Environmental management

Fundamental environmental policy | Environmental management system | Target and results of environmental activities | Compliance with environmental laws and regulations | Environmental accounting | Environmental conservation costs | Environmental conservation activities | Environmental impact of business activities | Environmental impact of products | Environmental impact of logistics | Environmental impact of facilities | Environmental impact of chemical substances | Environmental impact of water | Environmental impact of waste | Environmental impact of packaging materials | Environmental impact of paper | Environmental impact of office activities | Environmental impact of sales activities | Environmental impact of R&D activities | Environmental impact of production activities | Environmental impact of supply chain | Environmental impact of logistics | Environmental impact of facilities | Environmental impact of chemical substances | Environmental impact of water | Environmental impact of waste | Environmental impact of packaging materials | Environmental impact of paper | Environmental impact of office activities | Environmental impact of sales activities | Environmental impact of R&D activities | Environmental impact of production activities | Environmental impact of supply chain

Fundamental environmental policy

Panasonic Corporation (Panasonic) aims to contribute to society through electronic technology, and to create a sustainable environment and a better life for future generations through the ideas of Kiri, which underlying the importance to exercise accumulated and newly acquired knowledge.

Policy

Panasonic Group (Panasonic Group) aims to contribute to society through electronic technology, and to create a sustainable environment and a better life for future generations through the ideas of Kiri, which underlying the importance to exercise accumulated and newly acquired knowledge.

Panasonic Group will contribute to society through its business activities, and will also actively promote social contribution activities.

1. Contribution to society through business activities
Panasonic Group will contribute to society through its business activities, provide safe and secure products and services, and contribute to the sustainable development of the economy and society.

2. Contribution to environmental management
Panasonic Group will contribute to society through its business activities, and also actively promote environmental management to the sustainability of the earth and society, and contribute to the sustainable development of the economy and society.

3. Contribution to social contribution activities
Panasonic Group will contribute to society through its business activities, and also actively promote social contribution activities, such as social contribution activities, cultural activities, and volunteer activities.

4. Contribution to corporate governance
Panasonic Group will contribute to society through its business activities, and also actively promote corporate governance, such as compliance, risk management, and information disclosure.

5. Contribution to environmental management
Panasonic Group will contribute to society through its business activities, and also actively promote environmental management, such as the reduction of environmental impact of business activities, products and services, and the development of environmentally friendly technology.

6. Contribution to social contribution activities
Panasonic Group will contribute to society through its business activities, and also actively promote social contribution activities, such as social contribution activities, cultural activities, and volunteer activities.

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8. Contribution to environmental management
Panasonic Group will contribute to society through its business activities, and also actively promote environmental management, such as the reduction of environmental impact of business activities, products and services, and the development of environmentally friendly technology.

Environmental management system

Environmental management system
Environmental management system
Environmental management system

Reducing carbon emissions and climate change

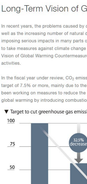
Long-Term Vision of Global Warming Countermeasures
Trends in energy usage and carbon emissions ▲
Renewable energy ▲
Value chain carbon emissions ▲
Response to the fluorocarbon emission control act ▲
Reductions in GHG emissions ▲

Long-Term Vision of Global Warming Countermeasures

In recent years, the problems caused by climate change, such as extreme weather droughts, heat waves, and heavy rain, etc.), as well as the increasing number of natural disasters, which were traditionally thought to occur once every 50 years, have been imposing serious impacts in many parts of the world. In addition to strengthening business continuity, companies are also required to take measures against climate change through both mitigation and adaptation. In March 2020, we formulated our Long-term Vision of Global Warming Countermeasures, and are working to cut greenhouse gas emissions (scope 1 and 2) from our business activities.

In the fiscal year under review, CO_2 emissions were reduced by 11.3% from the fiscal year ended March 31, 2006, achieving the target of 7.6% or more, mainly due to the introduction of renewable energy. In addition to energy-derived CO_2 emissions, we have been working on measures to reduce the emission of PFC, SF$_6$, and other semiconductor manufacturing gases that contribute to global warming by introducing combustion and plasma abatement equipment since FY2006.

▼ Target to cut greenhouse gas emissions for scope 1 and 2*



*Scope 1:Direct emission from use of fuel, GHG from non-energy sources, CO2 leaks
*Scope 2:Indirect emissions from the use of purchased electric power, etc. Reduction rate when the amount of greenhouse gas emissions in the 71st Business Period is set at 100

Long-term Vision
Aim to reduce greenhouse gas emissions in the 104th Business Period by at least 83% (2.5% annually)
71st Business Period used as standard for comparison

71st Business Period	59,237 t-CO_2

Greenhouse Gas Emissions (compared to the 71st Business Period) **11.3% decrease**

Greenhouse gas emission data is verified by a third party.

Trends in energy usage and carbon emissions

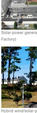
We are working on energy conservation activities to achieve our mid-term target of "improving unit energy consumption in the 84th fiscal year (ending September 30, 2021) by 7% or more compared to the 69th fiscal year (ending September 30, 2013). In the current fiscal year, we achieved the target of 8 % or more by reducing energy consumption rate per unit of production by 25.8 % compared to the 69th fiscal year through energy-saving measures in buildings and active introduction of equipment subsidized to the Top Runner Program.
We will continue to promote energy conservation and global warming prevention activities.

*Calculation scope: Hamamatsu Photonics K.K., the scope of application of the Energy Conservation Law.

Renewable energy

Hamamatsu Photonics is working hard to reduce carbon emissions by advancing the implementation of renewables such as solar and wind power. At Toyooka Factory, we have installed solar-power generating equipment (250 kW) on the walls and roof of No. 10 Building in collaboration with our solar power business. On the premises of the Central Research Laboratory, we combines solar-power generation with small-scale wind power generation, in a hybrid solution for outdoor lighting. As of January 2021, we have implemented a cumulative total 1,023 kW of renewable energy.
In October 2018, we commenced purchasing of Chubu Electric's "CO_2-free Electricity," expanding our introduction of renewables.

Renewable-energy target	Renewable-energy usage rate, 40 % or more
FY2021	9.0% (as of September 2021)


Solar-power generating equipment (Toyooka Factory)

Solar-power generating equipment (Shingai Factory)

Hybrid wind/solar-powered outdoor lighting (Central Research Laboratory)

Solar-power generating equipment (Main Factory)

Value chain carbon emissions

To gauge the environmental impact of the value chain[1], HPK is working on the calculation of Scope 3 (shown below) which is based on the Greenhouse Gas (GHG) Protocol.
Going forward, we will expand the calculation scope of Scope 3, improve accuracy, and strive to reduce emissions throughout the value chain.

