CSR Guidelines & Activity Reports - Safety, Accident Prevention, and Environmental Preservation

Initiatives for Managing Water Resources

Materiality Focus

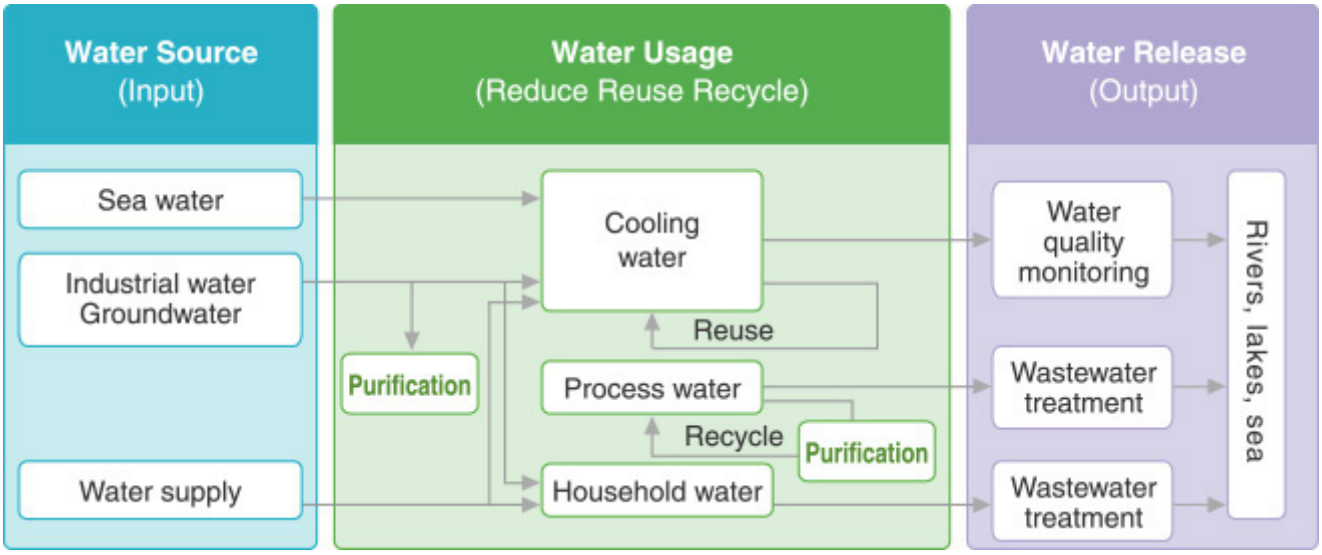
Environment

Toray Group is working to provide solutions to water resources problems around the world, based on the following policies. In its own operations, the Group effectively uses and recycles water and properly manages water resources.

1. Toray Group recognizes that water is one of the most important resources for humanity, and that people are confronting problems related to water resources in many areas of the world.
2. Toray Group is committed to helping to solve global water resources problems through its products, technologies and services.
3. Toray Group continuously monitors the state of regional water resources, and conducts appropriate management of water resources according to the basic principle of sharing precious water resources with the local communities where the Group operates.

Toray Group practices the 3Rs (reduce, reuse, recycle) in consuming water resources, and monitors the quality of water that is released into public bodies of water. Group companies outside Japan that are located in drought areas in particular recycle cooling water and wastewater and work to reduce the amount of industrial water used.

Water Resource Management by Toray Group



Water Usage Management

Water usage per unit of sales

■Reporting scope
Toray Group

■Target in fiscal 2018
No more than 61% of 2001 level

Result in fiscal 2018

51%

Toray Group used 230 million tons of water in fiscal 2018, an increase of 1% over the previous fiscal year. Compared to the amount used per unit of sales in fiscal 2001, set to an index value of 100, usage in fiscal 2018 was 51.0 points, down 3.0 points from the previous fiscal year (a 24% decrease from fiscal 2013). This improvement, despite the fact that the amount of water used was basically the same as the previous fiscal year, was due to the increase in Toray Group sales.

Related Information

› Environmental Data (Water Usage)

Comparative Water Usage Per Unit of Sales (Toray Group)

(FY)	2001	2013	2014	2015	2016	2017	2018
Comparative water usage per unit of sales	100	66.7	59.7	56.2	59.5	54.0	51.0

Initiatives to Reduce Waste

Materiality Focus

Environment

Waste recycling rate

■Reporting scope
Toray Group

■Target in fiscal 2018
At least 86%

Result in fiscal 2018

85.7%

Toray Group is carrying out zero emission initiatives as it works toward the realization of a sustainable, recycling-based world. Under the Fifth Medium-Term Environmental Plan, the Group worked to achieve its fiscal 2020 targets for rates of simply disposed waste,[1] landfill waste[2] and recycled waste,[3] which have been set as indicators for measuring progress toward attaining zero emissions.

1 Simply disposed waste rate = (incineration +landfill) / total waste
2 Landfill waste rate = landfill waste / total waste
3 Recycling rate = (recycled resources + resources with monetary worth) / (total waste + resources with monetary worth)

In recent years, Europe in particular has embraced a business model aligned with the concept of a circular economy, which is a resource circulation policy aimed at reducing the procurement of natural resources and the production of waste. Adding to its previous initiatives, Toray Corporate Business Research, Inc. now publicizes its survey results regarding the circular economy as part of its economic trends survey.

Related Information

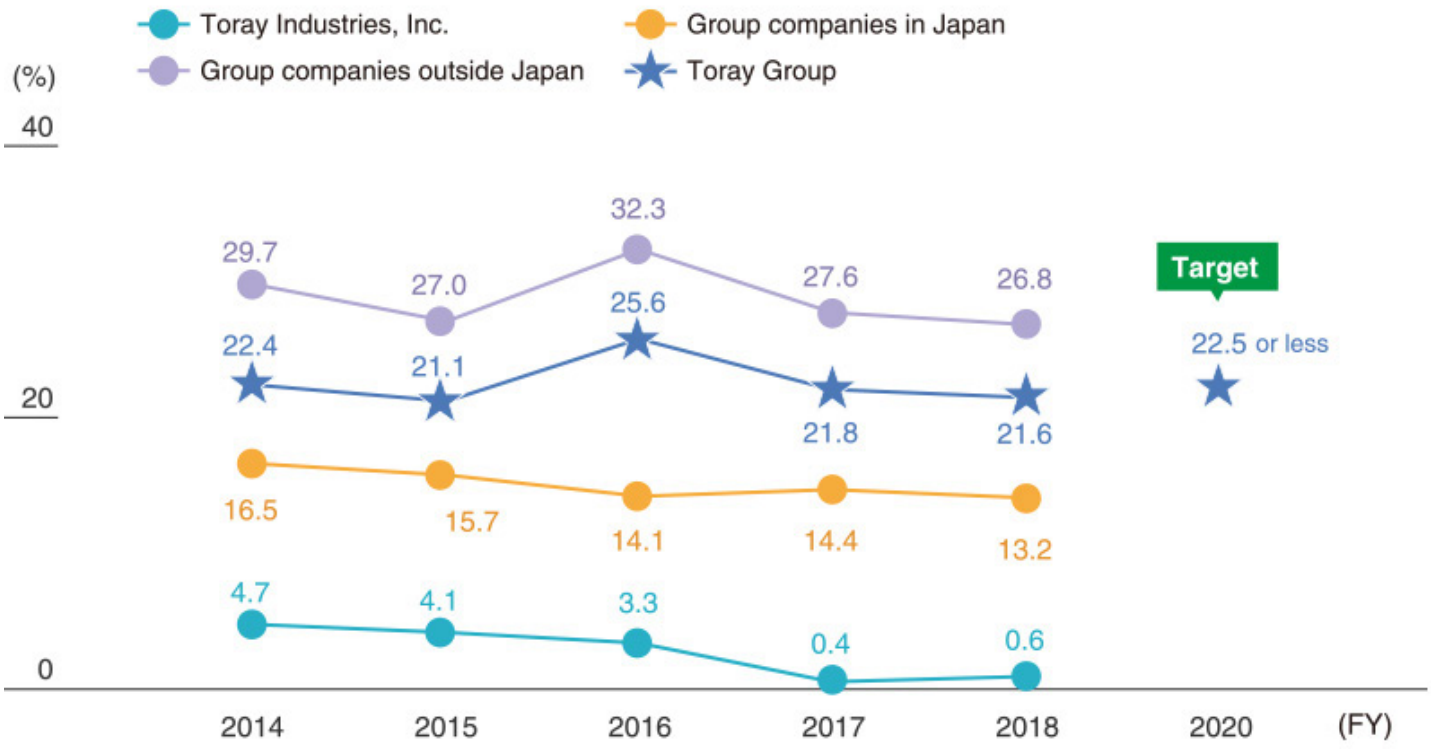
› Toray Corporate Business Research, Inc.: *Business Strategies in the Age of the Circular Economy* (Japanese site)

Results in Fiscal 2018

Simply Disposed Waste Rate

The simply disposed waste rate for Toray Industries, Inc. increased by 0.2 percentage points year-on-year to 0.6% because the total waste volume (the denominator in the equation) declined by about 2,000 tons. The rate for Toray Group as a whole improved 0.2 points year-on-year to 21.6%, more than meeting the Group's 22.5% target. The Group will continue to work on bringing its simply disposed waste rate down.

