

Environmental Initiatives

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0.46%

Final landfill disposal rate



13.9% reduction

Greenhouse gas emissions (baseline year: fiscal 2021)



12,172 people

Total number of participants in environmental conservation activities in fiscal 2023

Environmental Initiatives: Environmental Vision

SHARP Eco Vision 2050 Long-Term Environmental Vision



To realize our long-term environmental vision, Sharp is formulating medium-term environmental goals that define specific activities and quantitative targets in each field. To address the pressing issue of climate change, Sharp is accelerating efforts to achieve net zero CO₂ emissions from its business activities by 2030.

Sharp is aiming to solve social problems and continuously boost corporate value by deepening ties with stakeholders through business activities and environmental conservation efforts.

- *1 Subtracting the amount of absorption from the amount of greenhouse gas emissions, so that the total is effectively zero.
- *2 An economic system aimed at eliminating wastes and circulating resources. Waste products and raw materials are considered new resources and are thus recycled.
- *3 The Paris Agreement sets forth the long-term targets of keeping the rise in global average temperature well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C.

The international community has recognized the urgent need to address increasingly serious environmental problems, such as climate change, resource depletion, and ocean plastic pollution. This awareness is accelerating global action to solve these social problems, including efforts associated with the achievement of the Sustainable Development Goals (SDGs) and carbon neutrality^{*1}, and the creation of a circular economy^{*2}. In 2019 Sharp formulated SHARP Eco Vision 2050, a long-term environmental vision based on its Basic Environmental Policy of “Creating an Environmentally Conscious Company with Sincerity and Creativity,” which was established in 1992. Sharp is working toward realizing a sustainable global environment by pursuing long-term goals set in three fields of action with 2050 as the target year: climate change, resource recycling, and safety and security.

In the field of climate change, while keeping in mind the 1.5°C target^{*3} stipulated in the Paris Agreement, Sharp aims to become carbon neutral in its business activities. It also seeks to broaden and disseminate clean energy-related products and services and to reduce greenhouse gas emissions from its products and services. In the resource recycling field, Sharp pursues a circular economy by endeavoring to use recycled materials in all product parts and to achieve zero final landfill disposal from its business activities. In the safety and security field, Sharp strictly manages chemical substances that may affect people’s health, the natural environment, and ecosystems and restricts their use to eliminate the risk of negative effects.

Environmental Initiatives: Environmental Vision

Long-Term Environmental Goals

To bring about SHARP Eco Vision 2050, we have stipulated long-term goals in three fields of action. In pursuing these goals, we will strive to create more clean energy than the total amount of energy consumed in Sharp's entire supply chain, while minimizing the environmental impact of our business activities.



Climate Change

Sharp has up to now striven to use less energy in its business activities and to make products that are increasingly more energy efficient so as to reduce the amount of energy consumed by households and society as a whole.

We began developing solar cells after founder Tokujii Hayakawa said, "All the products we make use electricity. As our company grows, we will need more electricity, so why don't we make electricity ourselves?" Since then, we have spent more than half a century working to spread solar power generation.

It is precisely because Sharp makes products that use electricity that we have a responsibility to reduce the environmental impacts resulting from this electricity use.

By promoting the world goal of carbon neutrality, Sharp is taking on the challenge of achieving the following two goals by 2050 and thus becoming carbon-free throughout its supply chain, including its own business activities.

Goal

- Achieve net zero CO₂ emissions in Sharp business activities.
- Create more clean energy than the total amount of energy consumed in Sharp's entire supply chain.



Resource Recycling

Sharp has up to now provided the world with all kinds of value through the creation of new products. At the same time, we have used many resources to do so.

Sharp should continue to provide its stakeholders with all kinds of value by making the most efficient use of finite resources around the globe.

By making more efficient use of resources and continuing to offer maximum value with minimal resources, Sharp is taking on the challenge of achieving the following two goals by 2050 and thus building a circular economy and realizing a recycling-oriented society.

Goal

- Use no newly extracted resources* for making products.
- Achieve zero final disposal to landfill of waste generated in Sharp business activities.

* Excludes those not suitable for recycling from an environmental standpoint.



Safety and Security

Sharp uses various chemicals in production processes in its factories, and the products themselves contain various chemicals. Such chemicals must be strictly managed because some of them can have negative effects on people's health, the natural environment, or ecosystems.

Sharp's business activities must not have a negative effect on people's health, the natural environment, or ecosystems.

As well as complying with current international standards, Sharp has established its own even stricter in-house standards. Under these far-sighted standards, we thoroughly manage relevant chemicals with the goal of eliminating any negative effects that chemicals may have on people's health, the natural environment, or ecosystems.

Goal

- Properly manage chemicals in order to protect people's health, the natural environment, and ecosystems.

Environmental Initiatives: Climate Change

Sharp's Stance on Climate Change

Climate Change Initiatives Based on the Medium-Term Management Direction

In May 2024, Sharp announced its medium-term management direction aimed at accelerating its future growth. For its existing brand business, Sharp will pursue business transformation, including utilizing new technologies and launching new businesses in growth areas. Additionally, in pursuit of the next innovation, Sharp aims to capture new business opportunities by improving added value through stronger technological capabilities and expanded business domains.

In response to climate change, Sharp will work to transform its existing brand business through the creation of new customer experiences that are driven by the combination of home appliances with AI, and through the development of new products that capture the growing demand for carbon neutrality. Meanwhile, in pursuit of the next innovation, Sharp will, in addition to the traditional home and workplace, treat “mobility” as a living space, which it will work to create new value for, such as by building an EV ecosystem.

Sharp will further strengthen ties with its business partners and accelerate each of its initiatives to achieve dramatic growth while simultaneously addressing climate change.

Participation in Climate Crisis Initiatives and Other Efforts

Sharp participates in the Science Based Targets initiative (SBTi)^{*1}, which is focused on pursuing action that will achieve real and reliable results in the fight against climate change. Sharp had previously received SBT WB2°C^{*2} (well-below 2°C) certification and, in March 2024, obtained SBT 1.5°C^{*3} certification. Moving forward, Sharp will further accelerate its carbon neutrality efforts and pursue collaboration with suppliers to reduce greenhouse gas emissions across the entire supply chain, aiming to obtain SBT Net Zero^{*4} certification. Sharp also aims to use 100% renewable energy in business activities, with the aim of taking part in the RE100^{*5} global initiative.

In Japan, Sharp will continue to participate in the Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention^{*6} and the GX League^{*7} to promote initiatives by the electrical and electronics industry, along with collaborative efforts across industry, government, and academia and contribute to efforts aimed at achieving carbon neutrality for society as a whole.



- ^{*1} This climate change-related initiative is a collaborative effort of the United Nations Global Compact (UNGC), the CDP, World Resources Institute (WRI), and the World Wide Fund for Nature (WWF). The SBTi promotes the establishment of science-based GHG emissions reduction targets in conformance with the Paris Agreement.
- ^{*2} A target of keeping the increase in global average temperatures to well below 2°C above pre-industrial levels.
- ^{*3} A target of limiting the increase in global average temperatures to 1.5°C above pre-industrial levels.
- ^{*4} Calls for setting reduction targets at the 1.5°C level and balancing remaining emissions with carbon removal.
- ^{*5} A global initiative that aims for companies to cover 100% of the electricity used in their operations with renewable energy.
- ^{*6} This group comprises companies from electrical and electronics industry associations in Japan, such as the Japan Electrical Manufacturers' Association (JEMA) and the Japan Electronics and Information Technology Industries Association (JEITA). The Liaison Group undertakes industry-wide efforts aimed at preventing global warming—for example, proposing action plans to achieve carbon neutrality.
- ^{*7} GX stands for 'green transformation'—an initiative to transform society into being carbon neutral by 2050. The GX League is a forum where companies pursuing sustainable growth collaborate with other companies, government, and academic organizations that share the same GX goals.

Environmental Initiatives: Climate Change

Sharp's Stance on Climate Change

Reducing Greenhouse Gas Emissions across the Value Chain

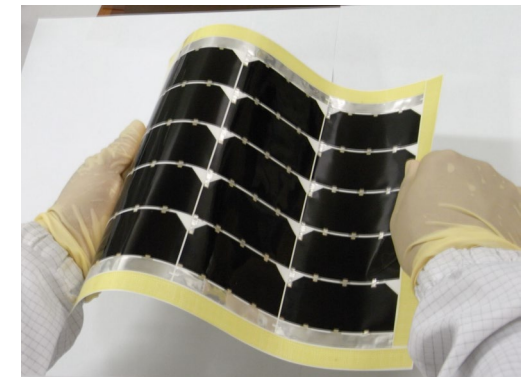
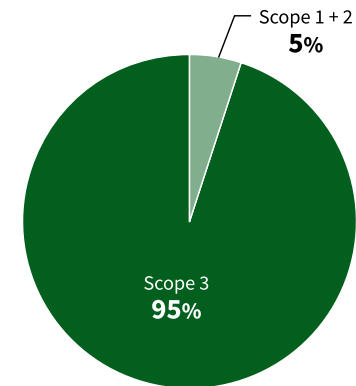
For greenhouse gas emissions across the entire Sharp value chain, emissions from its own activities (Scopes 1 and 2) account for 5%, and indirect emissions outside the scope of its activities, such as emissions associated with material procurement, transportation, and the use of sold products (Scope 3), account for 95%. Because of this, Sharp recognizes the importance of reducing greenhouse gas emissions across its entire value chain, not only through its own efforts to reduce the environmental impact of its activities, like product manufacturing, but, also, through efforts to reduce the environmental impact of material procurement and product use by customers (improving product energy efficiency). As part of its efforts to reduce greenhouse gas emissions from its own activities, Sharp is conserving energy at its production sites (such as by switching to LED lighting in offices and improving the efficiency of outdoor air-processing units and air-conditioning systems). Sharp is also systematically installing solar power systems at its business locations, and, with the full-scale operation of the solar power systems installed at its factories in Thailand and China in fiscal 2023, solar power systems will be in operation at 17 locations in Japan and overseas (see page 037). Furthermore, Sharp is also working to transition its company cars to electric EVs. For example, production and sales bases in Europe, including the UK and Sweden, are replacing existing cars with EVs and installing charging points. In materials procurement, Sharp will further strengthen cooperation with its business partners to reduce greenhouse gas emissions. In the field of transportation, Sharp continues to pursue a modal shift (a switch from truck-based transportation to environmentally friendly methods like ships and railroads) while also working to optimize landing points and review its parts procurement sources.

Sharp is actively working to create environmentally friendly products and devices whose use will result in reduced greenhouse gas emissions, as these emissions account for the largest portion across the company's entire value chain. Sharp designates its environmentally friendly products and devices as "Green Products" and "Green Devices." It has formulated and implemented guidelines that summarize the development and design rules of these products and devices in order to ensure it is continually working to improve their environmental friendliness (see page 063).

Contributing to Society through the Widespread Adoption of Renewable Energy

"As a manufacturer of products that consume electricity, we have a responsibility to become a manufacturer of electricity itself." This has been the motivating resolve behind Sharp's work on solar power generation begun in 1959. Sharp's efforts over the last half century have expanded into a wide range of fields, from residential use to power generation under harsh conditions in lighthouses and satellites, to mega solar power plants around the world. In January 2024, SLIM, the Japan Aerospace Exploration Agency (JAXA)'s spacecraft equipped with Sharp's thin-film compound solar cells, successfully made a pinpoint landing on the surface of the moon. It was confirmed that the solar cells operated normally after landing (see page 039). Sharp will continue to work to further promote the use of renewable energy in all sectors of society and to contribute to the realization of a decarbonized society.

■ Breakdown for Sharp Greenhouse Gas Emissions (Fiscal 2023)



Thin-film compound solar cells installed on board SLIM

Environmental Initiatives: Climate Change

TCFD-Based Information Disclosure

Action on the TCFD Recommendations

The Task Force on Climate-related Financial Disclosures (TCFD) was established by the Financial Stability Board (FSB), an organization promoting international financial stability. In 2017 the TCFD released recommendations for companies to disclose information on the risks and opportunities of climate change. Sharp has declared support for the TCFD recommendations and is expanding disclosure of climate-related information in accordance with the framework set by the TCFD.



1. Governance

Climate-related issues are monitored and countermeasures supervised by the President & CEO, who chairs the Sustainability Committee^{*1}. The committee includes senior executives and members from head office departments, business units, and subsidiaries. The committee works to thoroughly implement policies and visions related to aspects of ESG such as climate change; it deliberates on and promotes active measures; and it shares the latest trends on societal issues.

Through monitoring and review by management at committee meetings, Sharp continuously strengthens climate change action to play a part in making society sustainable.

2. Strategy

Sharp sees climate change as both a risk and an opportunity in the medium to long term. We are studying strategies and learning about organizational resilience in the context of climate change-related risks and opportunities. To understand long-term impacts up to 2050, we analyzed climate change scenarios outlined by the International Energy Agency (IEA) and the Intergovernmental Panel on Climate Change (IPCC) (1.5°C scenario^{*2} and 4°C scenario^{*3}). The following page provides detailed information about those risks and opportunities, along with a summary of associated measures.

3. Risk Management

Sharp identifies and assesses climate-related risks in accordance with the Rules of Business Risk Management^{*4}, in which the basic approach to risk management has been established. Specifically, Sharp identifies climate-related risks that are highly likely to occur based on its analysis of climate scenarios forecast for the future. Sharp reports its findings as necessary to senior executives and the Internal Control Planning Division, which serves as the risk management secretariat. It also facilitates necessary improvement measures in partnership with involved departments.

4. Metrics and Targets

In 2019 Sharp formulated SHARP Eco Vision 2050, a long-term environmental vision based on its basic environmental policy of “Creating an environmentally conscious company with sincerity and creativity,” which was established in 1992. Sharp is working toward realizing a sustainable global environment by pursuing long-term goals set in three fields of action with 2050 as the target year: climate change, resource recycling, and safety and security. With regard to the pressing global issue of climate change, Sharp is accelerating its efforts aimed at achieving net zero CO₂ emissions from the company’s activities by 2030.

■ Progress towards Reducing GHG Emissions (Fiscal 2023 Results)

Base Year (fiscal 2021 results)	Fiscal 2023 Results	Base Year Comparison
1,365 thousand tons CO ₂	1,175 thousand tons CO ₂	13.9% reduction

*1 See page 010.

*2 IEA Net Zero Emissions by 2050 Scenario; SSP1-1.9 scenario from the IPCC 6th Assessment Report (AR6).

*3 RCP 8.5 scenario from the IPCC 5th Assessment Report (AR5).

*4 See page 133.

Environmental Initiatives: Climate Change

TCFD-Based Information Disclosure

■ Business Risks and Opportunities; Sharp's Response

Scenario	Factors	Changes	Impacts on Sharp	Risk or Opportunity	Degree of Impact	Time Until Impact Becomes Apparent*	Sharp's Response
1.5°C	Introduction of carbon pricing	Increased raw material procurement costs	Costs passed on to purchase prices due to carbon tax levied on Sharp-purchased products	Risk	Large	Short term	<ul style="list-style-type: none"> ● Seek to use raw materials with low GHG emissions ● Find suppliers that strive to reduce environmental impact ● Optimize purchase volume (thorough inventory control)
		Increased direct operational costs	Increased payment costs due to carbon tax levied in line with Sharp's Scope 1 and 2 emissions	Risk	Large	Short term	<ul style="list-style-type: none"> ● Reduce GHG emissions through further energy savings ● Further investment into low-carbon facilities and equipment by introducing internal carbon pricing
	Pressure to decarbonize and pursue environmental friendliness in the supply chain	Decline in competitiveness due to failure to meet user needs for environmental friendliness	Decrease in sales due to failure to meet user expectations for environmental friendliness	Risk	Medium	Short term	<ul style="list-style-type: none"> ● Understand market needs through ongoing communication with users ● Ongoing R&D in energy savings
		Increased costs associated with switching to environmentally friendly materials	Increased costs associated with switching to electric furnace materials, recycled plastic, and bio-plastic, which emit less CO ₂	Risk	Medium	Medium term	<ul style="list-style-type: none"> ● Find suppliers that provide low-cost environmentally friendly materials ● Maintain consumer price elasticity through disclosure of the use of environmentally friendly materials
		Increased energy procurement costs due to switching to renewable energy	Increased costs associated with in-house power generation, power purchase agreements (PPA), switching to renewable energy, and purchase of environmental value certificates	Risk	Small	Medium term	<ul style="list-style-type: none"> ● Reduce GHG emissions through further energy savings ● Seek partners in low-cost PPA and renewable energy projects
	Expansion of the renewable energy market	Increased demand for solar power-related products and systems from producers and users of renewable energy	Increased possibility for revenue growth by expanding product and system offerings	Opportunity	Medium	Short term	<ul style="list-style-type: none"> ● Ongoing development of solar power-related products and systems in response to market demand
		Increased demand for zero energy houses (ZEH)	Increased possibility for revenue growth by strengthening offerings of flat-rate solar power services for homes and home energy management systems (HEMS)	Opportunity	Medium	Short term	<ul style="list-style-type: none"> ● Provide energy solutions (systems, services) that meet market demand
Expansion of environmental protection businesses	Expansion of circular economy business models	Increased support from customers by establishing a waste-free circular economy business model, amid growing efforts for decarbonization in society	Opportunity	Small	Medium term	<ul style="list-style-type: none"> ● Further pursue the recycling of waste plastic by leveraging closed-loop material recycling and other technologies ● Aggressively create new business opportunities through ongoing information gathering on solar cell recycling 	
4°C	Intensifying weather-driven disasters	Disruptions in the supply chain	Intensifying weather-driven disasters affect Sharp suppliers and bases and the supply chain, leading to a loss in sales opportunities for Sharp	Risk	Medium	Long term	<ul style="list-style-type: none"> ● Purchase from multiple sources and regions ● Survey the status of our main suppliers' business continuity plans (BCP) and reinforce measures ● Further upgrade BCPs at Sharp bases

* Short term: three years or less; medium term: by around 2030; long term: by around 2050.