Category	FY2019 emission volume		FY2020 emission volume		FY2021 emission volume	
	Emission volume (t-CO2)	Share of total (%)	Emission volume (t-CO2)	Share of total (%)	Emission volume (t-CO2)	Share of total (%)
Scope 1 (direct emissions: use of fuel, etc.)	13,170	2.1	12,796	2.0	12,599	2.1
Scope 2 (indirect emissions: use of purchased electricity, etc.)	49,572	8.0	49,979	7.7	46,638	7.7
Scope 3 (other indirect emissions)	557,572	89.9	588,298	90.4	542,845	90.2
1. Purchased goods and services	(369,771)	(66.3)	(361,786)	(61.5)	(356,721)	(65.7)
2. Capital goods	(73,350)	(13.2)	(116,511)	(19.8)	(53,214)	(9.8)
3. Fuel and energy use not included in scopes 1 and 2	(6,834)	(1.2)	(11,185)	(1.9)	(11,361)	(2.1)
4. Transport and delivery (upstream)	(8,464)	(1.5)	(8,640)	(1.5)	(11,167)	(2.1)
5. Waste generated by business activities	(463)	(0.1)	(448)	(0.1)	(486)	(0.1)
6. Business travel	(1,821)	(0.3)	(882)	(0.2)	(183)	(0.0)
7. Commuting by employees	(4,769)	(0.9)	(5,680)	(1.0)	(5,812)	(1.1)
8. Lease assets (upstream)	—	—	—	—	—	—
9. Transport and delivery (downstream)	—	—	—	—	—	—
10. Processing of sold products	(4,603)	(0.8)	(4,339)	(0.7)	(4,464)	(1.0)
11. Use of sold products	(87,195)	(15.6)	(78,541)	(13.4)	(98,088)	(18.1)
12. Disposal of sold products	(302)	(0.1)	(287)	(0.1)	(344)	(0.1)
13. Lease assets (downstream)	—	—	—	—	—	—
14. Franchises	—	—	—	—	—	—
15. Investments	—	—	—	—	—	—
Total	556,314	100.0	651,073	100.0	602,082	100.0

[1] The entire series of processes involving products, including material procurement, production, logistics, use and disposal. Includes both upstream and downstream parts of the Company's supply chain.

Method of calculation of scope 3

Category	Activity volume	Unit
1. Purchased goods and services	Amount of purchases of raw materials and parts	Emissions per unit amount of purchase
2. Capital goods	Monetary amount of capital goods purchased	Emissions per unit amount of purchase
3. Fuel and energy use not included in scopes 1 and 2	Fuel, electricity, and heat energy use	Emissions per unit of electricity and fuel used
4. Transport and delivery (upstream)	• Shipping volume related to purchased products and services • Cost of shipping of sold products	• Emission rate (corrected t-kg method) • Emission rate by shipping method
5. Waste generated by business activities	Output volume by type of waste	Output rate by type of waste
6. Business travel	• Distance traveled • Traveling expenses paid	Emission rate by transportation mode
7. Commuting by employees	• Distance traveled • Commuting expenses paid	Emission rate by commuting mode
8. Lease assets (upstream)	N/A	—
9. Transport and delivery (downstream)	N/A	—
10. Processing of sold products	Sales of products	Manufacturing emissions intensity by sector
11. Use of sold products	Final products: Number of units shipped, power consumption and service life	Proxy value for CO_2 emission coefficient by electricity provider (the Ministry of the Environment)
12. Disposal of sold products	Final products: Number of units shipped and product weight	Emission rate by product type
13. Lease assets (downstream)	N/A	—
14. Franchises	N/A	—
15. Investments	N/A	—

Third-party Verification of greenhouse gas emissions based on ISO 14064-3

To provide and publish transparent and reliable information on the greenhouse gas emissions data calculated by Hamamatsu Photonics (scope 1, 2, and 3), we obtained third-party verification by SGS Japan Inc., and their written opinion. We will continue to work to improve the reliability of its data and reduce greenhouse gas emissions.

<FY2016>
Verification statement [503 KB/PDF]
<FY2018>
Verification statement [235 KB/PDF]
<FY2019>
Verification statement [7.16 MB/PDF]
<FY2020>
Verification statement [773 KB/PDF]
<FY2021>
Verification statement [1.36 MB/PDF]

Response to the fluorocarbon emission control act

The Revised Fluorocarbons Recovery and Destruction Law, which was drafted for the purpose of preventing global warming caused by leaks of GHGs substitutes, was enacted in April 2015.
We are promoting compliance with this law by assigning a control number to each relevant equipment and building an internal database for managing that equipment information and inspection records. In each division and business site, we conduct education activities covering laws and regulations as well as internal management methods for the administrators.

Management database

Control number sticker

Reductions in GHG emissions

GHG used in semiconductor manufacturing such as PFC, SF6, and HFC have large global warming potential (GWP). We are working to reduce its emissions by installing removal devices and optimizing processes.

Abatement systems

Environment >

Environmental management >
Reducing carbon emissions and climate change
Disclosure based on TCFD Recommendations >
Management of pollution including waste >
Environmentally Friendly and Contributing Products >
Protecting our water resources >
Green procurement activities >
Request for survey on chemical substances in products >
Management of chemicals in products >
Environmental communication activities >
Environmental report back number >

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HAMAMATSU
PHOTON IS OUR BUSINESS

Disclosure based on TCFD Recommendations

Governance ↓ Strategy ↓ Risk management ↓
Metrics and Targets ↓

In August 2020, we announced our support for the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) and promoted an analysis of the risks, opportunities, and financial impacts of climate change on our business. We are pleased to disclose some of the results of this study based on the TCFD recommendations.

TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

Governance

Based on our basic policy of sustainability and fundamental environmental policy, we recognize that initiatives for climate change is one of the most important issues. The discussions and decisions made by the Environmental Committee and the Information Disclosure Committee, which are chaired by executive officers, as well as by its subcommittees and working groups under their supervision, are scrutinized by the Sustainability Management Committee, which is chaired by a director and managing executive officer and the general manager of the administration division. The Sustainability Management Committee notifies Board of directors of the key issues. The PDCA cycle has implemented to ensure matters pointed out by Board of directors throughout the company.

<Detailed Information>
Basic policy of sustainability:
https://www.hamamatsu.com/jp/ja/our-company/sustainability-and-csr/hamamatsu-photonics-sustainability.html >
Fundamental environmental policy:
https://www.hamamatsu.com/jp/ja/our-company/sustainability-and-csr/environment/environment-management.html >

Strategy

We recognize that various changes due to climate change will affect our business. In order to identify the most important risks and opportunities, we conducted a scenario analysis at 1.5/2℃ and 4℃ for our entire business in the following steps.