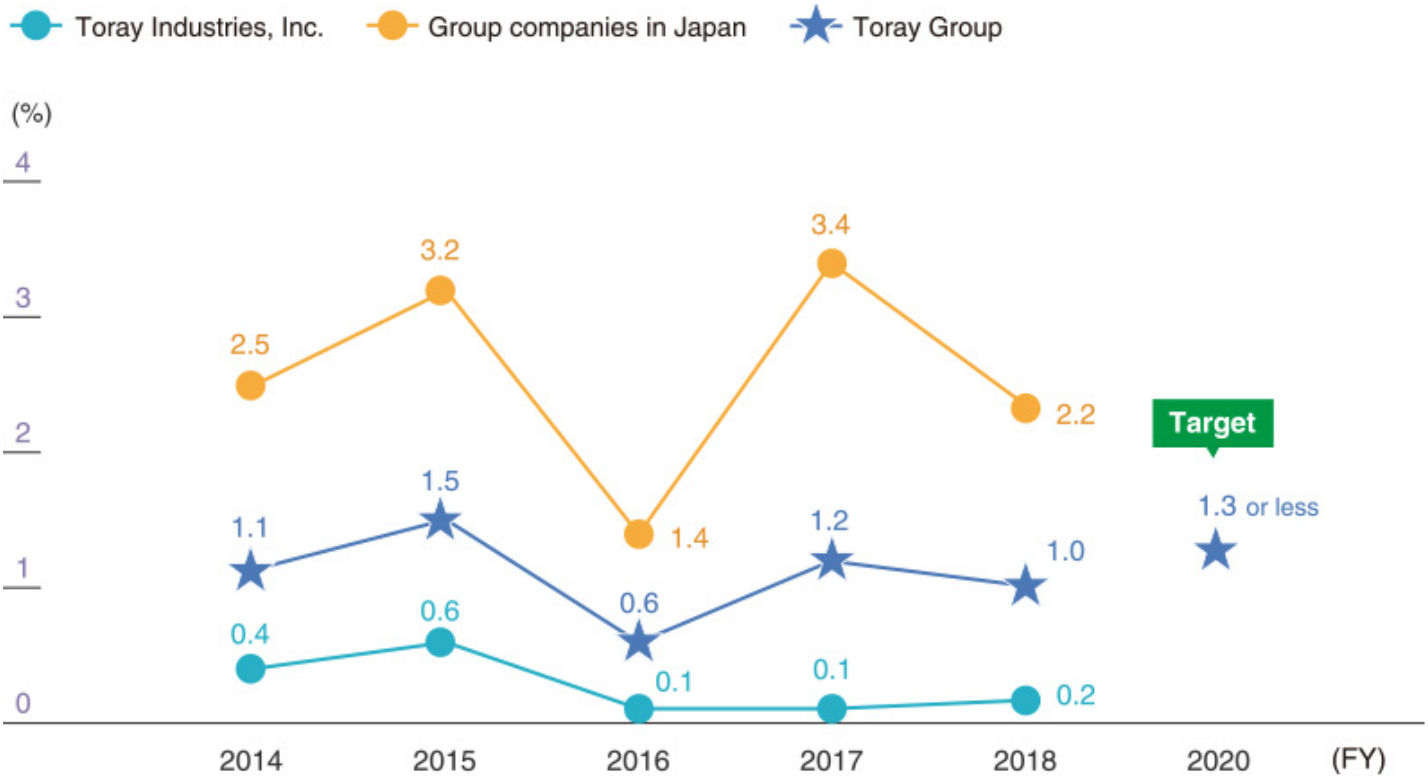
Simply Disposed Waste Rate (Toray Group)



Landfill Waste Rate

The rate of landfill waste at Toray Group fell by 0.2 percentage points to 1.0% from the previous fiscal year. This progress was due to Toray Group companies' efforts to recycle resources and turn them into valuable resources, which more than offset negative factors such as the disposal of some recycled resources as landfill waste at a group company in Japan due to the impact of a fire at a waste plastic processor.

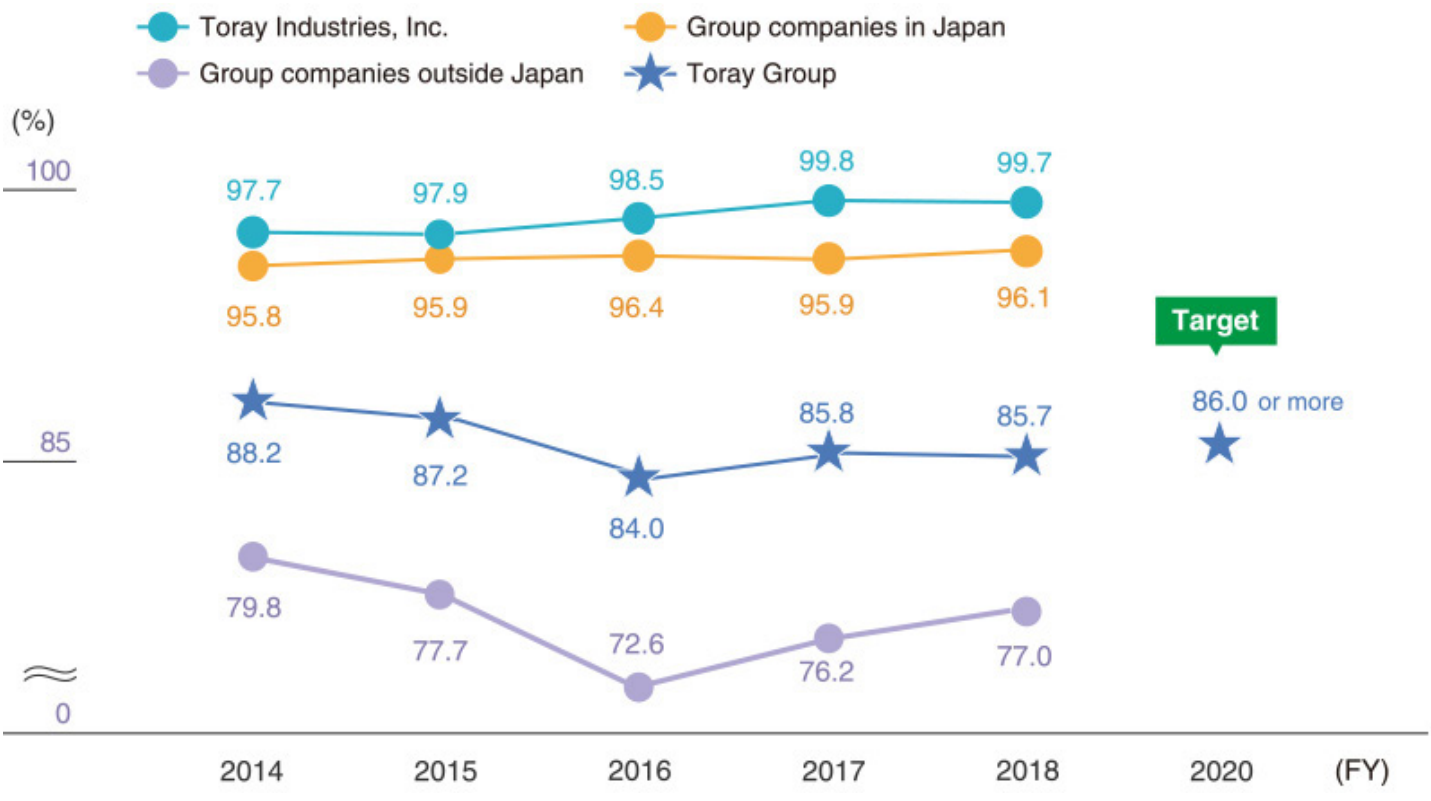
Landfill Waste Rate (Toray Industries, Inc. and Its Group Companies in Japan)



Recycling Rate

Toray Group's recycling rate decreased by 0.1percentage points year-on-year to 85.7% as a result of efforts to promote recycling at Toray Group companies outside Japan.

Recycling Rate (Toray Group)



Zero Emissions Initiatives at Companies and Plants

Toray Group considers a plant to have achieved zero emissions when the amount of simply disposed waste accounts for 1% or less of the total waste it generates. The Group works on its fiscal 2020 target of achieving zero emissions at 45 or more plants. However, in fiscal 2018, the number of plants with zero emissions decreased by one, bringing the total to 44 plants, at 22 companies, just missing the target.

Companies and Plants with Zero Emissions Status in Fiscal 2018

Toray Industries, Inc.	Shiga Plant, Seta Plant, Ehime Plant, Nagoya Plant, Tokai Plant, Aichi Plant, Okazaki Plant, Mishima Plant, Chiba Plant, Tsuchiura Plant, Gifu Plant, Ishikawa Plant, Nasu Plant
Group companies in Japan	Ogaki Fuso Spinning Co., Ltd. [Fuso], Toray Coatex Co., Ltd., Maruichi Fiber Co., Ltd., Toray Monofilament Co., Ltd., Toray Hybrid Cord, Inc., Toray Engineering Co., Ltd. [Shiga, Seta], Toray Precision Co., Ltd., Dow Corning Toray Co., Ltd.[Chiba, Fukui, Komatsu], Soda Aromatic Co., Ltd. [Koriyama], Toray Opelontex Co., Ltd., Du Pont-Toray Co., Ltd. , Toyo Plastic Seiko Co., Ltd. [Okazaki, Mishima, Koriyama], Toray Advanced Film Co., Ltd. [Nakatsugawa, Mishima, Takatsuki, Fukushima], Toray Fine Chemicals Co., Ltd. [Moriyama, Tokai, Matsuyama], Toray Medical Co., Ltd.
Group companies outside Japan	Toray Plastics (America), Inc. [Rhode Island], Toray Plastics (Shenzhen) Ltd., P.T. Toray Polytech Jakarta, Toray Chemical Korea Inc. [Anseong, Yugu], Toray Advanced Film Kaohsiung Co., Ltd, Toray Kusumgar Advanced Textile Private Limited

Note: Information in brackets refers to the names of the plants.

