Environment Report

2021

Nippon Carbon Co., Ltd.

Table of Contents

Message to our Stakeholders

For a long time of more than a century since the foundation in 1915, the Nippon Carbon Group has been making progress together with our customers, other relevant parties, and society, opening up the era as a pioneer of carbon engineering and playing the role of an engine for the industry. Our success started with the first domestic industrialization of artificial graphite electrodes for steel-making electric furnaces, followed by the continuous release of value-added products that satisfy the needs of each moment in Japan and overseas as well, such as carbon fibers, specialty carbon products, anode materials for lithium-ion batteries, and silicon carbide continuous fibers in the application area.

Nippon Carbon's core products, artificial graphite electrodes, are used in electric furnaces for melting iron scrap to make steel. Such electric furnaces contribute to the formation of a resource-circulating society by recycling iron discharged as scrap.

Today, the business environment around the Company goes on changing considerably on a global scale and the velocity of the change is surely increasing. We struggle to slough off old conventions, foresee and prepare for alteration of business circumstances, and reform ourselves to evolve into a corporate group that grows for the future in a sustainable manner.

With passion for a dream substance having unexplored potential, namely carbon, and the spirit to take on challenges, Nippon Carbon continues to provide products and relevant services with new value, while making efforts for ceaseless reinforcement of corporate governance to ensure sound, efficient management while serving to achieve a good balance between humans and nature and to create a happy society and future.

Carbon materials require large amount of energy during the course of manufacturing because high-temperature furnaces are used, and air pollutants, carbon dioxide, and waste must occur. Therefore, we promote energy saving, install eco-conscious facilities, and reduce waste. In addition, improvement in and good harmony with the environment in the neighborhood are addressed proactively.

I always appreciate your continued and further support of Nippon Carbon.

宮下 尚史

Takafumi Miyashita
Representative Director, CEO
Nippon Carbon Co., Ltd.

1. Environmental Activities

We fully realize that the Company operates in an industry that consumes a lot of energy and resources and is not able to survive without co-existence and co-prosperity with the surrounding areas. In order to hand over the home of all humankind, in other words, the Earth, to the next generations, the Environmental Philosophy has been established and environmental management activities are encouraged.

<Environmental Philosophy>

> Nippon Carbon pursues technologies in harmony with the environment and aims at realizing a society that allows affluent, fruitful lives.

<Environmental Policy>

Based on the Environmental Philosophy, the Company defines the Environmental Policy that acts as the driving force to maintain and improve environmental performance by constructing and modifying the environmental administration system, and thus develops its activities.

<Enhancement and strengthening of environmental management structure>

The organization to conduct environmental conservation activities is systematized for maintenance and improvement of the Environmental Management System so that eco-friendly corporate activities are deployed.

<Promotion of effective use of resources and energy>

The amount of resources and energy to use is reduced.

<Encouragement of environmental conservation activities>

Pollution of air, rivers and soils, odors, and noises are prevented. The volume of industrial waste is reduced.

<Compliance with environment-related laws and regulations>

Laws, regulations, ordinances, regional agreements, and other rules related to the environment are complied with to prevent pollution and destruction of the natural environment.

<Promotion of environmental education and social contribution activities>

In order to raise environmental awareness, all employees are educated about environmental management and they also participate in environmental conservation activities, aiming at coexistence with the local community for protection of the environment in the area and for improvement in communication.

2. Business Overview

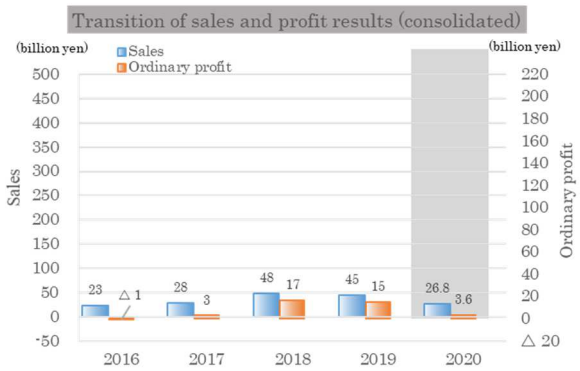
(1) Corporate profile (January 1, 2021)

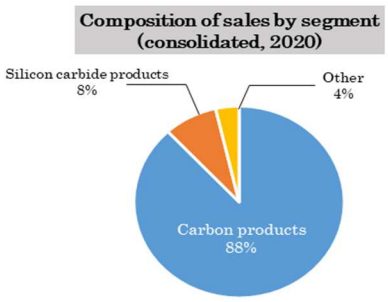
Corporate name	Nippon Carbon Co., Ltd.
Headquarters	TMG Hatchobori Bldg, 1-10-7 Hatchobori, Chuo-ku, Tokyo 104-0032 Japan
Main worksites	Headquarters, Toyama Plant, Shiga Plant, Shirakawa Plant, Laboratory Refer to http://www.carbon.co.jp for details about our worksites.
Foundation	December 20, 1915
Capital	7,402,770,000 yen
Employees	Consolidated: 663, Nippon Carbon: 182 (as of January 1, 2021)

(2) Business outline and financial performance

Main business	Manufacturing and sales of carbon products
Major products	Artificial graphite electrodes for steel-making electric furnaces, high-purity and ultra-high purity isotropic graphite for semiconductor production, molded carbon fiber heat insulators, carbon fiber reinforced composites, impervious graphite heat exchangers, anode materials for lithium-ion batteries, carbon products for mechanical components, high-performance sliding parts, flexible graphite sealing materials, carbon brushes, silicon carbide continuous fibers, and ultra-heat-resistant silicon carbide continuous fibers

Transition of financial results (fiscal year ended in December 2020)





(3) Scope of organizations and periods

Organizations concerned Five companies in Japan and one overseas affiliated company

Company/Plant name	Abbreviation	Address	Main business
Nippon Carbon Co., Ltd.	NC	Chuo-ku, Tokyo	Manufacturing and sales of carbon products
Toyama Plant	Toyama	Toyama-shi, Toyama	Manufacturing of artificial graphite electrodes for steel-making electric furnaces and anode materials for lithium ion batteries
Shiga Plant	Shiga	Ohmihachiman-shi, Shiga	Manufacturing of carbon fiber products
Shirakawa Plant	Shirakawa	Shirakawa-shi, Fukushima	Manufacturing of carbon fiber and other products
Nippon Techno-Carbon Co., Ltd.	NTC	Osato-cho, Kurokawa-gun,	Manufacturing and sales of carbon products
NTC Machining Co., Ltd.	NTCM	Osato-cho, Kurokawa-gun,	Manufacturing of carbon products
Nippon Carbon Engineering Co., Ltd.	NCEC	Toyama-shi, Toyama	Manufacturing of carbon products, and manufacturing and sales of industrial machines
NGS Advanced Fibers Co., Ltd.	NGSAF	Toyama-shi, Toyama	Manufacturing and sales of silicon carbide fiber products
Central Carbon Co., Ltd.	CC	Taipei City, Taiwan, etc.	Manufacturing and sales of carbon products