01/Identify Key Risks and Opportunities		02/Define Scenarios	03/Assess Impact on Business		04/Define Measures
Market changes and technological changes	Reputation	Define multiple scenarios that encompass the transition and physical risks associated with the organization	Impact on business		Measures
Governmental policies and laws	Physical risks		Input costs	Business costs	Business model transformation
			Profit	Supply chain	Portfolio transformation
			Suspension of business	Timing	Capacity and technology investment

01 Identification of key risks and opportunities

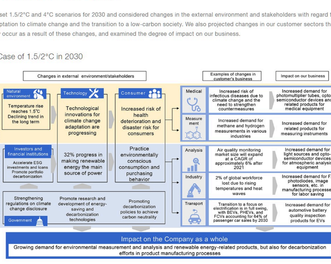
We identified the climate change risks and opportunities facing the company now and in the foreseeable future. We scrutinized the interests of our stakeholders and their future significance. As a result, we identified 16 transition and physical risks and opportunities.

Degree of Impact	Risks: Transition	Risks: Physical	Opportunities
High	#1 Increase in operational costs due to introduction of carbon tax/emissions trading scheme #2 Increased burden and risk of fines due to stricter disclosure requirements and regulations #3 Loss of reputation among customers, decrease in sales, and loss of competitiveness #4 Short-term increase in operating costs due to introduction of renewable energy and promotion of energy conservation #5 Tighter regulations on raw materials	#6 Increased risk of business shutdown and decreased sales due to severe wind and flood damage #7 Increased damage due to severe wind and flood damage #8 Increased air conditioning and cooling costs due to higher average temperatures #9 Increased risk of business shutdowns and decreased sales due to employees' inability to come to work due to higher average temperatures #10 Increased risk of business shutdown anddecreased sales due to employees' inability to come to work due to severe wind and flood damage	#11 Increase in sales through the provision of products and services that contribute to addressing climate change #12 Increase revenues by entering new markets #13 Decrease in expenses due to gains in client and investor reputation #14 Increase in revenues through introduction of renewable energy and promotion of energy conservation #15 Long-term increase in sales and decrease in expenses due to enhanced disaster resilience
Mild Low	#16 Loss of reputation and competitiveness among investors	・Decrease in sales resulting from lower production due to lower rainfall at the water sources from which the water is withdrawn	

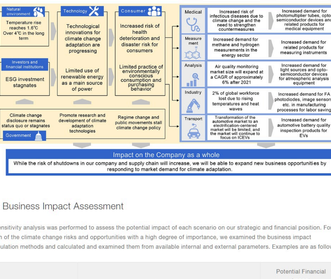
02 Definition of scenario groups

We set 1.5/2℃ and 4℃ scenarios for 2030 and considered changes in the external environment and stakeholders with regard to adaptation to climate change and the transition to a low-carbon society. We also projected changes in our customer sectors that may occur as a result of these changes, and examined the degree of impact on our business.

・Case of 1.5/2℃ in 2030



・Case of 4℃ in 2030



03 Business Impact Assessment

A sensitivity analysis was performed to assess the potential impact of each scenario on our strategy and financial position. For each of the climate change risks and opportunities with a high degree of importance, we examined the business impact calculation methods and calculated and examined them from available internal and external parameters. Examples are as follows;

Types		Impact on Business in 2030	Potential Financial Impact 1.5/2℃	Potential Financial Impact 4℃
Risks	Transitional	Decrease in sales due to lower product competitiveness and sluggish customer evaluations	High	-
		Short-term increase in operating costs due to introduction of renewable energy and promotion of energy conservation	Mild	
	Physical	Business shutdowns (production sites, logistics, inventory, supply chain) and sales decline due to severe wind and flood damage	Mild	High
		Damage to manufacturing sites due to severe wind and flood damage and increased restoration costs	Mild	High
Opportunities		Medical and biotechnology equipment: Increased sales of related products for specimen testing equipment	Mild	Mild
		Industrial Equipment: Increased sales of related products for EV battery inspection systems	Mild	Mild
		Analytical instruments: Increased sales of related products for environmental analysis	Mild	Low

04 Consideration of countermeasures

Based on the results of the project impact assessment, we will consider countermeasures for those items that have a large impact.

Risk management

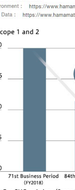
We have established environmental management rules and operate a company-wide environmental management system. We evaluate risks and opportunities for the environment, including climate change, and set environmental objectives and targets for each fiscal year. Management reviews our performance and challenges, and we strive to improve our environmental performance through continuous improvement.
Based on multiple climate-related scenarios, we have quantitatively evaluated risks and opportunities for financial impact, which will be used for risk management throughout the group in the future.

Metrics and Targets

Under the Group's long-term vision for global warming countermeasures, our greenhouse gas reduction targets (GHG reduction targets) were certified by the SBT Initiative, an international environmental organization, in October 2021 as scientifically based and in line with the Paris Agreement. Meanwhile, as key metrics in our mid- to long-term environmental strategy, we have established, evaluated, and managed GHG emissions, water usage, renewable energy usage, etc. GHG emissions are calculated for Scope 1, 2, and 3* in accordance with the GHG Protocol, and third-party verification is conducted. 74th fiscal year (ending September 30, 2021) GHG emissions (Scope 1 and 2) were 59,386 t-CO2 in the 74th fiscal year (ended September 30, 2021), a reduction of approximately 13 % (target 7.5 %) from the 71st fiscal year (ended September 30, 2018).

<Detailed Information>
Environment : https://www.hamamatsu.com/jp/en/our-company/sustainability-and-csr/environment.html >
ESG Data : https://www.hamamatsu.com/jp/en/our-company/sustainability-and-csr/esgdata.html >

▼Scope 1 and 2



▼Scope 3

Category 1	76% of suppliers by spend covering purchased products and service will have science-based targets by FY2026
Category 11	15% reduction by FY2031 (Compared to FY2019)

*Scope 1
Direct emission from use of fuels, city gas, GHGs from non-energy sources, etc., CFC leaks
*Scope 2
Indirect emissions from the use of purchased electric power, etc.
*Scope 3
Indirect emissions from the value chain (purchase of goods and services, logistics, sales, and disposals, etc.)

SCIENCE BASED TARGETS
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

・Our GHG emissions (Scope 1 and 2) for FY2021 was 59,386 t-CO_2. We reduced it by 13.1% (the target 7.5 %) compared with FY2018.
・Our SBT certified target (Scope 1 and 2) aims to reduce GHG emissions in FY2031 by 30 % compared with FY2019.

Environment >

Environmental management >
Reducing carbon emissions and climate change >
Disclosure based on TCFD Recommendations
Management of pollution including waste >
Environmentally Friendly and Contributing Products >
Protecting our water resources >
Green procurement activities >
Request for survey on chemical substances in products >
Management of chemicals in products >
Environmental communication activities >
Environmental report back number >

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Management of pollution including waste

Measures to prevent pollution ▲
Appropriate management of chemicals ▲
Appropriate waste management ▲
Preventing pollution of soil and groundwater ▲

Measures to prevent pollution

Hamamatsu Photonics works hard to prevent pollution. Our production facilities, most of which are located in Japan, use a range of chemicals in their manufacturing processes, some of which are specified chemicals with the potential to pollute the environment. Under Japanese law, all transfers and emissions of these chemicals must be reported to the government through the Pollutant Release and Transfer Register (PRTR) system. We appropriately report to the competent authority based on the data which stem from the chemical usage survey conducted twice a year.