CSR Guidelines & Activity Reports - Safety, Accident Prevention, and Environmental Preservation

Environmental Risk Management

Materiality Focus

Environment

Number of environmental accidents

■Reporting scope
Toray Group

■Target in fiscal 2018
0

Result in fiscal 2018

1

Compliance with Environmental Laws and Accidents in Fiscal 2018

In fiscal 2018, one environmental accident occurred within Toray Group. In this case, chemical solutions leaked outside of the plant and the impact on water quality at some measurement points exceeded the agreed level, but had an extremely minor impact on the environment.

This incident resulted from a failure to confirm defects with the liquid feed control program before work began. To prevent recurrence of similar accidents, measures were taken such as changing the program so that the flow of chemical solutions could be suspended in the event of an abnormality in the liquid feed control.

The Group received six complaints and requests from residents near its facilities concerning noise and odor, which were seriously examined and addressed by implementing improvements.

Environmental Accidents in Fiscal 2018 (Toray Group)

Administrative disposition due to violations of laws or ordinances[1]	0
Accidents (environmental accidents, etc.)	0
Slight but temporary exceeding of standard values[2]	1
Complaints/requests (noise, odor, etc.)	6

1 Includes improvement orders and fines. Improvement guidance and recommendations are included in accident figures.

2 No improvement guidance or recommendations were received from authorities, as there was no harm to the environment.

Preventing Soil and Groundwater Pollution

Toray Group constructs protective embankments around its facilities and storage tanks for hazardous chemicals, and takes precautions to ensure that none of these dangerous substances leak or discharge into the surrounding area or contaminate the soil onsite. In fiscal 2018, remediation using wells to clean up groundwater pollution continued at Toray Monofilament Co., Ltd., and remediation to address soil pollution continued at Toray Industries' Nagoya Plant. Toray Group will continue these ongoing remediation efforts and voluntary surveys to monitor soil and groundwater pollution.

Japan’s Soil Contamination Countermeasures Act was revised in April 2019. Toray Industries is working to familiarize the entire Group in Japan with the revisions. In the event that any pollution is identified, the Company’s policy ensures that measures are promptly taken to ensure that immediate cleanup steps are taken to remediate the pollution in line with the revised laws.

CSR Guidelines & Activity Reports - Safety, Accident Prevention, and Environmental Preservation

Environmental Accounting

Environment

Fiscal 2018 Environmental Accounting Report (Toray Industries)

Toray Industries, Inc. has been practicing environmental accounting since 1999, to track investments and gauge their cost effectiveness.

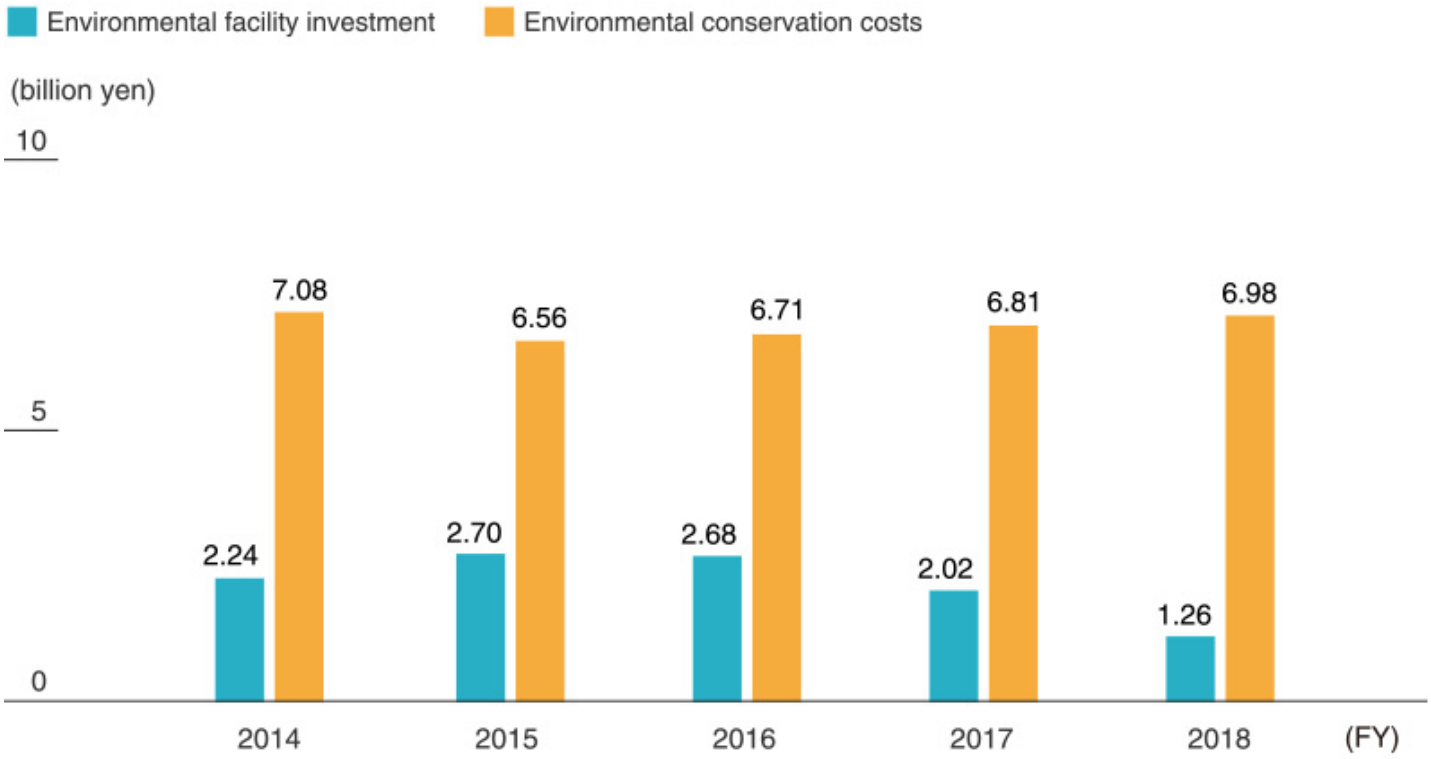
In fiscal 2018, the Company's environment-related investment amounted to 1.26 billion yen, down 0.76 billion yen compared to the previous year. Cost totaled 6.98 billion yen, up 0.17 billion yen compared to the previous year.

Fiscal 2018 Environmental Accounting Report (Toray Industries, Inc.)

Expenses				
Item		Subcategory and description	Investment (million yen)	Cost (million yen)
Business area costs	Pollution prevention costs	Air (including CFC countermeasures)	96	1,959
		Water quality	679	2,380
		Noise and vibration	14	8
		Greening	0	318
		Odors and other	128	170
	Global environment conservation costs	Energy conservation and combating global warming	334	-
	Resource recycling costs	Industrial waste reduction, recycling, disposal, and PCB waste disposal services	11	1,433
Upstream and downstream costs		Product recycling	0	0
		Container and package recycling	0	1
Management activity costs		Indirect labor costs, ISO certification and maintenance, environmental communications, and education	0	444
Social initiative costs		Regional initiatives, support for organizations, etc.	0	86
Environmental remediation costs		SOx fines, soil purification, etc.	0	180
Total			1,262	6,980

Effectiveness		
Item		Amount (million yen)
Financial effects	Reduction in energy costs	179
	Reduction in industrial waste disposal costs	27
	Sale of valuable recycled resources with monetary value	618
Quantitative environmental effects	Reduction of greenhouse gas emissions	9,500 tons-CO_2eq

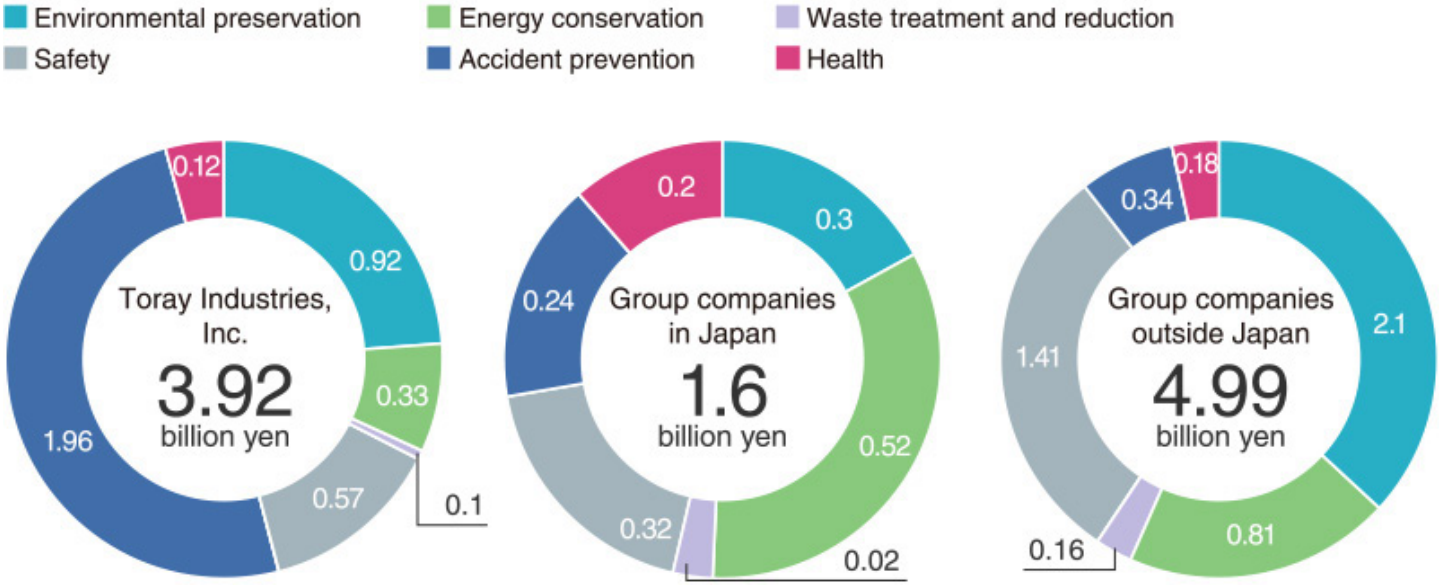
Environmental Facility Investment and Environmental Conservation Costs (Toray Industries, Inc.)