Periods concerned	From January 1, 2015 to December 31, 2020 (6 years) for the material balance, total material input, total product production, total energy input, greenhouse gases, water resource input, and total water discharge. However, the data from April 1, 2015, to March 31, 2021 (six years) are used for the items reported to central and municipal government agencies based on the energy conservation act, the global warming countermeasures law, the Water Pollution Prevention Act, the Air Pollution Control Act, the PRTR law, and other laws, in order to coincide with fiscal years of government agencies and avoid inconsistencies (labeled as FY 2020 and so on).

(3) Editorial policy

Reference guideline	Environmental Reporting Guidelines 2018, Ministry of the Environment Guide for Items Contained in the Environmental Report (3rd Edition), Ministry of the Environment
Date of issuance	July 2021
Scheduled date of next issuance	July 2022
Department that prepared this report	Corporate Environmental Management Committee, Nippon Carbon Co., Ltd.
Contact	CSR Department, Nippon Carbon Co., Ltd. TEL +81-3-6891-3737 FAX +81-3-6891-3785 E-mail info@carbon.co.jp

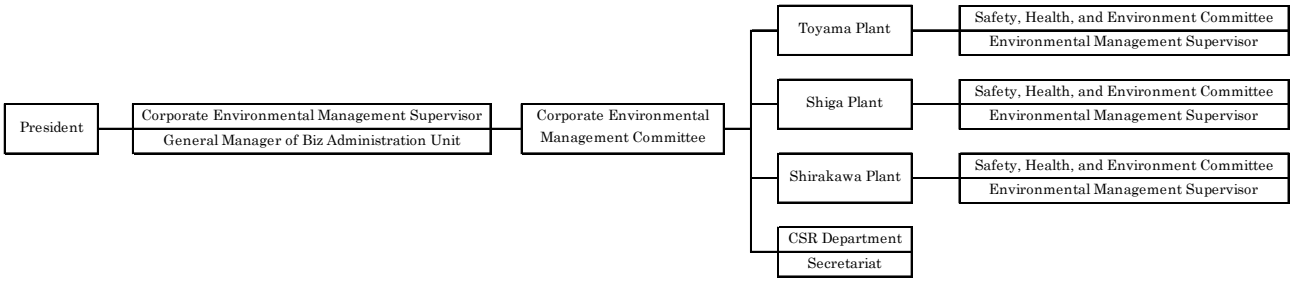
3. Enhancement and Strengthening of Environmental Management Structure

(1) Actual operation of Environment Management System (EMS)

In this Company, the organization to conduct environmental conservation activities is systematized for maintenance and improvement of the EMS so that eco-friendly corporate activities are deployed.

The Corporate Environmental Management Committee is convened at least once a year. The plant general manager of each plant participates in the meeting to review adequacy and effectiveness of the EMS per worksite and follows up activities to control global warming.

At each plant, the Plant General Manager Policy and the annual plan for safety, health, and the environment are established, and the progress is followed up in the audits of the plant general manager and the meetings of the Safety, Health, and Environment Committee on a monthly basis.



(2) Construction and use of EMS

ISO 14001 certification

Our three principal manufacturing sites obtained certification of ISO 14001.

Record of ISO 14001 certification

Site	Date of ISO 14001 certification	Certification body
Toyama Plant	August 21, 1998	European Quality Assurance
Shiga Plant	October 12, 1998	BUREAU VERITAS
Shirakawa Plant	July 5, 2017	European Quality Assurance

(3) Execution of internal environmental audit

At the Toyama, Shiga, and Shirakawa plants, the plant general manager, the department managers, and the members of the Safety, Health, and Environment Committee make the rounds of their sites every month, notify workplaces about matters pointed out, and follow up on the progress of improvements in monthly meetings of the Safety, Health, and Environment Committee and other occasions.

These three plants are subject to semiannual internal audits of in-house auditors in accordance with ISO 14001. In addition, third-party certification bodies perform re-certification and certification maintenance and one minor non-conformity (storage of solvents) was revealed at the Shiga plant in 2020. Corrective measures are always implemented for indicated items so that the EMS is strengthened.

4. Products, New Technologies, Research, and Development to Serve for Reduction of Environmental Burdens

<Contribution to a low carbon society through lithium-ion batteries>

The trend to EVs (electric vehicles) is accelerated sharply in Europe and China. Lithium-ion batteries are essential for such EVs. In addition, the rechargeable battery market is growing rapidly because of secondary batteries for energy storage systems at power stations and substations of electric power companies, for residential use, and for non-residential use, including peak-load shifting and reduction and emergency power supplies.

Through the anode materials for these batteries, we serve for eco-friendly vehicles that get along with the global environment and contribute to forming a low carbon society. The laboratory established together on the premises of the Shiga plant forwards research and development of next-generation anode materials for lithium-ion batteries in order to meet larger capacities, which arouse growing expectations in recent years.

<Contribution to establishing a low carbon society through heat insulators>

Heat insulators are carbon materials that play the most active role for energy saving of high-temperature furnaces. In the last several years, thermal insulators and hybrid insulation materials with high energy saving effects have been developed, and the superior insulation performance has led to successful reduction in energy consumption to 30% lower than conventional products. Thus, our products significantly contribute to users' energy savings.

On top of that, most of silicon monocrystalline pulling systems for semiconductors and optical fiber making machines consist of carbon materials that include molded carbon fiber heat insulators, which serve to save energy in the production processes.

<Contribution to establishing a low carbon society through carbon fiber reinforced carbon materials>

One of the product types manufactured at the Shiga plant is carbon fiber reinforced carbon materials. Different from metals, these materials maintain high strength even under harsh conditions at 2,000°C; moreover, they are five times lighter than iron. Therefore, metal thermal treatment providers replace metallic heat resistant trays with the ones made of these materials in the recent years, leading to energy saving thanks to lighter weight, shorter thermal treatment time, and smaller heating energy.

