication of AMR actions and measures
Climate change (GHG) • Discontinued operation due to extreme meteorological phenomena • Increased capital investment in response to regulatory reinforcement • Change in the market for tropical-infectious-disease-related products	Large	Small	Medium	○	• Information gathering from governmental agencies, trade organizations, etc. • Setting of CO ₂ emission reduction plans by the Energy Conservation Committee • Setting of measures for stable supply
Water risks • Discontinued operation due to droughts, floods, and water quality deterioration	Large	Small	Medium	○	• Information gathering from governmental agencies, trade organizations, etc. • Monitoring of waste water • Water consumption control
Resources conservation and circulation • Lowered reputation due to increased plastic waste • Elevated reputation due to resources conservation initiatives	Medium	Small	Medium	△	• Promotion of 3R initiatives • Restricted use for products

Assessment criteria

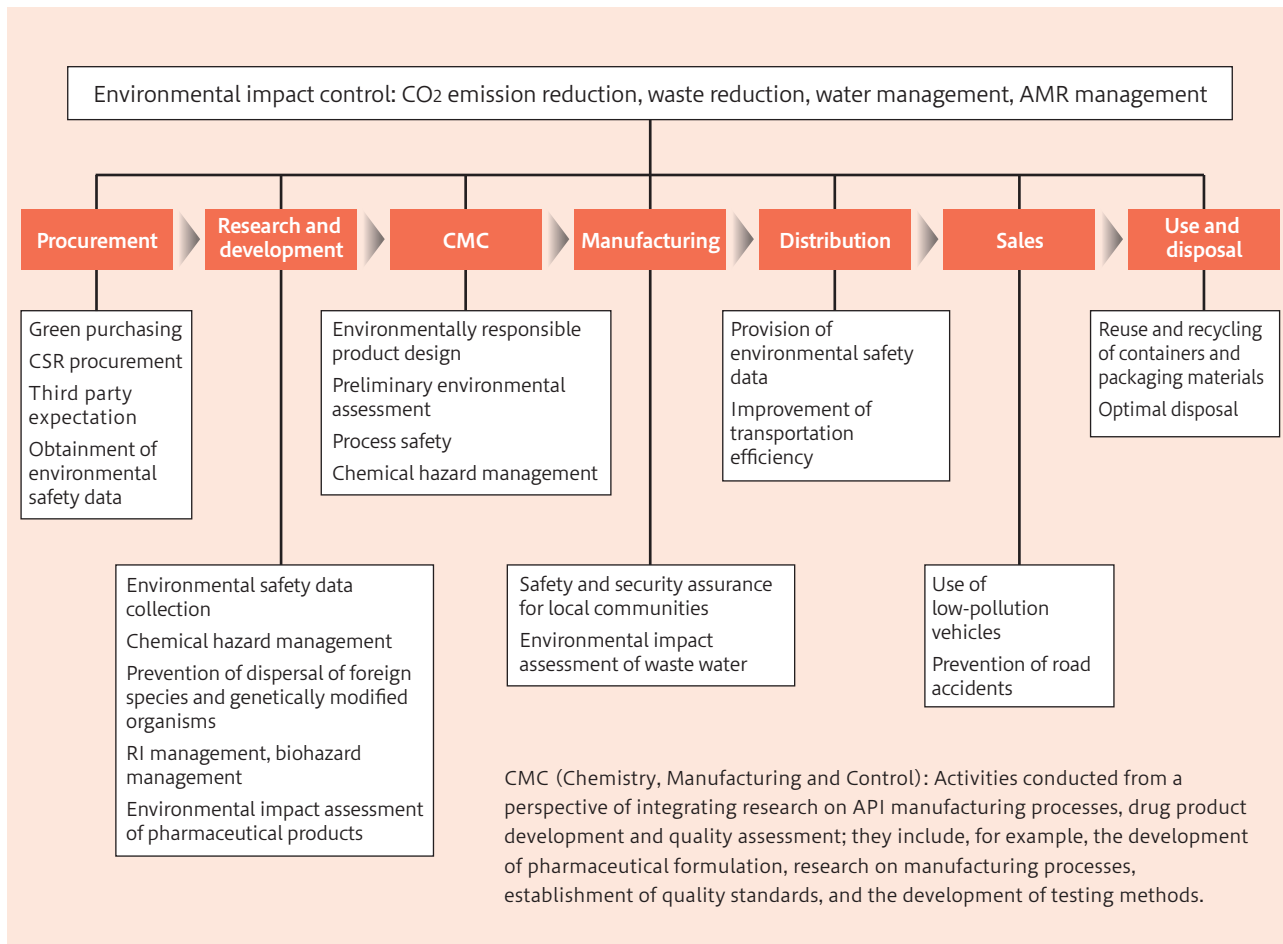
Assessment criteria are provided in the table below; deliberations by the Shionogi Group Companywide EHS Committee are also included.

Level	Impact	Frequency of occurrence
Large	Discontinued operation	Frequent in the area/industry
Medium	Capital investment	Past incidents
Small	—	No past incidents

Shionogi and the Environment

■ Environmental Value Chain Map

The environment is closely related to the whole spectrum of corporate life, ranging from raw material procurement to research, development, manufacturing, sales, use and disposal.



■ Shionogi and the Environment (input and output from business activities)

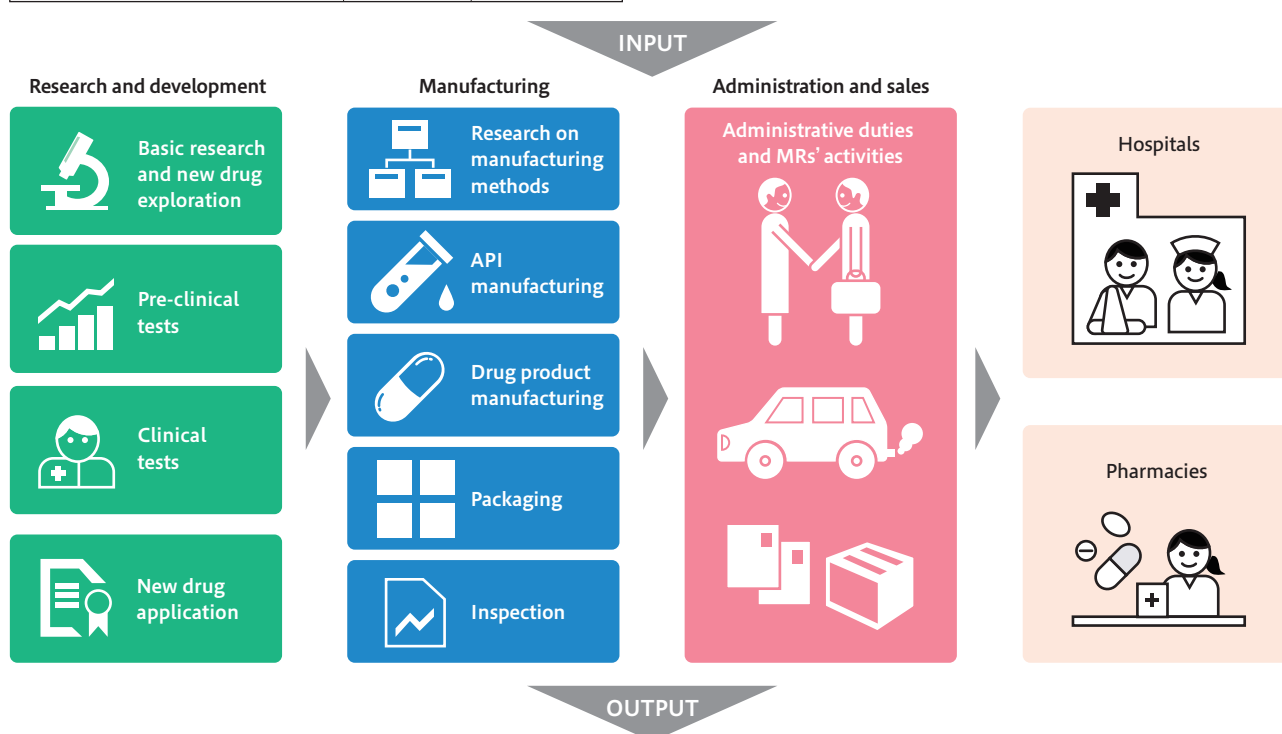
At Shionogi, we strive to meet concrete targets that we set for CO₂ emissions, wastewater, chemical substances, and waste resulting from our business activities while making sure to have accurate data on energy consumption, waste generation, and other related matters.

Energy		
Total energy	1,000 GJ	1,485
Electricity	MWh	84,025
Town gas	1,000Nm ³	5,771
Liquefied petroleum gas (LPG)	tons	360
Liquefied natural gas (LNG)	tons	7,113
Heavy oil	kL	39
Kerosene	kL	2
Light oil	kL	8
Gasoline	kL	12
Gasoline (for sales vehicles)	kL	1,370

Water		
Tap water	1,000m ³	246
Industrial water	1,000m ³	1,017

Chemicals		
PRTR-designated chemicals (quantity handled)	tons	203

Containers and packaging materials		
Quantity used	tons	1,103



Atmosphere		
CO ₂ (Scope 1 used as fuel)	tons-CO ₂	33,420
CO ₂ (Scope 1 used for sales vehicles)	tons-CO ₂	3,178
CO ₂ (Scope 2)	tons-CO ₂	26,210
NO _x	tons	17
SO _x	tons	0
Particulate matter	tons	2
PRTR-designated substances	tons	34
VOC	tons	52
Fluorocarbons	tons-CO ₂	456

Waste materials		
Waste generated (including valuable resources)	tons	3,646
Waste generated (excluding valuable resources)	tons	3,062
Reused/recycled	tons	3,025
Sent to landfill	tons	38
PRTR-designated substances	tons	131

Containers and packaging materials		
Consigned for reuse/recycling	tons	167

Water		
Sewers	1,000 m ³	311
Public waters	1,000 m ³	821
BOD	tons	5
COD	tons	3
PRTR-designated substances	tons	2
Nitrogen	tons	7
Phosphorous	tons	1

For detailed data, refer to the section “Results.”

Environmental Materiality

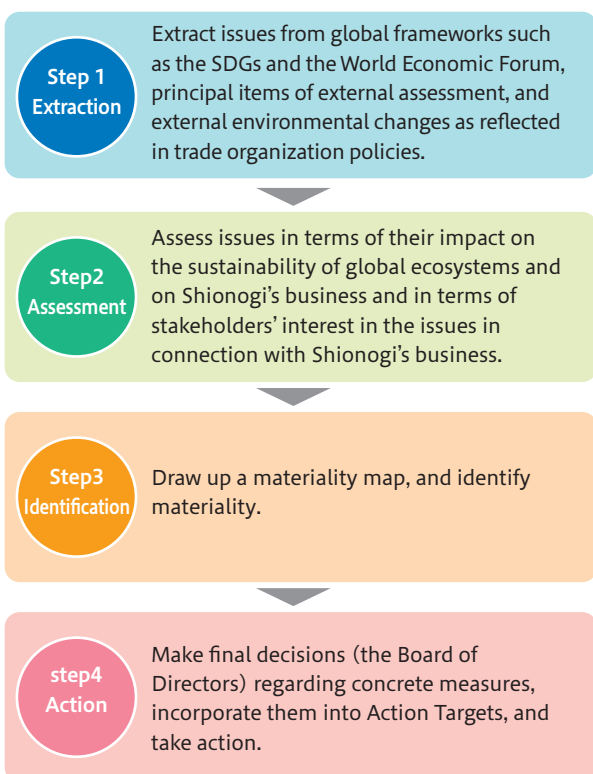
At Shionogi, we draw up a Materiality Map regarding our business activities in consideration of their relevance to our business and their importance in society. As a result, we identified "Protecting the environment" as one of Shionogi Group's material issues (Materiality).

In preparation for designing our activities for the environment, we extracted and identified issues of materiality in consideration of their impact on the sustainability of global ecosystems and on stakeholders based on the Environmental Reporting Guidelines. For the identification of materiality, we extracted and assessed issues in meetings among related divisions within the Company and through dialogues with ESG institutional investors, external experts, and other stakeholders. The Shionogi Group Companywide EHS Committee and the Corporate Executive Management Meeting deliberated on the material issues thus identified before the Board of Directors made final decisions on relevant matters.

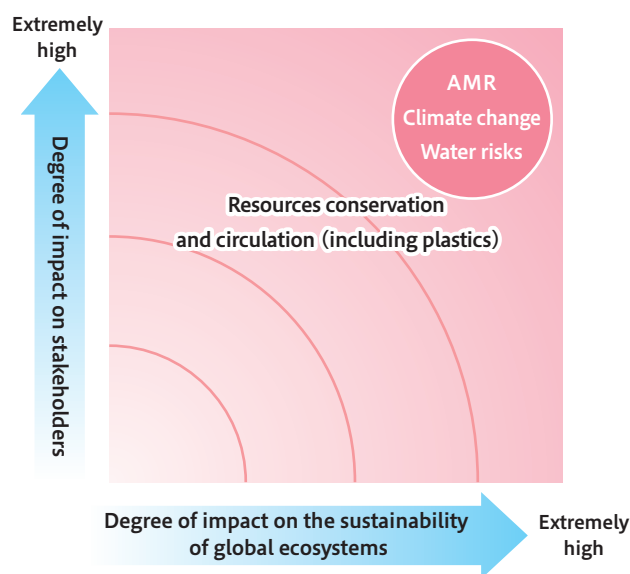
In the EHS Management Assessment that we had the honor of receiving in 2019 from Prof. Katsuhiko Kokubu (Kobe University Graduate School of Business Administration) and Ms. Eriko Nashioka (certified public accountant/licensed tax accountant and Representative Director of Institute for Environmental Management Accounting) for Shionogi's EHS Report, the two experts advised us as follows: The objective of identifying material issues is not merely clarifying priority policies, and the identification of materiality can prove significant only when it leads to concrete action. Drawing on this feedback, we have adopted long-term targets with regard to our efforts for AMR, climate change, and the handling of plastics.

We hope to further deepen our activities by clarifying concrete steps toward handling material issues in the future and key performance indicators (KPI) to offer value to society and meet our stakeholders' expectations.