Environmental Initiatives: Climate Change

Greenhouse Gas Emissions Based on the GHG Protocol Initiative

Sharp calculates greenhouse gas emissions based on the GHG Protocol^{*1} and then works to limit those emissions across the entire supply chain.

^{*1} The GHG Protocol is an international standard for calculating greenhouse gas (GHG) emissions. It was jointly established by the World Business Council for Sustainable Development (WBCSD), a coalition of the world's leading companies, and the World Resources Institute (WRI), a United States-based think tank.

^{*2} Flat-panel TVs, air conditioners, refrigerators/freezers, washing machines/dryers, air purifiers, Plasmacluster Ion generators, microwave ovens, copiers/MFPs, solar cells.

^{*3} Annual power consumption of each product × number of units sold × product life × CO₂ emission coefficient. The calculation method was revised for fiscal 2023.

^{*4} TVs (CRT TVs, flat-panel TVs), air conditioners, refrigerators/freezers, washing machines/dryers.

Greenhouse Gas Emissions by Scope 1/2/3 Categories Based on the GHG Protocol Initiative (Fiscal 2023)

Category	Emissions (Thousand Tons CO ₂)	Notes
Scope 1 (direct GHG emissions from business activities)	290	Emissions from combustion of fuel, etc.
Scope 2 (indirect GHG emissions from energy usage in business activities)	885	Emissions from the use of electricity. Location-based emissions (calculated using the average emission intensity of each region) were 1,005 thousand tons CO ₂ .
Total of Scope 1 and Scope 2	1,175	
Scope 3 (indirect GHG emissions from outside the scope of business activities)	1. Purchased goods and services	2,480 Emissions from the manufacture of materials procured for the main products ^{*2} sold in the reporting year
	2. Capital goods	130 Emissions from the construction, manufacture, and transportation of capital goods (such as equipment, machinery, buildings, facilities, and vehicles)
	3. Fuel- and energy-related activities (not included in Scope 1 or 2)	219 Emissions from the procurement of fuels (natural resource extraction, manufacture, and transportation) consumed in the generation of electricity and heat procured from other companies
	4. Upstream transportation and distribution	164 Emissions from the transportation of parts and materials and products manufactured
	5. Waste generated in operations	2 Emissions from waste disposal and treatment
	6. Business travel	19 Emissions from business travel by all employees
	7. Employee commuting	17 Emissions from commuting by all employees
	8. Upstream leased assets	— Included in Scope 1 and 2 emissions
	9. Downstream transportation and distribution	63 Emissions from the transportation (from retailers to end consumers) of the main products ^{*2} sold in the reporting year
	10. Processing of sold products	201 Emissions from processing at destination of products
	11. Use of sold products	19,110 Emissions ^{*3} from the use of the main products ^{*2} sold in the reporting year
	12. End-of-life treatment of sold products	763 Emissions from recycling 4 types of appliances ^{*4} , copiers/MFPs, and PCs, and emissions of refrigerants when disposing of air conditioners
	13. Downstream leased assets	— Not applicable
	14. Franchises	— Not applicable
	15. Investments	— Not applicable
Scope 3 total	23,168	
Scope 1 + 2 + 3 total	24,343	

Environmental Initiatives: Climate Change

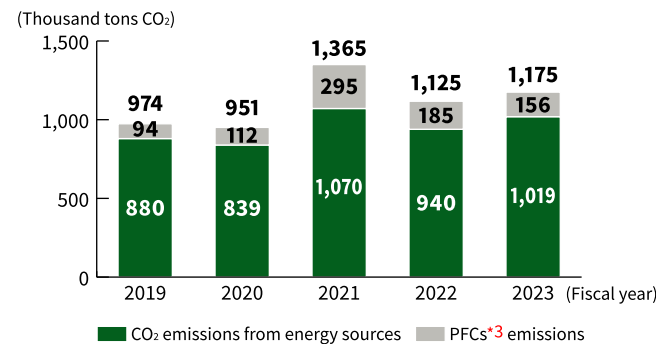
Reducing Business Activity-Linked Greenhouse Gas Emissions

Fiscal 2023 Objectives	Fiscal 2023 Achievements	Self-Evaluation	Priority Objectives for Fiscal 2024
■ Reduce greenhouse gas emissions by 8.4% (baseline year: fiscal 2021)	■ Reduced greenhouse gas emissions by 13.9% (baseline year: fiscal 2021)	★★	■ Reduce greenhouse gas emissions by 33.3% (baseline year: fiscal 2021)

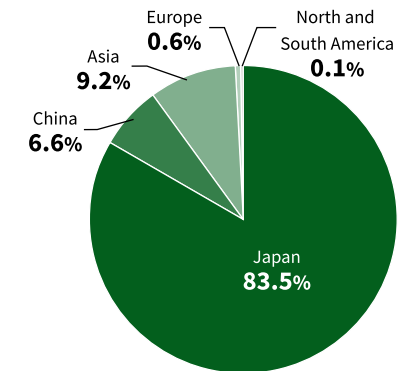
Self-evaluation: ★★★ Achieved more than targeted / ★★ Achieved as targeted / ★ Achieved to some extent

To address the global problem of climate change, Sharp is working to reduce GHG emissions from its business activities. We aim to achieve net zero CO₂ emissions from business activities by 2030. The Sharp Group's GHG emissions from business activities in fiscal 2023 was down 13.9% to 1,175,000 tons CO₂ compared to the previous fiscal year. Each Sharp production base is strengthening efforts involving all equipment and systems—ranging from production lines to utility systems for supplying electricity, gas, and water—to boost energy efficiency and reduce GHG emissions. In particular, the LCD and electronic component plants consume large amounts of energy. The plants' production, engineering, and environmental departments work together to reduce consumption of base-load energy. Efforts include installing inverters*¹ and optimizing the air conditioning in clean rooms*². To achieve its environmental goals, Sharp will continue to install solar power systems in its plants and other sites, introduce factory energy management systems, streamline production lines, and install energy-saving equipment in utility systems.

■ Sharp Group's GHG Emissions from Business Activities



■ GHG Emissions by Region (Fiscal 2023)



*¹ A device to control the number of motor rotations.

*² A room where the temperature, humidity, and cleanliness are kept at controlled levels.

*³ HFCs, PFCs, sulfur hexafluoride (SF₆), nitrogen trifluoride (NF₃).

Environmental Initiatives: Climate Change

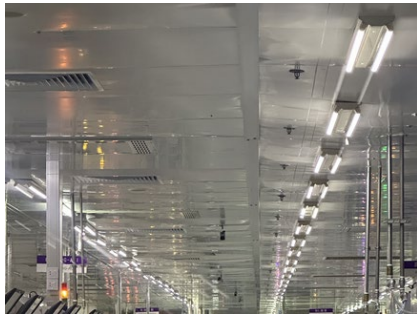
Reducing Business Activity-Linked Greenhouse Gas Emissions

Example

Reducing Greenhouse Gas Emissions at Production Sites

WSEC, Sharp's production base in China, has upgraded the electronic control system for the factory's air conditioning equipment and implemented total optimization control, as well as replaced all fluorescent lights with LED lamps. In addition, for the air compressors, thermal energy recovery is being used to help save energy while some of the equipment has been updated to more efficient models. Furthermore, a solar power system with an output of 2 MW-dc and annual power generation of 2,363 MWh was installed on the factory roof. As a result of these efforts, greenhouse gas emissions were reduced by approximately 4,000 t-CO₂ in fiscal 2023.

Sharp is actively pursuing energy-saving initiatives and the introduction of solar power systems at its domestic and overseas bases as it works to reduce greenhouse gas emissions globally.



Switching to LED lighting in the factory



Solar power system installed on the factory roof

Environmental Initiatives: Climate Change

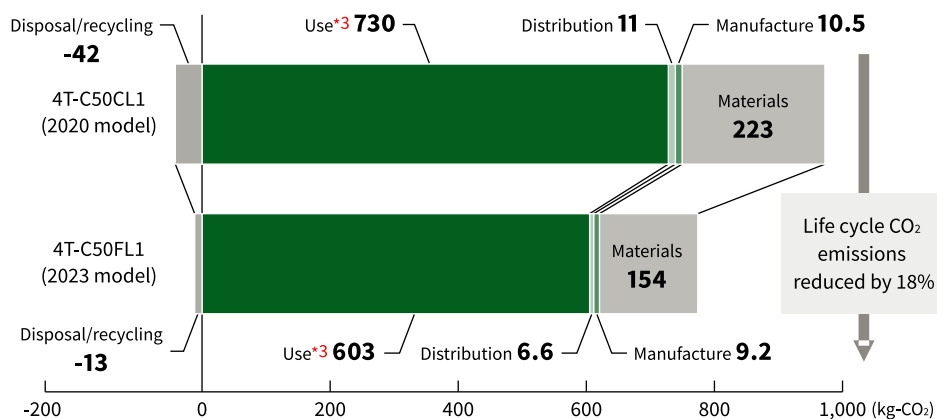
Product Life Cycle Assessment

Identifying and Reducing Environmental Impacts throughout the Life of Products

Sharp performs a life cycle*¹ assessment (LCA) on its products to identify their impact on the environment throughout their service life and uses the results in product planning and development.

Consumer electronics generally have a large impact on the environment during use. Thus, by focusing on improving their energy savings, overall environmental impact can be effectively reduced. A decrease in the environmental impact of 4K*² LCD TVs was achieved by improving energy efficiency and reducing the products' weight.

LCA Data for 4K LCD TVs

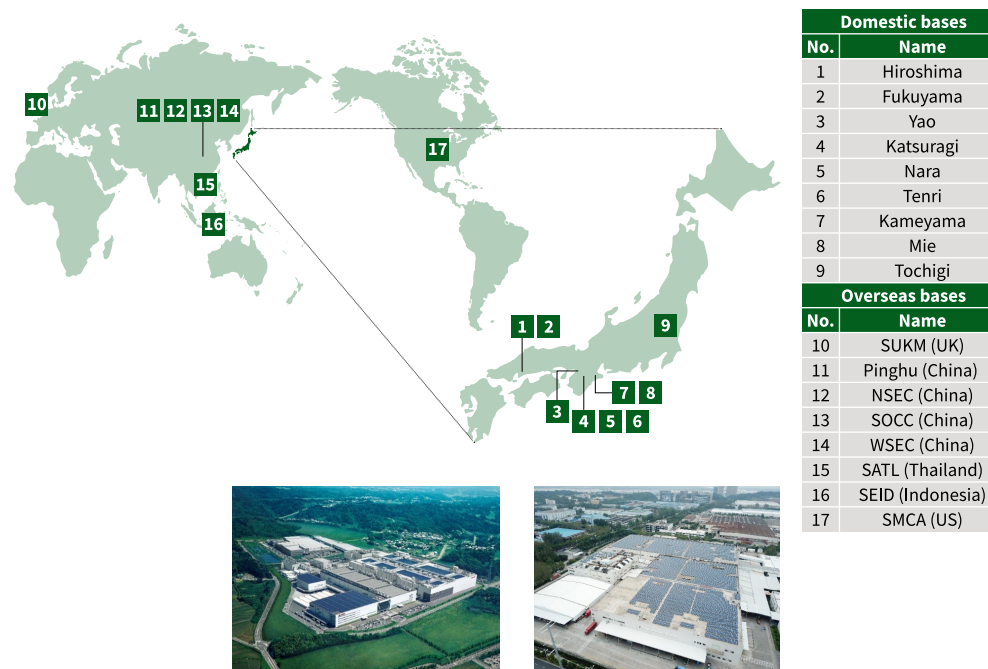


*¹ The life of a product from materials and parts procurement to manufacture, distribution, use, disposal, and recycling.
 *² Ultra-high-definition video standard with a resolution of 3,840 × 2,160 pixels (8.29 million pixels). This is four times the resolution of current 2K full high-definition broadcasts (1,920 × 1,080 pixels; 2.07 million pixels).
 *³ CO₂ emissions during use are calculated using a CO₂ emission coefficient (adjusted) announced by Japan's Electric Power Council for a Low Carbon Society (ELCS).
 *⁴ An agreement whereby a company or other entity purchases electricity, derived from natural energy sources, from a power producer or supplier on a long-term basis.

Utilizing Renewable Energy

Sharp has introduced the use of PV systems, green power, and other power sources to its domestic and overseas production bases and is advancing the use of renewables to do its part to create a decarbonized society. In fiscal 2023, the amount of green electricity purchased increased significantly to 14.58 million kWh, as a result of the full-scale implementation of PPAs (power purchase agreements)*⁴ at Sharp factories in Thailand and China. In-house solar power generation was 4.49 million kWh. Also, in fiscal 2023, Sharp began purchasing non-fossil fuel certificates for its Kameyama Plant and factory in Vietnam. As a result, the proportion of renewable energy in electricity consumption has increased to 6%.

Solar Power Systems at Sharp Bases Worldwide



Solar power systems installed on the roofs of Sharp production bases (left: Kameyama in Japan; right: NSEC in China)

Environmental Initiatives: Climate Change

Utilizing Renewable Energy

Example

“Eee Connect” System Connects Solar Power Systems, Storage Battery Systems, Home Appliances, and EVs

Sharp released the JH-WE2301 EV converter, which can charge and discharge EVs, and has built a V2H (vehicle-to-home) system that connects EVs to homes. In order to make effective use of electricity generated from sunlight, in addition to enabling connection to storage batteries and, from November 2023, connection to home appliances, in March 2024 Sharp began offering the Eee Connect system to enable connection to EVs as well.

This system coordinates the three elements of solar power generation, storage batteries, and EVs to allow for centralized control of EV charging and discharging in addition to conventional solar power generation and storage battery use. Clean electricity generated from sunlight is used to charge the EV as direct current (DC), thus enabling the generated electricity to be consumed efficiently within the home as well as making maximum use of solar power for driving the EV.

This EV converter is the smallest and lightest in the industry^{*1} and can be installed on the wall of a home, making it possible to install it even in parking lots, where space is limited.

COCORO Energy, Sharp’s cloud-based HEMS^{*2} service, which smartly and automatically controls energy equipment, will also feature a new EV connection function. When a weather warning is issued due to a typhoon or other weather event, the system will respond to the warning to allow users to prepare for power outages by charging not only the storage battery but also the EV.

In addition to an equipment warranty, the EV converter comes with a range of paid services, including 24/7 call center support and compensation for natural disasters and for damages due to accidents^{*3}. Users can contact Sharp in the unlikely event that a problem occurs at night. The product is covered for damage caused by natural disasters, such as lightning strikes or typhoons, and for damage caused by accidents, like the charging/discharging connector^{*4} falling. This means users can use the EV converter with peace of mind after purchase.