<Contribution to establishing a low carbon society through solar power generation components>

Solar power generation gains attention all over the world and carbon materials are essential in the production process of solar cells. The solar cells used for photovoltaic power generation are made of silicon metal. However, normal silicon does not work for the cells. For that purpose, silicon is once melted to create a crystal structure through which electrons flow regularly. The interior of melting furnaces in this process is mostly composed of carbon materials.

Our Group, as a whole, supplies crucibles, heaters, heat insulators, and all other carbon materials inside the furnaces. In particular, the Shiga plant produces heat insulators principally.

<Contribution to a low carbon society through silicon carbide continuous fibers Nicalon®>

The silicon carbide continuous fibers of Nicalon® are an advanced material having excellent resistance to heat and oxidization even in a high temperature atmosphere at a thousand and several hundred degrees and have been researched, developed, and modified over decades. The most notable application that makes full use of these features is ceramic composite materials (CMCs) reinforced with these fibers. Compared with metal materials, they are three times lighter, two times stronger, and resistant to 20% higher temperatures. These innovative components of lightweight, durable, and heat-resistant properties contribute significantly to improved fuel efficiency of aircraft, and they are called a "dream material" in the aviation industry.

(Cited from Aviation Wire on January 26,

NGS Advanced Fibers was founded as a joint venture corporation by three companies: General Electric (GE) from the United States, Safran from France, and Nippon Carbon, and manufactures and supplies Hi-Nicalon® silicon carbide continuous fibers to the joint company between GE and Safran, CFM International, where they have developed and commercialized the LEAP engines for small aircraft, which are already in service (1736 units were shipped out in 2019 and 815 units in 2020). CMC components are also used in the zone that reaches highest temperatures of the airliner GE9X engine developed by GE Aviation from the United States, improving fuel consumption by 10% compared to the present model GE90 and achieving low NOx emissions of 29% below the standard. The GE9X has already been mounted on the Boeing 777X, the next generation airplane to the 777, and succeeded in the first flight test.

<Contribution to forming a resource-circulating society by artificial graphite electrodes>

Artificial graphite electrodes are used for melting iron scrap in electric furnaces to make steel. Since the energy consumed in this process is less than that of the blast furnace method and iron scrap, which is discharged as unnecessary matter, is recycled as a resource, these products contribute to forming a resource-circulating society and serve to reduce the burden on the global environment. Recycling iron resources in Japan is realized based on the well-balanced steel shares between electric and blast furnace production.

As graphite has a low specific resistance and is never softened or melted at the practically highest temperatures, no other materials substitute for it, and we have used it for many years as an essential ingredient for iron recycling.

Besides, we have positively assisted in the reduction of electrode consumption intensity in steel making. Thanks to our electric furnace diagnoses and development of water-cooled electrodes, the consumption intensity is reduced to one-third to one-fourth of the value of the decade starting from 1965.

5. Environment-Conscious Plans of the Nippon Carbon Group

Important environmental issue	Medium-term environmental goal	Results of FY 2020
Global warming	Reduction in the energy input intensity of the entire NC Group by 2.5% below the level of FY 2015 by FY 2020	Increase by 27% year-on-year
Wastes	Reduction in final disposal of wastes of the entire NC Group by 10% below the level of 2015	Decrease by 52% year-on-year
Environmental safety	Zero environmental accidents in Japan	Zero environmental accidents

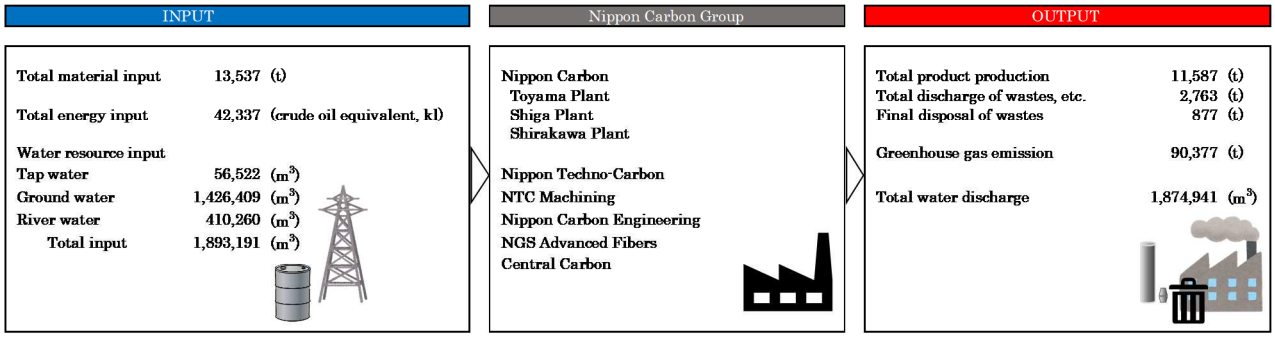
The energy input intensity was higher than the previous year by 27% because the production of this fiscal year was considerably decreased because of the coronavirus situation. Because of the significant drop in production, the final disposal of waste was also decreased by 52% year-on-year.

6. Encouragement of Environmental Conservation Activities

(1) Material balance of the Nippon Carbon Group (in 2020)

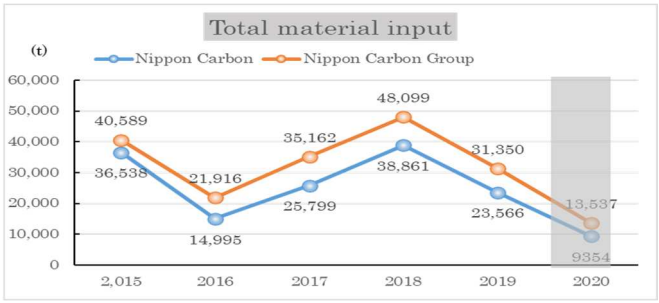
[Chart of resource input and product output in terms of environmental burdens]

Material balance of the Nippon Carbon Group (2020)