Identification of environmental materiality



Environmental Materiality Map



Summary of identification of environmental materiality

Material issues	Summary of identification
AMR 	This is a global issue that a pharmaceutical company manufacturing antimicrobials cannot ignore. The emergence of AMR impacts global ecosystems enormously.
Climate change  	Responding to climate change is essential for the sustainability of global ecosystems. Meanwhile, stakeholders' demand for action in this regard is growing increasingly strong.
Water and water risks 	With the growing probability of occurrence of torrential rainfalls and floods, water risks (particularly physical risks) must be closely watched from the perspective of BCP. Water is an indispensable factor for the business continuity of pharmaceutical companies and essential for the sustainability of global ecosystems.
Resources conservation and circulation (including plastics)  	Reducing waste and circulating resources mean effectively utilizing limited resources and are essential for the sustainability of global ecosystems. This is a part of the problem of marine plastic, and stakeholders' interest in this international issue has been growing in recent years.

Environmental materiality and the value chain

	Purchase	R&D	Manufacturing	Distribution and sales	Use and disposal
AMR	antimicrobial release management		antimicrobial release management		Promotion of responsible antimicrobial use
Climate change	Introduction of energy-saving equipment Introduction of renewable energy	Introduction of energy-saving equipment Introduction of renewable energy	Introduction of energy-saving equipment Introduction of renewable energy	Introduction of hybrid vehicles Improvement of transportation efficiency	Change in or recycling of containers and packaging materials
Water and water risks	Water risk assessment	Water risk assessment, water conservation, wastewater management	Water risk assessment, water conservation, wastewater management		
Resources conservation and circulation (including plastics)	Green purchasing	Design of environmentally responsible products	3R's of waste materials		Reuse, recycling and responsible disposal of containers and packaging materials

Action Targets

Since 1995, Shionogi has been working toward continuous improvement following medium-term targets in areas that concern the environment, including energy conservation, global warming control, resource conservation and waste management, and reinforced management of chemicals, in all areas of business activities, including R&D, production, and sales.

In FY 2016, we commenced efforts toward the achievement of Phase 5 of the Shionogi Group Environmental Action Targets for the period from FY 2016 to FY 2020. In FY 2018, we upgraded them as the Shionogi Group EHS Action Targets (FY2018–2020). Each year, we update our action plan based on identified risks, opportunities, and important challenges so as to ensure continuous improvement from the two aspects of the environment and health & safety.

In FY 2020, aligning the Action Targets with the new Medium-Term Business Plan (STS2030), we adopted and began working on new medium- and long-term EHS Action Targets (2020–2024/2030/2050). Below are the EHS Action Targets and results that concern the environment.

Shionogi Group EHS Action Targets (Environment) (2018–2020)

Scope: Shionogi Group companies in Japan

Action targets (FY 2018–FY 2020)	Results (FY 2018–FY 2019)	Achievement
1. Promote energy conservation and global warming control measures. <ul style="list-style-type: none"> Reduce CO₂ emissions in FY 2020 by 33% from the FY 2005 benchmark (by 40% in FY 2030). Improve specific energy efficiencies by an annual average of 1%. Promote the introduction of highly energy-efficient equipment. 	<ul style="list-style-type: none"> CO₂ emissions were reduced by 38%. Specific energy efficiencies were improved by an annual average of 0.5%. This target was not achieved due to a decrease in the denominator (total floor area). Switch was made to higher-efficiency equipment, including cold water chillers, absorption refrigerators using gas, and on-site motors. 	△
2. Strengthen resource conservation and waste treatment/disposal measures. <ul style="list-style-type: none"> Reduce the amount of waste generated by 55% from the FY 2000 benchmark. Improve the percentage of waste reused or recycled to 73% or higher, and reduce waste disposed of as landfill. 	<ul style="list-style-type: none"> The amount of waste generated was reduced by 54%. The percentage of waste reused or recycled was 83%. The amount of one-off waste, mainly resulting from equipment halt or deviation, was reduced. (Settsu Plant) The amount of waste liquids and plastics was reduced by promoting reuse. (Kanegasaki Plant) The amount of burnable waste generated was reduced by promoting reuse of unused materials and thoroughly sorting out paper waste. (SPRC) 	△
3. Manage chemical substances appropriately. <ul style="list-style-type: none"> Appropriately treat and dispose of PCB-containing waste materials at 78% of the sites and divisions handling them (toward a total ban in FY 2022). Appropriately manage Fluorocarbons-using equipment. Promote measures against chemical hazards. 	<ul style="list-style-type: none"> PCB-containing waste was appropriately treated and disposed of at 55% of the sites and divisions handling them (the FY 2019 target was achieved). Fluorocarbons-using equipment was appropriately managed (through inspection, maintenance record keeping, leakage reporting, etc.) SDS management procedures, measures against chemical hazards, and other operational documents were prepared or updated. 	○

Action targets (FY 2018-FY 2020)	Results (FY 2018-FY 2019)	Achievement
4. Develop the EHS management systems. <ul style="list-style-type: none"> Adjust to the revised version of ISO 14001, and promote continuous improvement. Integrate the environmental, health, and safety management systems. 	<ul style="list-style-type: none"> The Tokushima Plant (ISO 14001) and the Kanegasaki and Settsu Plants (OHSAS 18001) operated their respective management systems appropriately and continued certification. EHS management standard were established, and the status of operation at respective operating sites was confirmed to be problem-free via EHS audits and other such means. 	○
5. Ensure a sound aquatic environment. <ul style="list-style-type: none"> Depollute or decontaminate used water and return it to rivers. Reduce water consumption (Reduce FY 2019 water consumption by 30% from the FY 2005 benchmark). 	<ul style="list-style-type: none"> Wastewater criteria were met through the responsible operation of wastewater treatment facilities and periodic wastewater analysis. Water consumption was reduced by 40% (target achieved). WRI Aqueduct, WWF Water Risk Filter, and in-house water risk assessment were conducted. 	○
6. Contribute to biodiversity preservation. <ul style="list-style-type: none"> Maintain and improve effective use of the Botanical Gardens. Raise employees' awareness. 	<ul style="list-style-type: none"> Rare plants, including endangered species, were preserved and managed at Aburahi Botanical Gardens. Educational support was provided to elementary and higher secondary school students at Aburahi Botanical Gardens. Gene recombination experiments were appropriately managed, and educational programs were organized. Activities were carried out based on the "Basic Principles and Action Guidelines for Biodiversity" of the Japan Pharmaceutical Manufacturers Association. 	○

For detailed information, refer to the section "Results."

Shionogi Group EHS Action Targets (Environment) (2020-2024/2030/2050)

Scope: Shionogi Group companies in Japan (Global Shionogi Group for climate change)

The action targets focus on contributing to the global sustainability through biodiversity conservation and other initiatives, by working on AMR, climate change, and resources conservation and circulation, three of the most important environmental challenges.

Item	Medium- and long-term targets (2020-2024/2030/2050)	FY 2020 targets
1. Responsible management of chemical substances	<p>【AMR control】</p> <ul style="list-style-type: none"> • Maintain the management system at the Kanegasaki Plant. • Complete initial audits of 100% of relevant suppliers. • <u>By 2030, establish a responsible AMR management system, including the supply chain (complete post-audit follow-up).</u> <p>【Responsible management of PCB and Fluorocarbons】</p> <ul style="list-style-type: none"> • Reinvestigate PCB-containing waste, and complete responsible disposal/treatment (FY 2022 target). • Manage Fluorocarbons-using equipment responsibly, and promote the introduction of Fluorocarbons-free or low-GWP equipment. 	<p>【AMR control】</p> <ul style="list-style-type: none"> • Maintain the management system at the Kanegasaki Plant. • Complete audits of 50% of relevant suppliers. <p>【Responsible management of PCB and Fluorocarbons】</p> <ul style="list-style-type: none"> • Execute 100% disposal/treatment of currently known PCB-containing equipment. • Manage Fluorocarbons-using equipment responsibly, and promote the introduction of Fluorocarbons-free or low-GWP equipment.
2. Climate change control	<p>【GHG (CO₂) emission reduction】 (FY 2018 benchmark)</p> <ul style="list-style-type: none"> • Reduce Scopes 1+2 by 15% and Scope 3 by 15%. • Improve specific energy efficiencies by an annual average of 1%. • Promote the introduction of highly energy-efficient equipment and the electrification of equipment. • <u>By 2030, reduce Scopes 1+2 by 45% and Scope 3 by 40%, working toward zero emissions in 2050.</u> <p>【Water risk mitigation】</p> <ul style="list-style-type: none"> • Identify, in the most precise and thorough manner possible, water risks facing research centers, plants, and other major operating sites. 	<p>【GHG (CO₂) emission reduction】 (FY 2018 benchmark)</p> <ul style="list-style-type: none"> • Reduce Scopes 1+2 by 2%. <p>【Water risk mitigation】</p> <ul style="list-style-type: none"> • Conduct water risk assessment using WRI Aqueduct, WWF Water Risk Filter, and in-house assessment about major operating sites in Japan.
3. Resources conservation and waste management	<p>【Waste and plastics】</p> <ul style="list-style-type: none"> • Reduce the amount of waste generated by 25% from the FY 2018 benchmark. • Reuse/recycle 80% of waste generated. • Reuse/recycle 30% of waste plastics. • <u>By 2030, reuse/recycle 65% of waste plastics.</u> • Restrict plastic use in products. <p>【Water consumption reduce】</p> <ul style="list-style-type: none"> • Keep water consumption at or less 1,340,000 m³. 	<p>【Waste and plastics】</p> <ul style="list-style-type: none"> • Reduce the amount of waste generated by 15% from the FY 2018 benchmark. • Reuse/recycle 80% of waste generated. • Reuse/recycle 15% of waste plastics. • Restrict plastic use in products. <p>【Water consumption reduce】</p> <ul style="list-style-type: none"> • Keep water consumption at or less 1,570,000 m³.

The underlined targets are long-term targets for FY 2030 and FY 2050.

Results

AMR

AMR stands for “antimicrobial resistance,” that is, resistance to antimicrobials. AMR is believed to be principally caused by inappropriate or excessive administration of antimicrobials. It is also attributed to release from manufacturing plants as another factor. Therefore, approaches from various aspects are essential for effective AMR control.

In its many years of developing, manufacturing and selling antimicrobials, Shionogi has always responsibly handled their release into the environment. As a manufacturer of antimicrobials, we believe that AMR control is vitally important and are firmly committed to tackling this global challenge, also involving our suppliers in this endeavor.

Shionogi's medium- and long-term AMR control targets

FY 2020

Maintain the management system at the Kanegasaki Plant.
Complete audits of 50% of relevant suppliers.

FY 2024

Maintain the management system at the Kanegasaki Plant.
Complete audits of 100% of relevant suppliers.

FY 2030

Responsible management in practice, including the supply chain (complete post-audit follow-up).

■ On AMR Benchmark 2020*1

Shionogi has been selected to be on AMR Benchmark 2020*1 in recognition of its excellent overall AMR control activities. In the manufacturing category, in particular, Shionogi obtained 80, the highest score.

*1 AMR Benchmark 2020 is the world's first report in which companies' AMR control efforts are analyzed and evaluated by the NGO Access to Medicine Foundation, based in the Netherlands.

https://accesstomedicinefoundation.org/media/uploads/downloads/5f3f76733efaa_Antimicrobial_Resistance_Benchmark_2020.pdf

In September 2016, Shionogi signed the “AMR Industry Roadmap” with 13 global pharmaceutical companies and organizations at the World Economic Forum in Davos, taking the lead in fighting AMR. The signatory companies and organizations commit themselves to the strict management of antimicrobial release by themselves and throughout their supply chains, specifying their release management techniques in the form of a roadmap to be offered to all antimicrobial manufacturers so that they will also join in this worldwide effort to combat AMR. This movement has now developed into a major campaign called the “AMR Industry Alliance,” involving an increasing number of companies handling antimicrobials.