Sharp will continue to contribute to the widespread adoption of renewable energy by offering total solutions, including the Eee Connect system, which connects a solar power system, a storage battery system, home appliances, and EVs, as well as offering after-sales services.

^{*1} For a V2H system that can connect a solar power system, a storage battery system, and DC. As of February 15, 2024; based on Sharp findings.

^{*2} HEMS: Home energy management system. A system for managing and controlling the energy used in a home.

^{*3} Paid services provided jointly by Sharp Energy Solutions Corporation, Sompo Japan Insurance Inc., and Sompo Warranty Inc. To receive this service, users must have comprehensive movables insurance (paid) provided by Sompo Japan Insurance.

^{*4} Refers to the part of the EV converter that connects with the EV.



About Eee Connect

The three E’s in Eee Connect stand for energy, environment, and economy. By connecting devices and services in a “good” way (in Japanese, the word for “good” is pronounced like the letter E), clean energy generated by sunlight can be used economically and with consideration for the environment.

Eee Connect is Sharp’s own residential energy solution that connects a solar power system, cloud storage battery system, V2H system, cloud HEMS service, home appliances, and residential equipment to make effective use of electricity generated by sunlight.

It is a total solution that only Sharp, a company that began developing solar cells in 1959 and has been involved in the energy business for over 60 years while also developing cutting-edge AI technologies, can provide.

Environmental Initiatives: Climate Change

Utilizing Renewable Energy

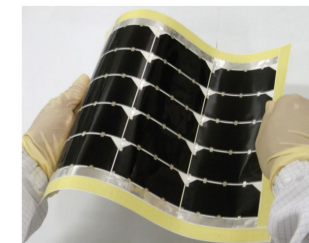
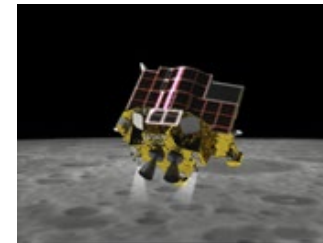
Example

SLIM*¹, JAXA’s Spacecraft Equipped with Sharp’s Thin-Film Compound Solar Cells, Makes Successful Pinpoint Landing on the Moon

SLIM, the Japan Aerospace Exploration Agency (JAXA)’s spacecraft equipped with thin-film compound solar cells developed and manufactured by Sharp, successfully made a pinpoint landing (within 100 meters of target) on the Moon’s surface early on January 20, 2024. It has been confirmed that the solar cells continued to operate normally following the landing. Sharp began developing solar cells for outer space applications in 1967, and the first solar cells were installed on the Ume satellite in 1976. Since then, we have been developing and manufacturing outer space solar cells for nearly half a century as Japan’s sole solar cell manufacturer certified by JAXA, and our solar cells have been installed on about 190 satellites*² to date. The thin-film compound solar cells installed on SLIM were developed using the same technology as the triple-junction compound solar module*³ that achieved the world’s highest*⁴ conversion efficiency of 32.65%*⁵ in 2022 with the support of NEDO*⁶. The structure encapsulates the solar cell within a thin film, making it lightweight and flexible enough to be mounted on curved surfaces, thus achieving specifications suitable for applications in outer space that require high efficiency and light weight. Sharp will continue to pursue research and development of solar cells for aerospace applications and contribute to satellite and space exploration projects, including those of JAXA.

■ Overview of Thin-Film Compound Solar Cells on Board SLIM

Structure	Sheet output	Sheet size	Number of sheets
<ul style="list-style-type: none"> Compound triple-junction type Film encapsulation 	20.9 W	297 x 271 x 0.25 mm (H x W x D) Weight approx. 41 g* ⁷	26 sheets (total power output: approx. 540 W)



Left: SLIM (artist rendering; ©JAXA)
Right: Thin-film compound solar cells installed on board SLIM

*1 SLIM (Smart Lander for Investigating Moon) is a small-scale lunar exploration spacecraft developed by JAXA, which plans to demonstrate technologies enabling high-accuracy landings required for future lunar and planetary exploration utilizing small spacecraft.

*2 As of November 30, 2023.

*3 A type of solar cell that achieves high conversion efficiency by incorporating three photo-absorption layers made of compounds consisting of two or more elements, for example indium, gallium, and arsenic, such that each layer absorbs light of a different wavelength.

*4 As of June 6, 2022, for solar modules at the research level (based on Sharp findings).

*5 Conversion efficiency confirmed by the National Institute of Advanced Industrial Science and Technology (AIST; one of several organizations around the world that officially certifies energy conversion efficiency measurements in solar cells) in February 2022. (Module surface approx. 965 square centimeters; maximum output 31.51 W)

*6 NEDO: New Energy and Industrial Technology Development Organization

*7 Total weight of installed sheets is approximately 1.07 kg.

Environmental Initiatives: Climate Change

Utilizing Renewable Energy

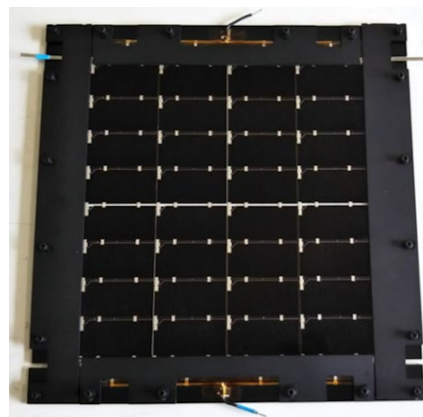
Example

Tandem/Silicon Stacked Solar Cell Module Achieves the World's Highest*¹ Conversion Efficiency of 33.66%*²

Sharp, working under the Research and Development Project for Mobile Solar Cells*³ sponsored by NEDO*⁴, has achieved the world's highest conversion efficiency of 33.66% in a stacked solar cell module that combines a tandem double-junction solar cell module*⁵ and a silicon solar cell module.

The conversion efficiency of this module breaks the world record of 32.65%, which our company achieved under a NEDO project in 2022. The prototype solar cell module has achieved high efficiency by efficiently converting light of various wavelengths into energy by a new structure, which has compound two-junction solar cells on the top layer and silicon solar cells on the bottom layer. Additionally, the thickness of the tandem double-junction solar cells can be reduced to less than one-third that of conventional triple-junction solar cells, reducing material costs.

Going forward, Sharp will continue to conduct research and development to improve the efficiency and reduce the cost of solar photovoltaic modules, with a view to installing them in electric vehicles and mobile equipment as well as in the aerospace and aviation fields.



Tandem/silicon stacked solar cell module achieved a conversion efficiency of 33.66%

*¹ As of October 27, 2023, for solar cell modules at the research level (based on Sharp findings).

*² Figures confirmed in February 2023 by AIST (National Institute of Advanced Industrial Science and Technology) in Japan, one of the world's official measurement agencies for solar cells [module area: 775 cm², maximum output: 26.1 W].

*³ Project objectives include: Development of technology to promote solar power generation as a primary power source; development of technology for creating new markets for photovoltaic power generation; and research and development of solar cells for mobile vehicles and equipment (development of ultra-high-efficiency module technology). Involved in joint research themes with the University of Tokyo and Toyota Institute of Technology. Project period: FY2020 to 2024.

*⁴ NEDO: New Energy and Industrial Technology Development Organization

*⁵ Double-junction structure with indium/gallium/phosphide as the top layer and gallium arsenide as the bottom layer.

Environmental Initiatives: Climate Change

Utilizing Renewable Energy

Example

Sharp Installs Self-Consumption Solar Power System at MinebeaMitsumi*1 Plant in the Philippines

Sharp has installed a solar power system at the Cebu Mitsumi Plant run by MinebeaMitsumi Inc. in the city of Danao, Cebu Island, the Philippines. Operation began on October 19, 2023, after a ceremony was held at the plant to mark the completion of the installation.

The system has an output of around 7.9 MW dc, giving it one of the largest capacities*2 among self-consumption solar power systems installed on Japanese-affiliated factories in the Philippines. The system will generate an estimated 12,806 MWh annually. This equates to an annual reduction in greenhouse gas emissions of roughly 6,833 t-CO₂. The generated electricity will be used within the plant, allowing it to reduce the amount of electricity it purchases from the grid.

MinebeaMitsumi is installing solar power systems at its bases around the world as part of an environmental policy of further reducing greenhouse gas emissions from its operations. After Thailand, the Philippines is the second country where Sharp has installed a solar power system on a MinebeaMitsumi plant.

Sharp remains committed to spreading the use of renewable energy around the world.

■ Overview of the Self-Consumption Solar Power System

Location	Output (module capacity)	Annual power generation capacity (estimate)	Avoided greenhouse gas emissions (estimate)	Start of operation
Cebu Mitsumi Plant (Cebu, the Philippines)	Approx. 7.9 MW-dc	Approx. 12,806 MWh/year (initial year)	Approx. 6,833 t-CO ₂ /year (equivalent)	October 19, 2023



MinebeaMitsumi's Cebu Mitsumi Plant

*1 MinebeaMitsumi Inc. develops and manufactures machined components such as bearings, along with motor components, analog semiconductors, measuring devices, and other machinery and electronic components. Headquarters: Kitasaku-gun, Nagano Prefecture, Japan; Representative: Yoshihisa Kainuma, Representative Director, Chairman, and CEO

*2 As of October 19, 2023; based on Sharp findings.

Environmental Initiatives: Climate Change

Reducing Logistics-Related Environmental Impact

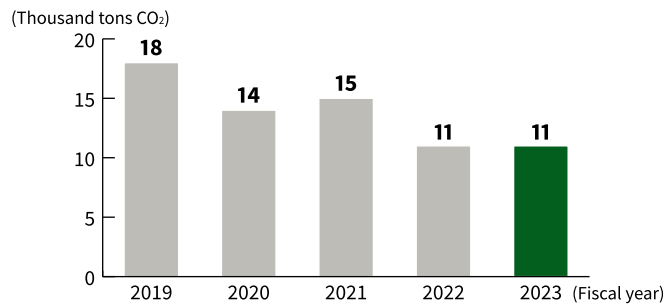
Reducing the Environmental Impact of Logistics in Japan

Sharp observes a rule set forth in the Japanese Act on the Rational Use of Energy (Energy Conservation Act) that requires specified shippers to reduce energy intensity by 1% or greater per year. All Sharp Group companies in Japan are working to reduce the environmental impact and costs associated with logistics.

In fiscal 2023, Sharp Group greenhouse gas (GHG) emissions from shipping activities in Japan were 11,000 tons CO₂. For Sharp Corporation, energy intensity was improved by an average of 3.1% for the most recent five years (fiscal 2019 to 2023). Sharp is steadily implementing a modal shift^{*1}, a change from conventional trucking to more environmentally friendly modes of transport, such as shipping (non-international coastal trading vessels) and rail (Japan Railways containers). And, by unloading imported goods at harbors chosen for their proximity to their main sales locations, Sharp is reducing re-transport between distribution centers. These efforts enable Sharp to reduce the environmental impact of its distribution activities. For shipments, Sharp has been certified with an Eco Rail Mark^{*2} by the Ministry of Land, Infrastructure, Transport, and Tourism and the Railway Freight Association.

^{*1} To shift freight transport from conventional trucking to more environmentally friendly modes of transport, such as rail and shipping.
^{*2} Products or companies that use a certain amount of rail transport for freight are given Eco Rail Mark certification. The mark is used on items such as product packaging and brochures to inform the public that a company uses environmentally friendly modes of transport.

■ GHG Emissions from Freight Shipments (Japan)



Reducing the Environmental Impact of International Logistics

Sharp has a wide range of initiatives to reduce the amount of GHGs that are emitted as a result of international shipping. The company is reducing airfreight volume as it switches to environmentally friendly modes of transport, and it is also improving load efficiency. Further, it is reviewing shipping routes and switching to harbors that are closer to the final destinations for products. Sharp is also switching to suppliers located closer to its factories.

In fiscal 2023, Sharp's GHG emissions from international transport were 112 thousand tons CO₂.



Eco Rail Mark certification

Environmental Initiatives: Resource Recycling

Minimizing and Recycling Business Activity-Linked Waste

Fiscal 2023 Objectives	Fiscal 2023 Achievements	Self-Evaluation	Priority Objectives for Fiscal 2024
■ Final landfill disposal rate of less than 0.5%	■ Final landfill disposal rate 0.46%	★★	■ Final landfill disposal rate of less than 0.5%

Self-evaluation: ★★★ Achieved more than targeted / ★★ Achieved as targeted / ★ Achieved to some extent

Curbing the Amount of Waste, etc. Generated

Sharp has been working to reduce waste and to recycle as much of it as possible in an effort to contribute to building a circular economy.

In fiscal 2023, the amount of waste, etc. generated by Sharp increased by 11% compared to the previous fiscal year to 95,000 tons, due to disposal of old equipment and expansion of production. The amount of recycling was 61,000 tons. Meanwhile, the final landfill disposal rate was 0.46%—low enough to achieve our second year in a row of zero discharge to landfill* on a global scale.

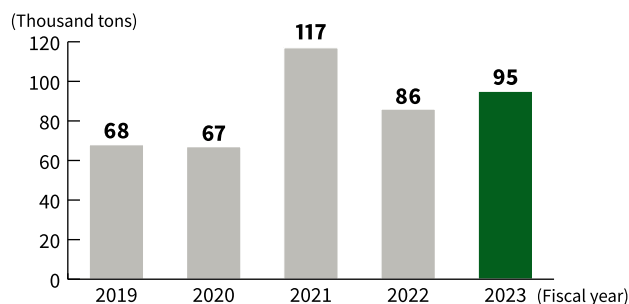
Sharp will continue to strengthen waste-reduction efforts at overseas bases while maintaining global zero discharge to landfill.

Appropriate Storage and Management of PCB Wastes

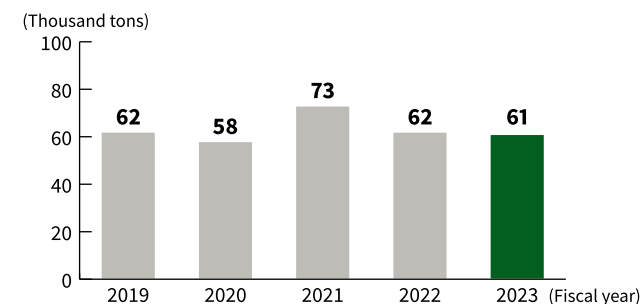
In Japan, Sharp properly stores and manages waste PCB (polychlorinated biphenyls) in accordance with the Act on Special Measures Concerning Promotion of Proper Treatment of PCB Wastes. Sharp has completed processing of all high-concentration waste PCB in fiscal 2022. As for the remaining low-concentration waste PCB, Sharp is on track to finish processing them at the earliest date possible.

* Sharp defines “zero discharge to landfill” as a final landfill disposal rate of less than 0.5%. Final landfill disposal rate (%) = Amount of landfill disposal ÷ amount of waste, etc. generated × 100.

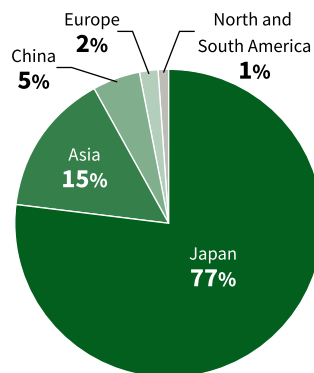
■ Amount of Waste, etc.



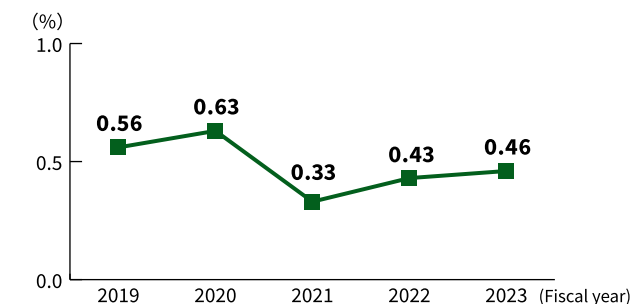
■ Amount of Recycling



■ Waste, etc. by Region (Fiscal 2023)



■ Final Landfill Disposal Rate



Environmental Initiatives: Resource Recycling

Expanding the Recycling of Used Products

Fiscal 2023 Objectives	Fiscal 2023 Achievements	Self-Evaluation	Priority Objectives for Fiscal 2024
<ul style="list-style-type: none"> Improve the processing efficiency of air conditioner indoor units equipped with automatic filter cleaning 	<ul style="list-style-type: none"> Processing efficiency improved by approx. 30% 	★★	<ul style="list-style-type: none"> Improve the quality of recycled plastics; reduce the proportion of mixed plastics

Self-evaluation: ★★★ Achieved more than targeted / ★★ Achieved as targeted / ★ Achieved to some extent

Sharp's Stance on Recycling Used Products

Sharp collects and recycles used products in compliance with the recycling laws and regulations of the respective country or region. Through the effective use of limited resources, Sharp is contributing to the realization of a sustainable society.