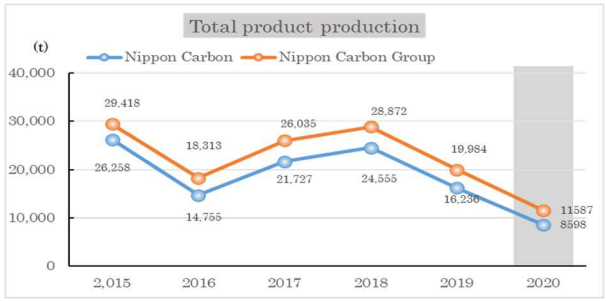


(2) Total material input and total product production

Total material input

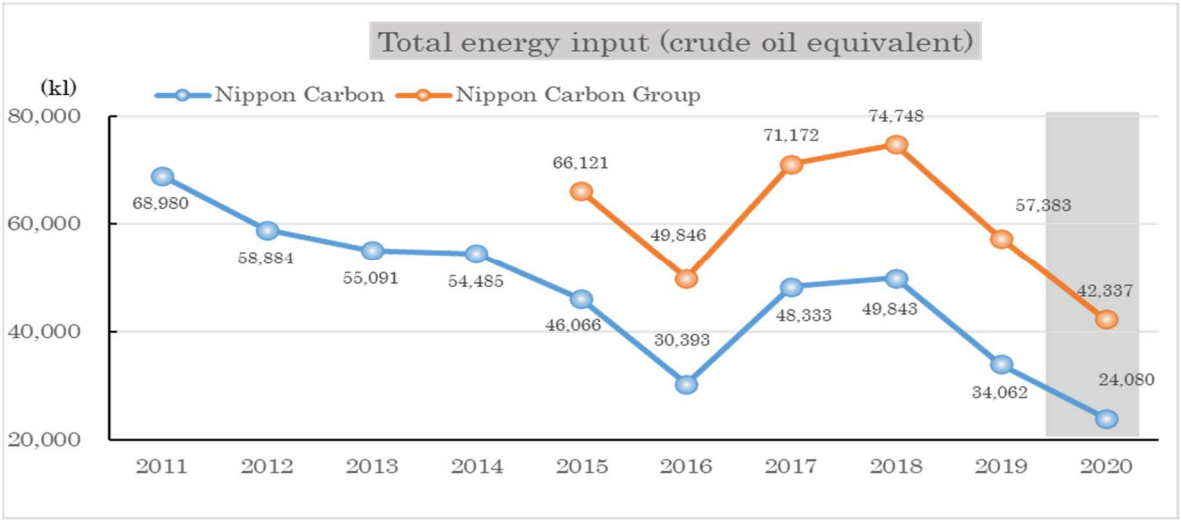


Total product production



Our core products, artificial graphite electrodes for steel making, are used to melt iron scrap in electric furnaces. While the production declined drastically because of the imbalance between production and the demand for steel materials in China, it took a sharp turn upward and after 2017 due to the world-scale lack of graphite electrode supplies. However, it peaked in 2018, and demand was unstable and production decreased in 2019. It further dropped in 2020 because of the COVID-19 pandemic.

(3) Total energy input and measures for its reduction

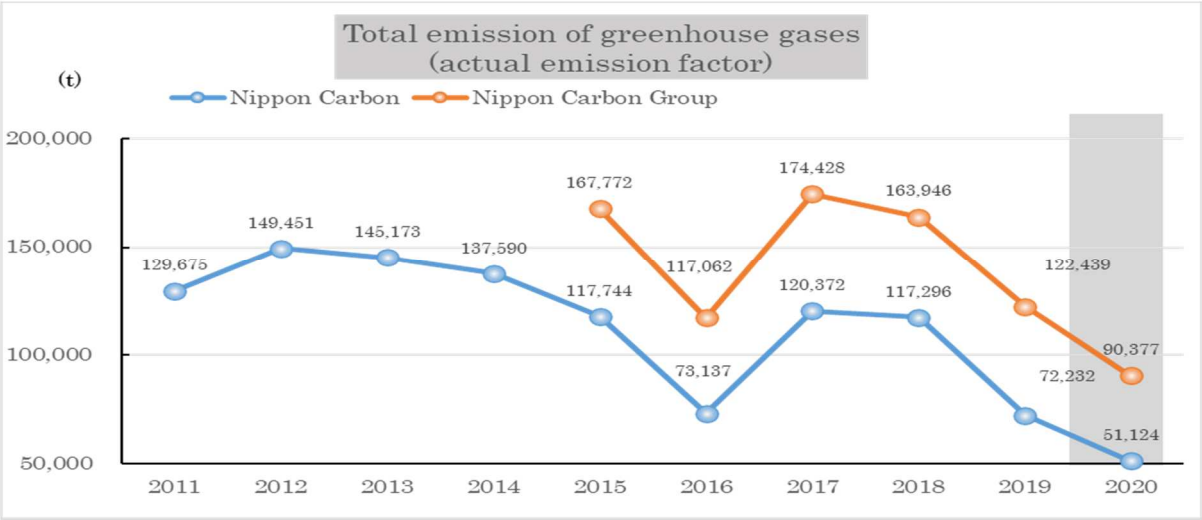


The electric power fed to the graphitization process of our principal products accounts for a significant

part of the total energy input. In addition, artificial graphite electrodes for steel making also make up a large portion of energy input at Nippon Carbon and specialty carbon products additionally do for the entire group. Since the amount of production depends on the economic situation, the energy use intensity per unit amount of production or money is technically considered as a scale of improvement evaluation.

In addition, thermal insulation of the heating section and lids of high-temperature furnaces is improved for energy saving. Moreover, optimization and automation of combustion, use of waste heat for preheating air-fuel mixtures, optimized operation of the cooling pumps and fans and the compressor, replacement of the transformer with a high-efficient one, and other measures are taken to reduce energy use.

(4) Greenhouse gas emission and measures for its reduction



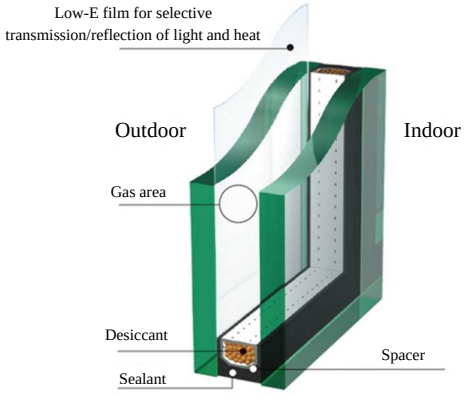
The emission of greenhouse gases is almost proportional to energy input. The Company considers:

"Measures for reducing emission = Measures for reducing energy input"

and intends to reduce them on the basis of the intensity.

The Shiga plant changes fuel from heavy oil and LPG to LNG and has employed a Regenerative Thermal Oxidizer (RTO) in order to reduce emissions of greenhouse gases.

The office buildings of the Toyama and Shiga plants have external wall materials and windowpanes excellent in heat shielding and insulation, such as ceramic siding panels and double-glazed windows, for low energy consumption and greenhouse gas emission reduction of the buildings based on the building energy conservation act.