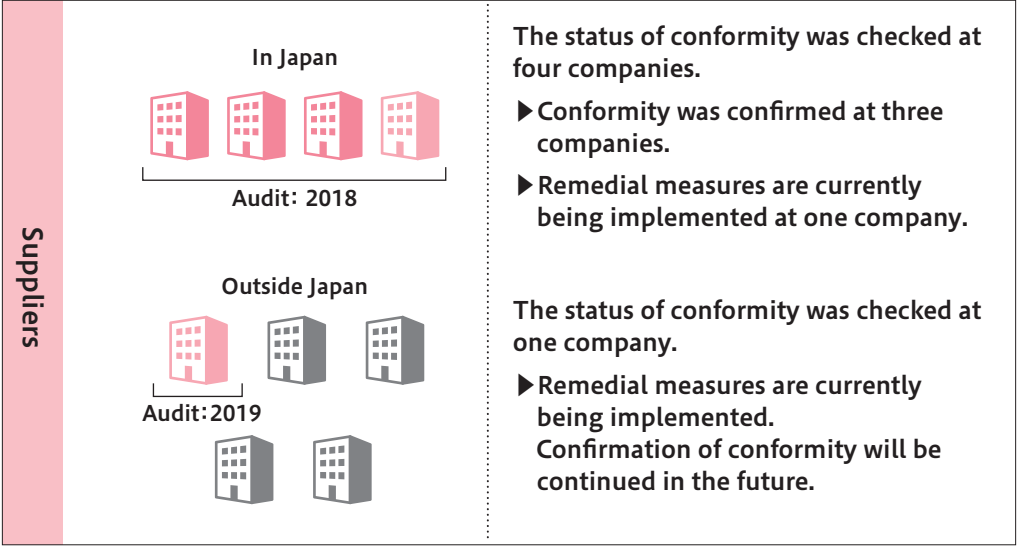
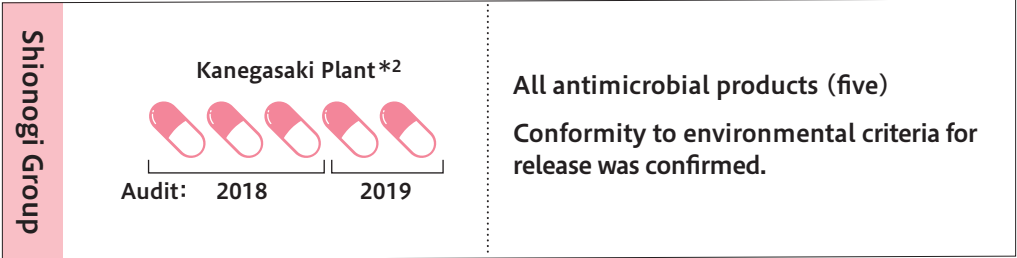
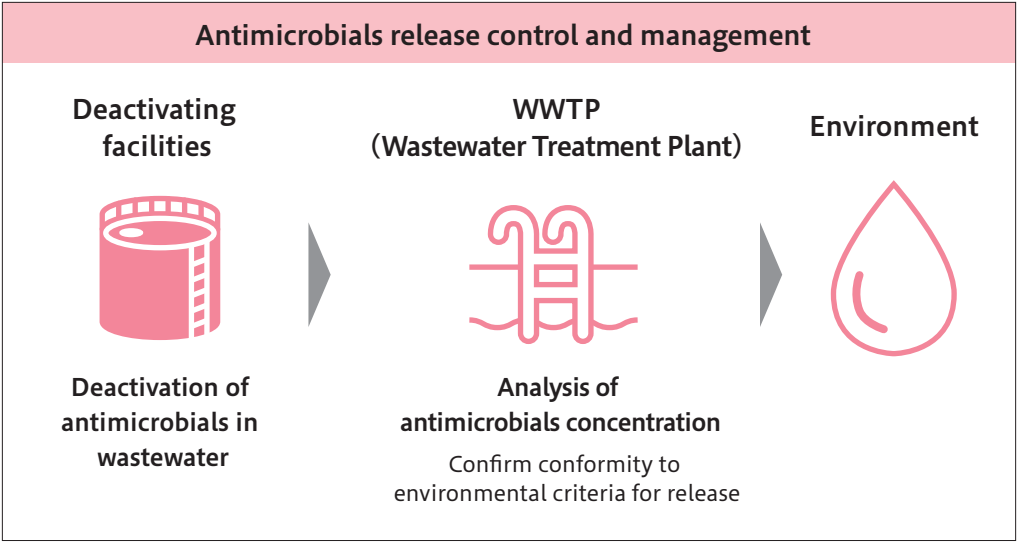


<Davos Declaration on Antimicrobial Resistance>

<https://www.ifpma.org/wp-content/uploads/2018/06/Roadmap-for-Progress-on-AMR-FINAL.pdf>

<AMR Industry Alliance>

<https://www.amrindustryalliance.org/>



*2 The Kanegasaki Plant is the only site that manufactures antimicrobials within the Shionogi Group.

Message from the Leadership Team	Topics	Environmental Management	Environmental Materiality	Action Targets	Results	Site Report	Environment Management Evaluation Opinion	
	AMR	Climate Change	Water	Waste	Chemical Substances	Pollution Prevention	Biodiversity	Environmental Accounting

As part of AMR Industry Alliance activities, Shionogi regularly inspects its antimicrobial release control and management. We have already completed the audit of all of owned antimicrobial-manufacturing plants, as well as all of our suppliers in Japan, in compliance with the guidelines for antimicrobial release control published by the AMR Industry Alliance*3. In FY 2019, we began audits of our suppliers outside Japan.

Shionogi's antimicrobial release control and management involve the following process: At its antimicrobial-manufacturing plants, antimicrobials contained in wastewater are deactivated before the wastewater is sent to in-house treatment facilities. Laboratory tests have confirmed the efficacy of this process in rendering wastewater harmless when released into the natural environment. We have also analyzed the concentration of antimicrobials in actual wastewater from Shionogi's plants in compliance with the AMR Industry Alliance guidelines.

In FY 2018, we confirmed the conformity of wastewater from the manufacturing processes of three out of the five antimicrobials manufactured at the Kanegasaki Plant to the criteria for harmless release into the environment.*4 In FY 2019, we confirmed the conformity of the remaining two products, thus establishing the conformity of all Shionogi Group antimicrobials to the harmless release criteria. As for solid waste materials generated from antimicrobial manufacturing at the Kanegasaki Plant, we have confirmed that they are entirely entrusted to an external service provider (Eco-system Akita Co., Ltd.) for disposal by incineration, with no antimicrobial release into the environment via solid waste materials.

In FY 2018, we confirmed the conformity to the harmless release criteria of three of the four antimicrobials whose manufacturing is commissioned to suppliers in Japan. In FY 2019, we newly audited the pharmaceutical supplier to whom we commission the manufacturing of one product (of the three whose manufacturing is commissioned to suppliers outside Japan). With regard to products whose conformity with the harmless release criteria has not been confirmed, we are continuing surveillance and taking necessary remedial measures. In the future, we intend to continue audits of our suppliers outside Japan with regard to the status of conformity to the criteria at the rate of one to two suppliers each year.

*3 Guidelines for antimicrobial release control published by the AMR Industry Alliance
https://www.amrindustryalliance.org/wp-content/uploads/2018/02/AMR_Industry_Alliance_Manufacturing_Framework.pdf

*4 As criteria for harmless antimicrobial release into the environment, Shionogi adopts "Predicted No-Effect Concentration (PNEC)" mentioned in the document*5 published by the AMR Industry Alliance or the basic value (0.01 µg/L) stated in the European Medicines Agency (EMA) Guidelines.

*5 <https://setac.onlinelibrary.wiley.com/doi/pdf/10.1002/ieam.4141>

Criteria for release into the environment for active pharmaceutical ingredients (API) of antimicrobials handled by Shionogi and audited items (Those in color have been audited by FY 2019.)

API of antimicrobials handled by Shionogi	Criteria for release into the environment (µg/L)	Shionogi		Suppliers	
		Drug Product	API	Drug Product	API
Flomoxef	0.01	○	○	Company A	
Cefcapene pivoxil hydrochloride	0.01	○	○		
Latamoxef	0.01	○	○		
Doripenem	0.11	○	○	Company B	
Cefiderocol	0.01	○	○		
Sulfamethoxazole/trimethoprim	0.60/0.50			Company C	Company F Company G
Metronidazole	0.13			Company D	Company H
Vancomycin hydrochloride	1.0			Company E	Company I

Companies E-I (suppliers outside Japan): Audits will be scheduled in the future for those not yet audited.

Supplier auditing results (by FY 2019)

Supplier	Country of location	Management system	Wastewater management	Solid waste material management	Conformity to harmless release criteria
Company A	Japan	○	○	○	○
Company B	Japan	○	○	○	○
Company C	Japan	○	○	○	○
Company D	Japan	△	○	○	△
Company F	India	○	△	△	×

○: Conforming to the AMR Industry Alliance guidelines criteria

△: Conforming to the AMR Industry Alliance guidelines criteria, except in a small number of aspects; remedial measures being implemented

×: Not fully conforming to the AMR Industry Alliance guidelines criteria; remedial measures being implemented

Climate Change

Climate change can have devastating global impact on the economy and social systems. An early transition to a low-carbon, and eventually carbon-free, society is now an urgent challenge facing the whole world. Risks relating to climate change and the process of transitioning to a low-carbon society impact almost all industrial sectors. At Shionogi, we are carefully assessing and working to minimize climate change risks.

To assess the impact of climate change and reinforce our preparedness while responding to society's growing demand for related information disclosure, we are working to improve and expand our information disclosure relating to climate change with reference to the Task Force on Climate-related Financial Disclosures (TCFD) framework.

Governance

The Shionogi Group Companywide EHS Committee operates as the organization that deliberates on important EHS subjects for eventual decision making, such as environmental policies, medium- and long-term targets, performance review, identification of environmental challenges, and environmental risk assessment. The Energy Conservation Committee is more narrowly specialized in issues relating to climate change and energy conservation. The Corporate Executive Management Meeting deliberates on risks and opportunities relating to climate change, before the Board of Directors makes final decisions about them.

Strategies

At Shionogi, we view global warming and other climate change-related issues as management challenges that we should tackle in earnest and incorporate our understanding of climate change risks and opportunities into our business strategies. Using the scenarios of RCP2.6 and RCP8.5*1 of the IPCC*2 Fifth Assessment Synthesis Report (AR5) as reference, we measure the financial impact of climate change risks and assess Shionogi's resilience.

*1 RCP: Representative Concentration Pathways

*2 IPCC: Intergovernmental Panel on Climate Change

Risks and opportunities

	Description	Financial impact	Probability of occurrence	Remarks
Transitional risk (regulatory reinforcement)	Additional investment for energy conservation	Medium (capital investment)	Intermediate	Supposing regulatory reinforcement to the level of SBT
Physical risk (extreme meteorological phenomena)	Discontinued operation due to damage to own plants	Large (discontinued operation)	Low	Supposing damage to plants due to an extreme meteorological phenomenon equivalent to the July 2018 torrential downpours
Physical risk (extreme meteorological phenomena)	Discontinued operation due to damage to the supply chain	Large (discontinued operation)	Low	Supposing an increase in extreme meteorological phenomena in Asia affecting the supply chain
Opportunity (improved external assessment)	Increased investment by investors	Medium (investment opportunity)	Intermediate	Supposing improvement in ESG assessment resulting from active information disclosure via Integrated/Environment Reports
Opportunity (CO₂ emissions reduction)	Reduced electricity cost through further energy conservation	Medium (lower operating cost)	Intermediate	Supposing power consumption upon attaining conformity to SBT criteria
Opportunity (new market entry)	Profit increase from climate change-related drug discovery	Medium (profit)	Low	Supposing change in the market for tropical infectious disease (malaria) drugs

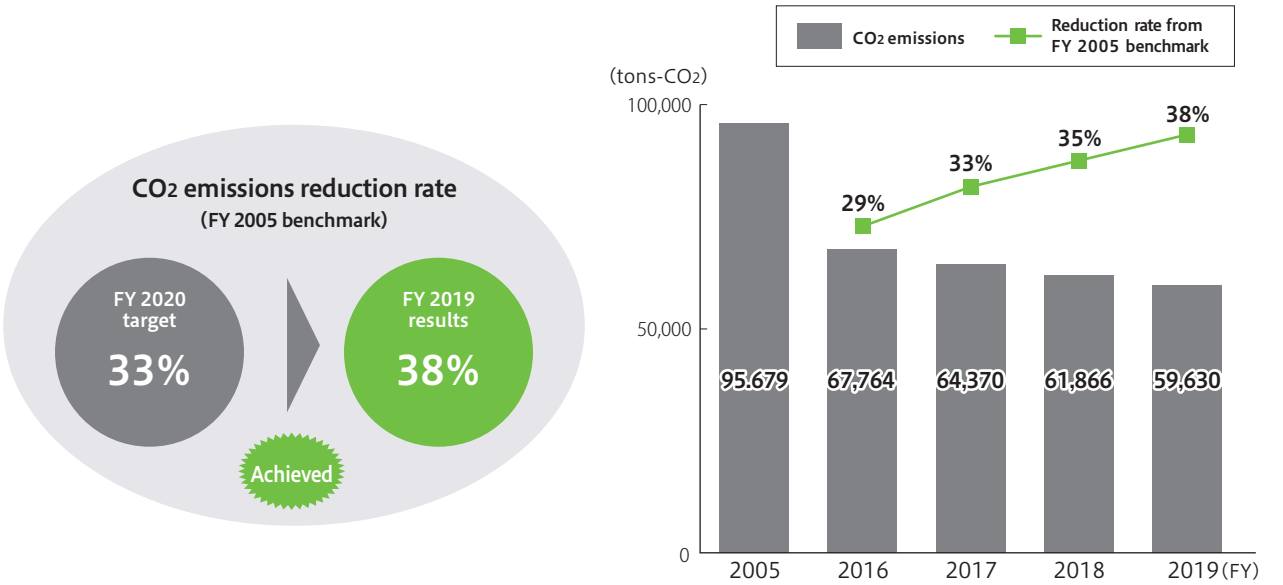
Message from the Leadership Team	Topics	Environmental Management	Environmental Materiality	Action Targets	Results	Site Report	Environment Management Evaluation Opinion
AMR	Climate Change	Water	Waste	Chemical Substances	Pollution Prevention	Biodiversity	Environmental Accounting

■ Risk management

Shionogi’s risk management is systematized in the following manner: The Shionogi Group Companywide EHS Committee and the Energy Conservation Committee assess the timing of emergence, financial impact, and other factors of climate change, adopting and implementing measures to respond to climate change risks in the order of priority. The Risk Management Subcommittee within the Corporate Strategy Committee comprehensively assesses climate change risks in consideration of other corporate risks before the Corporate Executive Management Meeting deliberates on them, and then the Board of Directors makes relevant final decisions.

■ Indexes and targets

Results



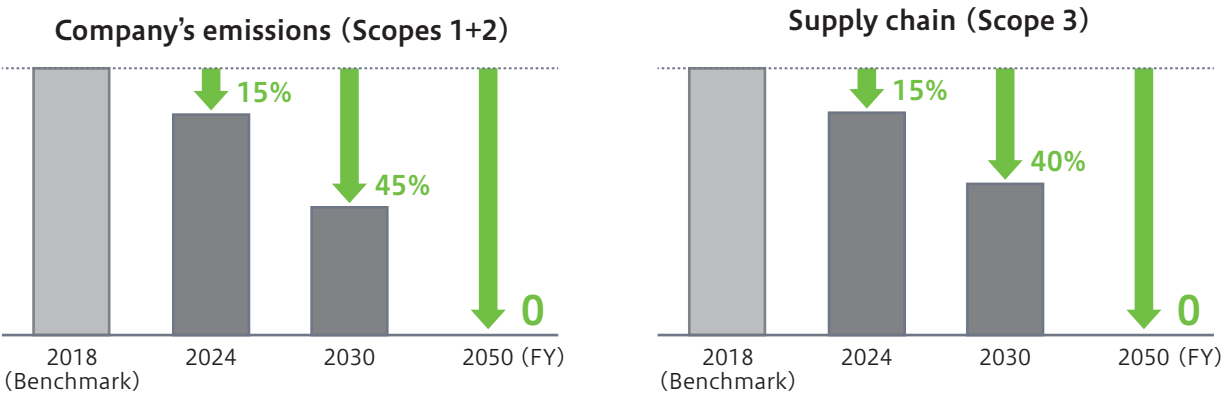
Medium- and long-term targets

We set medium- and long-term CO2 reductions plans following the worldwide movement toward the goal of attaining actual zero emissions by 2050.