Facility Investment in Safety, Health, Accident Prevention, and Environmental Preservation Projects (Toray Group)

Toray Group reports on facility investments relating to safety, health, accident prevention, and environmental preservation projects. Continuous investments included equipment security upgrades and upgrading fire protection and fire extinguishing equipment. Investments in environmental preservation included the installation of improving gas emissions and wastewater treatment facilities.

Fiscal 2018 Facility Investment in Safety, Health, Accident Prevention, Environmental Preservation, and Energy Conservation Projects (Toray Group)



Toray Industries Environmental Accounting Standards

- Some categories were changed based on the Ministry of the Environment's Guidelines for FY2005.
- Only economic effects that can be determined with a high degree of certainty are included in the calculation. Presumed effects are not included.
- Capital investment also includes facility investments for which environmental preservation is not the main objective. Capital investment resulting from leases is also included. Expenses include labor costs and depreciation. However, internal labor costs related to local volunteer activities are not included.
- Energy cost reduction figures show the amount of reduction for the 12 months after the completion of an energy conservation facility. Expenses are not recorded as they are deducted when the effect is calculated.
- Waste disposal cost reduction figures show the amount of reduction achieved through waste reduction efforts and resource recycling for 12 months after the measures are undertaken.
- Effects of reducing greenhouse gas emissions are measured over a 12-month period following the completion of measures or facilities to conserve energy.

Biodiversity Initiatives

Materiality Focus

Environment

Biodiversity is being destroyed at a dangerously fast pace with the advance of climate change, the depletion of natural resources, the destruction of ecosystems, and the extinction of species. This is one of the most urgent problems facing the world.
Toray Group views conservation of biodiversity as a critical global environmental issue that is of equal importance to reducing greenhouse gas emissions. The Group analyzes the impact of its business activities on biodiversity and strives to help build a more sustainable world.

Working Group Considers Initiatives for Biodiversity

Toray Group pursues biodiversity initiatives under a three-year action road map and sets its priorities under the Toray Group Biodiversity Basic Policy. In fiscal 2017, the Group implemented initiatives under the third road map, which runs from fiscal 2016 to fiscal 2018.

Biodiversity Initiatives Adopted December 2010

Basic Approach

Toray Group appreciates the gifts of nature that biodiversity provides, and strives to realize the conservation and sustainable use of biodiversity. The Group contributes to society through the development and dissemination of products and technologies which advance conservation of biodiversity.

Action Guidelines

1. We take into consideration the impact of our business activities on biodiversity, and strive to realize the conservation and sustainable use of biodiversity.
2. We endeavor to develop environmentally friendly technologies and products, and contribute to the conservation of biodiversity by making them available for use.
3. We practice fair use of genetic resources on the basis of relevant international agreements.
4. We recognize the influence of biodiversity within the supply chain, and pursue coexistence with nature.
5. We strive to raise employee awareness on biodiversity, and contribute to the building of a society that nurtures biodiversity through our communication with stakeholders.

Note: Toray Group respects Nippon Keidanren's Declaration of Biodiversity (Guide to Action Policies) and the Japanese Ministry of the Environment's Guidelines for Private Sector Engagement in Biodiversity. The Group is a promotion partner of Nippon Keidanren's Declaration of Biodiversity.

Procuring Raw Materials

Toray Group conducted a survey of all products to determine the usage of bio-based raw materials in product manufacturing. The Group developed rules for checking the biodiversity impacts of products in fiscal 2015, and has applied the rules to all products.

Social Initiatives

Toray Group endeavors to conserve biodiversity with its social initiatives. In fiscal 2018, employees and families of Toray Group companies in the Tokyo area took part in the fifth Toray Group Arakawa Clean Aid event, a joint initiative with the non-profit Arakawa Clean Aid Forum. After learning about garbage in rivers and oceans and the impact on the environment and ecosystems, participants join a garbage collection and inspection program, where they separate and record the type of refuse, learn about the natural environment, and then review the day. The idea is to help them understand the problem of garbage firsthand and to gain an awareness of the importance of the environment, which fosters natural diversity. In the outdoor learning session on the natural environment, which is based on the theme of experiencing the Arakawa River's biodiversity, participants learn about the importance of biodiversity by handling red flower crabs and juvenile Japanese sea perch, which live in the Arakawa River.



Garbage collection and inspection around the Arakawa River



Studying biodiversity using the juvenile Japanese sea perch, which lives in the Arakawa River

Increasing Green Areas

Number of companies and plants developing greenery policy and plan

■Reporting scope
Toray Group

■Target in fiscal 2018
at least 50

Result in fiscal 2018

54

Plants at Toray Industries, Inc. and its group companies in Japan are operating greenery policies and plans through 2020, guided by the Toray Group Basic Policy for Increasing Green Areas.[1] The plans encompass initiatives to conserve green areas, including natural forests[2] that have been protected since the plants began operating. Sustainable greenery conservation initiatives also help to conserve the environment for communities.



Forested area on the premises of Okayama Chemical Industry & Co., Ltd.

1 Toray Group Basic Policy on Increasing Green Areas was established in 2012, evolving out of greenery policies that were first established in 1973.
2 Natural groves or forestation by species based on potential native vegetation

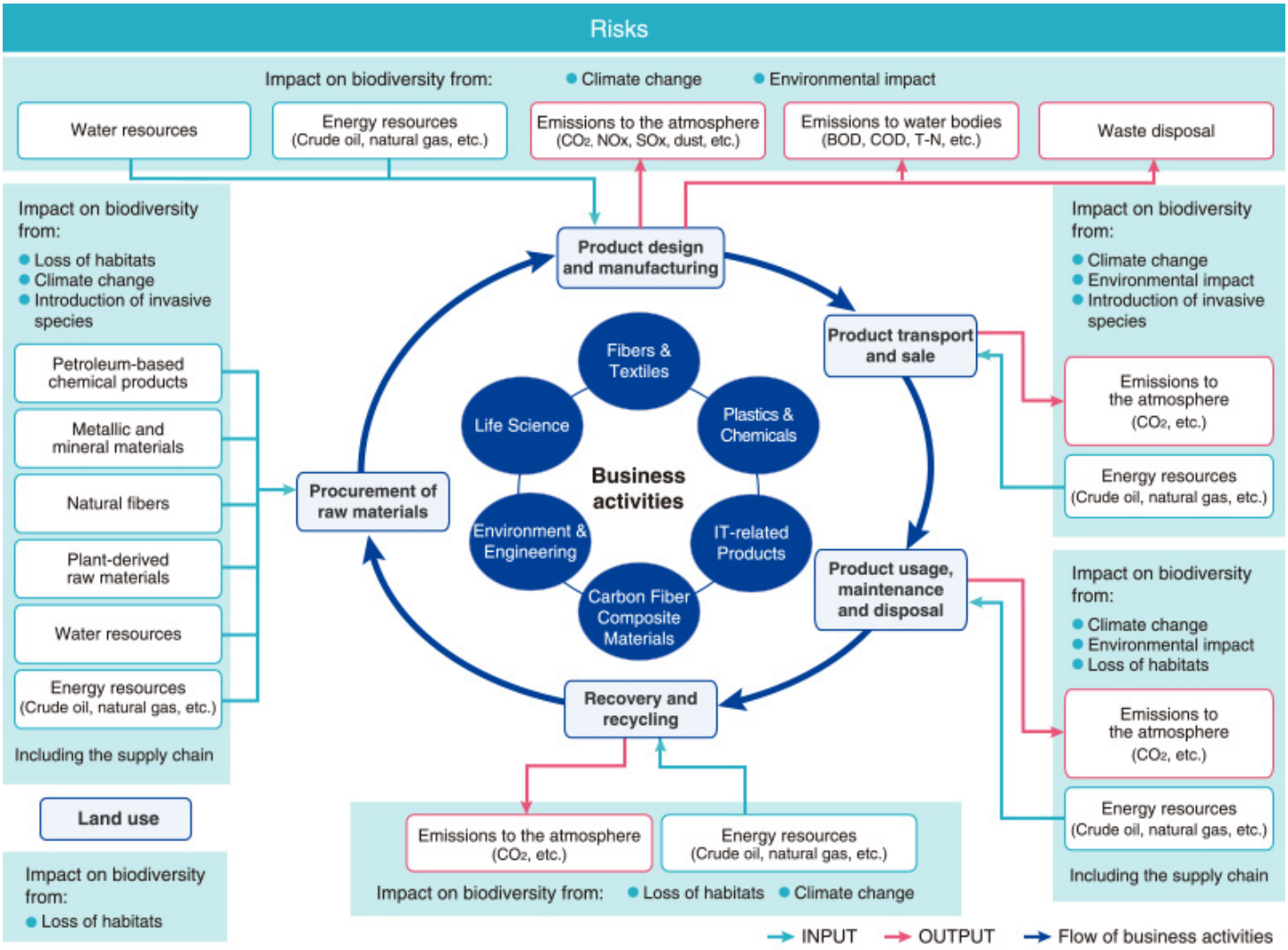
Toray Group's Basic Policy for Increasing Green Areas Established June 2012

A. Toray Group contributes to the preservation of the natural environment by promoting tree planting using planting methods suitable for the biodiversity of local habitats.
B. Toray Group aims to surround its production plants with greenery by giving priority to tree planting in areas at the boundaries of factory sites.
C. Toray Group sets goals for making each of its production plants greener while considering how to attain harmony with the surrounding environment as well as regulations concerning green space ratios in each respective country or region.