Japan

Recycling 4 Kinds of Home Appliances (Air Conditioners, TVs, Refrigerators, and Washing Machines)

As a member of the B Group^{*1} for home appliance recycling, Sharp has constructed—and is operating—a highly efficient recycling system consisting of 18 recycling plants in Japan. In fiscal 2023, Sharp collected 2.26 million units (down 1% over the previous fiscal year) of the four types of appliances covered by the Home Appliance Recycling Act. The processed and recycled weight amounted to approximately 65,000 tons (down 5% over the previous fiscal year). For all four appliance types, Sharp's rate of recycling exceeded the legally stipulated levels.

^{*1} The B Group consists of Sharp Corporation, Sony Corporation, Hitachi Global Life Solutions, Inc., Fujitsu General Ltd., Mitsubishi Electric Corporation, and other companies.

Sharp Corporation's Recycling Results for 4 Home Appliance Types (Fiscal 2023)

Note: All figures are rounded down to the nearest whole number.

	Unit	Air Conditioners	CRT TVs	Flat-Panel TVs	Refrigerators/Freezers	Washing Machines/Dryers	Total
Units collected from designated collection sites	Thousand units	328	74	956	452	448	2,260
Processed and recycled units	Thousand units	330	73	947	457	446	2,255
Processed and recycled weight	Tons	13,435	1,573	14,613	26,848	17,995	74,467
Recycled weight	Tons	12,773	1,174	12,671	21,669	16,939	65,228
Recycling rate	%	95	74	86	80	94	—
Legally required recycling rate	%	80	55	74	70	82	—

Toward Making Better Use of Resources

Sharp and Kansai Recycling Systems Co., Ltd.^{*2} have joined forces to make effective use of resources and to improve recycling efficiency.

Air conditioner indoor units with automatic filter cleaning have a more complex internal structure than models without this function and require experienced workers to dismantle them manually using the cell method^{*3}. To deal with a shortage of these skilled workers, in fiscal 2023, Kansai Recycling Systems introduced a cutting device specifically for air conditioner indoor units. Cutting the indoor unit before dismantling makes it easier to remove the internal parts, allowing even unskilled workers to dismantle it efficiently and reducing the average dismantling time by around 30% per unit.

^{*2} A consumer electronics recycling company established in Japan with joint investment from Sharp, Mitsubishi Materials Corporation, and four other companies.

^{*3} A method in which one worker performs a series of tasks rather than dividing up the work.



Air conditioner indoor unit cutting device



Indoor unit after cutting

Environmental Initiatives: Resource Recycling

Expanding the Recycling of Used Products

Recycling Used Products and Communicating with Local Communities

In accordance with the Home Appliance Recycling Act, Kansai Recycling Systems Co., Ltd. recycles four types of used home appliances (air conditioners, TVs, refrigerators, washing machines) in Hirakata, Osaka Prefecture and Iga, Mie Prefecture. In September 2023, the cumulative total of appliances recycled since the start of operations in April 2001 was 20 million units*¹. As a way of giving back to the community that has supported the company, and in the hope that the recycling of four familiar home appliances will encourage people to think more about the global environment, their own future, and the SDGs, Kansai Recycling Systems donated two picture books, Up Close! Factory Tour: TVs and Up Close! Factory Tour: Washing Machines (Plastic)*² to local elementary schools. In addition, restrictions imposed by the pandemic have been lifted for factory tours, and in fiscal 2023 the company welcomed a total of 1,242 visitors from Japan and overseas, bringing the cumulative visitor total to more than 30,000 people. Kansai Recycling Systems also participated in off-site lectures and local events*³, including a washing machine dismantling show.



A show at a local event

*¹ Number of home appliance recycling B Group manufacturer units

*² Introduces recycling at Kansai Recycling Systems (published by Iwasaki Publishing Co., Ltd.)

*³ A washing machine dismantling show was held at the Mottainai Bazaar (Suita City, November 19, 2023) and Hirakata Eco Forum 2024 (February 10, 2024).

Design-for-Recycling Training

Sharp is committed to considering the whole life cycle of products it manufactures. Together with Kansai Recycling Systems—where four kinds of Sharp products are recycled—Sharp has been holding design-for-recycling training for product planners and designers. In April 2024, 13 people, including those in charge of white goods, took part in the training.

The training emphasized the importance of designing products with an eye to their eventual recycling, with a focus on plastic material recycling. It also included a tour of the recycling plant. Participants practiced dismantling a fully automatic washing machine that had been used for over a decade. They saw how the ease of dismantling depends on the fastening method used—for example, whether the product is held together with screws. They also learned the importance of separating components into discrete material types.

Participants gained a better understanding of the recycling process, and expressed a desire to focus on achieving both quality and recyclability in their future designs. We will continue to foster awareness within the company so that we can pursue manufacturing that considers everything from material selection to end-of-life recycling.



Dismantling a washing machine

Reusing and Recycling Copiers and MFPs in Japan

Sharp is reusing and recycling copiers and MFPs collected both through Sharp distribution channels and through common industry channels. The company is also collecting used toner cartridges and remanufacturing them to the same quality standard of new products, thus assuring that customers will always get the same high quality. Sharp designs its toner cartridges for easy reuse and recycling. This ensures durability and reduces the amount of time needed to reprocess used cartridges.

Environmental Initiatives: Resource Recycling

Expanding the Recycling of Used Products

North America

In 2007, Sharp's American manufacturing and sales base SEC established MRM (Electronic Manufacturers Recycling Management Company, LLC)^{*1} to manage recycling of AV products. Growing nationwide efforts have seen a total of 2,400 collection points established for used products. MRM operates in accordance with the laws and regulations of each state and recycled a total of 53,000 tons of used products in fiscal 2023. In addition, since 2008, as part of its efforts to protect the environment and reduce landfill waste, SEC has been working with recycling companies to recycle all Sharp consumables, including toner cartridges, bottles, toner collection containers, and drum units. SEC encourages recycling by covering the materials and costs required to return used products.

^{*1} MRM is a joint venture with Panasonic Corporation of North America and Toshiba America Consumer Electronics, LLC.



Consumables shipping box

Europe

The EU WEEE Directive^{*2} (2012/19/EU) stipulates that the manufacturer is responsible for collecting and recycling products shipped within the EU. Each Sharp European sales base (Germany, France, Finland, Denmark, Poland, Hungary, Austria) collaborates with reputable recycling entities in the EU sales region to meet this requirement. Efforts are also made to reduce the volume of landfill waste by taking into account regulations governing packaging materials and batteries.

^{*2} Waste Electrical and Electronic Equipment Directive.

India

In India, the E-Waste (Management) Rules—which came into effect in 2016 and were amended in 2022—require manufacturers and others to properly dispose of used electronic/electrical equipment. SBI, Sharp's Indian sales base, has partnered with a local recycler, 3R Recycler, to carry out the recycling of used products.

The Plastic Waste Management Rules, which also came into effect in 2016, require manufacturers, importers, sellers, and regional governments to properly process plastic waste. SBI works with a local NGO, the Indian Pollution Control Association, to collect and recycle plastic waste.

Environmental Initiatives: Resource Recycling

Environmental Technologies That Contribute to a Sustainable, Recycling-Based Society

Fiscal 2023 Objectives	Fiscal 2023 Achievements	Self-Evaluation	Priority Objectives for Fiscal 2024
<ul style="list-style-type: none"> Develop flame retardancy formulation for environmentally friendly, halogen-free recycled polystyrene (PS) 	<ul style="list-style-type: none"> Completed screening and basic evaluation of flame retardants for flame retardancy formulation development 	★	<ul style="list-style-type: none"> Consider ways to add value to polystyrene (PS) Expand use of recycled plastics in products

Self-evaluation: ★★ Achieved more than targeted / ★★ Achieved as targeted / ★ Achieved to some extent

Expanding the Use of Recycled Plastics

In recycling materials, such as when end-of-life plastic is reused to make new products, the open-loop material recycling scheme is commonly adopted. It involves reusing recycled materials to make things like daily necessities and sundries. The majority of these are used only once and disposed of as municipal waste.

As opposed to this type of recycling, Sharp and Kansai Recycling Systems Co., Ltd.*1 jointly developed closed-loop plastic material recycling technology with a view to making better use of finite resources and reducing waste. This technology enables the repeated recovery of plastic from used consumer electronics products as well as the reuse of that plastic in parts of new consumer electronics products. The technology has been in practical use since fiscal 2001, when the Act on Recycling of Specified Kinds of Home Appliances (Home Appliance Recycling Act) was enacted in Japan.

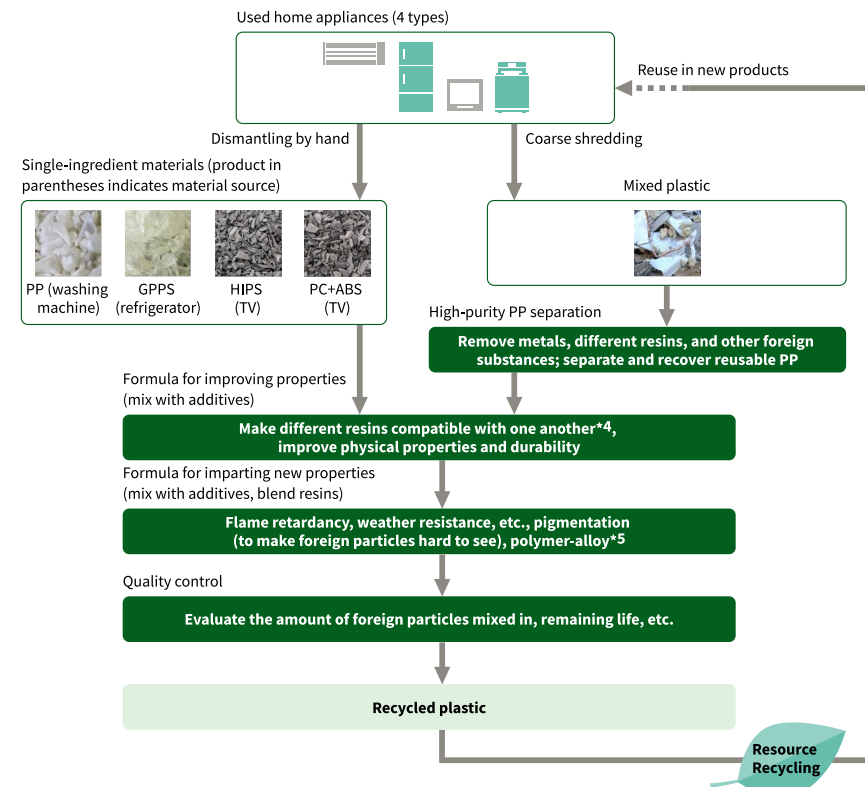
Sharp has been striving to make more plastic recyclable through the development of new technologies. These include a technology for recovering high-purity polypropylene (PP) from mixed plastic parts and parts that contain metal; a technology for improving the properties of recovered PP, HIPS*2, and PC+ABS*3 materials so that their quality is on a par with that of virgin materials; a technology that gives materials added value by imparting properties such as flame retardancy, weather resistance, and an antibacterial property, with the aim of expanding applications for recycled plastic; and a quality-control technology for ensuring optimal quality. Thanks to the development and introduction of these technologies that integrate everything from recovery to quality control, Sharp has been able to establish closed-loop material recycling to produce high-grade recycled plastic.

*1 A consumer electronics recycling company established in Japan with joint investment from Sharp, Mitsubishi Materials Corporation, and four other companies.

*2 High-impact polystyrene (general-purpose polystyrene [GPPS] given impact resistance by adding rubber).

*3 A polymer alloy of polycarbonate and acrylonitrile, butadiene, and styrene (a resin given new properties as a result of mixing in several types of polymers).

Recycling Plastic Recovered from the 4 Types of Home Appliances



*4 Blending multiple types of resins uniformly and finely dispersed into one another at the molecular level.

*5 A resin given new properties as a result of mixing in several types of resins.

Environmental Initiatives: Resource Recycling

Environmental Technologies That Contribute to a Sustainable, Recycling-Based Society

Expanding the Use of Recycled Plastics

In response to the increasing seriousness of environmental pollution from used plastic, countries are enacting and enhancing various laws and regulations related to plastic recycling. There is a push to move away from the traditional linear economy, characterized by mass production, mass consumption, and mass disposal, and towards a circular economy, characterized by limited input and consumption of new resources and minimal waste production. In Japan, as well, society's attitude towards plastic usage has changed significantly, as evidenced by the enforcement of the Plastic Resource Circulation Act*. The Act focuses on resource recycling across the entire life cycle of plastic products, making it increasingly important that plastic materials are properly disposed of and recycled.

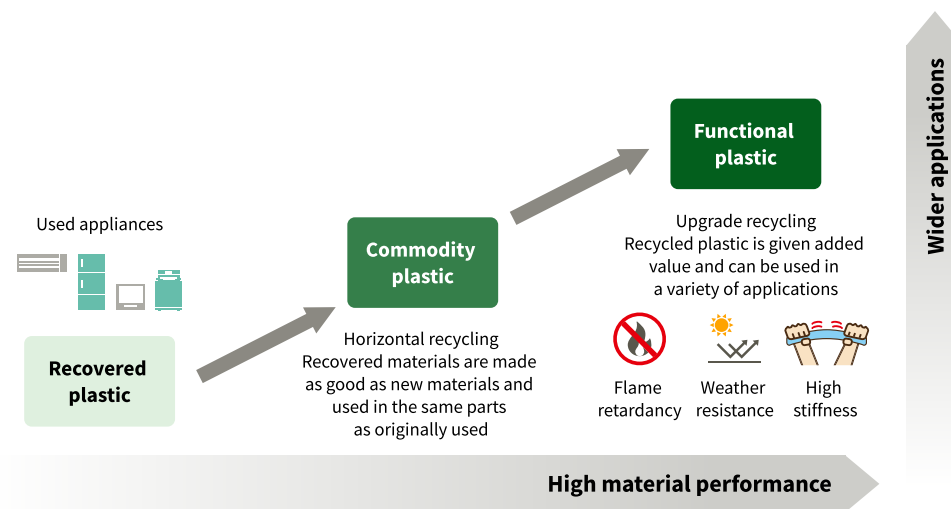
Against this background, Sharp is pursuing greater recycling of used plastics, not only through horizontal recycling, in which used plastics are made as good as new material and incorporated into the same parts as they were originally used, but also through upgrade recycling, in which the recycled plastic is given added value with flame retardancy, weather resistance, or high stiffness. In fiscal 2023, Sharp developed colored recycled polypropylene and used the material in the external parts of stick vacuum cleaners. Polypropylene recovered from used home appliances is given the physical properties and long-term durability demanded in home appliances using Sharp's own formulation technology.

One of the challenges in using recycled plastics is color variation. The used plastics that become raw materials contain a mix of different colors; thus, if recycled as-is, they would turn gray and their uses would be limited. As a countermeasure, coloring the material with a darker color would reduce color variation, but there is a trade-off in that adding pigments would reduce physical properties and durability. By optimizing the formulation it has developed, Sharp has made it possible to mass produce recycled plastics that maintain their physical properties and durability while also ensuring aesthetic qualities. And by using recycled plastics for exterior parts, we can expect further reductions in plastic waste.

As a further initiative for the future, Sharp will advance the development of recycled plastics, such as PS and ABS, which can also be used for exterior parts, and will accelerate their use into products.

* This law is focused on comprehensive plastic recycling across the entire life cycle of plastic-containing products, encompassing everything from manufacturer product design and production to waste disposal (effective as of April 1, 2022).