In the future, we intend to work toward the approval of SBT*3 initiatives with regard to our medium- and long-term targets.

*3 SBT: Science-based targets, that is, CO2 emissions reduction targets based on scientific data

【Medium- and long-term CO2 emissions targets】



Message from the Leadership Team	Topics	Environmental Management	Environmental Materiality	Action Targets	Results	Site Report	Environment Management Evaluation Opinion
AMR	Climate Change	Water	Waste	Chemical Substances	Pollution Prevention	Biodiversity	Environmental Accounting

■ Carbon pricing

Internal carbon pricing will be applied to our medium- and long-term CO2 emissions reduction plans and be used as criteria for investment decision making.

■ Shionogi’s tackle against AMR, which can further spread due to climate change

Shionogi’s tackle against AMR (antimicrobial resistance) is presented on the website “Climate Change Adaptation Information Platform (A-PLAT)” operated by the National Institute for Environmental Studies, Japan.

The page introducing our initiatives
<https://adaptation-platform.nies.go.jp/en/lets/adaptationbiz/shionogi.html>

■ Accolades

- Ranked “S” for the fifth consecutive year in the assessment of business operators under the Energy Conservation Act –
In FY 2016, under the Energy Conservation Act, the Japanese government established a system to evaluate and classify business operators into four ranks (S, A, B, and C) according to their energy conservation initiatives, thereby publicly announcing exemplary business operators. In this system, Shionogi has been ranked as “S” for the fifth consecutive year as an excellent business operator practicing advanced energy-saving initiatives.

■ Fluorocarbons

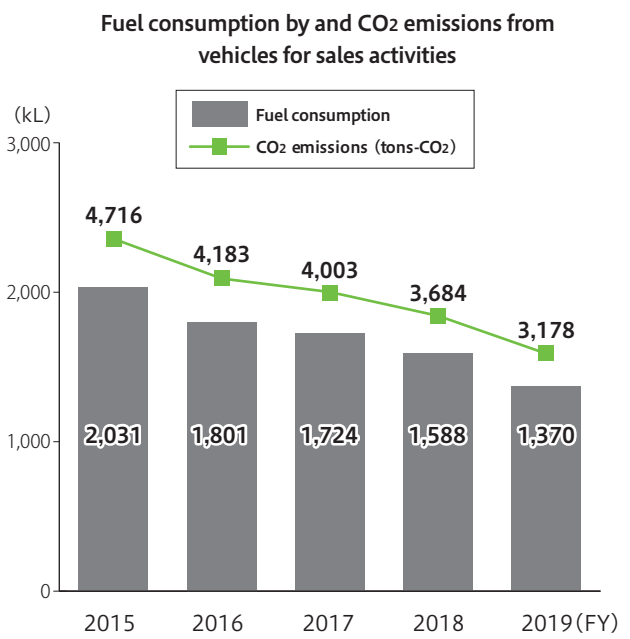
In compliance with the "Act on Rational Use and Proper Management of Fluorocarbons" Shionogi identifies refrigeration, air-conditioning and other types of applicable equipment that it possesses and operates, carries out simplified and periodic inspections, keeps related records, and calculates the amount of leakage. In FY 2019, Shionogi’s calculated Fluorocarbons leakage was 456 tons-CO2. In compliance with the Kigali Amendment to the Montreal Protocol*4, we are promoting a switch to Fluorocarbons-free or low-GWP*5 equipment on the occasion of renewal.

*4 The Montreal Protocol on Substances that Deplete the Ozone Layer, based on the Vienna Convention for the Protection of the Ozone Layer, restricts substances likely to destroy the ozone layer, namely chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs). The Kigali Amendment to the Montreal Protocol includes the restriction of production and consumption of hydrofluorocarbons (HFCs), a non-ozone-depleting Fluorocarbons alternative with a high greenhouse effect.

*5 GWP: Global Warming Potential

■ Vehicles for sales activities

Shionogi is striving to reduce CO2 and gas emissions by improving fuel efficiency through promoting the introduction of more fuel-efficient hybrid vehicles (HVs) to be rented by our medical representatives (MRs). All vehicles for use by our MRs in Japan are now HVs, except in cold regions. Starting from 2020, we are gradually introducing HVs also in cold regions toward a complete replacement by 2024.



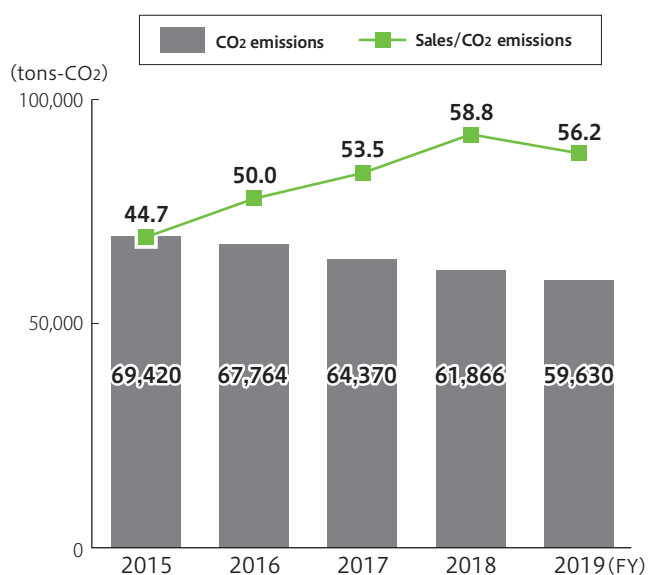
Message from the Leadership Team	Topics	Environmental Management	Environmental Materiality	Action Targets	Results	Site Report	Environment Management Evaluation Opinion
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CO2 emissions

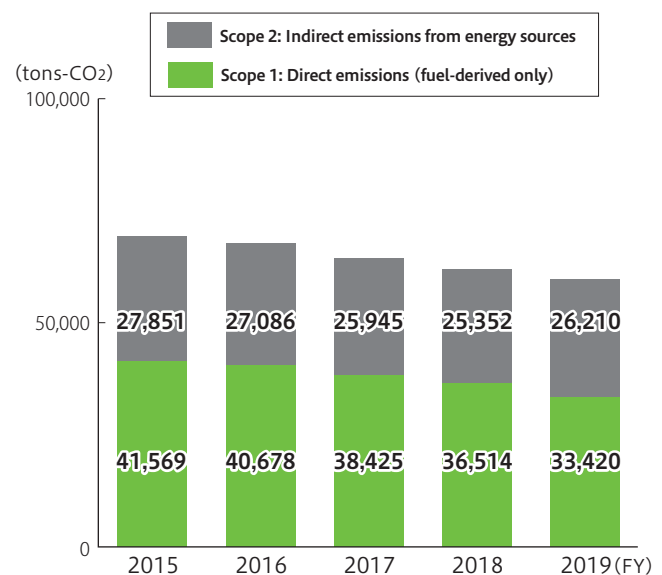
The Shionogi Group is actively working to reduce CO2 emissions to contribute to global warming mitigation.

The Federation of Pharmaceutical Manufacturers' Associations of Japan (FPMAJ) has adopted, as part of its action plan to realize a low-carbon society, the goal of reducing CO2 emissions by pharmaceutical companies by 23% in FY 2020 from the FY 2005 benchmark (Phase I) and by 25% in FY 2030 from the FY 2013 benchmark (Phase II). As an FPMAJ member, the Shionogi Group has set targets above these criteria and the goal of improving specific energy efficiencies by 1% per year. Moreover, we are also promoting the introduction of highly energy-efficient equipment to reduce energy consumption while continuously reviewing our operational modes.

CO2 emissions and productivity
(sales/CO2 emissions)

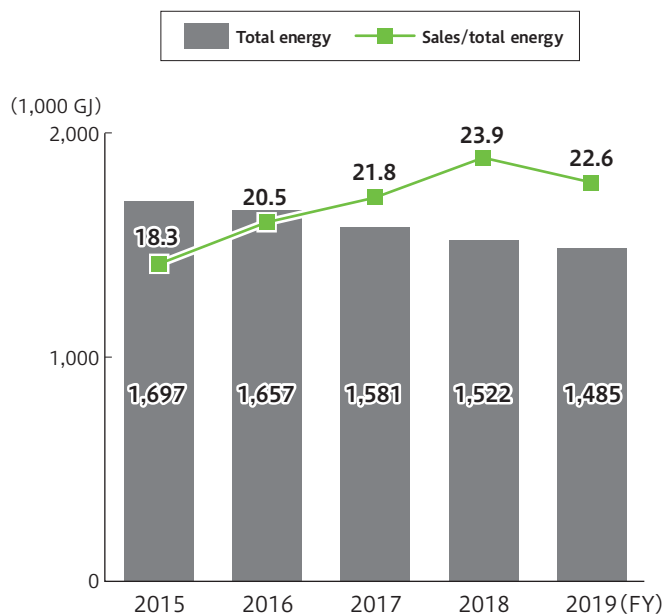


CO2 emissions by Scope

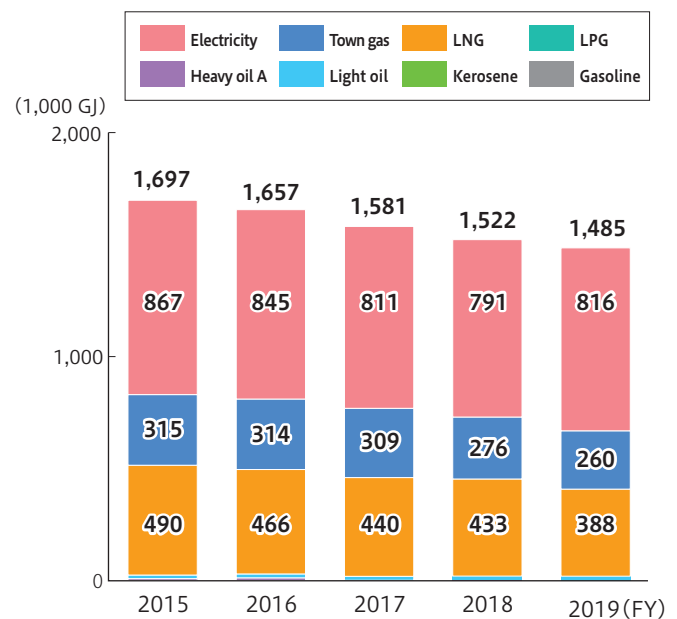


Energy consumption

Total energy and productivity (sales/total energy)



Consumption by energy



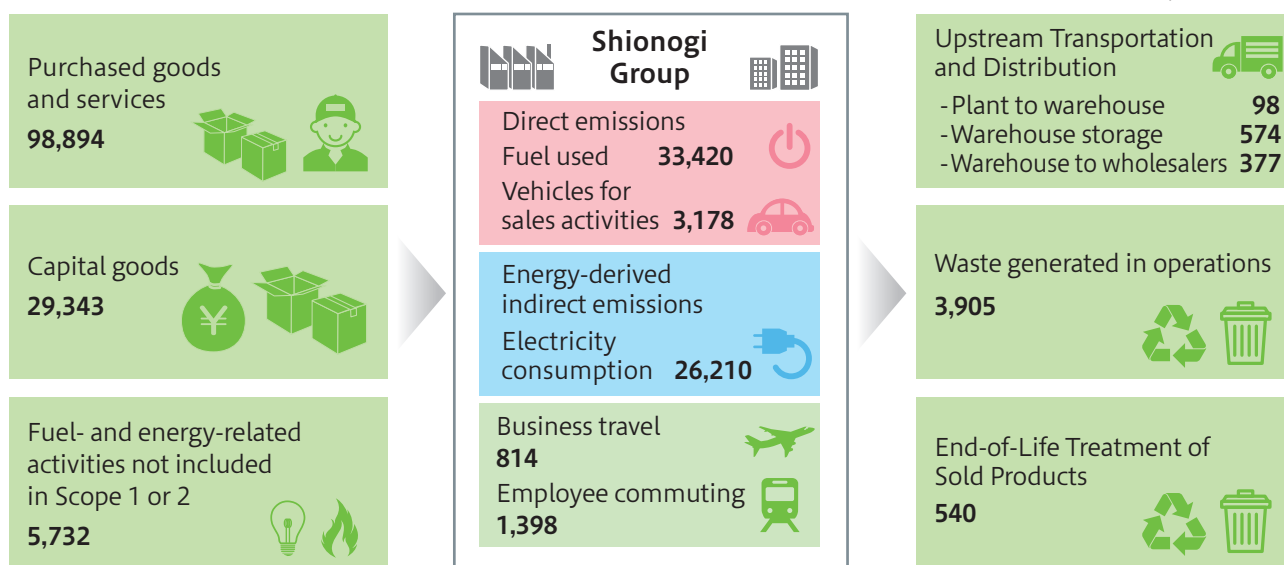
Message from the Leadership Team	Topics	Environmental Management	Environmental Materiality	Action Targets	Results	Site Report	Environment Management Evaluation Opinion
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■ Scope 3 (Greenhouse gas emissions throughout the supply chain)

A company's business activities form a supply chain of its partners through purchasing, sales and so forth. For truly effective CO₂ emission control, it is essential to measure and regulate CO₂ emissions not only from the company's own activities but also throughout the supply chain.

At Shionogi, we measure our CO₂ emissions throughout the supply chain of purchase/procurement, manufacturing, distribution and sales in accordance with the "Basic Guidelines on Accounting for Greenhouse Gas Emissions Throughout the Supply Chain" published by the Ministry of the Environment and the Ministry of Economy, Trade and Industry of Japan.