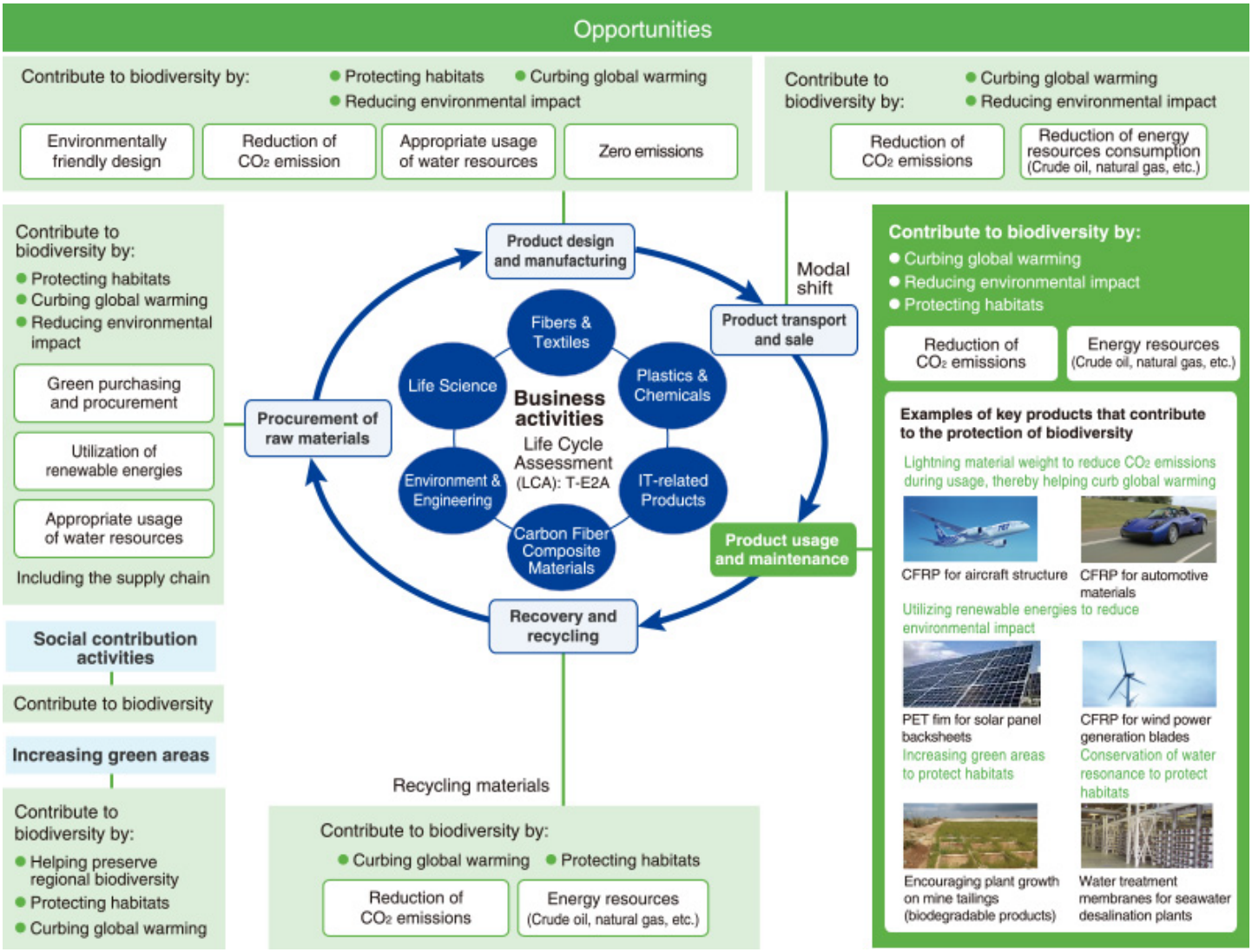
Toray Group's Approach to the Relationship between Corporate Activities and Biodiversity

Starting from the procurement of raw materials, the entire lifecycle of Toray Group's business activities has a wide range of effects on biodiversity. On the risk side, these effects include the use of water resources and energy resources and emissions into the atmosphere and water, while on the opportunity side, these effects include reductions to CO_2 emissions by offering products that reduce the weight of parts for aircraft and other equipment and protecting habitats by offering products that maintain green areas and protect water resources.

The two diagrams below conceptualize the relationship between the Group's business activities and biodiversity in terms of the two aspects of risks and opportunities.



Note: These diagrams were produced based on the Map of Corporate Activities and Biodiversity ® published by the Japan Business Initiative for Biodiversity.


Opportunities
Contribute to biodiversity by:
Protecting habitats
Curbing global warming
Reducing environmental impact
Environmentally friendly design
Reduction of CO2 emission
Appropriate usage of water resources
Zero emissions
Contribute to biodiversity by:
Curbing global warming
Reducing environmental impact
Reduction of CO2 emissions
Reduction of energy resources consumption (Crude oil, natural gas, etc.)
Contribute to biodiversity by:
Protecting habitats
Curbing global warming
Reducing environmental impact
Green purchasing and procurement
Utilization of renewable energies
Appropriate usage of water resources
Including the supply chain
Product design and manufacturing
Modal shift
Product transport and sale
Fibers & Textiles
Life Science
Plastics & Chemicals
Business activities
Life Cycle Assessment (LCA): T-E2A
Environment & Engineering
IT-related Products
Carbon Fiber Composite Materials
Procurement of raw materials
Product usage and maintenance
Recovery and recycling
Contribute to biodiversity by:
Curbing global warming
Reducing environmental impact
Protecting habitats
Reduction of CO2 emissions
Energy resources (Crude oil, natural gas, etc.)
Examples of key products that contribute to the protection of biodiversity
Lightning material weight to reduce CO2 emissions during usage, thereby helping curb global warming
CFRP for aircraft structure
CFRP for automotive materials
Utilizing renewable energies to reduce environmental impact
PET film for solar panel backsheets
CFRP for wind power generation blades
Increasing green areas to protect habitats
Conservation of water resonance to protect habitats
Encouraging plant growth on mine tailings (biodegradable products)
Water treatment membranes for seawater desalination plants
Social contribution activities
Contribute to biodiversity
Increasing green areas
Contribute to biodiversity by:
Helping preserve regional biodiversity
Protecting habitats
Curbing global warming
Recycling materials
Contribute to biodiversity by:
Curbing global warming
Protecting habitats
Reduction of CO2 emissions
Energy resources (Crude oil, natural gas, etc.)

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Environmental Impact Overview

Environment

Environmental Impact Overview Fiscal 2018

	Toray Industries, Inc.					Group companies in Japan					Group companies outside Japan				
	FY2015	FY2016	FY2017	FY2018	Compared to previous year (%)	FY2015	FY2016	FY2017	FY2018	Compared to previous year (%)	FY2015	FY2016	FY2017	FY2018	Compared to previous year (%)
INPUT															
Energy (1,000,000 gigajoules)	29.0	27.9	29.0	27.6	-4.8	7.2	7.2	6.5	6.2	-4.6	46.8	52.0	50.8	54.0	6.3
Water usage (1,000,000 tons)	171	168	174	176	1.1	12	13	13	13	0.0	38	44	41	42	2.4
Industrial water	135	135	139	139	0.0	5	4	4	5	16.7	13	23	17	16	-5.9
Public water	0	0	0	0	6.5	0	0	0	0	-100.0	13	12	11	11	0.1
Seawater	6	5	5	6	17.2	1	1	1	1	-11.6	6	7	7	1	-85.6
Groundwater	24	23	25	25	0.9	6	7	8	7	-12.5	0	0	0	8	1983.1
Others	6	5	5	6	11.4	0	1	0	0	-100.0	6	2	6	6	-0.6
OUTPUT															
GHG (10,000 tons CO_2eq)															
6 gases including CO_2	212	201	203	195[1]	-3.9	45	45	40	38	-5.0	304	314	304	331	8.9
PRTR Law-specified substances (tons)															
Atmospheric emissions	201	189	330	327	-0.9	265	245	101	102	0.5	196	318	442	457	3.4
Water emissions	30	31	27	28	4.7	0	0	0	0	0.0	0	0	0	0	0.0
Waste transfers	939	866	1,023	746	-27.0	1,340	1,246	1,554	1,334	-14.2	1,270	9,960	7,628	2,799	-63.3
Air pollutants (tons)															
SOx	298	264	268	245	-8.6	24	20	16	16	0.2	2,870	3,090	2,192	2,291	4.5
NOx	1,456	1,332	1,335	1,306	-2.2	43	51	40	32	-20.0	828	768	716	709	-1.0
Dust	108	105	103	96	-6.8	3	3	1	1	0.6	220	235	122	174	42.6
Industrial wastewater (million tons)															
	167	159	164	167	1.8	10	10	10	10	3.1	24	25	24	23	-4.2
Water pollutants (tons)															
BOD	713	655	576	624	8.4	24	27	24	32	33.6	236	245	177	168	-5.3
COD	812	776	789	780	-1.1	41	24	27	28	2.5	1,621	1,603	1,298	1,149	-11.5
Nitrogen	437	406	415	394	-5.2	18	14	14	14	-2.5	-	-	-	-	
Phosphorus	28	27	25	31	24.0	1	1	1	2	65.3	-	-	-	-	
Waste (1,000 tons)															
Recycled	30.5	29.0	32.4	30.6	-5.6	14.2	14.5	14.7	15.9	8.0	79.0	89.0	101.7	112.8	10.9
Incinerated and other	1.1	0.9	0.1	0.1	16.7	2.1	2.1	1.9	2.0	5.9	9.7	17.6	16.6	20.5	23.8
Direct landfill Diposal	0.2	0.0	0.00	0.1		0.5	0.2	0.6	0.4	-31.9	19.5	24.4	24.1	24.1	0.0