Used Plastic Recycling Method



Examples of Colored Recycled Polypropylene Use



Environmental Initiatives: Resource Recycling

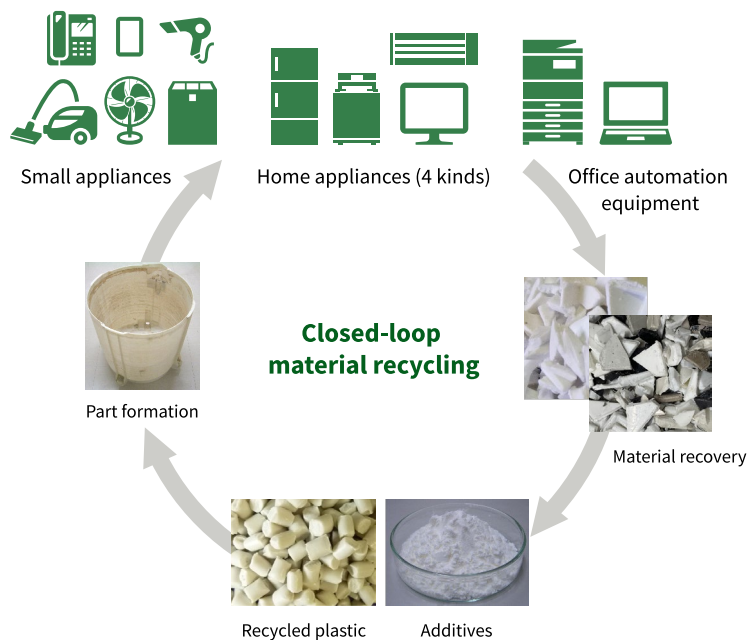
Environmental Technologies That Contribute to a Sustainable, Recycling-Based Society

Establishing a Circular Economy

The use of recycled plastic developed through Sharp's own closed-loop material recycling technology was extended to refrigerators, air conditioners, washing machines, and small appliances released in fiscal 2023. In fiscal 2023, the cumulative total amount used since 2001 reached 21,000 tons.

Moving forward, Sharp aims to expand closed-loop material recycling to all of its products, not just these four home appliances, to contribute to the realization of a circular economy.

■ Establishing a Circular Economy



■ Used Plastic Recycling Method



Product	Recycled Plastic	Part	Source
Refrigerator	PP	Duct cover	Refrigerator vegetable case
		Pump cover	Refrigerator vegetable case
		Evaporator cover	Washing machine spin tub, balancer, other
Washing machine	PP	Washing tub	Washing machine tub
Air conditioner	PP	Condensation cover, motor holder	Washing machine spin tub, balancer, other
		Vertical louver, interlocking plate	Refrigerator vegetable case
Stick vacuum cleaner	PP	Stand, nozzle, other	Air conditioner, refrigerator, and washing machine parts
Ceramic fan heater	Flame-retardant PP	Casing	Air conditioner, refrigerator, and washing machine parts
Car Plasmacluster Ion generator	Flame-retardant PC + ABS	Internal parts	Flat-panel TV back cabinet
Handheld device (Handy Terminal) charger	Flame-retardant PC + ABS	Charger	Flat-panel TV back cabinet

Related information: >

[Closed-Loop Plastic Material Recycling Technology](#)

Environmental Initiatives: Resource Recycling

Effectively Using Water Resources

Fiscal 2023 Objectives	Fiscal 2023 Achievements	Self-Evaluation	Priority Objectives for Fiscal 2024
■ Improvement rate of water intensity: 10% (baseline year: fiscal 2021)	■ Improvement rate of water intensity: 6% (baseline year: fiscal 2021)	★	■ Improvement rate of water intensity: 10% (baseline year: fiscal 2021)

Self-evaluation: ★★★ Achieved more than targeted / ★★ Achieved as targeted / ★ Achieved to some extent

Sharp's Stance on Water Resources

Water resource problems are arising on a worldwide scale with the increase in the world's population, the economic growth of developing countries, climate change, and other factors. Sharp is striving to make effective use of water resources in line with the environmental conservation guidelines stipulated in Sharp's Basic Environmental Philosophy, the Sharp Group Charter of Corporate Behavior, and the Sharp Code of Conduct. In particular, Sharp recognizes that securing the water resources necessary for the production of LCDs and other electronic devices is a serious issue that could affect business continuity. That is why Sharp is pursuing the reduced use of new water and an increased use of recycled water.

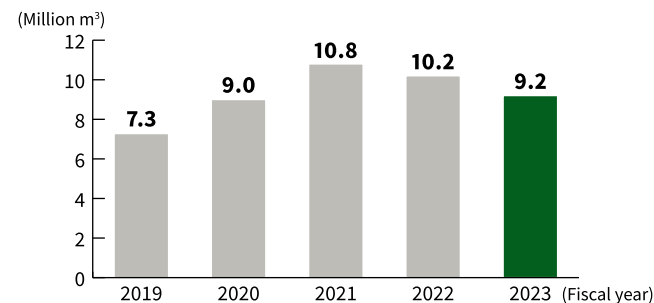
Reducing the Amount of New Water Used and Using More Recycled Water

The volume of new water used by Sharp in fiscal 2023 decreased by 9% compared to the previous fiscal year to 9.2 million m³. The improvement rate of water intensity was 6%. To minimize the effects on business continuity of the risk of water shortages, Sharp assesses water risk at its plants using the Aqeduct assessment tool developed by the World Resources Institute (WRI). SATL, Sharp's production base in Thailand, is located in an area of highest risk. It is therefore reducing its use of new water by recycling water discharged from the production process and other sources.

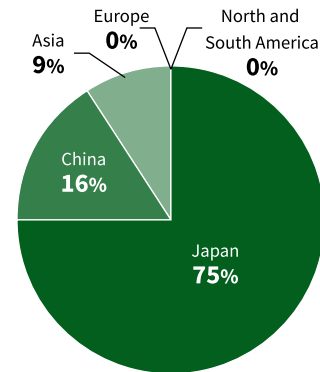
The Kameyama Plant (Kameyama, Mie Prefecture, Japan) and the Mie Plant (Taki District, Mie Prefecture, Japan) require a large amount of water in the production process for LCDs and other products. All of the water discharged from the production process is collected and reused via a closed-loop recycling system adopted at both plants. Through measures such as this, Sharp is maintaining a recycling rate* of at least 60%. Looking ahead, Sharp will pursue further water-use efficiency worldwide and boost production efficiency in accordance with business expansion. In fiscal 2023, there were no litigation issues, fines, or penalties due to violations of water-related laws and regulations. There were also no serious water-related accidents.

* Recycling rate = Amount recycled ÷ (amount of new water + amount recycled).

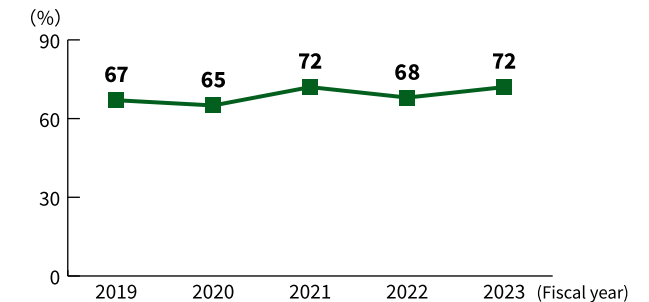
■ Volume of New Water Used



■ New Water Used by Region (Fiscal 2023)



■ Water Recycling Rate



Environmental Initiatives: Resource Recycling

Effectively Using Water Resources

Water Used and Drainage by Region (Fiscal 2023)

(m³)

Region	Water withdrawal*1			Effluent					Amount consumed*3	Amount recycled
	Third-party water*2	Groundwater	Total	Surface water	Sewerage	Seawater	Groundwater	Total		
Japan	6,418,515	471,264	6,889,779	3,282,356	319,924	1,640,054	0	5,242,334	1,647,445	23,864,080
Asia	789,451	10,026	799,477	26,322	443,932	0	0	470,254	329,223	211,328
China	1,498,850	29,883	1,528,733	0	1,138,475	0	0	1,138,475	390,258	213,450
North and South America	16,229	0	16,229	0	16,229	0	0	16,229	0	0
Europe	7,459	0	7,459	0	6,891	0	0	6,891	568	0
Total	8,730,504	511,173	9,241,677	3,308,678	1,925,451	1,640,054	0	6,874,183	2,367,494	24,288,858

*1 Surface water, seawater, and produced water was 0.

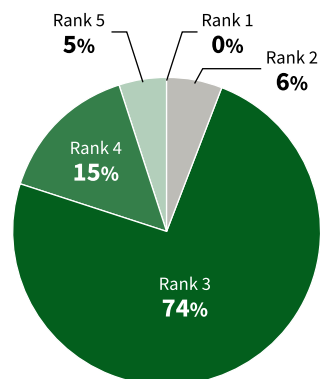
*2 Industrial-use water and tap water.

*3 Water consumption = Water withdrawal – Effluent.

*4 Under Aqueduct, each region is assigned a water stress score. There are five levels, from rank 1 (low risk) to rank 5 (high risk).

*5 Areas with an Aqueduct water stress score of rank 4 or higher.

Volume of New Water Used by Water Stress Rank*4 (Fiscal 2023)



Volume of New Water Used in Water Stressed Regions*5 (Fiscal 2023)

(m³)

Region	Third-party water	Ground-water	Surface water	Seawater	Produced water	Total
Japan	35,516	0	0	0	0	35,516
Asia	734,590	0	0	0	0	734,590
China	1,032,868	0	0	0	0	1,032,868
North and South America	0	0	0	0	0	0
Europe	0	0	0	0	0	0
Total	1,802,974	0	0	0	0	1,802,974

Environmental Initiatives: Resource Recycling

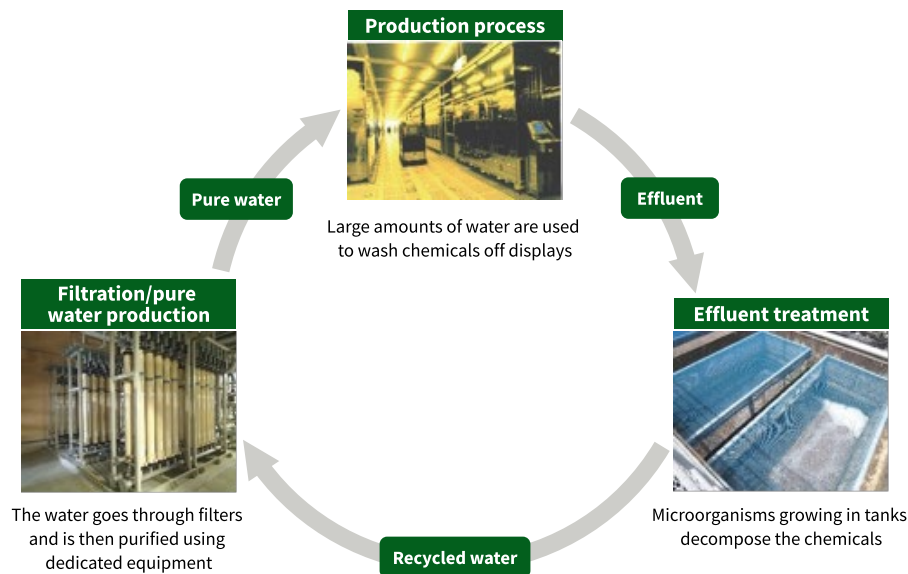
Effectively Using Water Resources

Example

Closed-Loop Water Recycling System

The Mie Plant (Taki District, Mie Prefecture) has adopted a closed-loop water recycling system to repeatedly recycle the large amount of water used for the production of displays. The water discharged from the production process contains chemicals that must not be released from the plant untreated. All of this water is collected and goes through steps such as passing through filters and biofiltration (the natural decomposition of chemicals using microorganisms), before being purified with dedicated equipment. The resulting water is used repeatedly in production.

■ Closed-Loop Water Recycling Flow



Example

Reducing Water Usage at Overseas Bases

At SATL, a production base in Thailand, large volumes of water are discharged from the production process and restrooms. This water was previously released into a nearby river after being properly treated. But now SATL is using newly installed water recycling equipment to purify that water and use it in the production process. The greywater* generated by this recycling process is kept in storage tanks and used for restrooms and for watering the factory's green areas. SMM, Sharp's production base in Malaysia, is using rainwater tanks to reduce the amount of water it requires. Large tanks installed in the plant collect rainwater that is used in, for example, air conditioner cooling equipment and restrooms. Thanks to these efforts, SATL and SMM have been able to reduce the consumption of clean water by about 89,000 m³ per year.

* Water that is unfit for drinking but is not harmful to the human body or the environment.



SATL's water recycling equipment



SMM's rainwater tanks

Environmental Initiatives: Safety and Security

Sharp's Policy on Management of Chemical Substances

Sharp's products are built from a plurality of parts and materials and contain wide-ranging chemical substances. Our production processes at factories also use chemical substances. Chemical substances are useful for enhancing the performance and quality of products, whereas some of them may have negative effects on the natural environment and human health. Today, regulations to manage chemical substances are implemented in many countries. Some include prohibited or restricted use of specified chemical substances and labeling requirements, and others require the management of information on product content data, reporting of the amounts discharged into the atmosphere and water areas, management of the working environment, and occupational health management.

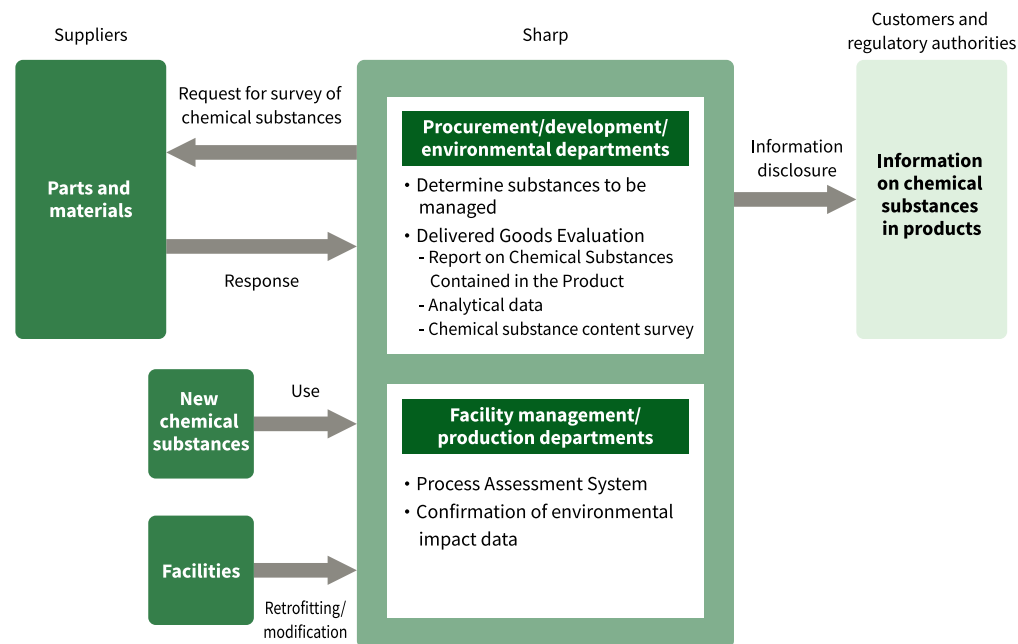
In accordance with our Basic Environmental Policy of "Creating an Environmentally Conscious Company with Sincerity and Creativity," the Sharp Code of Conduct stipulates the management of chemical substances as follows, on the precondition of compliance with applicable environmental laws, regulations, and regional agreements.

- We will work to compile information related to hazardous substances that might damage the environment or human health, and will not, as a matter of principle, make use of these hazardous substances in our products and services.
- We will ensure proper use and control, and also reduce our consumption of chemical substances in our business activities, including research, development, and manufacturing, at levels meeting or exceeding those stipulated by laws and regulations.

To "properly manage chemicals in order to protect people's health, the natural environment, and ecosystems" is another goal of Sharp. It is a long-term objective set in the SHARP Eco Vision 2050 long-term environmental vision in the safety and security field of action.

An example of our specific efforts to manage chemical substances in products is Delivered Goods Evaluation, in which we check chemical substances contained in components and materials delivered for our production in cooperation with our suppliers. It allows us to monitor and manage information on chemical substances contained in our products. At the factory-level, the process assessment system is in place. It is a preliminary assessment of new chemical substances to be used or equipment retrofitted or modified for handling chemical substances and is performed to check their safety and environmental impact.