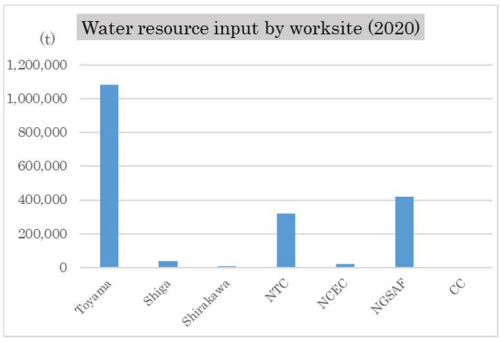


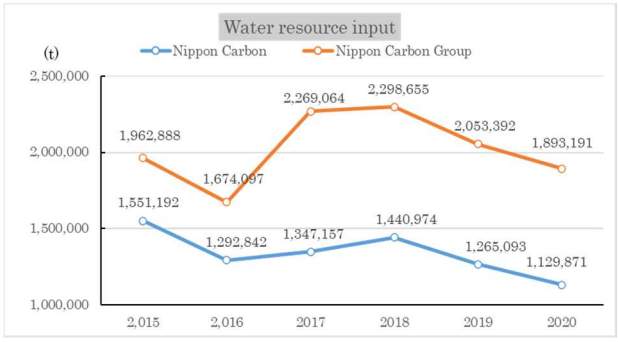
NGS Advanced Fibers manufactures and sells the Nicalon® silicon carbide continuous fibers. Regarding the production process of Nicalon®, 25% of CFC substitutes used has been eliminated for conservation of the global environment.

The Japan Carbon Association is an industry group, which addresses greenhouse gas emission reduction, and the Nippon Carbon Group actively takes part in it.

(5) Water resource input and total water discharge

Water resource input

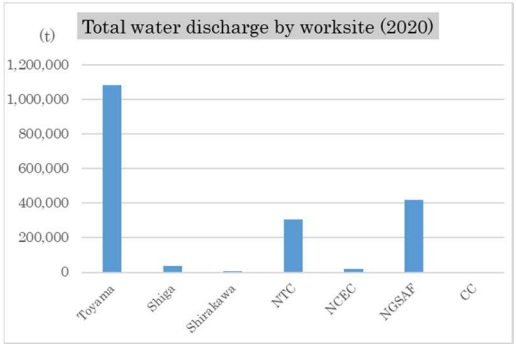


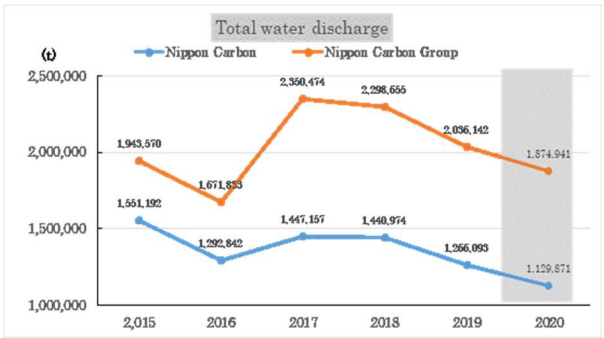


Most of the water resources are used for indirect cooling of thermal treatment facilities, including baking ovens and graphitization furnaces. Therefore, the water resource input is proportional to the amount of production and energy use in general. The drop in water resource input in 2016 was caused by the decrease in the operating rate of thermal treatment furnaces due to reduced production at the Toyama plant. It increased from 2017 and onward thanks to the recovery of electrode production and commencement of a new plant of NGS Advanced Fibers. The index regarding water resources declined in 2020 because of the reduction in electrode production.

The Toyama plant, NCEC, and NGSAF are located at the southern end of the Toyama Plain, and the place has sufficient ground water. The Toyama plant uses a huge amount of river and ground water, which does not affect irrigation for rice fields in the surrounding area. We enjoy the blessings of the rich nature of Japan.

Total water discharge





Since most of the water resources we utilize is for indirect cooling of thermal treatment furnaces, and the quality is practically the same after use, except for the temperature rise, the amount corresponding to the input is discharged into the rivers. A part of the water is consumed for direct cooling and evaporates and diffuses into the air.

The effluent from the Toyama plant is released into the Osawano Canal that flows along the plant and enters the Jinzu River running to Toyama Bay. In the case of the Shiga plant, the Sanmyo River (Class A

river) passes through the premises of the plant and reaches Lake Biwa, and the water then flows via the Seta River and the Yodo River into Osaka Bay. The wastewater from the Shirakawa plant flows into the Tono River, which leads to the Abukuma River.

(6) Recycling of water resources (within the business areas)

The heat of the cooling water after use in thermal treatment furnaces is radiated into cooling towers. Thus, we seriously deploy cyclical use and devise reductions in the input to the minimum.

(7) Concentration and water pollutant load of items having discharging standards under the Water Pollution Prevention Act

Toyama Plant

Measurement item	Unit	Agreement	FY 2015		FY 2016		FY 2017		FY 2018		FY 2019		FY 2020	
			Ave.	Max.	Ave.	Max.	Ave.	Max.	Ave.	Max.	Ave.	Max.	Ave.	Max.
pH		5.8 - 8.6	7.3	6.9 - 8.1	7.3	6.9 - 7.6	7.3	6.8 - 7.7	7.3	6.9 - 8.1	7.3	6.9 - 8.0	7.3	6.9 - 8.4
Biochemical oxygen demand (BOD)	(mg/l)	25 or less	1.3	3.6	2.0	13	2.7	3.3	1.2	6.3	1.0	3.4	0.9	4.3
Chemical oxygen demand (COD)	(mg/l)	160 or less	1.6	1.8	1.6	1.8	1.3	6.6	1.6	2.4	1.6	2.4	3.7	7.6
Suspended solids (SS)	(mg/l)	60 or less	6.5	40.0	4.5	34.0	4.5	18.0	1.2	25.0	4.1	28.0	3.4	20.0
Normal hexane extract	(mg/l)	3 or less	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	0.02	<0.5