	Toray Industries, Inc.					Group companies in Japan					Group companies outside Japan				
	FY2015	FY2016	FY2017	FY2018	Compared to previous year (%)	FY2015	FY2016	FY2017	FY2018	Compared to previous year (%)	FY2015	FY2016	FY2017	FY2018	Compared to previous year (%)
Coal ash (1,000 tons)															
Recycled	63.9	62.4	57.8	68.7	18.9	-	-	-	-	-	26.7	17.2	19.1	22.6	18.6
Direct landfill diposal	2.3	2.0	1.9	3.2	66.7	-	-	-	-	-	0.7	0.4	0.2	0.2	3.3

1 Toray greenhouse gas emissions have obtained a third-party guarantee from Lloyd's Register Quality Assurance Limited (LRQA).

Index of Environmental Impact Per Unit of Sales[2]

	Toray Industries, Inc. and its group companies in Japan					Group companies outside Japan					Total				
	FY2015	FY2016	FY2017	FY2018	Year-on-year comparison (points)	FY2015	FY2016	FY2017	FY2018	Year-on-year comparison (points)	FY2015	FY2016	FY2017	FY2018	Year-on-year comparison (points)
GHG emissions	67.9	64.7	62.2	57.1	-5.1	65.7	74.2	58.7	57.8	-0.9	73.8	76.4	67.8	64.7	-3.1
PRTR atmospheric emissions	30.4	28.2	27.2	26.0	-1.2	15.5	27.4	31.1	29.1	-2.0	24.4	28.3	29.7	28.1	-1.6
SOx emissions	5.2	4.6	4.5	3.9	-0.6	15.4	16.8	10.5	9.9	-0.6	17.4	18.0	12.6	12.1	-0.5
Water usage volume	71.5	70.9	70.4	68.6	-1.8	42.6	53.7	41.1	36.8	-4.3	56.2	59.5	54.0	51.0	-3.0
BOD emissions	44.3	40.9	34.8	36.6	1.8	19.8	22.4	13.3	11.3	-2.0	33.8	33.3	25.1	24.9	-0.2
Landfilled waste volume	13.6	5.3	11.2	8.3	-2.9	43.1	52.9	47.7	37.3	-10.4	64.3	73.1	73.6	59.3	-14.3

2 The amounts per unit of sales shown in the table are referenced to an index value of 100 set for the base year of fiscal 2001.

Aggregate Environmental Impact Data by Company Type and Location

	Toray Industries, Inc.	Group companies in Japan	Group companies outside Japan
GHG	All 13 plants and 1 research laboratory	51 plants at 25 companies	75 plants at 54 companies
PRTR Law-specified substances	All 13 plants and 1 research laboratory	50 plants at 25 companies	75 plants at 54 companies
SOx, NOx, dust	All 13 plants and 1 research laboratory	43 plants at 23 companies	75 plants at 54 companies
BOD	All 13 plants and 1 research laboratory	43 plants at 23 companies	75 plants at 54 companies
COD[3]	All 13 plants and 1 research laboratory	43 plants at 23 companies	75 plants at 54 companies
Nitrogen and phosphorus	All 13 plants and 1 research laboratory	43 plants at 23 companies	-
Waste	All 13 plants and 1 research laboratory	50 plants at 25 companies	75 plants at 54 companies

3 COD figures for Toray group companies in Japan and Korea are given in CODmn (using the potassium permanganate method).
Other group companies outside Japan are given in CODcr (using the potassium dichromate method).

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Chemical Substance Emissions and Transfer Data

Environment

PRTR Law-Specified Substance[1] Emissions and Transfer Data for Fiscal 2018

1 Chemical substances designated Class 1 under the April 2010 revision of Japan's PRTR Law

Toray Industries, Inc.	Tons (dioxins: mg-TEQ)			
Substance name	Atmospheric emissions	Water emissions	Soil emissions / company landfill	Waste transfers
Methyl acrylate	0.3	0.0	0.0	0.0
Acrylonitrile	19.8	4.5	0.0	334.9
Acetaldehyde	2.9	0.0	0.0	0.0
Antimony and antimony compounds	0.0	0.0	0.0	0.3
Asbestos	0.0	0.0	0.0	8.7
Ethylbenzene	4.8	0.0	0.0	0.0
ε-Caprolactam	0.0	12.5	0.0	0.0
Xylene	4.5	0.0	0.0	0.0
Chlorobenzene	0.1	0.0	0.0	1.9
Chloroform	2.6	0.0	0.0	14.6
Cobalt and cobalt compounds	0.0	1.2	0.0	15.5
4,4'-diaminodiphenyl ether	0.0	0.0	0.0	0.2
Inorganic cyanide	38.3	0.0	0.0	0.0
1,4-Dioxane	0.2	2.1	0.0	0.4
Diuron	0.0	0.0	0.0	0.3
Dichlorobenzene	10.5	0.0	0.0	1.4

Toray Industries, Inc.	Tons (dioxins: mg-TEQ)			
Substance name	Atmospheric emissions	Water emissions	Soil emissions / company landfill	Waste transfers
Dichloromethane	159.0	0.0	0.0	4.9
N, N-dimethylacetamide	0.1	0.0	0.0	24.5
N, N-dimethylformamide	9.3	0.6	0.0	191.2
Styrene	8.2	0.0	0.0	1.4
Terephthalic acid	0.0	0.0	0.0	5.3
Dimethyl terephthalate	0.0	0.0	0.0	4.5
Trichloroethylene	0.4	0.2	0.0	0.6
Toluene	7.5	0.0	0.0	35.9
Nitrobenzene	0.0	0.0	0.0	16.7
O-, m- and p-Phenylenediamine	0.0	3.2	0.0	7.6
Phenol	0.0	2.7	0.0	0.0
Bromomethane	49.4	0.0	0.0	0.0
Benzene	1.5	0.8	0.0	0.0
Poly (oxyethylene) alkyl ether	0.2	0.0	0.0	10.7
Manganese and manganese compounds	0.0	0.2	0.0	1.5
Methacrylic acid 2,3-Epoxypropyl	0.0	0.0	0.0	2.7
Methyl methacrylate	4.2	0.0	0.0	8.6
Methylenebis (4,1-phenylene) diisocyanate	3.6	0.0	0.0	46.3
Nickel and nickel compounds	0.0	0.3	0.0	5.8
Dioxins	2.2	15.5	0.0	19.9
Total	327.4	28.3	0.0	746.3

Note: The list shows emissions and transfers of 36 substances (out of Toray Industries' 60 PRTR Law-specified substances) exceeding 50 kg and dioxins.

Group companies in Japan	Tons (dioxins: mg-TEQ)			
Substance name	Atmospheric emissions	Water emissions	Soil emissions / company landfill	Waste transfers
Butyl acrylate	0.1	0.0	0.0	0.2
Acetonitrile	0.1	0.0	0.0	12.1
1-Allyloxy-2,3-epoxy propane	0.0	0.0	0.0	5.0
Ethylbenzene	16.4	0.0	0.0	47.9
Ethylene oxide	0.2	0.0	0.0	0.0
Ethylene glycol monoethyl ether	0.3	0.0	0.0	0.6
Epichlorohydrin	0.0	0.0	0.0	6.2
Xylene	14.6	0.0	0.0	31.0
p-Chloronitrobenzene	0.0	0.0	0.0	0.1
1-chloro-2,4-dinitrobenzene	0.0	0.0	0.0	0.4
Ethylene glycol monoethyl ether acetate	0.0	0.0	0.0	0.2
Ethyl acetate	1.5	0.0	0.0	0.3
Dichloromethane	1.0	0.0	0.0	26.3
N, N-dimethylacetamide	17.0	0.0	0.0	394.0
N, N-dimethylformamide	11.0	0.0	0.0	64.6
Styrene	0.3	0.0	0.0	0.3
Toluene	36.4	0.0	0.0	577.2
Carbon disulfide	0.5	0.4	0.0	0.0
1-nonanol	0.0	0.0	0.0	3.7
Hydroquinone	0.0	0.0	0.0	2.4
n-hexane	1.1	0.0	0.0	44.1
Poly (oxyethylene) alkyl ether	0.2	0.0	0.0	48.3
Formaldehyde	0.2	0.0	0.0	0.1
Maleic anhydride	0.0	0.0	0.0	2.9
Methacrylate acid	0.0	0.0	0.0	24.0

Group companies in Japan	Tons (dioxins: mg-TEQ)			
Substance name	Atmospheric emissions	Water emissions	Soil emissions / company landfill	Waste transfers
Methyl methacrylate	0.1	0.0	0.0	5.0
α-methylstyrene	0.0	0.0	0.0	0.4
Methylpyridine	0.6	0.0	0.0	36.3
Molybdenum and molybdenum compounds	0.0	0.0	0.0	0.3
Dioxins				
Total	101.5	0.4	0.0	1333.7

Note: The list shows emissions and transfers of 30 substances (out of the 67 PRTR Law-specified substances for group companies in Japan) exceeding 50 kg and dioxins.