(Unit: tons-CO₂)



Scope1 : Direct emissions from the company's fuel use and industrial processes

Scope2 : Indirect emissions accompanying the consumption of electricity and thermal energy purchased by the company

Scope3 : Indirect emissions from the supply chain other than those under Scope 1 or 2

(Unit: tons-CO₂)

	Category	FY 2017 results	FY 2018 results	FY 2019 results	Calculation methods (based on the Guidelines)
Scope1	Direct emissions				
	Fuel used	38,425	36,514	33,420	Amount of fuel used as defined under the Energy Conservation Act
	Vehicles for sales activities	4,003	3,684	3,178	Amount of fuel used for vehicles for sales activities
Scope2	Energy-derived indirect emissions	25,945	25,352	26,210	Amount of electricity purchased as defined under the Energy Conservation Act
Scope3	Purchased goods and services	128,468	100,659	98,894	Purchase price of raw materials and merchandise purchased
	Capital goods	58,283	10,627	29,343	Acquisition price of fixed assets newly acquired in the year
	Fuel- and energy-related activities not included in Scope 1 or 2	2,876	2,798	5,732	Amount of electricity purchased
	Upstream Transportation and Distribution				・ Upstream Transportation and Distribution of raw materials not included ・ Downstream transportation and delivery of products (weight and distance)
	- Plant to warehouse	144	122	98	- Plant to warehouse
	- Warehouse storage	388	534	574	- Warehouse storage
	- Warehouse to wholesalers	386	357	377	- Warehouse to wholesalers
	Waste generated in operations	3,797	4,092	3,905	Weight of waste materials classified by type
	Business travel	703	684	814	Number of employees
	Employee commuting	800	780	1,398	Travel expenses calculated for each means of transportation
	End-of-Life Treatment of Sold Products	915	669	540	Amount used by type as classified under the Containers and Packaging Recycling Act

The calculation methods are as indicated in the "Basic Guidelines on Accounting for Greenhouse Gas Emissions Throughout the Supply Chain (Ver. 2.3)" of the Ministry of the Environment and the Ministry of Economy, Trade and Industry of Japan.

Up to FY 2018, the calculations only concerned Shionogi & Co., Ltd. Following the occasion of the establishment of Shionogi Pharma, Co., Ltd., thereby separating the manufacturing function, the calculations concern the Shionogi Group companies in Japan, starting from FY 2019. This has resulted in a barely noticeable change.

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Water

Water is a source of life that circulates the globe and benefits humans and diverse ecosystems through interactions with the atmosphere, soil and other elements. Further worsening water shortage and pollution and flood risk are threatening the sustainability of decent living standards in the future due to the continuing increase in the world population, economic expansion, and climate change.

At Shionogi, we carefully assess, and take appropriate measure to minimize, water risks with a focus on important challenges that can seriously impact the production of pharmaceutical products and all aspects of our corporate life. This is because we are acutely aware that water is an essential factor for the continuation of our pharmaceutical business and for the sustainability of global ecosystems.

Water risk assessment

Quality water is essential for the manufacturing of pharmaceutical products. Water depletion or flooding in the catchment areas where we operate can seriously impact our business continuity. Therefore, we have assessed water risks facing our major operating sites engaged in manufacturing and research, using the internationally recognized WRI Aqueduct*1 and WWF Risk Filter*2 so as to understand water supply necessary for present operations and future business continuity, clarify water risks such as the increase in the probability of floods, and draw up preventive measures.

In-house deliberations based on risk assessment results and past experience and knowledge have led us to conclude that the Shionogi Group is exposed to relatively low water risks for the moment. On the other hand, the level of our future water stress*3 has been on the rise. Accordingly, we are reinforcing our efforts for water conservation and are considering consultation with experts for future water risk assessment.

We have incorporated risk assessment based on the WRI Aqueduct into the selection of our suppliers to clarify and minimize their latent risks.

*1 Water risk assessment tool developed and published by the World Resources Institute (WRI)

*2 Water risk assessment tool developed and published by the World Wide Fund for Nature (WWF)

*3 Condition of strained water supply and demand

WRI Aqueduct Assessment Results (Baseline Water Stress)

Country (operating site location)	No. of operating sites	Risk level/Number of operating sites					Future water stress change
		High	High to medium	Medium	Medium to low	Low	
Japan (Iwate, Shiga, Osaka, Hyogo, and Tokushima)	6	–	–	–	5	1	Change to medium/high level by 2040
China (Jiangsu)	1	–	–	–	–	1	No major change until 2040

WWF-Water Risk Filter Assessment (Baseline Water Stress)

Country (operating site location)	No. of operating sites	Risk level/Number of operating sites				
		High	High to medium	Medium	Medium to low	Low
Japan (Iwate, Shiga, Osaka, Hyogo, and Tokushima)	6	–	–	4	1	1
China (Jiangsu)	1	–	–	1	–	–

In-house assessment

(Shionogi's self-assessment based on hazard maps and other documents and data published by the Ministry of Land, Infrastructure, Transport and Tourism and other entities)

Water risk category		Risks and opportunities	Financial impact	Probability	Remarks
Physical risk	Water shortage	Discontinued operation due to droughts	Large (discontinued operation)	Low	Has not occurred in at least the last 30 years
	Water excess	Discontinued operation due to floods	Large (discontinued operation)	Low	Has not occurred in at least the last 30 years
	Water quality deterioration	Site operation suspended due to water quality deterioration	Large (discontinued operation)	Low	Has not occurred in at least the last 30 years
Regulatory risk		Additional investment in wastewater treatment following reinforced wastewater quality criteria	Medium (capital investment)	Intermediate	Respond to applicable administrative policies in all sincerity
Reputation risk		Compromised public confidence due to environmental pollution by wastewater from the site	Large (compromised confidence)	Low	Recovering public confidence is difficult; must address this risk item with special focus

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Water consumption

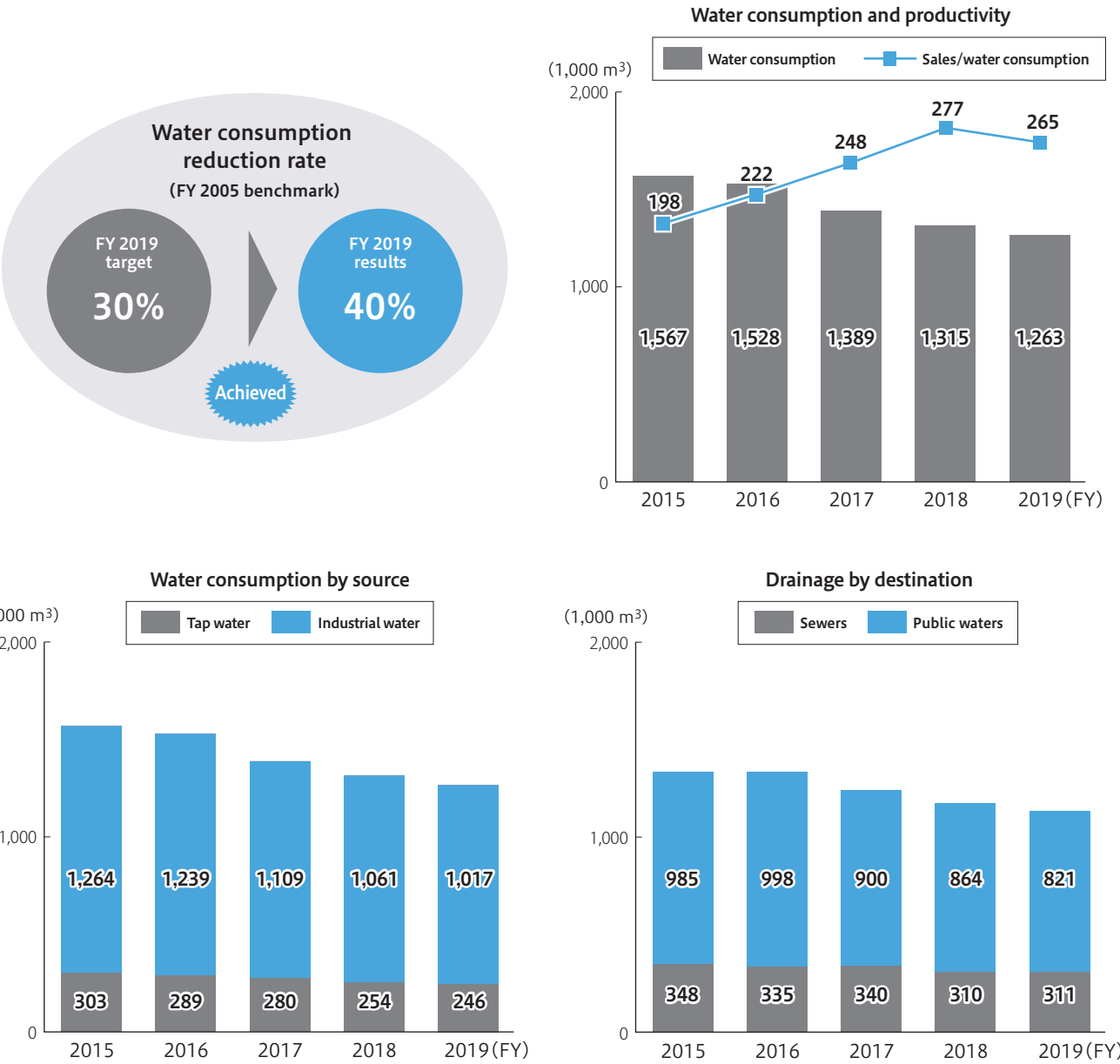
To protect water, the Shionogi Group keeps accurate measures of its water consumption, both tap water and industrial water, and strives to conserve water by reviewing its manufacturing equipment operation and cleansing methods. We obtain the water we use entirely from the public water supply system, with no direct water intake from underground, rivers or the sea. We do not obtain water from areas where the level of water stress is found to be high in risk assessment.

We release wastewater into sewers or rivers, not into the sea. Our wastewater, purified by in-house treatment facilities and constantly monitored for any abnormality, conform to our management criteria, which are voluntarily set more stringently than those mandated by laws and regulations.

The quantity of actual water consumption by the operating sites corresponds to about 10% of the quantity of water taken in, with a large part of the water used for our activities eventually returned to the aquatic environment.

Our medium-term target for water consumption is keeping it at or less 1,340,000 m³ in FY 2024 (keeping at the level of FY 2018 consumption).

Results



Message from the Leadership Team	Topics	Environmental Management	Environmental Materiality	Action Targets	Results	Site Report	Environment Management Evaluation Opinion
AMR	Climate Change	Water	Waste	Chemical Substances	Pollution Prevention	Biodiversity	Environmental Accounting

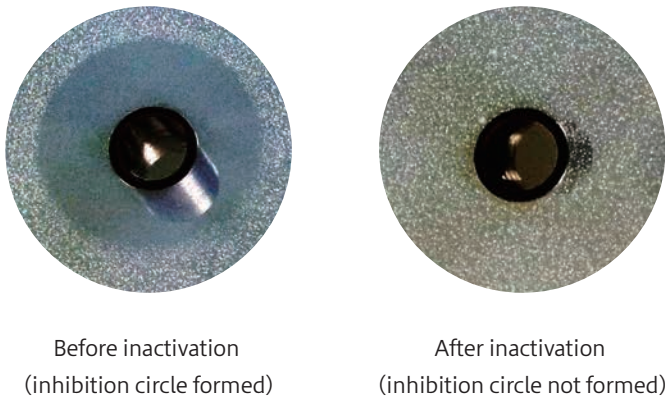
■ Pharmaceuticals in the Environment

Pharmaceuticals released into the natural environment are drawing an increasing amount of attention worldwide, as attested to by the report published by the Organization for Economic Cooperation and Development (OECD) titled “Pharmaceuticals in the Environment (PiE).”^{*1} At the Shionogi Group, we confirm at the outset of manufacturing each new product that its pharmaceutical ingredients contained in treated wastewater do not have any impact on the natural environment, thereby responsibly handling pharmaceuticals not only during the manufacturing process but also during release from the plant.

For AMR control, we confirm that the level of antimicrobial content in wastewater has no environmental impact if released into the environment in the following manner: antimicrobials contained in wastewater are first inactivated in the building where they are produced and are then sent to the in-house wastewater treatment facility.

^{*1}: OECD 「Pharmaceutical Residues in Freshwater」
<https://www.oecd.org/publications/pharmaceutical-residues-in-freshwater-c936f42d-en.htm>

Testing the activity of an antimicrobial



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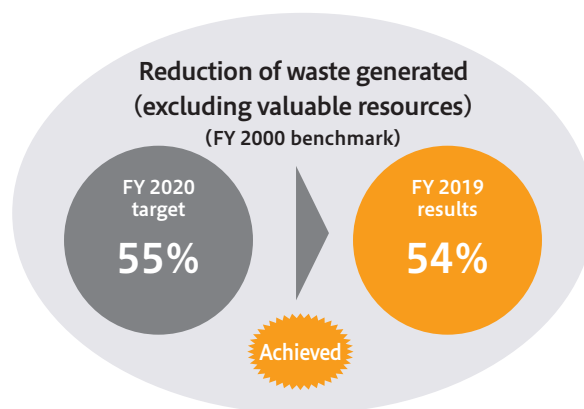
Waste

The world population increase and economic expansion have brought about mass production, mass consumption, and mass disposal in our society, giving rise to serious environmental problems, such as the depletion of natural resources, the destruction of the natural environment, and the rapidly growing need for final waste disposal sites. It is now imperative to conserve natural resources and reduce negative impact on the environment.