The chemicals used at our sites are managed through the surveys of chemical use described above, as well as through Green Procurement Management Standard for Chemical Substances For HAMAMATSU Group[1]. These substances are controlled especially carefully during the disposal phase. Japan's Environmental Basic Act lists seven typical forms of pollution that can be harmful to human health and living environments: (1) Air pollution, (2) Water pollution, (3) Soil pollution, (4) Noise, (5) Vibration, (6) Land subsidence, and (7) Odor. At Hamamatsu Photonics, we manage all these forms of pollution according to the law and our own standards from the perspective of preventing accidents that can cause pollution. When the possibility of pollution from our business activities arises, we move promptly to identify the source of the pollution, report the matter to the competent authorities and local communities and strive to return conditions to their original state.

[1] Green Procurement Management Standard for Chemical Substances For HAMAMATSU Group; Hamamatsu Photonics' in-house standards applying to substances the Company designates as the Environment-related Substances. We also have the Green Procurement Management Standard for Chemical Substances For Suppliers which sets the same level of criteria as the standard for HAMAMATSU Group sets, which focuses on chemicals contained in products/parts supplied by suppliers and is opened to the public.

Note. The data tabulation period is based on the Company's fiscal year.

FY2021: October 1, 2020 to September 30, 2021
FY2020: October 1, 2019 to September 30, 2020
FY2019: October 1, 2018 to September 30, 2019
FY2018: October 1, 2017 to September 30, 2018
FY2017: October 1, 2016 to September 30, 2017

Appropriate management of chemicals

Twice a year, Hamamatsu Photonics conducts a survey of the status of chemical use, to gain an understanding of the full extent of its use of chemicals in manufacturing processes and the like. Among these are Class 1 specified chemicals[2] as designated in the PRTR system. When chemicals of this type are handled by the Company in quantities of 1 t per year or more, they become subject to reporting. In 2020 the Shizuoka Factory and Miyakoda Factory handled the use of 4 such chemicals. The chemicals reported by Hamamatsu Photonics, the volume of Class 1 specified chemicals handled in each fiscal year[3], and their output per unit of net sales are as shown below. In FY2021, Volume handled was increased from previous fiscal year because of production increase. On the other hand, volume handled per unit of net sales was same level as previous fiscal year because net sales increased.

[2] Chemicals for which both submission of the volume released into the environment under the PRTR system and provision of safety data sheets (SDSs) are required. As of January 2022, 462 substances are designated as Class 1 specified chemicals.

- https://www.nite.go.jp/gioj/chemical_management/law/prtr-2.html >

[3] Chemicals of this type used by any of the Company's business locations in quantities of over 1 kg per year are subject to tabulation.

Substances subject to reporting based on the PRTR system

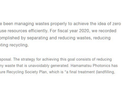
	FY2016	FY2017	FY2018	FY2019	FY2020
Toyooka Factory	-	-	-	-	-
Terno Glass Works	-	-	-	-	-
Main Factory	1. 2-amino ethanol 2. Hydrogen fluoride and its water-soluble salts	1. 2-amino ethanol 2. Hydrogen fluoride and its water-soluble salts	1. 2-amino ethanol 2. Hydrogen fluoride and its water-soluble salts 3. Pyrocatechol (	1. 2-amino ethanol 2. Hydrogen fluoride and its water-soluble salts 3. Pyrocatechol (	1. 2-amino ethanol 2. Hydrogen fluoride and its water-soluble salts 3. Pyrocatechol (
Mitsue Factory	-	-	-	-	-
Shingai Factory	-	-	-	-	-
Joko Factory	-	-	-	-	-
Central Research Laboratory	-	-	-	-	-
Miyakoda Factory (Compound semiconductor Fabrication Center)	-	-	Ferric chlorides	Ferric chlorides	Ferric chlorides
Industrial Development Research Center	-	-	-	-	-
Tsukuba Research Center	-	-	-	-	-

Advancement of collection and use of SDSs

SDSs are useful for understanding the properties of chemicals and handling them safely. Hamamatsu Photonics ensures that the latest SDSs not only for chemicals for which provision of SDSs is required under the Industrial Safety and Health Act but for all chemicals it handles. SDSs are recorded in the Company's database, allowing a role in risk assessment of chemicals and in maintaining the safety of workplaces and the surrounding environment.

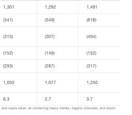
Reducing atmospheric emissions of VOCs

To reduce atmospheric emissions of volatile organic compounds (VOCs), Hamamatsu Photonics is reducing its use of these compounds and installing equipment for its recovery. VOCs are primarily used in industrial cleaning facilities, with lower emissions in this category including ethanol, isopropyl alcohol and acetone. Targets for reduction of VOC emissions include a 30% or more reduction in VOC emissions per unit of net sales in comparison with FY2000 and a recovery rate of 50% or more.



Inspection of status of handling of chemicals

While evaluation of risks associated with chemicals is based on SDSs, the actual degree of risk is heavily dependent on the environment in which chemicals are used. At Hamamatsu Photonics, we regularly inspect the workplaces and chemical storage sites where chemicals are handled, under the Company's Rules for Chemical Safety. When problems are detected through the inspection process, we correct them promptly, then report the matter to the Headquarters' Chemicals Working Group and share the information appropriately.



Chemical safety training

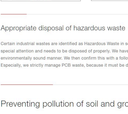
To ensure employees treat chemicals properly and prevent environmental accident, Hamamatsu Photonics has prepared accident and disaster response manuals, metals and impacts disaster response equipment, and regularly holds disaster response training sessions. Training sessions include training on response to chemical spills, evacuation drills in preparation for indoor gas leaks and training on respirator tank attachment.
We also regularly hold chemical safety educational program for employees. To understand risk about treating chemical substance, we share internal/external chemical substance accident cases or incite expert from outside to give professional lecture.

Appropriate waste management

Striving for zero emissions

Based on the appropriate waste treatment as the basic policy, we have been managing waste properly to achieve the idea of zero emissions[4], to reduce their negative impact on the environment and use resources efficiently. For fiscal year 2020, we recorded the landfill rate[5] of 0.2 % and achieved zero emissions. This was accomplished by separating and reducing wastes, reducing interior goods, reusing equipment and packaging materials and promoting recycling.