CSR Guidelines & Activity Reports - Safety, Accident Prevention, and Environmental Preservation

Sites with ISO 14001 Certification

Environment

Sites with ISO 14001 Certification (as of March 2019)

Toray Industries, Inc. : All 13 plants
Shiga, Seta, Ehime, Nagoya, Tokai, Aichi, Okazaki, Mishima, Chiba, Tsuchiura, Gifu, Ishikawa, Nasu
Group companies in Japan: 35 plants at 21 companies[1]
• Du Pont-Toray Co., Ltd. [Tokai] • Toray Opelontex Co., Ltd. • Toray Textiles, Inc. [Tokai] • Toray Coatex Co., Ltd. [Kyoto, Chemical Products] • Toray Hybrid Cord, Inc. • Toray Plastics Precision Co., Ltd. [Mishima, Koriyama] • Toray PEF Products Inc. [Konan] • Toray Monofilament Co., Ltd. • Toray Advanced Film Co., Ltd. [Mishima, Takatsuki, Fukushima, Nakatsugawa] • Toray KP Films Inc. • Toray Fine Chemicals Co., Ltd. [Moriyama, Matsuyama, Tokai, Chiba] • Toray Engineering Co., Ltd. [Numazu] • Soda Aromatic Co., Ltd. [Noda, Koriyama, Okayama Chemicals] • Toray Amenity and Civil Engineering Co., Ltd. [Ehime, Fukushima] • Dow Corning Toray Co., Ltd. [Chiba, Fukui, Yamakita, Komatsu] • Suido Kiko Kaisha, Ltd. • Toray Medical Co., Ltd. • Ichimura Sangyo Co., Ltd. • Toray International, Inc., Ltd. • Chori Co., Ltd. • Toray Carbon Magic Co., Ltd.

1 In addition, 12 companies received certification as affiliated companies on Toray Industries' sites.

2 Information in brackets refers to the names of the plants.

3 Companies or plants that had acquired ISO14001 certification before joining Toray Group are listed as ISO14001-certified organizations, not as organizations which newly acquired ISO14001 certification in fiscal 2018. Toray Battery Separator Film Co., Ltd. has been counted as Toray Industries' Nasu Plant since fiscal 2017.

Group companies outside Japan: 58 plants at 43 companies	
USA	• Toray Plastics (America), Inc.〔Rhode Island, Virginia〕 • Toray Resin Co. • Toray Fluorofibers (America), Inc. • Toray Carbon Fibers America, Inc. • Toray Composites (America), Inc. • Toray Membrane USA, Inc.
UK	• Toray Textiles Europe Ltd.
France	• Toray Films Europe S.A.S. • Toray Carbon Fibers Europe S.A. • Toray Carbon Fibers Europe（Lacq）
Germany	• Euro Advanced Carbon Fiber Composites GmbH • Greenerity GmbH
Italy	• Alcantara S.p.A. • DELTA
Czech Republic	• Toray Textiles Central Europe s.r.o.
Hungary	• Zoltek (Hungary)
Indonesia	• P.T. Century Textile Industry Tbk • P.T. Easterntex • P.T. Indonesia Toray Synthetics • P.T. Acryl Textile Mills • P.T. Indonesia Synthetic Textile Mills • P.T. Toray Polytech Jakarta
Thailand	• Thai Toray Textile Mills Public Company Limited • Thai Toray Synthetics Co., Ltd. [Bangkok, Ayutthaya, Nakhonpathom] • Luckytex (Thailand) Public Company Limited〔M1, M2, M3〕
Malaysia	• Penfibre Sdn. Berhad • Penfabric Sdn. Berhad〔M1, M2, M3, M4〕 • Toray Plastics (Malaysia) Sdn. Berhad
China	• Toray Fibers (Nantong) Co., Ltd. • Toray Sakai Weaving & Dyeing (Nantong) Co., Ltd. • Toray Plastics (Shenzhen) Ltd. • Toray Film Products (Zhongshan) Ltd. • Toray Plastics Precision (Zhongshan) Ltd. • Toray Plastics (Suzhou) Co., Ltd. • Toray Fibers & Textiles Research Laboratories (China) Co., Ltd. • Toray Advanced Materials Research Laboratories (China) Co., Ltd. • Toray Polytech (Nantong) Co., Ltd. • Toray BlueStar Membrane Co., Ltd. • Toray Plastics (Chengdu) Co., Ltd.
Republic of Korea	• Toray Advanced Materials Korea Inc〔M1, M2, M3〕 • STEMCO, Ltd. • Toray Chemical Korea Inc〔M1, M2, M3, M4〕 • Toray Battery Separator Film Korea, Ltd • Toray BSF Coating Korea Limited[4]
Taiwan	• Toray Advanced Film Kaohsiung Co., Ltd.

4 A company that newly acquired ISO14001 certification in fiscal 2018.

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Environmental Data for Toray Industries and Principal Group Companies

Environment

Environmental Data for 13 Toray Industries' Plants and Principal Group Companies

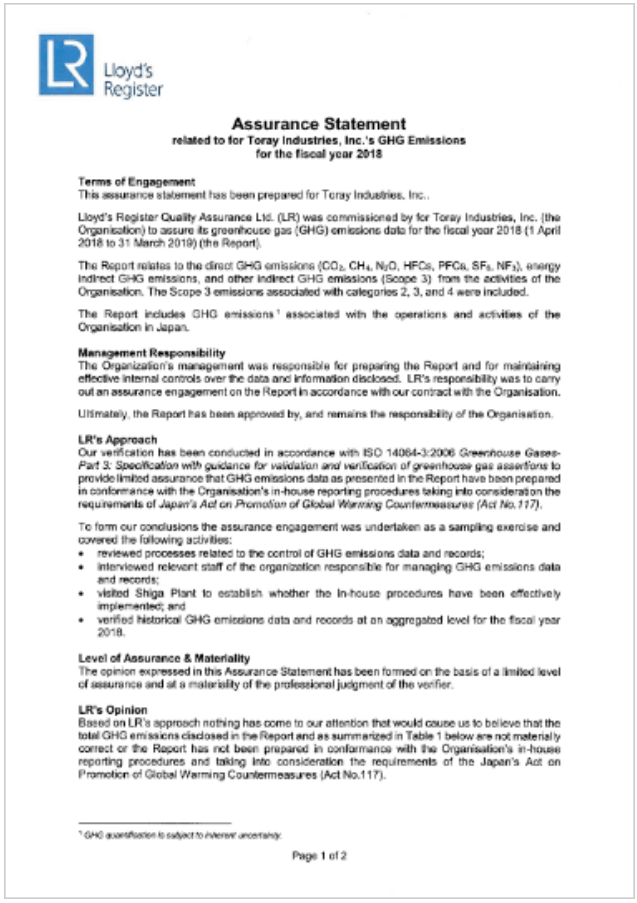
	Emission Volume														Principal manufactured products
	GHG emissions	PRTR				Gas emissions			Water emissions			Waste			
		Emissions			Waste transfers	SOx	NOx	Dust	BOD	COD	Water	Recycled	Simple incineration	Landfill disposal	
		Air	Water	Soil & landfill	Waste										
	10,000 tons CO_2/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	million m^3/year	tons/year	tons/year	tons/year	
Shiga Plant	8.4	1	0	0	13	0	30	5	36	65	22.8	3,603	13	0	• Base material of ultrasuede™ man-made suede • LUMIRROR™ polyester film • TOPTICAL™ color filter • TORAYVINO™ home water purifier
Seta Plant	0.2	0	0	0	0	0	0	0	0	0	0.1	79	0	0	• TORAYLON™ acrylic fiber • Medical devices (Inoue Balloon catheters, ANTHRON™ P-U catheters)
Ehime Plant	65.4	67	10	0	555	229	689	83	109	129	32.5	6,289	25	0	• TORAY TETORON™ polyester staple fiber • TORAYCA™ carbon fiber • ROMEMBRA™ reverse osmosis membrane module • TORAYCON™ PBT resin
Nagoya Plant	9.5	18	0	0	53	0	49	2	86	124	30.0	3,834	27	27	• AMILAN™ nylon resin • TORAYCON™ PBT resin • Various fine chemicals
Tokai Plant	64.4	55	18	0	15	8	371	1	340	359	19.1	6,994	54	0	• Caprolactam • Tereph- thalic acid • TORAY TETORON™ polyester chips • TORELINA™ PPS resin
Aichi Plant	2.3	0	0	0	8	0	2	0	2	0	1.6	171	1	0	• Nylon filament yarn • RAYTELA™ plastic optical fiber