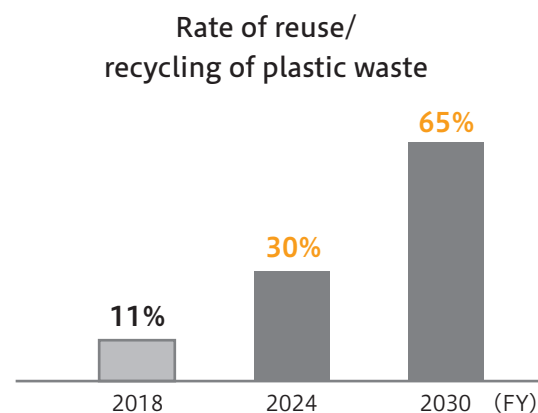
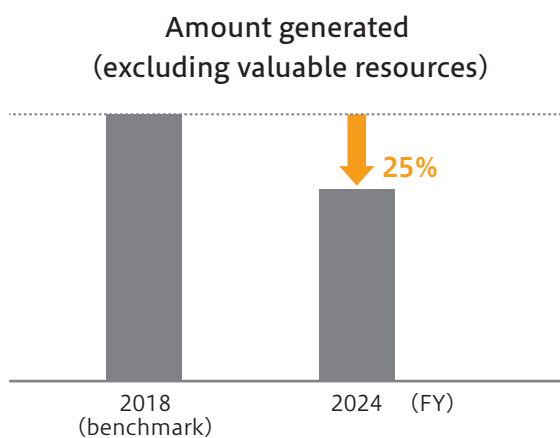
Environmental pollution due to marine plastic waste has also become a global issue. In such a situation, Shionogi is striving to be environmentally responsible. The Shionogi Group uses and disposes of resources as pharmaceutical ingredients, as well as research materials, equipment, and instruments, generating in FY 2019 some 3,100 tons of waste. As for plastic, in FY 2019 we used about 640 tons of plastic and generated about 280 tons of waste plastic.

We are striving to restrict waste generation and reuse and recycle resources while promoting the responsible disposal and implementing measures to reduce the amount of plastics used for our products.

Results



Medium- and long-term targets



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Waste Generation, Reuse and Recycling, and Disposal by Landfill

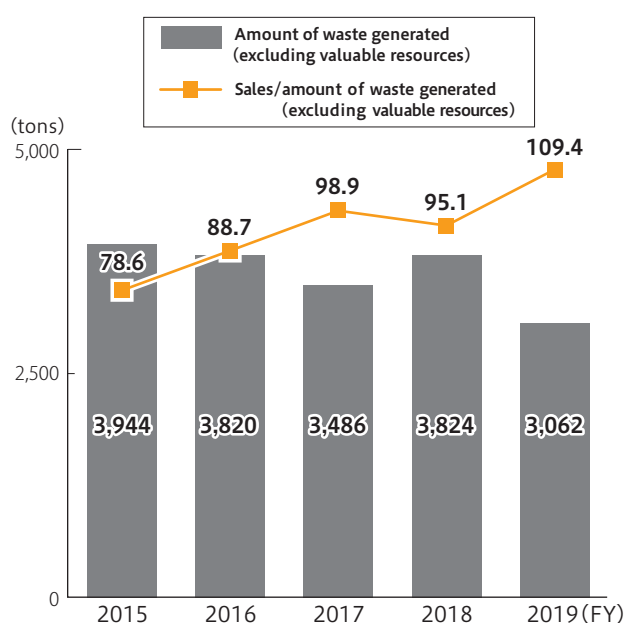
As part of its voluntary action plan to realize a reuse- and recycling-oriented society, the FPMAJ has adopted the goals of reducing the amount of industrial waste disposed of as landfill in FY 2020 by 70% from the FY 2000 actual amount and of reusing or recycling at least 55% of industrial waste in FY 2020. As an FPMAJ member, the Shionogi Group also set its numerical targets for FY 2020, considering the manufacturing situations and the progress of related measures at the operating sites.

Waste materials generated within the Shionogi Group mainly include waste oils resulting from its manufacturing processes, sludge from wastewater treatment, and plastics used in product containers. We practice the “3R” approach (Reduce, Reuse, and Recycle) through various measures, such as improving the manufacturing processes, selling waste liquids, plastics and metals, and reducing the amount of waste liquids generated. (For Shionogi’s efforts to reduce plastic use, refer to “Strategies for the reuse and recycling of plastic waste” on Page 9.)

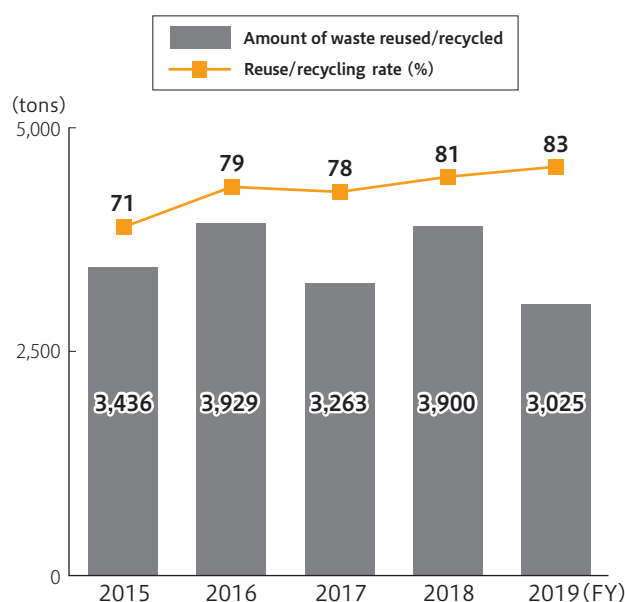
Shionogi obtains its rate of reuse and recycling by taking the amount of waste sold plus the amount reused/recycled and dividing it by the amount of waste generated (including valuable resources).

The landfill rate is defined as the amount disposed of as landfill divided by the amount of waste generated (including valuable resources).

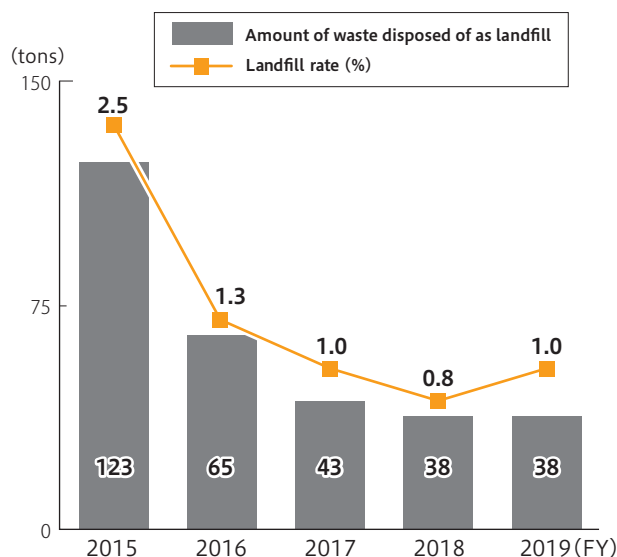
Waste generation and productivity (sales/amount generated)



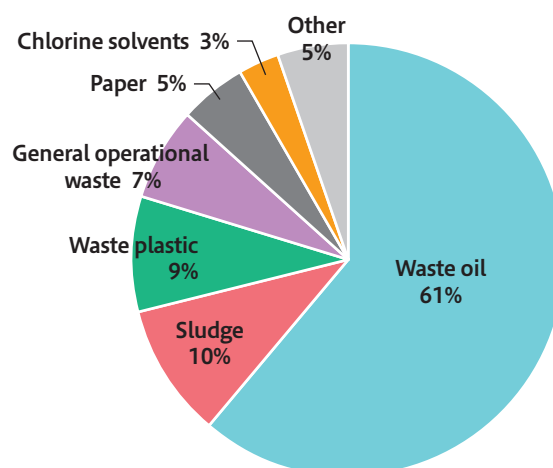
Amount and rate of waste reused/recycled



Waste disposed of as landfill and landfill rate



Amount of waste generated (excluding valuable resources) by type (FY 2019 results)



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■ Prevention of illegal dumping

To prevent illegal dumping of industrial waste, Shionogi takes great care in selecting the business operators to whom we consign waste transportation and treatment/disposal, giving priority to those officially recognized for their quality services. In addition, we verify the quality of their operation on the basis of their business licenses, treatment/disposal facilities, operational conditions, document management status, implementation of emergency drills, and so forth, using our contractor evaluation sheet. Upon selecting the operators, we ensure the appropriate management of contractual documents, licenses, and manifests (waste management sheets), conducting at least one on-site inspection per year for each operator.

■ Reuse and recycling of product containers and packaging materials

In compliance with the Containers and Packaging Recycling Act, we put to reuse and recycling a part of the containers and packaging materials used for the products we sell. We are also striving to reduce our environmental impact by modifying container materials and packaging forms while making sure to maintain and improve product quality.

Containers and packaging materials used and amount consigned for reuse/recycling (FY 2019 results)

(tons)

	Containers and packaging materials used	Amount consigned for reuse/recycling
Plastic	641	147
Paper	418	11
Glass (transparent)	37	7
Glass (brown)	8	2

Reuse/recycling consignment fee: 6,909 thousand yen

■ In-house reuse/recycling of resources

Organic solvents used during the manufacturing process of active pharmaceutical ingredients (API) at the Kanegasaki Plant, such as dichloromethane, ethyl acetate, and methanol, are collected in-house for reuse, thereby effectively using resources and regulating waste generation.

■ Clean-up activities

Environmental pollution caused by marine plastic waste has become a major global issue. Marine plastic waste can partly be traced back to plastic waste generated overland and carried into the sea by rain and wind via rivers. Therefore, personnel at Shionogi's respective operating sites participate in clean-ups along the surrounding roads, removal of illegal posters, and other such initiatives organized in the local communities.

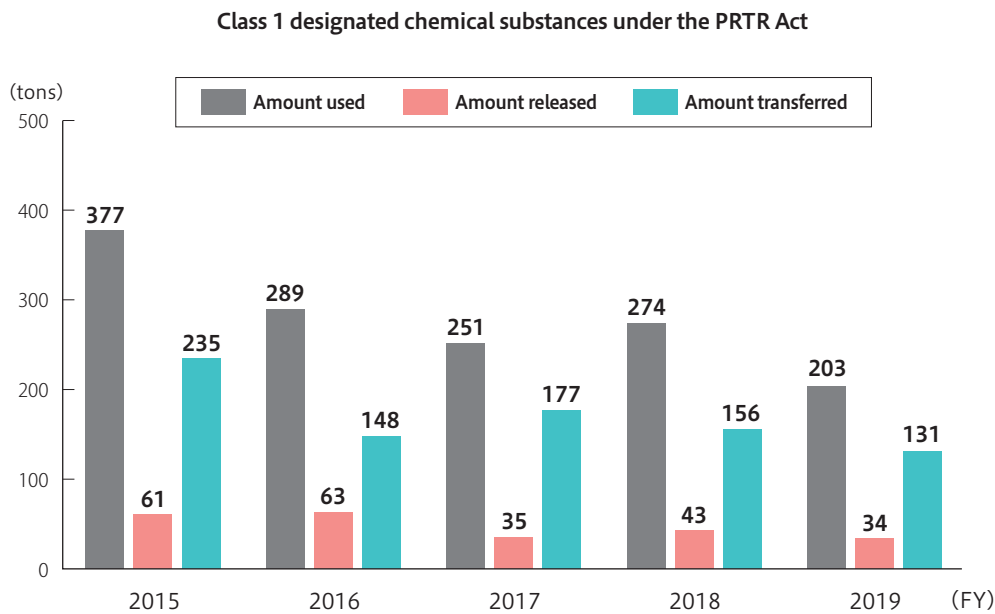
Chemical Substances

The research, development and manufacturing of pharmaceutical products involve the use of numerous types of chemical substances. Some of them can adversely impact human health, ecosystems, and the global environment. The handling of chemical substances is governed by the Pollutant Release and Transfer Register (PRTR) Act and various other laws and regulations. It goes without saying that Shionogi strictly adheres to these rules. We also make sure to appropriately manage chemical substances by regulating their release into the atmosphere, sewers and public waters in accordance with our voluntary criteria, which are stricter than those imposed by related laws and regulations. We consider these actions to be extremely important in terms of compliance and corporate social responsibility.

PRTR

In compliance with the PRTR Act, under which it is mandatory to record, calculate and publish the status of release of chemical substances into the environment, Shionogi submits relevant data to the authorities and manages the amounts of volatile organic compounds (VOCs) we use, release, and transfer. In the future, we will continue our responsible management of VOC use, release and transfer to reduce the impact that our operations may have on the environment.

Under the PRTR Act, business operators are required to record and report to the authorities the amounts of chemical substances that are released into the atmosphere and rivers, disposed of, and recycled in their operations. The table on the following page lists the headings under which this reporting is made. The “amount transferred” to “outside operating sites” refers to the amount handled as waste.

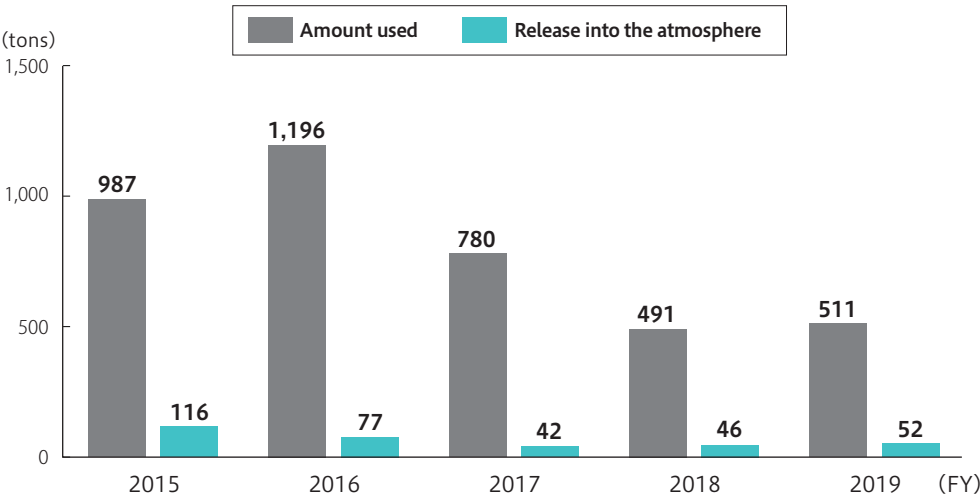


Substances to be registered under the PRTR Act

(Unit: kg)

Substance name	Amount used	Amount released			Amount transferred	
		Atmosphere	Public waters	Soil	Outside operating sites	Sewers
<i>N,N</i> -Dimethylacetamide	7,394	21	0	0	4,159	0
<i>N,N</i> -Dimethylformamide	8,081	31	0	0	5,281	0
Acetonitrile	78,153	2,847	0	0	70,808	0
Chloroform	6,034	163	0	0	5,871	0
Dichloromethane (methylene chloride)	82,786	30,186	2	0	33,489	0
Tributylamine	5,114	0	0	0	0	0
Toluene	2,898	29	0	0	2,869	0
<i>n</i> -Hexane	6,346	256	0	0	6,090	0
Pyridine	6,175	5	0	0	2,653	0

VOC use and release into the atmosphere



■ PCB

Polychlorinated biphenyls (PCBs) are a cause of great concern in terms of global-scale contamination because they do not easily biodegrade in the environment but easily accumulate in the bodies of living organisms through the food chain. In the past, PCBs were used in numerous items, such as condensers, transformers and fluorescent light ballasts. It is therefore imperative that all materials containing PCBs, whether they are being replaced or are still in use, be appropriately managed to contain their impact.