■ Chemical Substance Management System



Environmental Initiatives: Safety and Security

Managing Chemical Substances Contained in Products

In order to reduce environmental impacts of its products and to comply with chemical substance regulations in relevant countries, Sharp manages chemical substances contained in its products in accordance with its own management categories that take into account applicable laws and regulations in relevant countries, voluntary standards set by industry groups, and even potential future regulations. We determine chemical substances that we should manage according to these categories, notify suppliers, and conduct a survey of chemical substances contained in products to obtain chemical substance content data.

Determining Declarable Substances

Sharp's Standard Manual for Management of Chemical Substances Contained in Parts and Materials is made available to the public to clarify the chemical substances it manages according to its own management categories. This manual divides the target chemical substances into four categories: banned substances, substances banned depending on the application, candidate substances to be banned, and managed substances. For each category, applications, criteria values, and the date of total abolition are defined. These, as well as our in-house standards, are reviewed annually in anticipation of future legal and regulatory trends.

Related information: >

[Standard Manual for Management of Chemical Substances Contained in Parts and Materials](#)

Chemical Substance Management Categories

Category	Description	Remarks
Banned substances	Substances that cannot be used for any purpose	<ul style="list-style-type: none"> Substances whose inclusion in products is currently regulated or is expected to be regulated in the future under laws and regulations and on environmental labels in Japan or overseas
Substances banned depending on the application	Substances regarded as banned by Sharp depending on the application (excluded applications)	<ul style="list-style-type: none"> Substances that Sharp regulates on its own initiative in advance of global trends because it is widely known that their environmental impact is high and alternative substances exist
Candidate substances to be banned	Substances that are candidates for being banned; substances to be substituted if contained in products	<ul style="list-style-type: none"> Substances expected to be banned in the near future under laws and regulations in Japan or overseas Substances that Sharp may ban in the future, depending on trends in laws and regulations, but that cannot be categorized as a Sharp banned substance at present because safety thresholds, ban dates, regulated applications (excluded applications), etc. have not been determined under laws and regulations
Managed substances	Substances for which it is necessary to ascertain whether the specified substance is present, the amount contained, and so on	<ul style="list-style-type: none"> Substances for which disclosure of information on their usage status in products is required, or is expected to be required in the future, under laws and regulations and on environmental labels in Japan or overseas Substances for which customers have requested, or for which there is a possibility of being requested, that their usage status information in products be disclosed

Delivered Goods Evaluation

We conduct Delivered Goods Evaluation in cooperation with suppliers. Its purpose is to assess the chemical substances contained in parts and materials (materials, general components, finished and semi-finished products, indirect materials, others) sourced from suppliers according to the chemical substance management categories. Information obtained through the Delivered Goods Evaluation is used for understanding chemical substances contained in products and compiling information to be shared with our supply chain.

Report on Chemical Substances Contained in the Product and Analysis Data

Sharp's suppliers are required to submit a Report on Chemical Substances Contained in the Product before they deliver a new component or material for the first time. This is used to confirm their conformity with the regulations prohibiting the use of specific chemical substances in products in relevant countries. With this report, we check the presence of banned substances and decide whether to purchase the component or material.

Suppliers must also submit analysis data on the 10 substances regulated under the EU RoHS Directive* (lead, mercury, cadmium, hexavalent chromium, PBB, PBDE, DEHP, BBP, DBP, and DIBP) for confirmation of compliance with the regulatory requirements.

* An EU directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Related information: > [Report on Chemical Substances Contained in the Product, Analysis Data](#)

Environmental Initiatives: Safety and Security

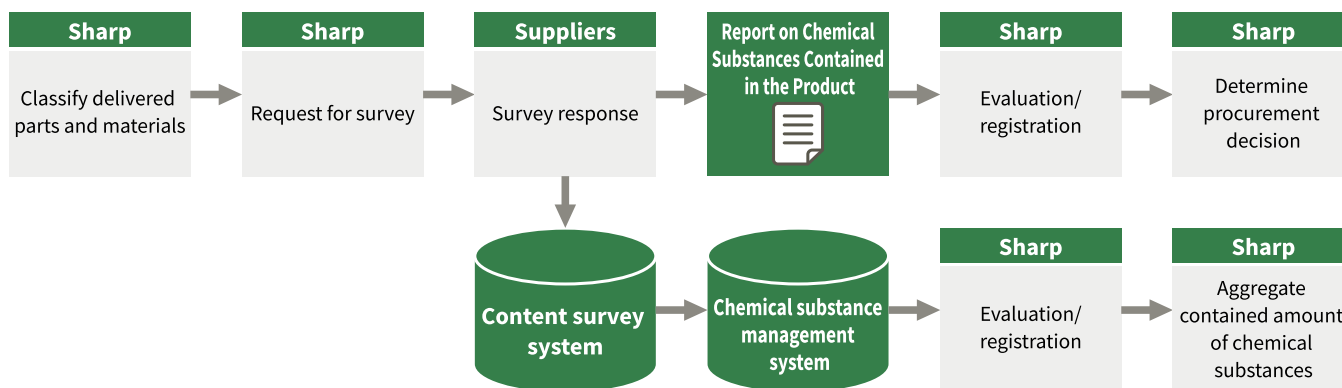
Managing Chemical Substances Contained in Products

Chemical Substance Content Survey

The EU REACH regulations^{*1} and other legal requirements in countries around the world oblige companies to communicate and disclose information on chemical substances contained in their products throughout their supply chain. To meet these requirements, it is necessary to have a system through which all supply chain partners—whether supplying raw materials, materials, parts, or finished products—cooperate to gather, aggregate, and share information on chemical substances. Sharp’s suppliers are asked to enter information on how much chemical substances are contained in their parts and materials, and where, in the Chemical Substance Content Survey System. This helps us gather information on chemical substances contained in our products, which is then used to manage and aggregate data on our chemical substance management system. For information collection, Sharp also utilizes chemSHERPA^{*2}, an information sharing scheme compliant with the IEC 62474^{*3} international standard.

Sharp has also been registered with the SCIP^{*4} database since January 2021. SCIP is one of the EU’s measures aimed at building a circular economy.

■ Delivered Goods Evaluation (Evaluative Process for Newly Delivered Parts and Materials)



^{*1} An EU regulation mandating the registration, evaluation, authorization, and restriction of chemical substances manufactured or imported into the EU.

^{*2} An information sharing scheme developed under the leadership of the Japanese Ministry of Economy, Trade and Industry for the purpose of efficiently communicating information on chemical substances in products over the entire supply chain.

^{*3} An international standard on the procedures and details of information sharing in the supply chain for products and components in the electrical and electronics industry containing chemical substances.

^{*4} SCIP: Substances of Concern in articles as such or in complex objects (Products). A database for information on substances of very high concern (SVHCs) managed by the European Chemicals Agency.

Environmental Initiatives: Safety and Security

Effective Management of Chemical Substances Used at Factories and Their Risk Management

Sharp strives to minimize the risk of environmental pollution and accidents associated with chemical substances and to properly meet chemical substance regulations. To this end, Sharp controls chemical substances used at, and released from, its production bases by implementing the process assessment system and the monitoring and risk management of chemical substances. To minimize the environmental impact and ensure occupational safety, workers handling chemical substances go through regular education and training. They also receive regular health checks.

Process Assessment System

The process assessment system is Sharp’s in-house system for preliminarily assessing the hazards, safety measures, and other factors of chemical substances. This assessment applies when a new chemical substance is to be introduced or when the procedure for handling chemical substances needs to be changed, for example. The system ensures that chemical substances are properly managed at all stages from procurement to disposal and that safety measures are implemented for the equipment handling them. It is designed to review the appropriate disposal of waste chemical substances, the proper treatment of exhaust gas and wastewater, and safety procedures for workers handling chemical substances, and to evaluate and determine the conditions for the safe use of chemical substances. Chemical substances are grouped into four categories according to their gravity of impact on safety/health, hazard/explosion, and environmental conservation: legally banned substances, sensitive substances, managed substances, and registered substances. An appropriate management level is assigned to each category.

■ Chemical Substance Management Categories under the Process Assessment System

Category	Description
Legally banned substances	Chemical substances that are banned for production, etc. under laws and regulations. Substitutes for them need to be searched for.
Sensitive substances	Chemical substances that are not legally banned but are banned by Sharp for use due to their high levels of toxicity (acute toxicity/carcinogenicity) or hazards (explosiveness/flammability). Substitutes for them need to be searched for.
Managed substances	Chemical substances that have toxicity (corrosiveness/irritancy), hazards (combustibility/spontaneous combustibility), or other concerns but may be used under adequate control.
Registered substances	Chemical substances that have limited toxicity or hazards and thus may be used under specified control.

Monitoring and Risk Management of Chemical Substances

Sharp has established voluntary standards that are stricter than either the regulatory requirements or the levels agreed upon with local communities for chemical substances used at its production bases. These standards ensure the comprehensive monitoring and management of the target chemical substances released and transferred, as well as the concentrations and emissions of air and water pollutants.

Environmental Initiatives: Safety and Security

Release and Transfer of PRTR-Listed Substances

Sharp monitors and reports the release and transfer of chemical substances covered by the Japanese PRTR^{*1} Act. In fiscal 2023, in response to a revision in the PRTR Act, Sharp reviewed the target substances. Twenty-three of the PRTR chemicals were handled in Japan and five overseas^{*2} in quantities of 500 kg or more by one or more plants during fiscal 2023.

^{*1} PRTR: Pollutant Release and Transfer Register. A system that mandates the collection and dissemination of information, such as the amount of harmful chemicals discharged and transferred.

^{*2} Sharp defines target substances based on laws in Japan.

PRTR Data for Japan (Fiscal 2023)

PRTR No.	Chemical	Amount Handled	Amount Discharged		Amount Transferred		Amount Consumed		Amount Removed
			Into Atmosphere	Into Public Water Areas	Into Sewerage	Into Waste, etc.	Contained in Products	Recycled	
20	2-Aminoethanol	2,002,848	909	0	0	28,776	0	1,725,578	247,585
44	Indium and its compounds	37,912	0	0	0	4,922	5,264	27,726	0
80	Xylene	3,552	18	0	0	0	0	0	3,534
83	Cumene	537	0	0	0	0	0	510	27
135	2-methoxyethyl acetate	104,000	664	0	0	0	0	78,126	25,210
232	N, N-dimethylformamide	26,082	0	0	0	0	0	0	26,082
272	Copper salts (water-soluble, except complex salts)	81,796	0	0	0	71,028	8,815	1,160	793
343	Pyrocatechol (also called catechol)	1,793	0	0	0	1,793	0	0	0
374	Hydrogen fluoride and its water-soluble salts	806,820	7,182	0	1,075	383,863	0	35,311	379,389
401	1,2,4-benzenetricarboxylic 1,2-anhydride	773	0	0	0	62	711	0	0
405	Boron compounds	5,886	32	0	0	5,499	62	293	0
412	Manganese and its compounds	23,141	0	0	0	550	22,591	0	0
438	Methylnaphthalene	10,271	47	0	0	0	10,224	0	0
453	Molybdenum and its compounds	15,828	0	0	0	4,273	475	11,080	0
594	Ethylene glycol monobutyl ether	39,921	1,833	0	0	16,924	0	40	21,124
627	Diethylene glycol monobutyl ether	1,196,185	2,327	0	0	10,457	0	646,022	537,379
665	Cerium and its compounds	830	0	0	0	830	0	0	0
674	Tetrahydrofuran	5,561	700	0	0	1,470	0	0	3,391
677	Tetramethylammonium hydroxide	3,968,845	1,585	0	0	289,768	0	2,420,539	1,256,953
691	Trimethylbenzene	19,987	24	0	0	763	0	14,488	4,712
746	N-Methyl-2-pyrrolidone	142,988	3,668	0	0	27,868	0	73,789	37,663
751	2-(2-Methoxyethoxy)ethanol	5,347,707	1,596	0	0	25,826	0	2,819,825	2,500,460
752	1-Methoxy-2-(2-methoxyethoxy)ethane	10,175	0	0	0	814	9,361	0	0
	Total	13,853,438	20,585	0	1,075	875,486	57,503	7,854,487	5,044,302

(kg)

Environmental Initiatives: Safety and Security

Release and Transfer of PRTR-Listed Substances

■ Overseas PRTR Data (Fiscal 2023)

(kg)

PRTR No.	Chemical	Amount Handled	Amount Discharged		Amount Transferred		Amount Consumed		Amount Removed
			Into Atmosphere	Into Public Water Areas	Into Sewerage	Into Waste, etc.	Contained in Products	Recycled	
82	Silver and its water-soluble compounds	1,057	0	0	0	155	902	0	0
300	Toluene	3,467	3,467	0	0	0	0	0	0
591	Ethylcyclohexane	1,437	1,222	0	0	215	0	0	0
392	N-hexane	36,874	36,874	0	0	0	0	0	0
448	Methylenebis(4,1-phenylene) diisocyanate	1,628,870	0	0	0	37,990	1,590,880	0	0
Total		1,671,705	41,563	0	0	38,360	1,591,782	0	0

Environmental Initiatives: Safety and Security

Managing Environmental Load into Air and Water Areas

Fiscal 2023 Objectives	Fiscal 2023 Achievements	Self-Evaluation	Priority Objectives for Fiscal 2024
■ VOC emissions into the atmosphere: 204 tons or less (fiscal 2010 levels)	■ VOC emissions into the atmosphere: 63 tons	★★	■ VOC emissions into the atmosphere: 204 tons or less (fiscal 2010 levels)

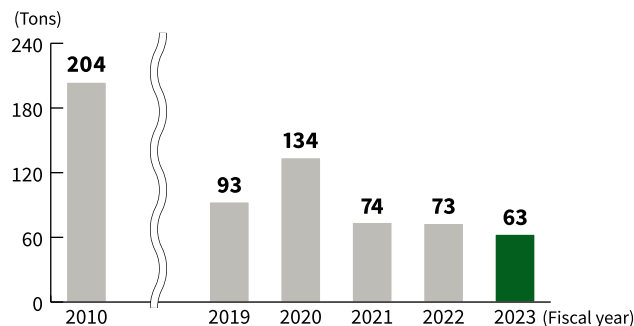
Self-evaluation: ★★★ Achieved more than targeted / ★★ Achieved as targeted / ★ Achieved to some extent

Reducing VOCs

Sharp strives to reduce the volatile organic compounds (VOCs) it emits. It has set a target of keeping VOCs released into the atmosphere to no higher than fiscal 2010 levels (based on a voluntary action plan by the Japanese electrical and electronics industry). Fiscal 2023 VOC emissions were 63 tons, lower than the amount emitted in fiscal 2010 (204 tons), thus achieving the target.

Sharp is reducing VOCs with the installation of highly efficient abatement facilities in LCD production sites, a major source of VOC emissions.

■ VOC Emissions into the Atmosphere

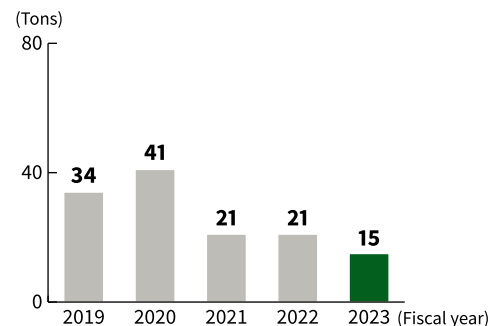


Managing Environmental Load into Air and Water Areas

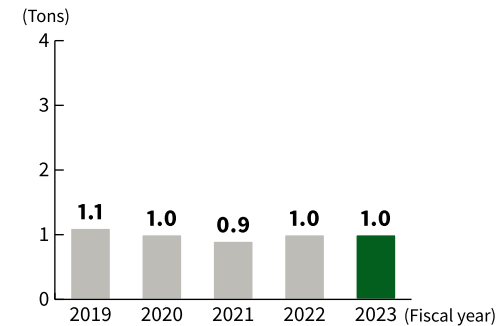
Sharp properly manages pollutants that affect air and water quality by establishing voluntary standards that are stricter than those set forth in laws and regulations and stricter than those agreed upon with local communities. It also actively conducts risk communication with local communities.