	Emission Volume														Principal manufactured products
	GHG emissions	PRTR				Gas emissions			Water emissions			Waste			
		Emissions			Waste transfers	SOx	NOx	Dust	BOD	COD	Water	Recycled	Simple incineration	Landfill disposal	
		Air	Water	Soil & landfill	Waste										
	10,000 tons CO_2/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	tons/year	million m^3/year	tons/year	tons/year	tons/year	
Okazaki Plant	8.5	7	0	0	75	0	32	2	12	7	3.8	2,042	9	9	• Nylon filament yarn • TORAY WATERLESS PLATE™ printing plate • Filtryzer™ hemodialyzers • TORAYVINO™ home water purifier
Mishima Plant	13.5	1	0	0	5	3	71	0	15	24	35.5	1,294	2	1	• LUMIRROR™ polyester film • TORAY TETORON™ polyester filament yarn • DORNER™ oral administration prostacyclin PGI2 derivative • FERON™ natural interferon-β preparation
Chiba Plant	1.7	20	0	0	2	0	10	0	5	56	4.1	2,288	30	21	• TOYOLAC™ ABS resin
Tsuchiura Plant	2.2	0	0	0	0	0	4	0	1	0	0.3	454	0	0	• TORAYFAN™ BO polypropylene film
Gifu Plant	8.2	0	0	0	19	0	25	1	11	10	9.5	879	0	0	• ultrasuede™ man-made suede • LUMIRROR™ polyester film • TORELINA™ PPS film
Ishikawa Plant	6.4	1	0	0	1	5	15	0	4	6	7.0	1,440	9	5	• TORAY TETORON™ polyester filament yarn • Nylon filament yarn • TORAYCA™ prepreg
Nasu Plant	4.1	157	0	0	0	0	6	2	0	0	0.1	1,095	7	0	• Lithium-ion rechargeable battery
Toray Hybrid Cord, Inc.	1.4	2	0	0	1	0	1	0	2	4	0.7	334	2	2	• Tire cord • Carpet pile fiber
Toray Advanced Film Co., Ltd. [Mishima]	0.3	1	0	0	23	0	0	0	0	0	0.3	226	0	0	• CERAPEEL™ Release film • LUMISOLAR™ PV-back sheet
Malaysia Penfibre Sdn. Berhad[Fibers & Textiles]	3.4	0	0	0	0	0	0	12	1	5	0.2	137	87	58	• TORAY TETORON™ polyester staple fiber
France Toray Films Europe S.A.S.	3.2	0	0	0	0	0	12	0	3	15	1.5	2,777	3,746	683	• LUMIRROR™ polyester film

CSR Guidelines & Activity Reports - Safety, Accident Prevention, and Environmental Preservation

Third-Party Assurance

Environment



Lloyd's Register

Assurance Statement
related to for Toray Industries, Inc.'s GHG Emissions
for the fiscal year 2018

Terms of Engagement
This assurance statement has been prepared for Toray Industries, Inc..

Lloyd's Register Quality Assurance Ltd. (LR) was commissioned by for Toray Industries, Inc. (the Organisation) to assure its greenhouse gas (GHG) emissions data for the fiscal year 2018 (1 April 2018 to 31 March 2019) (the Report).

The Report relates to the direct GHG emissions (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3), energy indirect GHG emissions, and other indirect GHG emissions (Scope 3) from the activities of the Organisation. The Scope 3 emissions associated with categories 2, 3, and 4 were included.

The Report includes GHG emissions[1] associated with the operations and activities of the Organisation in Japan.

Management Responsibility
The Organization's management was responsible for preparing the Report and for maintaining effective internal controls over the data and information disclosed. LR's responsibility was to carry out an assurance engagement on the Report in accordance with our contract with the Organisation.

Ultimately, the Report has been approved by, and remains the responsibility of the Organisation.

LR's Approach
Our verification has been conducted in accordance with ISO 14064-3:2006 *Greenhouse Gases-Part 3: Specification with guidance for validation and verification of greenhouse gas assertions* to provide limited assurance that GHG emissions data as presented in the Report have been prepared in conformance with the Organisation's in-house reporting procedures taking into consideration the requirements of *Japan's Act on Promotion of Global Warming Countermeasures (Act No.117)*.

To form our conclusions the assurance engagement was undertaken as a sampling exercise and covered the following activities:

- reviewed processes related to the control of GHG emissions data and records;
- interviewed relevant staff of the organization responsible for managing GHG emissions data and records;
- visited Shiga Plant to establish whether the in-house procedures have been effectively implemented; and
- verified historical GHG emissions data and records at an aggregated level for the fiscal year 2018.

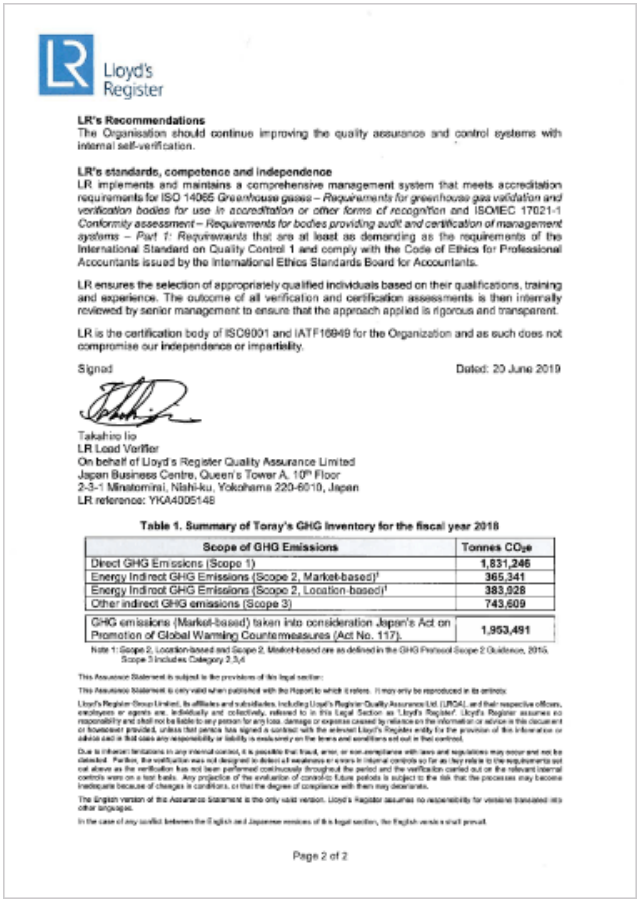
Level of Assurance & Materiality
The opinion expressed in this Assurance Statement has been formed on the basis of a limited level of assurance and at a materiality of the professional judgment of the verifier.

LR's Opinion
Based on LR's approach nothing has come to our attention that would cause us to believe that the total GHG emissions disclosed in the Report and as summarized in Table 1 below are not materially correct or the Report has not been prepared in conformance with the Organisation's in-house reporting procedures and taking into consideration the requirements of the Japan's Act on Promotion of Global Warming Countermeasures (Act No.117).

[1] *GHG quantification is subject to inherent uncertainty.*

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Lloyd's Register

LR's Recommendations
The Organisation should continue improving the quality assurance and control systems with internal self-verification.

LR's standards, competence and independence
LR implements and maintains a comprehensive management system that meets accreditation requirements for ISO 14065 *Greenhouse gases – Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition* and ISO/IEC 17021-1 *Conformity assessment – Requirements for bodies providing audit and certification of management systems – Part 1: Requirements* that are at least as demanding as the requirements of the International Standard on Quality Control 1 and comply with the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants.

LR ensures the selection of appropriately qualified individuals based on their qualifications, training and experience. The outcome of all verification and certification assessments is then internally reviewed by senior management to ensure that the approach applied is rigorous and transparent.

LR is the certification body of ISO9001 and IATF16949 for the Organization and as such does not compromise our independence or impartiality.

Signed Dated: 20 June 2019

Takahiro Iio
LR Lead Verifier
On behalf of Lloyd's Register Quality Assurance Limited
Japan Business Centre, Queen's Tower A, 10th Floor
2-3-1 Minatomirai, Nishi-ku, Yokohama 220-6010, Japan
LR reference: YKA4005148

Table 1. Summary of Toray's GHG inventory for the fiscal year 2018

Scope of GHG Emissions	Tonnes CO_2e
Direct GHG Emissions (Scope 1)	1,831,246
Energy Indirect GHG Emissions (Scope 2, Market-based)[1]	365,341
Energy Indirect GHG Emissions (Scope 2, Location-based)[1]	383,928
Other indirect GHG emissions (Scope 3)	743,609
GHG emissions (Market-based) taken into consideration Japan's Act on Promotion of Global Warming Countermeasures (Act No. 117).	1,953,491

Note 1: Scope 2, Location-based and Scope 2, Market-based are as defined in the GHG Protocol Scope 2 Guidance, 2015. Scope 3 includes Category 2,3,4

This Assurance Statement is subject to the provisions of the legal section:

This Assurance Statement is only valid when published with the Report to which it refers. It may only be reproduced in its entirety.

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Due to inherent limitations in any internal control, it is possible that fraud, error, or non-compliance with laws and regulations may occur and not be detected. Further, the verification was not designed to detect all weaknesses or errors in internal controls so far as they relate to the requirements set out above as the verification has not been performed continuously throughout the period and the verification carried out on the relevant internal controls were on a test basis. Any projection of the evaluation of control to future periods is subject to the risk that the processes may become inadequate because of changes in conditions, or that the degree of compliance with them may deteriorate.

The English version of the Assurance Statement is the only valid version. Lloyd's Register assumes no responsibility for versions translated into other languages.

In the case of any conflict between the English and Japanese versions of this legal section, the English version shall prevail.

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