*4 : "Zero emissions" is the approach of striving for a society with zero waste disposal. The strategy for achieving this goal consists of reducing resources used and waste generated in production processes while recycling any waste that is unavoidably generated. Hamamatsu Photonics has achieved zero emissions according to the definition in the 3rd Shizuoka Prefecture Recycling Society Plan, which is "a final treatment (landfilling, etc.) rate of less than 1.0%" including waste acid and waste alkali.
*5 Landfill rate: Landfill volume in proportion to waste volume



	FY2017	FY2018	FY2019	FY2020	FY2021
Output volume	1,168	1,184	1,301	1,292	1,491
Industrial waste	(494)	(550)	(541)	(549)	(618)
Hazardous waste[6]	(230)	(271)	(313)	(307)	(404)
General waste	(141)	(123)	(152)	(149)	(152)
Valuables	(298)	(251)	(293)	(287)	(317)
Recycling volume[7]	873	914	1,050	1,077	1,250
Landfill volume	8.7	4.6	6.3	2.7	3.7

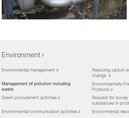
*6 Waste designated in law as specified hazardous waste. These include sludge, waste acid, and waste alkali, oil-containing hazardous waste, organic chlorines, and dioxin-containing waste, and waste plastics containing specified hazardous substances.
*7 The amount of recycling is the total amount of material and thermal recycling related to the amount of valuable materials.

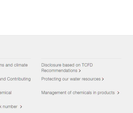
Ensuring proper disposal at our contracted waste facilities

Each year Hamamatsu Photonics carries out comprehensive checks of our contracted waste facilities, to ensure that waste is disposed appropriately. We confirm the details of contractors' waste-treatment licenses, compliance with requirements for treatment and storage of waste as stipulated in the Waste Disposal and Public Cleansing Act, and whether contractors maintain harmonious relationships with surrounding residential communities. In audits of contractors, we review all processes from waste transport to landfilling. If incorrect treatment occurs (an event for which the Company fortunately has no cases at this time), the Company reports the matter to the competent authorities in accordance with the law.

Number of confirmations of status of proper disposal by our contracted waste facilities

	FY2017	FY2018	FY2019	FY2020	FY2021
Number of confirmations	17	21	23	19	24





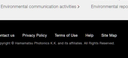
Appropriate disposal of hazardous waste

Certain industrial wastes are identified as Hazardous Waste in several laws and regulations.1 These kinds of wastes require special attention and needs to be disposed of properly. We have entrusted contractors whose facilities provide disposal in an environmentally sound manner. We then confirm this with a follow-up visit at these sites on a regular basis.
Especially, we strictly manage PCB waste, because it must be disposed until the legally set deadline.

Preventing pollution of soil and groundwater

Hamamatsu Photonics' manufacturing processes include processes in which waste liquids containing hazardous substances are emitted. If the piping that conducts this waste liquid becomes damaged or cracked, resulting in leaks of hazardous substances, pollution of soil or groundwater can result. A revision of the Water Pollution Control Act mandates that even piping buried underground must be inspected for leaks. In light of the risk of pollution with even greater concern, we exhume underground piping and tanks and place them above ground if necessary. In addition, in view of the high incidence of earthquakes in Japan, we introduce flexible piping in certain places to prevent damage to piping due to vibration.

Placement of buried piping above ground and introduction of flexible piping



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Environmentally Friendly and Contributing Products

While contributing to global environmental conservation and reduction of environmental impact through our products and its applications, we have promoted development of new technologies and sales of products to reduce such impact from the products themselves based on our guidelines for "Environmentally Friendly and Contributing Products" as follows.

Environmentally Friendly Products

Products that are designed to have less impact on the environment, such as by reducing the amount of waste or designing products that are easy to recycle, and that have improved one or more of the following compared to conventional products.

- Smaller, thinner and lighter
- Power saving
- Products with reduced or eliminated hazardous substances (hazardous substances: HoHS 1U substances, the environment-related substances to be controlled set by us, etc.)
- Reusability (reuse)
- Recyclability (recycling)
- Ease of disposal (ease of disassembly in case of equipment)

Environmentally Contributing Products

The products themselves or the final products using them that contributes to and are used for applications such as the conservation of the global environment.

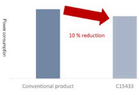
- Prevention of global warming, diffusion of new and renewable energy sources
- Prevention of ozone depletion, air pollution, water pollution, and soil contamination; analysis of pollutants
- Analysis of chemical substances contained in products, evaluation of toxicity of chemical substances
- Reduction, separation and disposal of waste

Case Studies

Every year, we develop new environmentally friendly and contributing products. Here are some typical examples from the current fiscal year.

●Power Supply for Biplanar Phototubes

C15433 is a high-voltage power supply used in biplanar phototubes for laser waveform observation. By adopting an AC adapter that meets the requirements of Level 6 of the International Energy Star Program and other measures, power consumption has been reduced by 10% compared to conventional products.



●Pulsed Solid State Laser

L11038-11 is a passively Q-switched short-pulse laser capable of 2 mJ of high energy output despite its compact laser head. Because LIBS does not require any pre-treatment of the measurement object, it is expected to become an important method for "in-situ analysis" such as waste recycling and in-line plant inspections. It is expected to become an important method for "in-situ analysis" such as waste recycling and in-line plant inspections.

●Laser Heating System (T-SMILS)

The laser heating system (L15570) is a laser light source for laser thermal processing while measuring the temperature of the processing point. Laser processing can produce products with energy savings due to the high electricity-to-optical conversion efficiency of lasers (about twice that of LEDs). Therefore, by converting processes that are conventionally produced using a heating furnace to laser processing, power consumption can be reduced to about 1/10. In addition, resin welding technology using lasers can firmly bond identical materials and has high processing stability, enabling higher yields (less material waste) and improved product recyclability.

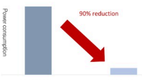
τ-SMILS
Thermal Processing Integrated Laser System

●Light Source Array Unit (Fura-2)

L11601-07 is an excitation light source for the fluorescent indicator Fura-2 for FDSS/uCELL, which uses microplates and measures fluorescence change over time in batch measurements. The LC-8 xenon light source has been used for FDSS7000EX, but the development of the LED light source unit for FDSS/μCELL has realized power saving of the light source for Fura-2 measurement.

FDSS7000EX

FDSS/uCell



●Dual PHEMOS

Dual PHEMOS, which enables analysis from both sides, has been added to the lineup of semiconductor failure analysis systems. Previously, two units were required, an upright type for surface observation and an inverted type for backside observation, but with Dual PHEMOS, both front and backside can be observed with a single unit. In addition, the number of parts has been reduced by approximately 300 because only one system rack is required.