Shiga Plant

Measurement item	Unit	Ordinance	FY 2015		FY 2016		FY 2017		FY 2018		FY 2019		FY 2020	
			Ave.	Max.	Ave.	Max.	Ave.	Max.	Ave.	Max.	Ave.	Max.	Ave.	Max.
pH		6.0 - 8.0	7.2	6.9 - 7.4	7.2	7.4	7.30	7.0 - 7.8	7.3	7.1 - 7.7	7.3	7.0 - 7.5	7.2	7.5
Biochemical oxygen demand (BOD)	(mg/l)	30 or less	4.2	13.0	3.5	11.0	8.4	29.0	4.6	12.0	4.6	7.0	3.3	6.0
Chemical oxygen demand (COD)	(mg/l)	30 or less	4.0	7.7	3.6	6.1	5.0	14.3	5.1	10.9	5.8	7.3	3.7	5.9
Suspended solids (SS)	(mg/l)	70 or less	3.8	11.6	1.5	4.0	3.0	9.1	2.8	5.3	2.8	6.0	2.0	4.8
Oil	(mg/l)	5 or less	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
T-N (Total Nitrogen)	(mg/l)	20 or less	1.7	4.5	2.1	3.9	3.0	7.2	2.4	5.6	2.3	4.3	1.8	4.4
T-P (Total Phosphorus)	(mg/l)	—	0.2	0.4	0.2	0.3	0.3	0.9	0.3	0.8	0.2	0.5	0.1	0.2

Shiga Prefecture holds Lake Biwa, which is a large freshwater lake in Japan and a closed water system with only one outlet, namely the Seta River (to become the Yodo River downstream), and has addressed water quality control, eutrophication prevention, and biodiversity conservation of the lake ahead of the rest of Japan. The Shiga plant is not only subject to the Water Pollution Prevention Act but also the Act on Special Measures concerning Conservation of Lake Water Quality, the Act on Preservation and Regeneration of Lake Biwa, and extra regulations stipulated in other ordinances.

Some worksites and processes directly use water for machine cutting, and the wastewater containing graphite and other components is properly treated before discharging into rivers. Although no prefectural ordinances apply to the Shirakawa plant with regard to the quality of effluent, external experts regularly analyze the quality, and we confirm and monitor that the results meet the proper levels.

(8) Air pollution and loads relevant to living environments

Soot, dust, sulfur oxides, nitrogen oxides, and other harmful substances generated due to fuel combustion in thermal treatment furnaces are removed by electric dust collectors and other exhaust gas treatment equipment before the gas is released from the smokestack. In addition, combustion conditions are modified to reduce the generation itself. The thermal treatment furnaces of the Toyama and Shiga plants are units generating soot or smoke. The Shirakawa plant is outside the scope of the regulation, and the quality is voluntarily measured.

Toyama Plant

Measurement item		(Unit)	Legal regulation*		FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Soot and dust	Emission	ton	—		37.7	24.0	29.6	51.0	32.8	16.3
	Concentration	g/Nm3	0.1 or less - 0.4 or less	Ave.	0.018	0.031	0.016	0.028	0.063	0.022
				Max.	0.076	0.170	0.065	0.099	0.150	0.100
Sulfur oxides (SOx)	Emission	ton	—		38.8	23.5	43.5	48.5	31.8	20.3
	Concentration	Nm3/h	7 or less - 52 or less	Ave.	0.169	0.169	0.196	0.207	0.133	0.205
				Max.	0.650	0.739	1.236	1.230	0.908	1.080
Nitrogen oxides (NOx)	Emission	ton	—		74.1	21.4	28.0	83.8	59.3	53.1
	Concentration	ppm	180 or less - 300 or less	Ave.	51.0	38.5	32.8	47.2	35.6	50.1
				Max.	200.0	140.0	140.0	120.0	130.0	110.0

* Regulatory value depends on the facility type (smokestack height).

Shiga Plant

Measurement item		(Unit)	City standard	Agreement		FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Boundary Dust	Concentration	mg/Nm3	0.25	0.08	Ave.	0.020	0.022	0.021	0.026	0.014	0.016
					Max.	0.040	0.037	0.045	0.069	0.024	0.040
Boundary Sulfur oxides (SOx)	Concentration	ppm		0.1	Ave.	0.014	0.011	0.011	0.026	0.027	0.008
					Max.	0.064	0.030	0.082	0.540	0.780*	0.087

* Our investigation concluded that the source was out of the premise of the plant.

Shirakawa Plant

Measurement item		(Unit)	Legal regulation		FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Soot and dust	Emission	ton	—		0.003	0.004	0.005	0.007	0.003	0.003
	Concentration	g/Nm3	0.25	Ave.	Less than 0.001	Less than 0.001	0.0015	Less than 0.001	Less than 0.001	Less than 0.001
				Max.	Less than 0.001	Less than 0.001	0.0020	Less than 0.001	Less than 0.001	Less than 0.001
Sulfur oxides (SOx)	Emission	ton	—		0.039	0.051	0.038	0.053	0.044	0.032
	Concentration	Nm3/h	0.987	Ave.	Less than 0.004	Less than 0.003	Less than 0.003	Less than 0.003	Less than 0.002	Less than 0.002
				Max.	Less than 0.004	Less than 0.004	Less than 0.003	Less than 0.003	Less than 0.002	Less than 0.002
Nitrogen oxides (NOx)	Emission	ton	—		0.194	0.221	0.143	0.365	0.185	0.118
	Concentration	ppm	180	Ave.	34	26	19	34	21	29
				Max.	46	32	23	39	33	39

Noises based on the Noise Regulation Act

	Time	(Unit)	Agreement	Max.					
				FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Toyama Plant	6:00 - 8:00	dB	55 or less	54	55	55	55	53	52
	8:00 - 19:00		60 or less	60	58	60	60	59	59
	19:00 - 22:00		55 or less	55	54	55	55	55	57*
	22:00 - 6:00		50 or less	50	49	50	50	56	50

* The noise sources were insects and canals and we confirmed that there were no problem.

	Time	(Unit)	City regulatory standard	Max.					
				FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Shiga Plant	6:00 - 8:00	dB	60 or less	58	55	59	53	54	55
Category 3 district	8:00 - 18:00		65 or less	58	61	56	55	58	56
	18:00 - 22:00		65 or less	60	65	60	60	57	59
	22:00 - 6:00		55 or less	55	62	55	54	54	55
Category 4 district	6:00 - 8:00	dB	65 or less	45-58	50-54	44-58	49-53	47-55	50-57
	8:00 - 18:00		70 or less	51-65	52-59	45-58	55-60	50-59	50-60
	18:00 - 22:00		70 or less	53-59	59-65	50-61	61-67	60-63	53-62
	22:00 - 6:00		60 or less	50-60	57-59	48-56	51-60	53-60	47-60

Shiga Plant falls under Noise Category 3 and 4 districts of Omihachiman City.