At Shionogi, appropriate management of PCB-containing materials is assured by personnel specifically appointed for this task. At the same time, the treatment and disposal of PCB-containing materials are continued according to a medium-term plan. In FY 2020, Shionogi expects to complete the disposal of all known PCB-containing materials, and this will be followed by inspection to ensure there are no oversights.

■ Environmental and safety assessment of chemical processes

Shionogi performs preliminary assessment of the safety of chemicals and the danger of reaction and incompatibility in the development stage of manufacturing and testing methods for pharmaceutical compounds and candidate compounds and in the designing stage of related equipment. We also continue to explore production processes so as to enhance efficiency in terms of waste reduction, energy conservation, and the like in the manufacturing stage.

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Pollution Prevention

Environmental pollution caused by exhaust gas, wastewater, and waste materials containing toxic substances resulting from business activities adversely impacts human health and ecosystems. Pollution can also be caused by the use of products and discarded unneeded products. In Japan, various cases of serious pollution harming human health began emerging in the second half of the 1900s due to the country’s industrialization and economic development, which dramatically increased the amounts of waste materials and toxic substances contaminating the atmosphere, aquatic areas, soil, and underground water. At Shionogi, we are fully aware that pollution prevention continues to be an essential social challenge today, as we endeavor to protect and enhance people’s health and the daily environment. Environmental pollution, once it occurs, poses serious impact to the local communities and biodiversity, which can only be restored to their original state – if it is possible to do so at all – with enormous time and cost.

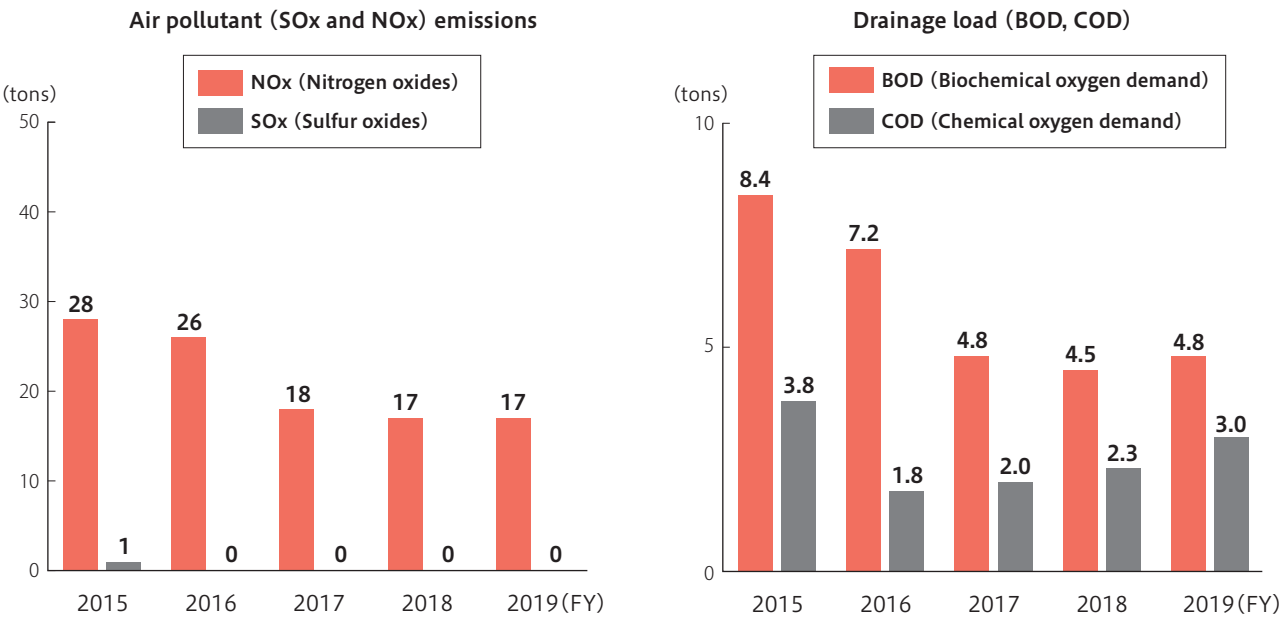
At Shionogi, we consider legal compliance as the very foundation of our corporate existence. Compliance with EHS-related laws and regulations is an integral part of our EHS policy. Our EHS management system provides a framework in which we ensure strict compliance with laws and regulations relating to air, water and soil pollution while assessing the status of compliance and implementing measures for effective pollution prevention. For example, Shionogi has long been making an effort to reduce pollution risk by operating in-house wastewater treatment facilities and conducting periodic monitoring.

Prevention of air, water and soil pollution

To prevent air pollution, Shionogi strictly observes the regulatory values for NOx, SOx, and particulate matter while reducing SOx generation through boiler fuel conversion. To prevent contamination in sewers and rivers, we maintain voluntary control values for pollutants that are stricter than the legal and regulatory values, carrying out round-the-clock monitoring with the use of TOC *1 meters and oil content monitoring devices. At the Kanegasaki Plant, the Tokushima Plant, and the Aburahi Research Center, waste water is treated and purified at the facilities on their premises before it is released into nearby rivers.

The Kanegasaki Plant, which handles large quantities of chemicals, maintains voluntary control values for soil, taking measurements periodically. The measurements have constantly been below the applicable environmental criteria.

*1 TOC: Total Organic Carbon



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■ Compliance with related laws and regulations

Environment-related laws and regulations vary, encompassing a wide spectrum, from waste and energy management to the prevention of air and water pollution and the management of chemical substances. To ensure thorough compliance, we share information on legal and regulatory revisions at the respective operating sites, organize educational programs, and compile relevant information and knowledge in manuals. We also conduct a periodic assessment of the status of legal and regulatory compliance. As with environmental matters, we also promote legal and regulatory compliance and assessment with regard to health and safety affairs.

To date, we have never been subject to litigation or penalties for EHS-related violations. In FY 2019, we registered no cases of legal violation and did not receive any complaints from the general public.

Number of incidents of excess emissions (exceeding legal restrictions) (Cases)

FY	2015	2016	2017	2018	2019
Shionogi	0	0	1	0	0
Group companies	0	0	0	0	0

Number of complaints relating to the environment (Cases)

FY	2015	2016	2017	2018	2019
Shionogi	1	1	2	1	0
Group companies	0	0	0	0	0

No litigation
or penalties
in the past

FY 2019
results

No legal violations,
no accidents,
no complaints

Biodiversity

Shionogi is committed to protecting biodiversity. We endorse the “Declaration of Biodiversity by Keidanren and Action Policy,” publishing our ambitious action policies for and specific activities on biodiversity as part of the “Initiative based on the Declaration of Biodiversity by Keidanren”. (Refer to “Topics” on Page 8.)

With regard to our environmental activities concerning biodiversity, we set action targets and organize related programs, including education for employees. All such activities conform to the Act Concerning the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms (“Cartagena Act”) and the Invasive Alien Species Act.

At the Botanical Gardens within the Aburahi Research Center, we preserve endangered species and rare plants. We also use the Botanical Gardens for the benefit of the local community mainly through events that we organize to support education for local children, future community leaders.

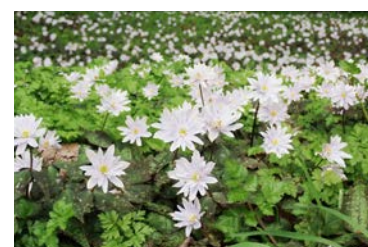
As our general education support at Aburahi Elementary School, a public school in Koka City, we organize workshops in which pupils try their hand at dyeing goods with dyes taken from indigo plants and purple gromwell cultivated in the herb garden we have created on the school grounds, and we organize classes wherein pupils learn about plants by touching and observing plant roots, leaves, seeds, and fruits in the Botanical Gardens. We hold these events in partnership with Kusuri Gakushukan (Pharmacological Learning Center) in Koka City and other local corporations, with experts from the botanical gardens of Kobe and Kyoto Pharmaceutical Universities serving as guest lecturers. The events are highly appreciated as initiatives that support children’s learning for the future through collaboration among local government, academia and the business community. In 2019, Aburahi Elementary School was honored with the Education Minister’s award in the National Schoolyard and Childcare Centre Yard Biotope Contest for the school’s activities, which were recognized as the best among the contestants.



Scenes from elementary school programs

As for the preservation of endangered species and rare plants, in FY 2019 we transplanted some wild anemones (*Anemone keiskeana*), autogenous on the premises of Taki Shrine, a protected natural habitat in Shiga Prefecture, to the Aburahi Botanical Gardens, thereby starting ex situ conservation in anticipation of extinction in the natural habitat. In Shiga Prefecture, *Anemone keiskeana* is designated as a rare wild plant species and as a species exposed to increased risk of extinction.

The Shionogi Group intends to continue the management and maintenance of the Aburahi Botanical Gardens, through which we carry out conservation activities as described above and contribute to education in the local community.



Anemone keiskeana

“Shiga Prefecture Certificate of Biodiversity Initiatives” for the Botanical Gardens

The Aburahi Botanical Gardens has obtained a “Shiga Prefecture Certificate of Biodiversity Initiatives (One Star)” in recognition of community activities viewed as effective initiatives for the protection of biodiversity and the sustainable use of natural resources.



Environmental Accounting

Shionogi practices environmental accounting based on the Environmental Accounting Guidelines of the Ministry of the Environment of Japan. Environmental accounting enables us to clarify the environmental protection costs and benefits from related activities and to quantitatively manage initiatives for environmental protection. In FY 2019, our main investment items included the replacement of air-conditioning systems, refrigerators, boilers, and other such equipment, resulting in global environment protection costs. The main cost items included a pollution prevention cost, arising mainly from the maintenance and management of exhaust gas and wastewater treatment facilities and dichloromethane absorption and recovery equipment, and a resource circulation cost for waste treatment and disposal. The actual economic benefits included profit from the sale of waste liquids, metal scrap, and other recyclable resources and a reduction in energy costs mainly for electricity and gas, realized through the revision of manufacturing and air-conditioning equipment.

Accounting scope

Accounting covers the period from April 1, 2019 through March 31, 2020, and its scope includes Shionogi & Co., Ltd. and Shionogi Group companies in Japan.

Environmental protection costs were calculated by proportional distribution according to the percentages related to environmental protection.

Economic benefits from environmental protection measures were calculated by taking into account only effects that are calculated based on objectively verifiable grounds (actual effects).

Environmental protection costs

Category		Key activities	Investment (in 1,000 yen)	Cost (in 1,000 yen)
(1) Business area cost			8,900	605,210
Breakdown	① Pollution prevention cost	Maintenance and management of the below ・ exhaust gas treatment equipment ・ wastewater treatment facilities ・ dichloromethane absorption and recovery equipment Measurement and analysis of wastewater, exhaust gas, etc.	0	253,283
	② Global environment protection cost	Renewal of air-conditioning systems, refrigerators, boilers, etc. Operational improvement of manufacturing and air-conditioning facilities	8,900	101,199
	③ Resource circulation cost	Recycling and treatment of the below ・ waste solvents ・ general waste materials ・ industrial waste	0	250,728
(2) Upstream/downstream cost		Consignment of reuse of containers and packaging materials	0	7,804
(3) Administration cost		Maintenance and operation of environmental management systems Development and maintenance of green zones	0	311,166
(4) R&D cost			0	0
(5) Social activity cost		Contribution to environmental organizations Communication with local communities	0	719
(6) Environmental remediation cost		Penalty imposed for pollutants	0	179
Total			8,900	925,360

Economic benefits from environmental protection (actual positive effects)

Description		Amount of money (in 1,000 yen)
Benefit	Business income from recycling of waste	6,033
Cost reduction	Reduction in energy and water expenses	20,444
Total		26,477

Site Report

■ Shionogi Pharmaceutical Research Center

Energy and resource consumption

(FY)

Item	Unit	2015	2016	2017	2018	2019
Electricity	1,000kWh	28,224	28,647	28,594	28,450	28,599
Gasoline	kL	0	0	0	0	0
Kerosene	kL	0	0	0	0	0
Light oil	kL	0	0	0	0	0
Heavy oil A	kL	1	3	1	2	1
Liquefied petroleum gas (LPG)	tons	0	0	0	0	0
Liquefied natural gas (LNG)	tons	0	0	0	0	0
Town gas	1,000Nm ³	2,522	2,625	2,551	2,402	2,366
Water	1,000m ³	134	157	164	135	131

Impact released

(FY)

Item	Unit	2015	2016	2017	2018	2019
CO ₂	tons-CO ₂	14,099	14,464	14,278	13,903	13,865
Waste generated (excluding valuable resources)	tons	464	466	488	427	390
Waste put to landfill	tons	15	16	15	13	12
Drainage (sewers)	1,000m ³	134	157	164	135	131
Drainage (public waters)	1,000m ³	0	0	0	0	0
NO _x	tons	2	2	2	2	2
SO _x	tons	–	–	–	–	–
BOD	tons	3	3	2	2	2
COD	tons	–	–	–	–	–

Substances to be registered under the PRTR Act

(kg)

Substance name	Amount used	Amount released			Amount transferred	
		Atmosphere	Public waters	Soil	Outside operating sites	Sewers
<i>N,N</i> -Dimethylformamide	2,738	0	0	0	2,738	0
Acetonitrile	8,946	292	0	0	8,654	0
Chloroform	6,034	163	0	0	5,871	0
<i>n</i> -Hexane	6,346	256	0	0	6,090	0

Shionogi Pharmaceutical Research Center



■ Shionogi CMC Research Innovation Center

Energy and resource consumption

(FY)