Dual PHEMOS

●ODPL Measurement System

The ODPL measurement system (C15993-01) measures the spectrum of photoluminescence in all directions using an integrating sphere to determine the luminous efficiency of a sample. It can instantly calculate IQE (Internal Quantum Efficiency), which is necessary for quality evaluation of GaN single crystals, which are attracting attention as a power device material, and perovskite crystals, which are expected to increase the efficiency of solar power generation and LEDs, in a nondestructive and non-contact manner.
It contributes to the development of smaller, faster, and lower power loss (higher efficiency) power devices.
* ODPL (Omnidirectional photoluminescence)

2020 > 2019 > 2018 >

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Protecting our water resources

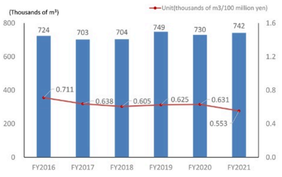
Effective use of water resources ↓
Wastewater management ↓
Water risk assessment and countermeasures ↓
Contributions to replenishment of groundwater and preservation of forests ↓

Effective use of water resources

Hamamatsu Photonics is conducting activities aimed at supporting a 5% or more reduction in water use per unit of net sales (in comparison with FY2016) until the fiscal year ending September 30, 2021 (FY2021). We met this target in FY2021, with a 22.2% reduction as compared with FY2016.

New Medium- and long-term targets :
Support of reduction of water use per unit of sales by 10 % compared with FY2020 by FY2030(Reduce by 1% in one year).

Trends in water use and water use per unit of net sales



We recognize the importance of water resources and is dedicated to reducing its use, as well as recycling the water it does use. We conduct water-saving campaigns in-house. At its Main Factory, we have introduced a system to obtain half of the water used in pure-water manufacturing from recycled water. Today we recycle 200,000 m^3 of water per year.

Wastewater management

	Unit	FY2019	FY2020	FY2021
Water use (total)	Thousands of m^3	749	730	742
Tap water	Thousands of m^3	105	101	102
Well water	Thousands of m^3	601	585	591
Industrial water	Thousands of m^3	43	44	49
Wastewater (total)	Thousands of m^3	664	706	717
Public sewer	Thousands of m^3	135	138	133
River discharge	Thousands of m^3	529	568	584

Note: The term "Third party sources" used by the CDP Water applies to the total of "tap water" and "industrial water", and "Groundwater (renewable)" by the CDP Water applies to "Well water".
Note: "River discharge" is applied to total of "Fresh surface water" and "Groundwater" by the CDP Water, and "Third-party destinations" by the CDP Water applies to "Public sewer".

Hamamatsu Photonics monitors water intake and wastewater volumes at all of its factories and research facilities, based on the laws of Japan and its own criteria. Each month, third-party analytical organizations conduct wastewater analysis, testing wastewater at points just before the final discharge ports. If abnormal values are discovered, we immediately undertake to determine the causes and takes appropriate measures, in strict compliance with environmental laws and regulations.

Water risk assessment and countermeasures

Hamamatsu Photonics evaluate water risks of all production sites both Japan and overseas with water-risk evaluation tool "WRI Aqueduct". As of January 2022, we confirm that all domestic production sites have no significant water risks.

In addition to "WRI Aqueduct", we also measure of risks with local hazard maps such as "Hamamatsu City Disaster Prevention Maps" and "Ibaraki Digital Map". As a result, we recognize that Shingai Factory would be inundated if the Tenryu River should flood. Therefore, in the new building No.2 of the Shingai Factory, we are taking measures against flood damage, such as installing waterproof walls and buoyancy flip-up waterproof plates.

Furthermore, Hamamatsu Photonics has participated in the CDP Water Survey since 2016, we report our water risk and countermeasures on it.

Installing waterproof walls and buoyancy flip-up waterproof plates

Contributions to replenishment of groundwater and preservation of forests

• Replenishment of groundwater and preservation of forests
To preserve the groundwater in its home region, Hamamatsu Photonics and the Regional Groundwater Response Council cosponsor regular groundwater-replenishment and forest-preservation exercises. We participate in these exercises as a member of the Council, which is composed of Iwata City Environmental Preservation Promotion Council and groundwater users in the surrounding region. The aim of these efforts is to preserve abundant water resources for future generations by maintaining groundwater replenishment levels, through the cultivation of healthy forests. In 2020 we took part in thinning of a local forest aimed at replenishing groundwater, sponsored by the Regional Groundwater Response Council.

• Afforestation for protection against tides
As part of its activities to preserve biodiversity and contribute to the region, we participate in the "~KALA Project". The "~KALA Project" is a project to plant protective stands of trees on the inland side of seawalls, to mitigate damage from tsunamis. The effort was initiated as part of the Hamamatsu Area Seawall Plan, led by the government of Shizuoka Prefecture. Since 2017 we have participated twice a year, with activities such as planting trees and mowing grass.

(Photo courtesy of: Iwata City)

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Green procurement activities

To partners delivering parts and materials to Hamamatsu Photonics K.K. ↓
Request for cooperation in supplier surveys ↓
Survey tools ↓
Inquiries concerning green procurement ↓

To partners delivering parts and materials to Hamamatsu Photonics K.K.

As interest grew on the part of society with respect to the environment and international environmental regulations were beefed up, Hamamatsu Photonics decided to formulate "Green Procurement Guidelines" and "Green Procurement Management Standard for Chemical Substances", and to promote involvement in environmental concerns. We ask our business partners for their understanding and cooperation in this effort, and to conform to these guidelines and standards when delivering products and materials to us.

■Important information

NEW October 1, 2022
We revised "Management Standard for Chemical Substances" to 19th edition. With this revision, other documents and files for supplier survey were also changed.

Main points of this revision are followings;

Management Standard for Chemical Substances

1. Changed "The Environment-related Substances to be Controlled in Parts and Materials" from 46 to 47 groups
2. Changed the "Table 1. & 3." in response to the above

Please refer to Revision Records (V19.0) for more information.
The latest forms and tools for survey are available in this website.
We will ask you the details for survey request by e-mail.

Green Procurement Guideline (V4.0) [41 KB/PDF]
Revision Records (V4.0)[14 KB/PDF]
Management Standard for Chemical Substances (V19.0) [259 MB/PDF]
Revision Records (V19.0) [85 KB/PDF]

Request for cooperation in supplier surveys

We would like to ask suppliers to answer below surveys to your parts and materials delivered to us. We will forward the survey request by email separately.

- Survey Sheet regarding Environment-related Substances to be Controlled in Parts and Materials
- Non-inclusion Warranty for Banned and Restricted Substances
- Non-use Certificate for Ozone-Depleting Substances in process*
- Non-use Certificate for Chlorinated Organic Solvent in process*

*Please submit only when we ask in our survey request

Survey tools

Please download the below files and use for your answer to supplier surveys.