	Time	(Unit)	Prefectural ordinance regulation	Max.					
				FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Shirakawa Plant	6:00 - 7:00	dB	70 or less	66	61	64	64	51	50
Category 5 district of prefectural ordinance	7:00 - 19:00		75 or less	73	61	66	62	54	51
	19:00 - 22:00		70 or less	66	61	64	64	51	50
	22:00 - 6:00		65 or less	65	63	63	62	52	51

Shirakawa Plant falls under Category 5 district (exclusive industrial district) of an ordinance of Fukushima Prefecture.

Vibration based on the Vibration Regulation Act

	Time	(Unit)	Legal regulation	Max.					
				FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Toyama Plant	8:00 - 19:00	dB	70 or less	34	35	32	33	37	35
	19:00 - 8:00		65 or less	30	29	24	27	32	30

Offensive odors based on the Offensive Odor Control Act

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Toyama Plant	Not exceeding the limits for 22 specified offensive odor substances					
	Odor Index less than 10					

(9) Release and transfer of chemical substances

Most of our products are graphite and carbon, which are chemically stable and harmless. A part of the processes uses phenol, formaldehyde, triethylamine, and divinylbenzene as ingredients. These chemical

substances are carbonized or decomposed to CO_2, H_2O, NO_2, and so on by thermal treatment and afterburners.

Toyama Plant

		(Unit)	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
(1)-243 dioxins	Release	mg-TEQ	0.2103	0.0474	0.0044	0.0231	0.8804	-
	Transfer		0.0000	0.0000	0.0000	0.0001	0.0000	-

Shiga Plant

		(Unit)	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Specific (1)-411 formaldehyde	Release	kg	31.1	44.7	55.1	14.2	17.9	14.2
	Transfer		0.0	0.0	0.0	0.0	0.0	0.0

Shirakawa Plant

		(Unit)	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
(1)-31 antimony	Release	kg	0.0	0.0	0.0	0.0	0.0	0.0
	Transfer		940	1,410	1,240	1,500	1,300	1,140
(1)-277 triethylamine	Release	kg	0.0	0.0	0.0	0.0	0.0	0.0
	Transfer		0.0	0.0	0.0	0.0	0.0	0.0

Release of chemical substances is also known and monitored at Nippon Techno-Carbon, Nippon Carbon Engineering, and NGS Advanced Fibers.

Nippon Techno-Carbon

		(Unit)	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
(1)-53 ethylbenzene	Release	kg		2.0	11.0	11.0	9.2	11.0
	Transfer			363.0	2,166.0	2,166.0	1,823.8	2167.0
(1)-80 xylene	Release	kg	14.0	1.0	6.0	6.0	6.2	7.3
	Transfer		0.0	203.0	1,171.0	1,173.0	1,223.8	1,453.0
(1)-202 divinylbenzene	Release	kg	0	0.0	2.0	8.0	5.6	3.0
	Transfer		0	1,600.0	3,809.0	10,640.0	5,637.4	2,975.0
(1)-349 phenol	Release	kg	3	4.0	4.0	3.0	-	-
	Transfer		0	706.0	795.0	664.0	-	-

Nippon Carbon Engineering

		(Unit)	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
(1)-202 divinylbenzene	Release	kg	0.0	0.0	0.0	0.0	0.0	0.0
	Transfer		2,988.0	4,725.0	3,675.0	3,165.0	2,560.0	3,523.0
(1)-349 phenol	Release	kg	0.0	0.0	0.0	0.0	0.0	0.0
	Transfer		1,300.0	1,270.0	1,300.0	1,290.0	1,000.0	1,352.0

NGS Advanced Fibers

		(Unit)	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
(1)-53 ethylbenzene	Release	kg	0.0	0.0	0.0	0.0	0.0	0.0
	Transfer		5,100.0	7,900.0	4,000.0	6,700.0	9,700.0	8,041.0
(1)-80 xylene	Release	kg	0.0	0.0	0.0	0.0	0.0	0.0
	Transfer		4,300.0	6,800.0	3,400.0	5,500.0	8,000.0	6,579.0

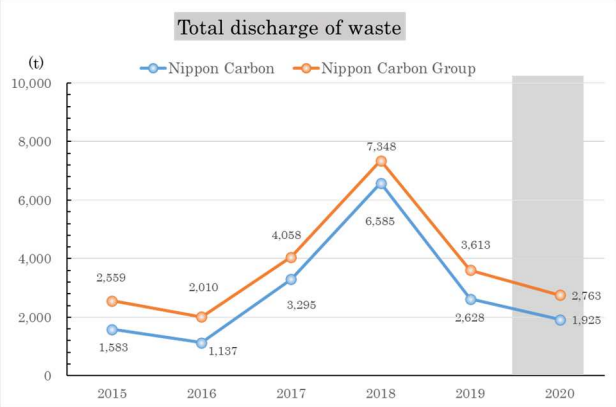
Concentration measurement of dioxins based on the Act on Special Measures against Dioxins

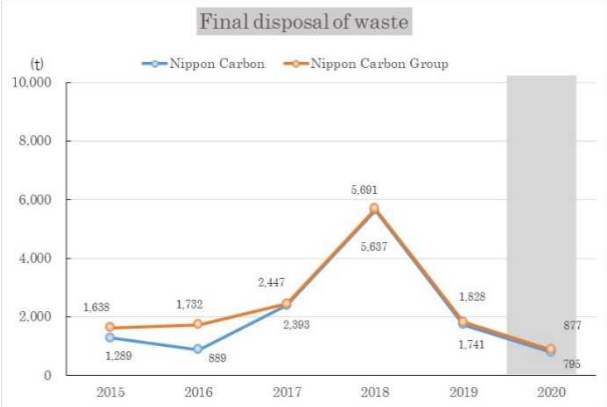
The Toyama plant has waste incinerators installed and has notified Toyama Prefecture and Toyama City of Specified Facilities based on the Act on Special Measures against Dioxins. The emission reduction measures include discontinuation of incinerating polyvinyl chloride in 1998 and plastics in 2002. In 2020, the incinerator that generated dioxins was shut down.

Toyama Plant

		(Unit)	Regulation	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Dioxins toxic equivalent	Exhaust gas	$(ng\text{-}TEQ)/m^3N$	10 or less	0.0270	0.0062	0.0006	0.0029	0.0083	-
	Incineration ash	(ng-TEQ)/g	3 or less	0.0000	0.0000	0.0001	0.0011	0.0000	-

(10) Total discharge of waste and final disposal of waste





It is possible that unnecessary bulk graphite and carbon except carbon fibers are used as an energy source. However, the discharge of waste temporarily increased in 2018 and not all of them were handled as valuables, causing a rise in final disposal. In 2019, disposal as valuables for products went well, and both total discharge and final disposal of waste decreased again. Steady disposal as valuables was also realized in 2020, and waste discharge was reduced, which was one of the factors in the smaller final disposal.