Atmospheric Emissions in Japan

■ NOx Emissions



■ SOx Emissions

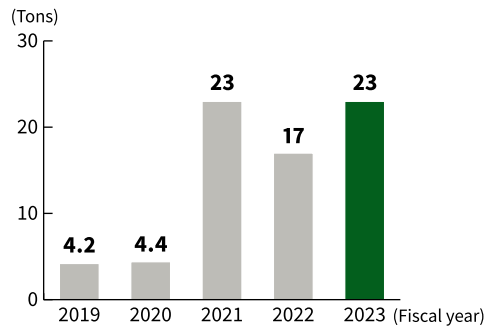


Environmental Initiatives: Safety and Security

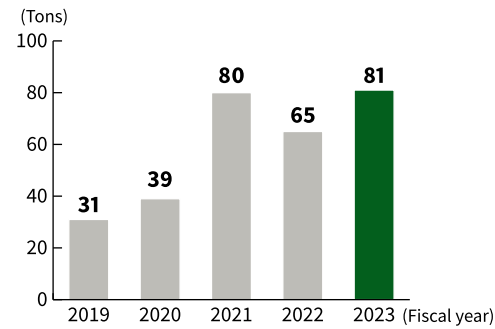
Managing Environmental Load into Air and Water Areas

Emissions into Water Areas in Japan

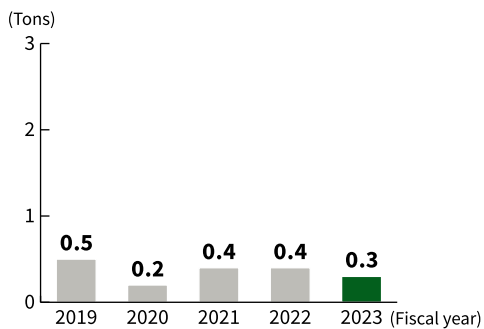
■ COD (Chemical Oxygen Demand)



■ Nitrogen Pollutant Load



■ Phosphorous Pollutant Load



Risk Management of Soil and Groundwater Pollution

Sharp has established and is appropriately applying in-house standards to minimize the risk of environmental pollution and accidents caused by chemical substances. It also strives to prevent such incidents from occurring by taking multi-layered leakage prevention measures at facilities that handle chemical substances. For plants where chlorine solvent contamination was found in the past, Sharp regularly notifies local government authorities and others of the cleanup progress.

Example

Analyzing Plant Wastewater Samples

Sharp's Fukuyama Plant (Fukuyama, Hiroshima Prefecture) collects and analyzes plant wastewater in collaboration with local residents and Fukuyama city officials as part of its risk communication activities. The collected wastewater undergoes individual analyses by the three parties, who share the results and exchange opinions on them. This also provides Sharp the opportunity to foster good relations with all relevant parties.

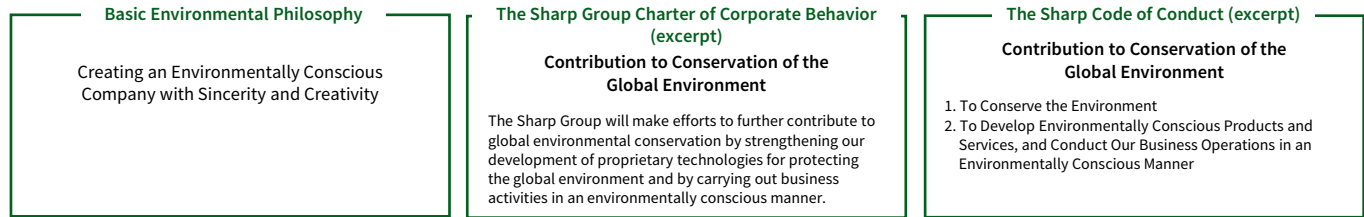


Wastewater sampling and analyses by three parties

Environmental Initiatives: Environmental Management

Putting Sustainable Management into Practice

In accordance with internal environmental conservation guidelines established in line with Sharp's Basic Environmental Philosophy, the Sharp Group Charter of Corporate Behavior, and the Sharp Code of Conduct, Sharp is pursuing environmental consciousness across all of its business activities. Toward realizing a sustainable global environment, Sharp has formulated SHARP Eco Vision 2050, a long-term environmental vision with 2050 as the target year. Under this vision, Sharp is striving to solve social problems and continuously raise corporate value through the development of technologies and the provision of products and services.

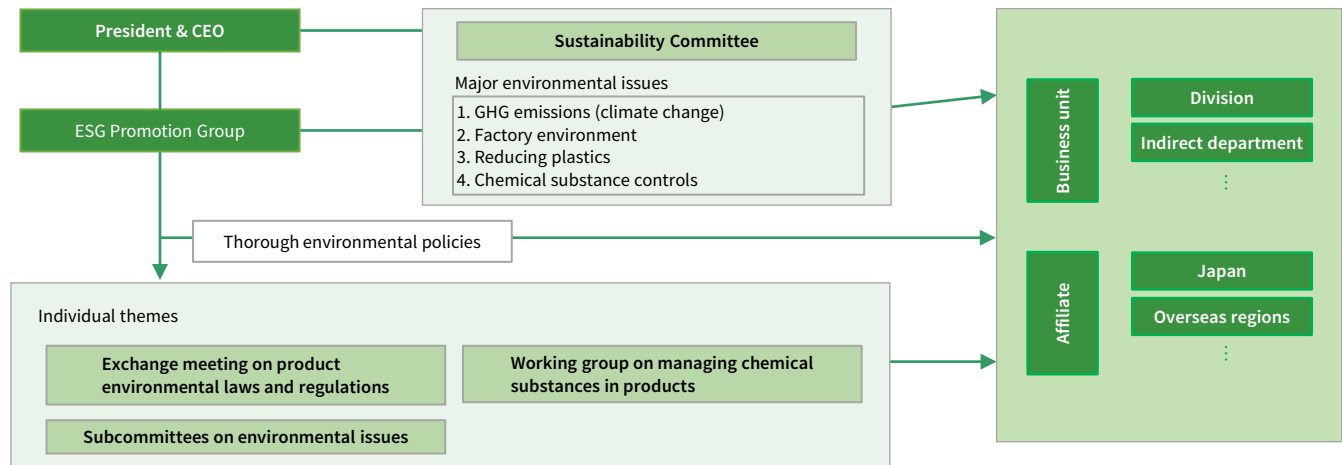


Related information: > [Sharp Group Charter of Corporate Behavior \(Contribution to Conservation of the Global Environment\)](#)
[Sharp Code of Conduct \(IV. Contribution to Conservation of the Global Environment\)](#)

Promoting Sustainable Management

Sharp has set up the ESG Promotion Group to formulate and carry out the company's environmental vision, policies, and targets, and to strengthen environmental governance. The ESG Promotion Group formulates important environmental policies, strategies, and measures at the corporate level regarding sustainable management based on Sharp's management policies and environmental vision. The Sustainability Committee* includes the president & CEO, senior executives, and the heads of Sharp business units and subsidiaries. Through this committee, the ESG Promotion Group confirms progress toward environmental goals and supports environmental activities. In the area of product environmental laws and regulations and chemical substance controls, we periodically hold information exchange meetings to ensure compliance with applicable requirements. Working groups and subcommittees are also established as required to address environmental issues that call for cross-functional efforts.

System for Promoting Sustainable Management in the Environmental Area



* See page 010.

Environmental Initiatives: Environmental Management

Putting Sustainable Management into Practice

Environmental Education

In accordance with the basic strategy of its management policy—foster and strengthen human resources—Sharp strives to step up the cultivation of human resources as the foundation of its sustainable management. To this end, the company has been providing training programs, including basic training open to all employees.

Since fiscal 2019, Sharp has held environmental awareness training to help all employees acquire a wide range of environmental knowledge, and an introductory training course on environmental laws and regulations, which is mandatory for third-year employees.

In fiscal 2023, Sharp held three types of training on sustainability: e-learning, video learning, and group training.

With the aim of fostering human resources who will contribute to the company in stepping up compliance and achieving its environmental vision, Sharp will continue to improve and expand its environmental education curricula by adjusting them to different duties and roles.

Environmental Performance Data Collection and Management

To support sustainable management, Sharp has introduced a cloud-based system for efficiently collecting and managing data on Sharp's environmental performance, including energy consumption, waste generation, water usage, and chemical substances handled in Sharp's business activities. This system is in operation at Sharp bases in Japan and overseas. Collecting and analyzing such data helps Sharp grasp the current state of its sustainable management, identify problems, and formulate measures. Sharp is also engaging with suppliers to gather primary data.

Promoting an Environmental Management System

Since 1995, Sharp has been operating an ISO 14001-based environmental management system and has acquired ISO 14001 certification for all worldwide production bases. The purpose of this system is to strengthen environmental sustainability management and improve the environmental awareness of employees.

ISO 14001 was revised in fiscal 2015. It now requires companies to further their efforts with a more strategic perspective—for example, by integrating their environmental activities with business activities. In response to the revision, Sharp is operating a more effective environmental management system that matches the particular needs of each base.

Related information: > [ISO 14001-Certified Plants and Offices](#)

Product and Plant Audits

Sharp regularly carries out a Green Product/Green Device Audit aimed mainly at ensuring compliance in product development. The company checks compliance with the environmental laws and regulations of each country and the reflection of environmentally friendly design in products, such as energy efficiency, resource savings, and recyclability.

Sharp also reviews and evaluates environmental activities at its production bases as part of the CSR self-assessment survey.*

* See page 015.

Legal Violations, Accidents

In fiscal 2023, Sharp was not subject to any lawsuits or fines related to environmentally related legal violations. There were also no major environmentally related accidents.

Environmental Initiatives: Environmental Management

Developing Environmentally Conscious Products and Devices

Developing Green Products and Devices

Sharp calls its environmentally conscious products “Green Products (GP).” The GP Guidelines, which define development and design criteria in line with seven concepts, have been in use at all product design departments since fiscal 1998. In developing products, Sharp sets specific objectives according to the GP Standard Sheet, which is formulated based on the GP Guidelines. In the trial manufacture and mass production stages, it determines how well the actual product has met these objectives. The content of the GP Standard Sheet—the benchmark for development objectives—is revised each year in order to constantly improve the environmental performance of Sharp products. Sharp sales and manufacturing bases in Europe, ASEAN countries, and the Middle East meet periodically to keep abreast of changing product environmental laws and regulations around the world. The information gathered at these meetings is shared with Sharp business units in Japan and the legal requirements relating to product design are reflected in the GP Guidelines.

Sharp calls its environmentally conscious devices “Green Devices (GD).” To define guidelines for development and design based on seven concepts, Sharp established the GD Guidelines, which it began applying at all device design departments in fiscal 2004. Sharp sets objectives according to the GD Standard Sheet and assesses how objectives have been met in a similar way to GP standards. In fiscal 2013, Sharp revamped the GD assessment system by adding new criteria concerning forward looking initiatives that take customer demands into consideration. The degree to which these criteria are satisfied is represented in points called GD Challenge Points. The assessment criteria are revised every year so that Sharp can continuously raise the environmental performance of its products such as LCD modules and sensors.

Green Product Concepts

- Energy Saving / Energy Creating

Products with superb energy-saving/energy-creating performance
Improve the energy efficiency and reduce the energy consumption of products; other measures
- Resource Conservation

Products designed to conserve resources
Reduce the amount of materials used; design products that conserve resources during use; extend the life span of products; other measures
- Recyclability

Products designed for recycling
Design products that are easy to disassemble; use easy-to-recycle materials; other measures
- Safe Use and Disposal

Products that can be used and disposed of safely
Do not use substances that negatively affect people’s health or the environment; other measures
- Use of Green Materials and Devices

Products that use green materials and devices
Use recycled materials / plant-based plastics; other measures
- Environmental Consciousness Pertaining to Batteries, etc.

Products that use batteries, manuals, and packaging with enhanced environmental consciousness
Reduce product packaging; design products that allow easy removal of batteries; other measures
- Showing Eco Information of Products

Products that show their environmental performance and information
Acquire environmental labels (eco labels); implement LCA; other measures

Green Device Concepts

- Energy Efficiency / Energy Creating

Devices with superior energy efficiency and that consume less energy
Reduce power consumption during operation and in standby mode; other measures
- Resource Conservation

Devices designed to conserve resources
Reduce device weight or volume; other measures
- Recyclability

Devices designed for recycling
Use standard plastic; design devices that are easy to disassemble; other measures
- Safe Use and Disposal

Devices that can be used and disposed of safely
Manage usage of chemical substances contained in parts and materials; other measures
- Long Life

Devices that make products last longer
Extend the life of the product with exchangeable parts and consumables (target: LCD devices); other measures
- Packaging

Devices that use packaging with enhanced environmental consciousness
Reduce packaging; other measures
- Information Disclosure

Devices that give environmental information
Provide information on chemical substances in devices; other measures

Environmental Initiatives: Environmental Management

Developing Environmentally Conscious Products and Devices

Developing Super Green Products

Since fiscal 2004, Sharp has been certifying products that offer a particularly high level of environmental performance as “Super Green Products (SGP).” In fiscal 2023, sales of those products reached 109.5 billion yen, with SGP sales accounting for 25% of all GP sales in Japan. In fiscal 2016, Sharp revised the criteria for this certification. Products are certified if (1) they offer class-leading energy-saving or energy-creating performance, or (2) they offer significantly high environmental performance through the use of unique Sharp technology. This way, Sharp is aggressively pursuing the development of products that consume as little power as possible or that use resources to the least possible extent, as well as developing high-efficiency solar cells.

■ Examples of Super Green Products



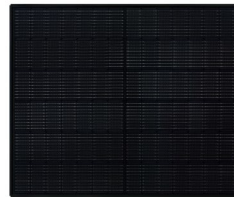
Front-loading Plasmacluster washing machine/dryer ES-X11B



Smartphone AQUOS sense8



Digital full-color MFP BP-70C45

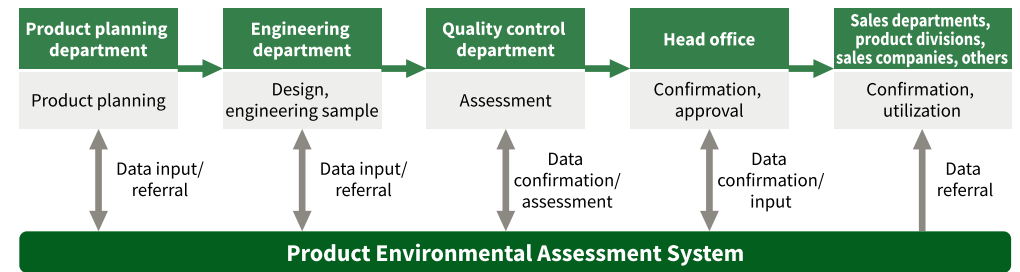


Solar module NQ-254BM

Product Environmental Assessment System

Sharp operates a product environmental assessment system to ensure compliance with environmental laws and regulations as well as to promote environmentally conscious product design. This system allows Sharp to keep a database of the development know-how and design data that all Sharp design and development bases possess on environmentally conscious products and devices. The database is used to raise design standards and to promote in-house standardization of life cycle assessments (LCA). This way, the system is contributing to the creation of environmentally conscious Sharp products and devices. Since fiscal 2016, Sharp has been strengthening the function for checking products’ compliance with environmental laws and regulations.

■ System Flow



Environmental Initiatives: Environmental Management

Environmentally Conscious Products

Example

Energy Conservation Grand Prize 2023: Sharp Wins Highest Award “Minister of Economy, Trade and Industry Award” with Plasmacluster Front Loading Washer & Dryer, and “ECCJ Chairman’s Award” for “Tsunagaru (Connected) Lighting Control Solution”

In the Energy Conservation Grand Prize 2023 Product & Business Model Category, Sharp won Minister of Economy, Trade and Industry Award, the highest award, with its “Plasmacluster Front Loading Washer & Dryer ES-X11B,” and ECCJ Chairman’s Award for “Tsunagaru (Connected) Lighting Control Solution.” Energy Conservation Grand Prize is sponsored by The Energy Conservation Center, Japan, and is one of the most prestigious awards in Japan. Energy Conservation Grand Prize is a program that recognizes outstanding energy conservation efforts and advanced, high-efficiency energy-saving products in the industrial, commercial, and transportation sectors in Japan.