Survey Sheet regarding Environment-related Substances to be Controlled in Parts and Materials (Ver.19.0)[121 KB/XLS]
Non-inclusion Warranty for Banned and Restricted Substances (V19.0) [74 KB/XLS]
Non-use Certificate for Ozone-Depleting Substances in process (V8.0)[84 KB/XLS]
Non-use Certificate for Chlorinated Organic Solvent in process (V8.0) [71 KB/XLS]

Inquiries concerning green procurement

Contact office	Secretariat of environmental committee 5000, Hirakuchi, Hamakita-ku, Hamamatsu City, Shizuoka Pref.,434-8601, Japan Access >
Phone	(81)53-584-0268
Fax	(81)53-584-0276
E-mail	E-mail >

This is the primary contact information for green procurement between Hamamatsu Photonics and our suppliers. Please contact our sales office in your region for your inquiry about green procurement to our products.

Global organizations >

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Request for survey on chemical substances in products

Key survey requests ↓ Response ↓

Please contact our sales or the supplier if you require a survey on The Environment-related Substances (banned, restricted and controlled substances) contained in our products, as well as information on compliance with environmental laws and regulations.

Key survey requests

- EU RoHS directive compliant
- EU REACH regulation　SVHC information
- Environment-related Substances information of Hamamatsu Green Procurement Management Standard
  （equivalent to IEC62474　Declarable substance groups and declarable substances）
- Minamata Convention on Mercury　mercury-added products
- US TSCA　Persistent, Bioaccumulative, and Toxic (PBT) Chemicals
- IMDS data sheet

Response

- Hamamatsu original format（EU RoHS、EU REACH SVHC information）
- Customer format (EU RoHS、EU REACH SVHC information、other chemical substances information sheet)
- BOMcheck Regulatory compliance declaration
- chemSHERPA-AI compliance information

* Depending on the product, it may take some time to respond to a request. In some cases, we may not be able to fulfil your request due to the communication of information in the supply chain.
* We are unable to respond to requests for disclosure of information on the composition of our products, such as chemSHERPA-AI composition information, as it contains our confidential information.

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Management of chemicals in products

Compliance with regulations on chemicals in products ↓
Background and objectives ↓
Framework for advancement of green procurement ↓
Responding to regulations ↓
Our initiative on Mercury ↓
System of information about chemicals in products ↓
Status of handling of main restricted substances ↓
Future directions ↓

Compliance with regulations on chemicals in products

Since 2004, we have been managing chemical substances in products. We are committed to staying up to date with the latest information regarding chemicals through industrial associations and responding swiftly and appropriately to new regulations.

Background and objectives

It is universally understood that the regulation and management of chemicals is an integral part of the international background against which manufacturers operate. Strict compliance with such rules and regulations is essential for the continuation of business. The international management of chemicals dates to the adoption of the Rio Declaration and Agenda 21, at the 1992 United Nations Conference on Environment and Development (the "Earth Summit"). The events of the Earth Summit later led to the enactment in Europe of regulations on chemicals in products. Similarly, international treaties were concluded that prohibits the use of specified chemicals, taking a strategic approach to international chemical management. In Japan, efforts are under way to pass and overhaul laws to accord with laws overseas. To comply with these regulations on chemicals is a requirement of manufacturers in all markets.
Against this background, we at Hamamatsu Photonics are advancing management of chemicals in products based on Management of chemicals in products-Principles and guidelines, a JIS standard; and Guidelines for the management of chemicals in products, published by the Joint Article Management Promotion Consortium (JAMP). On this basis, we have established the Green Procurement Management Standard for Chemical Substances for HAMAMATSU Group. At the same time, we recognize that effective management of chemicals in products is impossible without a consistent framework imposed across the entire supply chain. For this reason our Green Procurement Policy requests that business partners implement their own systems for management of chemicals included in products.

Green procurement >

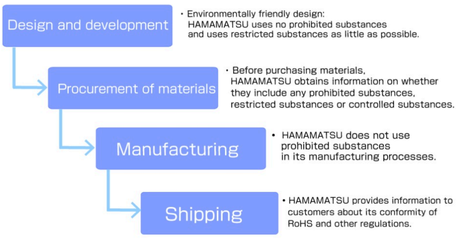
Framework for advancement of green procurement

At Hamamatsu Photonics, the task of responding to regulations on chemicals in products falls to the Headquarters Product Assessment Working Group, which is one of the Headquarters Environmental Working Groups within the Headquarters Environment Committee, the decision-making body of our environmental management system. The Headquarters Product Assessment Working Group is composed of the representatives of each business location of the Company as well as the Environment Committee Secretariats. For their part, similar Working Group are established at each business location, where they coordinate with the to frame specific regulatory responses at their locations.

Environmental management system >

Responding to regulations

Hamamatsu Photonics manages chemicals in products based on the Green Procurement Management Standard for Chemical Substances for HAMAMATSU Group. This management standard is applied consistently throughout the Company, governing all products, purchased materials and substances used in production processes. In preparing this standard and listing controlled substances, we referred to a number of international treaties, such as the Stockholm Convention on Persistent Organic Pollutants; international regulations, such as the RoHS and REACH directives in the European Union; and lists of controlled substances, such as IEC 62474. The inclusion and use of the chemicals in question are managed according to three levels: prohibited substances, restricted substances and controlled substances. To ensure that these criteria reflect updates to the related laws, they are reviewed regularly, and knowledge of any revisions is circulated by the Headquarters Environment Committee and through our environmental training programs.
Guided by the Green Procurement Management Standard for Chemical Substances for HAMAMATSU Group, we strive to reduce the environmental impact of the chemicals it uses at every stage. (Please refer to the illustration.)



The products are shipped in compliance with the requirements of each regulation.
The regulatory conformity check is conducted in cooperation with the Quality Control Committee. Products that have been verified are affixed with an environmental label indicating conformity, and a Declaration of Conformity is issued.

Our initiative on Mercury

This pertains to US Customer Only:
Hamamatsu Corporation Mercury Education Plan

Hamamatsu Corporation Mercury Education Plan is available by clicking the following title.

Hamamatsu Corporation Mercury Education Plan [50 KB/PDF]

System of information about chemicals in products

To confirm the status of chemicals in products and evaluate their compliance with regulations, Hamamatsu Photonics has introduced an information system for management of chemicals in products. This system centrally manages information on our products and information obtained from business partners about their materials. We use the system Company-wide to inform customers of the results of surveys and investigations and to manage documents to confirm compliance. This system enables comprehensive identification of chemical substance information contained in products. Moreover, it is also used to gradually reduce chemical substances restricted for use in products in accordance with future regulations. To make as many employees as possible familiar with the system, we conduct regular in-house training on its use. Today the system has over 500 users throughout Hamamatsu Photonics, in departments such as Quality Control, Production Management, Environmental Management and Material Management.

Status of handling of main restricted substances

Our Fundamental environmental policy is committed to compliance with domestic and international legal requirements related to regulated substances. The list of substances restricted for use based on our standards is posted and disclosed in the " Management Standard for Chemical Substances". The following is a list of major regulations and the status of compliance with those substances.