(11) Actions to prevent accidental release of harmful substances

We legally disposed of waste containing a trace amount of PCBs at the Toyama plant and PCB-containing capacitors at the Shiga plant. These are treated according to the PCB disposal plan of a national project.

Provision and replacement of environmental facilities are also forwarded, and the exhaust gas treatment equipment of the Shiga plant was changed in FY 2020. In this way, we pay attention to always keep the environmental standards of gas and water discharged from the plants.

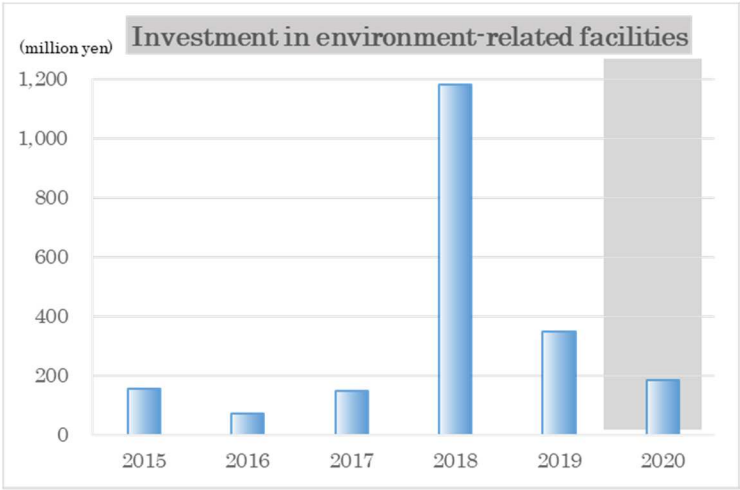
Replacement of the exhaust gas treatment equipment

(12) Actions for biodiversity conservation

Green Fund activities

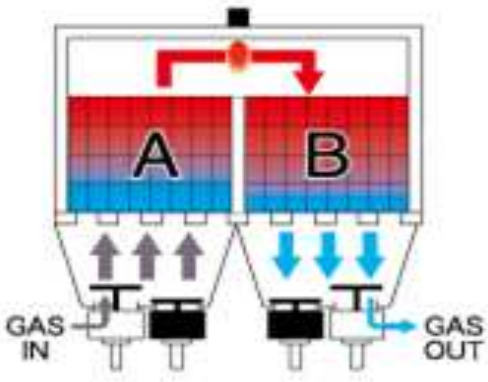
The Shirakawa plant participates in the Green Fund activities through the Fukushima Prefecture Woods, Forestry, Greening Association, contributing to advancement of forest maintenance. In addition, we cut down trees that are dense in the mountains around the plant premise for environmental improvement of the boundary forests.

7. Investment in Environment-Related Facilities



At all of the Toyama, Shiga, and Shirakawa plants, we intensively invested in environment-related facilities in 2020 the same as in the previous year and actively promoted environmental burden reduction by preventive maintenance against energy efficiency impairment, including touch up of furnaces, as well as maintenance and replacement of environment conservation equipment, such as dust collectors and exhaust gas treatment facilities.

The Regenerative Thermal Oxidizer (RTO) installed at the Shiga plant has the structure where exhaust gas passes through ceramic heat storage media, realizing high thermal efficiency and assured deodorization. The fuel consumption was reduced to less than one fourth of that of conventional facilities and odor constituents are surely decomposed by combustion.



Shiga Plant: Operation principle of the RTO

Toyama Plant: Thermal insulation work for the impregnation drying oven

8. Other Topics

(1) Compliance with environment-related laws and regulations

Our three principal plants with ISO 14001 certification have created a list of applicable laws and regulations related to the environment and always keep it updated. In order to reduce effects of business activities on ambient environment, we comply with the laws, regulations, and rules applied to business activities and properly run relevant systems and make efforts for improvement in adequate maintenance and operation of facilities. The plants certified under ISO 14001 regularly confirm that laws and regulations are adhered to and agreements with corresponding local governments are observed.

Meanwhile, the Shiga plant received three complaints and questions from neighboring residents (two issues about odor and one about noise) in 2020. In addition to preventing recurrences, we make continuous efforts so that no new complaints arise.

(2) Promotion of environmental education and social contribution activities

<In-house education>

Each plant has QC circles per workplace for voluntary improvement activities and holds QC circle competitions on a regular basis. The groups selected therein are called to the annual company-wide QC circle competition. Many circles address the themes of reduction in energy use quantity and intensity, decrease in the use of energy and raw materials, and maintenance of risk elimination equipment, and they are always good references for the other worksites. Therefore, this activity also has a role of environmental education to employees and expansion of ideas.

<Emergency, fire, natural disaster drills>

An emergency drill is held annually at each plant in consideration of possible accidents and emergency situations that may affect the environment. In addition, training sessions for fire and natural disasters are conducted in the spring and fall. As autumn is generally the season when fires break out, we participate in overall fire drills organized according to the regional circumstances by the local fire department so that the consciousness of disaster prevention is developed, and the skills to cope with disasters are improved together with local residents.

Toyama Plant

Shiga Plant

Shirakawa Plant

<Interaction with local communities>

In normal years, Osawano Elementary School, which is located nearby, conducts an extra class to observe lives in the canal of the Toyama plant, which was canceled because of the Covid-19 pandemic. All plants are adjacent to residential zones. Continued cooperation in local events helps good communication between the plants and the surrounding areas.

<Greening in and around the plants>

The Shiga plant is adjacent to commercial establishments and the residential area of the Omihachiman Station. While service, maintenance, and replacement of environmental facilities of the plant are the focus, being a clean plant is the goal so that it matches the scenery of the location.

<Cleaning near the plants>

In early spring, the Toyama plant takes part in *ezarai*, which refers to cleaning of agricultural ditches before starting rice planting and is performed by local communities jointly. The Shiga plant expands daily cleaning in the National Occupational Health Week. The task is titled Clean Operations, and they clean the streets to the nearest station Omihachiman.

As for the Shirakawa plant, they clean the city road leading to the plant entrance every year, trim grass, and pick up trash.

Ezarai of Toyama Plant

Sidewalk cleaning of Shiga Plant

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