Item	Unit	2015	2016	2017	2018	2019
Electricity	1,000kWh	9,958	10,359	10,077	10,161	9,694
Gasoline	kL	0	0	0	0	0
Kerosene	kL	0	0	0	0	0
Light oil	kL	0	0	0	0	0
Heavy oil A	kL	0	0	0	0	0
Liquefied petroleum gas (LPG)	tons	0	0	0	0	0
Liquefied natural gas (LNG)	tons	0	0	0	0	0
Town gas	1,000Nm ³	986	1,006	1,033	980	925
Water	1,000m ³	89	95	85	82	77

Impact released

(FY)

Item	Unit	2015	2016	2017	2018	2019
CO ₂	tons-CO ₂	5,191	5,354	5,331	5,238	4,975
Waste generated (excluding valuable resources)	tons	180	192	207	205	159
Waste put to landfill	tons	0.2	0.0	0.0	0.0	0.0
Drainage (sewers)	1,000m ³	73	71	63	60	57
Drainage (public waters)	1,000m ³	0	0	0	0	0
NO _x	tons	0	1	0	1	1
SO _x	tons	–	–	–	–	–
BOD	tons	0	0	0	0	0
COD	tons	–	–	–	–	–

Substances to be registered under the PRTR Act

(kg)

Substance name	Amount used	Amount released			Amount transferred	
		Atmosphere	Public waters	Soil	Outside operating sites	Sewers
<i>N,N</i> -Dimethylacetamide	4,180	21	0	0	4,159	0
<i>N,N</i> -Dimethylformamide	2,553	13	0	0	2,541	0
Acetonitrile	6,705	24	0	0	6,587	0

Shionogi CMC Research Innovation Center



■ Aburahi Research Center

Energy and resource consumption

(FY)

Item	Unit	2015	2016	2017	2018	2019
Electricity	1,000kWh	2,340	2,485	2,580	2,518	2,449
Gasoline	kL	5	5	5	5	7
Kerosene	kL	4	1	2	1	2
Light oil	kL	0	0	0	0	0
Heavy oil A	kL	0	0	0	0	1
Liquefied petroleum gas (LPG)	tons	301	327	333	329	349
Liquefied natural gas (LNG)	tons	0	0	0	0	0
Town gas	1,000Nm ³	0	0	0	0	0
Water	1,000m ³	16	15	15	15	15

Impact released

(FY)

Item	Unit	2015	2016	2017	2018	2019
CO ₂	tons-CO ₂	1,626	1,738	1,786	1,755	1,800
Waste generated (excluding valuable resources)	tons	43	41	48	44	52
Waste put to landfill	tons	2	1	2	1	2
Drainage (sewers)	1,000m ³	0	0	0	0	0
Drainage (public waters)	1,000m ³	12	8	13	12	11
NO _x	tons	2	2	3	–	–
SO _x	tons	0	0	0	–	–
BOD	tons	0	0	0	0	0
COD	tons	0	0	0	0	0

Substances to be registered under the PRTR Act: None

Aburahi Research Center



■ Settsu Plant

Energy and resource consumption

(FY)

Item	Unit	2015	2016	2017	2018	2019
Electricity	1,000kWh	20,864	19,549	17,274	14,884	15,496
Gasoline	kL	1	1	1	1	2
Kerosene	kL	0	0	0	0	0
Light oil	kL	1	1	2	2	8
Heavy oil A	kL	0	0	0	0	0
Liquefied petroleum gas (LPG)	tons	0	0	0	0	0
Liquefied natural gas (LNG)	tons	0	0	0	0	0
Town gas	1,000Nm ³	3,036	2,899	2,781	2,278	2,039
Water	1,000m ³	173	152	140	140	127

Impact released

(FY)

Item	Unit	2015	2016	2017	2018	2019
CO ₂	tons-CO ₂	13,055	12,356	11,413	9,571	9,233
Waste generated (excluding valuable resources)	tons	459	390	276	266	300
Waste put to landfill	tons	1.7	1.0	0.8	0.8	0.8
Drainage (sewers)	1,000m ³	126	108	98	102	110
Drainage (public waters)	1,000m ³	0	0	0	0	0
NO _x	tons	4	3	3	2	2
SO _x	tons	—	—	—	—	—
BOD	tons	2	1	1	1	1
COD	tons	3	1	1	2	2

Substances to be registered under the PRTR Act

(kg)

Substance name	Amount used	Amount released			Amount transferred	
		Atmosphere	Public waters	Soil	Outside operating sites	Sewers
Acetonitrile	2,327	0	0	0	2,327	0

Settsu Plant



■ Kanegasaki Plant

Energy and resource consumption

(FY)

Item	Unit	2015	2016	2017	2018	2019
Electricity	1,000kWh	17,115	14,900	13,835	13,745	16,672
Gasoline	kL	5	5	4	4	3
Kerosene	kL	0	0	0	0	0
Light oil	kL	0	0	0	1	0
Heavy oil A	kL	233	325	48	80	37
Liquefied petroleum gas (LPG)	tons	13	14	13	12	11
Liquefied natural gas (LNG)	tons	8,970	8,530	8,067	7,932	7,113
Town gas	1,000Nm ³	0	0	0	0	0
Water	1,000m ³	990	938	826	818	795

Impact released

(FY)

Item	Unit	2015	2016	2017	2018	2019
CO ₂	tons-CO ₂	30,747	29,055	26,685	26,375	25,032
Waste generated (excluding valuable resources)	tons	2,360	2,261	1,881	2,120	1,372
Waste put to landfill	tons	98	43	22	21	16
Drainage (sewers)	1,000m ³	0	0	0	0	0
Drainage (public waters)	1,000m ³	829	818	743	740	704
NO _x	tons	20	18	10	12	12
SO _x	tons	1	0	0	0	0
BOD	tons	2	3	1	1	1
COD	tons	–	–	–	–	–

Substances to be registered under the PRTR Act

(kg)

Substance name	Amount used	Amount released			Amount transferred	
		Atmosphere	Public waters	Soil	Outside operating sites	Sewers
<i>N,N</i> -Dimethylformamide	2,790	18	0	0	2	0
Acetonitrile	31,651	2,246	0	0	25,002	0
Dichloromethane (methylene chloride)	82,786	30,186	2	0	33,489	0
Tributylamine	5,114	0	0	0	0	0
Pyridine	6,175	5	0	0	2,653	0

Kanegasaki Plant



■ Tokushima Plant

Energy and resource consumption

(FY)

Item	Unit	2015	2016	2017	2018	2019
Electricity	1,000kWh	3,811	4,455	4,521	5,065	4,646
Gasoline	kL	0	0	0	0	0
Kerosene	kL	0	0	0	0	0
Light oil	kL	0	0	0	0	0
Heavy oil A	kL	0	0	0	0	0
Liquefied petroleum gas (LPG)	tons	0	0	0	0	0
Liquefied natural gas (LNG)	tons	0	0	0	0	0
Town gas	1,000Nm ³	359	366	401	388	365
Water	1,000m ³	150	172	143	112	105

Impact released

(FY)

Item	Unit	2015	2016	2017	2018	2019
CO ₂	tons-CO ₂	2,067	2,292	2,393	2,541	2,352
Waste generated (excluding valuable resources)	tons	261	313	482	692	690
Waste put to landfill	tons	0.6	1.2	0.3	1	6
Drainage (sewers)	1,000m ³	0	0	0	0	0
Drainage (public waters)	1,000m ³	145	172	143	112	105
NO _x	tons	–	–	–	–	–
SO _x	tons	–	–	–	–	–
BOD	tons	1	1	0	0	0
COD	tons	1	0	0	0	1

Substances to be registered under the PRTR Act

(kg)

Substance name	Amount used	Amount released			Amount transferred	
		Atmosphere	Public waters	Soil	Outside operating sites	Sewers
<i>N,N</i> -Dimethylacetamide	3,213	0	0	0	0	0
Acetonitrile	28,524	285	0	0	28,238	0
Toluene	2,898	29	0	0	2,869	0

Tokushima Plant



■ C&O Pharmaceutical Technology (Holdings) Ltd. Nanjing Plant

Energy and resource consumption

(FY)

Item	Unit	2015	2016	2017	2018	2019
Electricity	1,000kWh	7,044	9,004	7,008	7,636	9,221
Steam	GJ	0	0	0	0	15,863
Coal	tons	0	0	0	0	0
Liquefied petroleum gas (LPG)	tons	302	534	462	489	220
Water	1,000m ³	180	236	122	151	137

Impact released

(FY)

Item	Unit	2015	2016	2017	2018	2019
CO ₂	tons-CO ₂	6,470	10,012	7,937	8,603	7,368
Waste generated	tons	53	153	23	25	70
Waste put to landfill	tons	11	19	2	3	6
Drainage (sewers)	1,000m ³	63	74	31	42	46
Drainage (public waters)	1,000m ³	0	0	0	0	0

C&O Pharmaceutical Technology (Holdings) Ltd. Nanjing Plant



Environment Management Evaluation Opinion

Each year we have the honor of having experts from the Institute for Environmental Management Accounting (IEMA) assess our reports so as to ensure the reliability and transparency of the information we publish therein and to advise us on the Shionogi Group's environmental initiatives, status of management, and future activities. For the fiscal year presented in this report, the experts visited us at the Head Office and the Shionogi CMC Research Innovation Center, where they interviewed the leadership team and verified the environmental data.



(L-R) Prof. Katsuhiko Kokubu and Ms. Eriko Nashioka, IEMA; Masako Kudo (head of the Sustainability Management Office) and Takeshi Shiota (Corporate Officer), Shionogi



Interview with the leadership team

Environment Management Evaluation Opinion



An overview of the objectives and executed actions

As a third party unrelated to the business operation of Shionogi & Co., Ltd. (hereinafter referred to as “Shionogi”), we provide this report to enhance the credibility of Shionogi’s report by assessing its business management activities with an emphasis on the environment as described in its Environmental Report 2020.

We have conducted a series of activities to investigate the position of Shionogi’s environmental activities within its management strategies and how they are planned and executed accordingly; and how performance data, as the result of these activities and the basis of disclosure information, is created, evaluated, and used. Starting with an interview with Dr. Takeshi Shiota (Corporate Officer and the head of Corporate Planning Department, Corporate Strategy Division), we visited the relevant departments within the company to review related documents including the integration report, and to hold discussions with personnel in charge. At the Shionogi CMC Research Innovation Center, we conducted basic verification to confirm that the preparation of the evidence for the disclosed numerical data had been carried out in accordance with the designated systems.

Evaluation Opinion

For the fiscal year examined, Shionogi decided to disclose its Integrated Report and Environment Report, with the content of the EHS report prepared up to last fiscal year included. As a result, the position of each report has become clearer, with the content of the two reports largely enriched. In “Shionogi Transformation Strategy 2030 (STS2030)”, the new medium-term management plan announced in June 2020, the items related to contributing to a sustainable society were listed as one of the key issues to focus on, and Shionogi’s value creation model was made clearer by specifying the issues in relation to the SDGs items in particular. Embracing “SDG 3: Good Health and Well-being” as its main target as a pharmaceutical company, the Shionogi Group’s social mission is clearly defined as relieving the threat of infectious diseases, improving social productivity, increasing healthy life expectancy, and contributing to sustainable social security. At present, as COVID-19 is having a major impact on society, these social missions are becoming more important than ever, to which Shionogi can greatly contribute with its main business as a pharmaceutical company and progress is also expected to be made in their core business. Since these are areas highly expected by the society, in the future, Shionogi could demonstrate its achievements in these areas in a more visible manner with the use of indicators so as to visualize its social value creation and further clarify its impact on society.

The Shionogi Group defines environmental activities as a material issue (as a result of materiality analysis) that relates to the core of management, along with governance-related and social activities such as human resource development. With resource conservation and circulation as priority issues, Shionogi’s environmental activities have been promoted concretely and steadily at a high level, with particular focus on the issues that are highly significant for a pharmaceutical company including AMR control (management of antimicrobial released into the environment, etc.), response to water-related risks and climate change. It is highly commendable that in conjunction with the STS2030, new medium- and long-term environmental targets have been established and executed at high levels, including response to the TCFD recommendations and even incorporating the factor of climate change into AMR control.

The Shionogi Group has been promoting environmental conservation activities from early on, with related activities implemented at its respective operating site at high levels. In the future, we expect to see the Shionogi Group’s effort expanding fully from within the group to the entire supply chain.

The Integrated Report provides abundant information on the Shionogi Group’s business prospects and management foundation. The Environment Report provides a clearer picture of how environmental activities are being developed by playing down the issues described in the Integrated Report, as well as their position in the overall picture. It is hoped that further strengthening the linkage between the two reports will make it easier for readers to understand the Shionogi Group, from major matters such as the value creation model to specific activities.

<Shionogi CMC Research Innovation Center>

The Shionogi Group relinquished its blanket ISO14001 certification obtained in the past. The Shionogi CMC Research Innovation Center is operating at present, with the Environmental Committee and the Health and Safety Committee merged together into the EHS Committee.

The Shionogi CMC Research Innovation Center has a long history of operations and has been conducting very high-level environmental activities. For this reason, many of its environmental action targets are set to maintain the same level instead of achieving a higher level.

Although it is believed that environmental activities are deeply rooted in the entire center, it would be good to have a mechanism to maintain and improve motivation, such as focusing on activities that contribute to reducing the absolute value of environmental impact even if they are small. We learned that the way people work has changed greatly in the center in response to COVID-19, with many now working remotely. The content of work has changed along with the way people work, which should call for review in many aspects at not only the CMC Innovation Center but also the Shionogi Group as a whole.

For this Evaluation Opinion, the survey was conducted remotely in consideration of COVID-19. This experience pointed out that change need to be made to support remote work such as the digitization of documents.

September 14, 2020

Institute for Environmental Management Accounting (IEMA)

Katsuhiko Kokubu (Professor, Kobe University/ Director of IEMA)

Eriko Nashioka (Representative Director of IEMA/certified public accountant, licensed tax accountant)



Published by Sustainability Management Office,
Corporate Planning Department, Shionogi & Co., Ltd.
November 2020