EU RoHS Directive
Compliance with the 10 restricted substances has been completed by July 2021 for the subject products, and we are supplying products that comply with the directives. We publish the status of RoHS compliance in its products on the Hamamatsu Photonics website, where anyone can confirm it at any time.

Search RoHS compliant products >

EU REACH regulation
We regularly collect information on substances of very high concern that need to be communicated in value chain, and communicate this information to our customers using the industry information communication format.

Green procurement activities >

Future directions

To continue to fulfill its social responsibilities in the environmental aspects in cooperation with its business partners, Hamamatsu Photonics intends to place priority on partnership with companies that respond effectively to regulations on chemicals included in products. Informed by the checksheet with the Guidelines for the management of chemicals in products published by JAMP, Hamamatsu Photonics conducts regular on-site checks of implementation by its business partners. If these checks indicate that improvements are required, we will ask those business partners to take action and will provide support for them in doing so.

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Environmental communication activities

Agreed with the "Declaration of Biodiversity by Keidanren (Japan Business Federation) and Action Policy" ↓
Contributing to preservation of the regional environment ↓
Collection of used toothbrushes ↓

Agreed with the "Declaration of Biodiversity by Keidanren (Japan Business Federation) and Action Policy"

In January 2020, Hamamatsu Photonics agreed with the "Declaration of Biodiversity by Keidanren and Action Policy (Revised Edition)".

Initiative based on the Declaration of Biodiversity by Keidanren

Contributing to preservation of the regional environment

Hamamatsu Photonics has always recognized the importance of a healthy and flourishing natural environment. As part of its efforts to promote a greener environment in the region, we carry out tree-planting activities. In addition, we are planting an acorn to make a forest on the company premises.

Clean-up activities in line with the Biodiversity Hamamatsu Strategy

As part of its efforts to preserve biodiversity, Hamamatsu Photonics participates in and publicizes the Hamamatsu Biodiversity Strategy, conducting environmental maintenance activities around its business locations and elsewhere in the city and prefecture. We participate in the annual "Lake Hamana Cleanup Campaign" etc, maintaining biodiversity in the region to preserve a flourishing natural environment for the future. In 2021, "Lake Hamana Cleanup Campaign" was canceled due to COVID-19, and other cleanup activities were canceled or scaled down. Taking measures against COVID-19, Hamamatsu Photonics conducted cleanup activities around its business locations 11 times, with 361 employees participating in total.

Lake Hamana Cleanup Campaign(2019)

Cleanup campaign on the Toyoda River(2020)

Planting trees on the seawall

Flower-bed display by Hamamatsu businesses

Happy memorial trees

As part of its activities to promote biodiversity and raise awareness of environmental issues, in October 2011 Hamamatsu Photonics began distributing "Happy Memorial Trees" to employees who bought a house or were married. To further encourage employees to grow trees at home, in October 2014 we expanded the program to include employees who enrolled a child in primary school. This program has proven valuable in raising environmental awareness among employees and their families. The photos shown here were provided by employees in commemoration of tree planting. To date, 972 employees have applied for it since 2011.

Hamamatsu Photonics is committed to the beautification, maintenance and management of the environment. We plant trees on the grounds of each business location and create "green curtains" that flourish in the summer.

Collection of used toothbrushes

In FY2019 Hamamatsu Photonics began a program to collect used toothbrushes. An outside organization awards us points according to the amount of toothbrushes collected by weight; these points are then converted into funds contributed to activities in the community. Although this program has barely started, our employees have already contributed a total of 46 kg of used toothbrushes.

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WEB environment report (2020)

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- Green procurement activities
- Environmental communication activities
- Reducing carbon emissions and climate change
- Protecting our water resources
- Management of chemicals in products
- ESG data (Environment)

WEB environment report (2019)

Previous reports

Environmental and Social Report 2019 [4.3 MB/PDF]

Environmental and Social Report 2018 [3.5 MB/PDF]

Environmental Report2017 [2.8 MB/PDF]

Environmental Report2016 [8.5 MB/PDF]

Environmental Report2015 [6.7 MB/PDF]

Environmental Report2014 [6.4 MB/PDF]

Environmental Report2013 [4.0 MB/PDF]

Environmental Report2012 [4.4 MB/PDF]

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ESG data

You can view various data of ESG (Environment, Social, and Governance), based on Hamamatsu Photonics's business and social activities.

− Environment

	Unit	2020	2021	2022
Energy	(kl)	[consolidated:34,737] 30,307	[consolidated:35,177] 30,912	[consolidated: *] *
Electricity	(kWh)	[consolidated:125,829,614] 110,355,594	[consolidated:128,468,749] 113,478,245	[consolidated: *] *
Renewable Electricity	(kWh)	[consolidated:7,099,740] 7,099,740	[consolidated:11,544,463] 11,544,463	[consolidated: *] *
Carbon Emissions	(t-CO_2)	[consolidated:651,073] 558,151	[consolidated:602,082] 509,884	[consolidated: *] *
Scope1（All Direct Carbon Emissions）	(t-CO_2)	[consolidated:12,796] 11,689	[consolidated:12,599] 11,604	[consolidated: *] *
Scope2（Indirect Carbon Emissions）	(t-CO_2)	[consolidated:49,979] 42,359	[consolidated:46,638] 39,701	[consolidated: *] *
Scope3（Other Indirect Carbon Emissions）	(t-CO_2)	[consolidated:588,298] 504,103	[consolidated:542,845] 458,579	[consolidated: *] *
Water	(1,000m^3)	[consolidated:825] 730	[consolidated:825] 742	[consolidated: *] 793
Tap water	(1,000m^3)	[consolidated:135] 101	[consolidated:136] 102	[consolidated: *] 109
Well water	(1,000m^3)	[consolidated:646] 585	[consolidated:640] 591	[consolidated: *] 630
Industrial water	(1,000m^3)	[consolidated:44] 44	[consolidated:49] 49	[consolidated: *] 54
Wastewater	(1,000m^3)	[consolidated:788] 706	[consolidated:789] 717	[consolidated: *] 769
Public sewer	(1,000m^3)	[consolidated:183] 138	[consolidated:179] 133	[consolidated: *] 148
River discharge	(1,000m^3)	[consolidated:605] 568	[consolidated:610] 584	[consolidated: *] 621
VOC emissions	(t)	13.6	13.7	17.2
Materials	(t)	626	637	790
Participants of chemical substance education	(People)	499	507	692
Industrial waste	(t)	549	618	657
Certain hazardous waste	(t)	307	404	339
Valuable material	(t)	288	317	285
Recycling	(t)	1,077	1,250	1,230
Landfill	(t)	3	4	7
Green Purchasing Rate	(%)	89.6	97.3	*
ISO14001 certification (employee ratio)	(%)	98.0	98.1	*

* To be updated after January 2023.

+ Social

+ Governance

(Note) The reporting period is our business year (from October of previous year to September) or the general fiscal year (from April to March of next year).

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