Left: ES-X11B-S (crystal silver)/-T (rich brown) Plasmacluster front-loading washer/dryer
Right: “Tsunagaru (connected) lighting control solution” system diagram

Features of award-winning products and solutions and background of award

- ES-X11B Plasmacluster front-loading washer/dryer
By adopting a unique Hybrid Drying Technology that combines a heat pump and a support heater, and a Non-Exhaust Drying Method that suppresses wasted thermal energy without emitting steam outside the machine, we have achieved the industry’s highest level of energy savings^{*1}. “Hybrid Drying NEXT”, which achieved the highest drying power in Sharp history^{*2}, was highly praised and received this award.
- Tsunagaru (Connected) Lighting Control Solution
In a logistics warehouse, by using network cameras to monitor the movements of forklifts and workers, and effectively controlling the brightness of LED lighting, an 89%^{*3} reduction in power consumption was achieved compared to conventional methods in the case examined in the awards. Additionally, the remote monitoring of on-site footage was highly valued for its contribution to improving labor safety environments, leading to this award.

^{*1} In a washer & dryer with a drying capacity of 6kg. Washing to drying 6kg: Power consumption 600Wh. As of December 18, 2023, according to Sharp research. (Numbers are based on Japan Electrical Manufacturers Association voluntary standards)
^{*2} By realizing hybrid drying technology of a heat pump and support heater, and AI control of temperature/humidity sensors, heaters, and compressors, we aim to achieve energy-saving, speedy drying with a warm and comfortable finish. The drying power is the same as our ES-W114 (released in 2021).
^{*3} Estimated value by our company that takes into account dimming control (assuming that work is repeated in the network cameras detection area every 10 minutes, and the dimming lower limit is set to 12% and the worker leaves after 2 minutes each time). [Calculation conditions] Annual lighting hours: Calculated based on 10 hours of lighting per day and 3,000 hours of lighting per year (Japan Lighting Manufacturers Association Guide A139-2023).

Environmental Initiatives: Biodiversity Protection

Protecting Biodiversity

Fiscal 2023 Objectives	Fiscal 2023 Achievements	Self-Evaluation	Priority Objectives for Fiscal 2024
<ul style="list-style-type: none"> Collaborate with local communities to solve social problems, with employees taking the lead role in conducting activities that benefit communities and, thereby, contribute to achieving the SDGs 	<ul style="list-style-type: none"> Total number of participants in environmental conservation activities: 12,172 (including family members), total number of activities: 824 (in Japan) 	★★	<ul style="list-style-type: none"> Have employees take the lead in carrying out environmental conservation activities together with the local community and, thereby, contribute to achieving 30by30*1

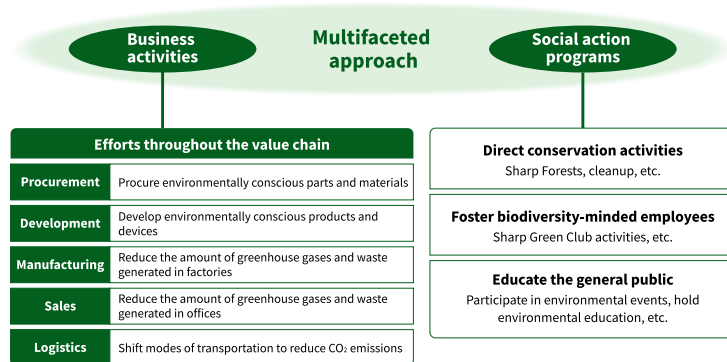
Self-evaluation: ★★★ Achieved more than targeted / ★★ Achieved as targeted / ★ Achieved to some extent

Biodiversity Protection through Business and Social Action Programs

While Sharp’s business activities impact biodiversity, the company also benefits from the resources that biodiversity provides. That is why the Sharp Group is carrying out a multifaceted approach in which it protects biodiversity through business activities and social action programs at worldwide bases.

Based on the Sharp Group Policy on the Sustainable Support of Biodiversity, Sharp formulated the Sharp Biodiversity Initiative in fiscal 2009. The Initiative describes biodiversity in an easy-to-understand manner, and it outlines concrete measures for business activities and social action programs that take biodiversity into account.

Sharp’s Efforts for Protecting Biodiversity



Environmental Community Service Activities to Contribute to Biodiversity Protection

In order to contribute to the preservation of ecosystems in which diverse flora and fauna coexist, Sharp carries out environmental conservation activities not only in Japan but also around the world. At major Sharp business locations in Japan, we have set up branches of the Sharp Green Club (SGC),

a joint labor-management volunteer organization. SGC’s activities emphasize communication with local residents and other stakeholders. For example, through the Sharp Forest project, SGC groups work to protect *satoiyama* (areas between foothills and arable land). This involves afforestation efforts conducted by volunteers in five locations around Japan that seeks to use forest cultivation as a means of fostering an understanding of the relationship, as well as deepening the connection, between forests, wildlife, and humanity and to foster greater global environmental mindedness. SGC also works with the Ministry of the Environment, local governments, and other organizations in two locations in Japan to protect wetlands and waterfowl listed under the Ramsar Convention, such as by eliminating invasive species and conducting cleanup activities. In addition, employee volunteers take part in ongoing cleanup activities around the Sharp Group’s various factories and business locations as well as participate in cleanup and greening initiatives organized by local governments and other organizations, all for the sake of facilitating environmental protection tied to, and carried out in conjunction with, local communities.

In fiscal 2023, 824 such activities took place. These involved 12,172 volunteers, including Sharp executives, employees, and their family members. Overseas, too, Sharp held tree-planting and other such activities as part of a corporate social responsibility (CSR) program. This way, the entire Sharp Group made efforts to preserve the world’s ecosystems. Starting from fiscal 2024, Sharp is participating in the 30by30*1 Alliance for Biodiversity headed up by Japan’s Ministry of the Environment. Through certification as a nationally certified sustainably managed natural site*2, it aims to be registered in the international database of OECM (Other Effective area-based Conservation Measures).



*1 The goal, pledged at the 2021 G7 Summit, is to halt and reverse biodiversity loss (“nature positive”) by 2030, aiming to effectively conserve more than 30% of the country’s land and marine areas as healthy ecosystems.

*2 A location recognized by the Ministry of the Environment as contributing to the conservation of biodiversity.

Environmental Initiatives: Biodiversity Protection

Protecting Biodiversity

Example

Conserving Bamboo Lilies

The Tenri Plant (Tenri, Nara Prefecture) is committed to preserving biodiversity on ancient burial mounds located within its grounds. Bamboo lilies, a rare wild plant species, naturally grow on these mounds but have become scarce due to land development and overharvesting. To nurture and conserve these lilies, our employees maintained the area by weeding the grounds and cutting down withered bamboos in spring and autumn.



Weeding the grounds



Cutting down withered bamboos



Bamboo lilies, a rare wild plant native to the area



Bamboo lilies

Example

Conserving Freshwater Fish Species

The Kameyama Plant (Kameyama, Mie Prefecture) is working to propagate *Tanakia lanceolata*, a freshwater fish on Mie Prefecture's endangered species list. A large population of this fish used to inhabit rivers and streams in the municipality of Kameyama, but numbers have dropped drastically due to factors such as diversion of natural waterways, predation from invasive species, and a decrease in the bivalves that the fish depend on.

The biotope pond on the plant premises is suitable for conservation and propagation of the *Tanakia lanceolata*: there is little chance of invasive species entering, and its soil is sand, an ideal habitat for the bivalves crucial to the fish's survival.

Employees carry out periodical surveys of the fish population as part of ongoing conservation activities.



Surveying growth of the fish



Tanakia lanceolata (male)

Environmental Initiatives: Biodiversity Protection

Protecting Biodiversity

Example

Environmental Conservation Activities at the Ramsar Convention Wetland of Yatsu Higata

At the Makuhari Site (Chiba, Chiba Prefecture), SGC, a volunteer group made up of both labor and management, undertakes environmental conservation activities at the Yatsu Higata mudflats, a Ramsar Convention wetland in Narashino, Chiba Prefecture. In November 2023, a total of 19 employees and their family members, with the cooperation of the Yatsu Higata Nature Observation Center, cut reeds in a freshwater pond to maintain bird habitats and prevent the pond from becoming land.



Cutting reeds



Wild birds at the Yatsu Higata mudflats

Example

Ongoing Greening Activities

Indonesian production and sales base SEID undertakes greening activities aimed at raising environmental awareness, reducing greenhouse gas emissions, and preserving forests.

In March 2024, to coincide with World Conservation Strategy Day, 27 SEID employees planted a total of 30 trees of six different species, including cocoa, fig, and rubber trees, in Karawang, West Java, as well as installed biopore infiltration holes* in 60 locations to increase the soil's water-retaining capacity. A total of 657 plants and trees have now been planted in Karawang since 2013.

* Cylindrical holes drilled vertically into the ground to prevent flooding.



Participants from the different departments in SEID



Planting rubber trees

Environmental Initiatives: Biodiversity Protection

Protecting Biodiversity

Example

Reforestation Activities

UK sales base SBSUK is committed to environmentally friendly printing as part of the Forest Positive initiative. This program effectively eliminates the environmental impact of deforestation by planting more trees than is accounted for by the amount of paper used for printing.

Through its partner, PaperCut, SBSUK has planted 3,341 trees thus far. In fiscal 2023, 200 trees in total were planted across all of Sharp's UK operations, which is equivalent to the use of 1.6 million sheets of paper. Moving forward, Sharp will continue to actively work to protect forests and contribute to reforestation projects around the world.



Example

Protecting Biodiversity on International Day for the Conservation of the Mangrove Ecosystem

It is estimated that 3,531 disasters occurred in Indonesia in 2022*¹. Indonesia's tropical climate and volcanoes make it highly vulnerable to such disasters as earthquakes, floods, heavy rainfall, and prolonged droughts.

Indonesian production and sales base SEID worked with Yayasan Terumbu Karang, a non-profit organization focused on conserving coral reefs, and with the residents of Tunda Island to plant 3,300 mangrove seedlings as part of blue carbon*² regeneration.

*¹ Based on a survey by BNPB (Indonesian National Disaster Management Authority).

*² Carbon and greenhouse gases absorbed and stored in coastal and marine ecosystems, such as mangrove forests, seagrass meadows, brackish waters, and coral reefs.



Planting trees

Environmental Initiatives: Biodiversity Protection

Protecting Biodiversity

Example

Cleanup Activities Coinciding with World Cleanup Day

Indonesian production and sales base SEID undertakes activities to raise awareness of the dangers of plastic waste, a global environmental issue, as well as to highlight the importance of recycling. In September 2023, to coincide with World Cleanup Day, SEID conducted cleanup activities together with an environmental conservation organization, aiming to raise environmental awareness among the residents and tourists of Harapan Island and to protect the island's beautiful natural environment.

Fifty students from Harapan Island also participated in the cleanup, and approximately 72 kg of waste was collected. The collected waste was separated, with some of it being taken to facilities called waste banks* before being recycled into products. In addition, SEID donated 111 mangrove seedlings.

* This system involves using a middleman to purchase the garbage, with the proceeds of the sale being transferred to the person who brought the garbage.



Calling on tourists to take their garbage with them



Donation of mangrove seedlings to the local community on Harapan Island

Environmental Initiatives: Overview of Environmental Impact

Material Balance

Sharp gathers data to gain an overview of the burden its business activities place on the environment. Measured items include the consumption of energy and materials in business activities, the emissions of greenhouse gases, and the generation of waste. Sharp then uses these values to reduce its environmental burden.

Coverage: Sharp Corporation production sites and production subsidiaries in Japan and overseas

Input

Item			Unit	Fiscal Year	
				2023	
Procurement, R&D, product manufacture	Energy		TJ*1	19,751	
		Electricity	Million kWh	1,876	
		Renewable energy*2	Million kWh	19	
		City gas	Million m ³	56	
		LPG, LNG	Tons	4,973	
		Heavy oil, kerosene, gas oil, gasoline	Kl	1,630	
		Hot water, cold water, steam	TJ	732	
	PFCs purchased	Tons	1,629		
	Water resources	Water withdrawal		Million m ³	33.5
			Third-party water*3	Million m ³	9.2
			Groundwater	Million m ³	8.7
				Million m ³	0.5
		Water reused	Million m ³	24.3	
	Chemical substances handled (PRTR-listed)	Tons	15,525		
Chemical substances handled (VOCs)	Tons	2,216			
Materials consumed*4	Thousand tons	575			
Logistics	Energy consumed (vehicle fuel)*5	TJ	158		
Product use	Energy consumed (electricity)*6	Million kWh	3,507		

Greenhouse gases Water Chemicals Resources

Output

Item			Unit	Fiscal Year	
				2023	
Procurement, R&D, product manufacture	Greenhouse gases	CO ₂	Thousand tons CO ₂	1,175	
		Gases other than CO ₂ (converted into amounts of CO ₂)		Thousand tons CO ₂	1,019
				Thousand tons CO ₂	156
			HFC	Thousand tons CO ₂	3
			PFC	Thousand tons CO ₂	88
			SF ₆	Thousand tons CO ₂	49
		NF ₃	Thousand tons CO ₂	16	
	Effluent		Million m ³	6.9	
		Public water areas	Million m ³	5.0	
		Sewerage	Million m ³	1.9	
	Chemical substances released and handled (PRTR-listed)	t	1,015		
	Chemical substances released and handled (VOCs)	t	63		
	Atmosphere*5	NOx emissions	t	15	
		SOx emissions	t	1	
Water areas*5	COD (chemical oxygen demand)	t	23		
	Nitrogen pollutant load	t	81		
	Phosphorous pollutant load	t	0.3		
Product shipments*7	Thousand tons	480			
Waste, etc.		Thousand tons	95		
	Final landfill disposal	Thousand tons	0.4		
Logistics	CO ₂ emissions*5	Thousand tons CO ₂	11		
Product use	CO ₂ emissions*6	Thousand tons CO ₂	1,913		

Recycle

Item		Unit	Fiscal Year
			2023
Amount recycled*5	Home appliances (4 kinds)	Thousand tons	65
	Copiers/MFPs	Thousand tons	1.5
	PCs	Tons	5
Disposal after recycling*5		Thousand tons	9

- *1 TJ (terajoule) = 10¹²J.
- *2 Amount of solar power generated; amount of green power certificates purchased.
- *3 Industrial-use water and tap water.
- *4 Total weight of product shipments and waste, etc. (estimate).
- *5 In Japan.
- *6 Annual energy used and amount of CO₂ emitted by major products sold in the reporting year (estimate).
- *7 Total weight of major products sold in the reporting year and packaging materials used (estimate).

Environmental Initiatives: Overview of Environmental Impact

Calculation Standards for Environmental Performance Data

The environmental performance data are calculated based on the following calculation standards.

■ Input

Environmental Performance Indicators		Calculation Method
Procurement, R&D, product manufacture	Energy consumed	Calculated based on the Act on Rationalizing Energy Use and the Japanese Ministry of the Environment's Greenhouse Gas Emission Calculation and Reporting Manual
	PFCs purchased	HFCs, PFCs, sulfur hexafluoride (SF ₆), and nitrogen trifluoride (NF ₃) purchased annually
	Water resources consumed	Consumption and recycled use of water purchased from third parties (industrial-use water, tap water) and groundwater
	Chemical substances handled (PRTR-listed)	Among the substances covered under the PRTR Law, the total amount of substances handled annually at each plant in quantities of 500 kg or more
	Chemical substances handled (VOCs)	Among the 20 types of volatile organic compounds (VOCs) specified by Japan's four major electrical and electronic industry associations, the total amount of substances handled annually at each plant in quantities of 1 metric ton or more
	Materials consumed	Total weight of major products* sold in the reporting year (estimate), plus waste, etc. generated
Logistics	Energy consumed	Revised ton-km method
Product use	Energy consumed	Estimate of annual energy used by major products* sold in the reporting year. Calculation based on each product's annual energy consumption rate (using a heat input per unit of 9.97 MJ/kWh).

* Flat-panel TVs, air conditioners, refrigerators/freezers, washing machines/dryers, air purifiers, Plasmacluster Ion generators, microwave ovens, copiers/MFPs, solar cells.

■ Output

Environmental Performance Indicators		Calculation Method	
Procurement, R&D, product manufacture	Greenhouse gas emissions	<ul style="list-style-type: none"> CO₂ emissions from purchased electricity Japan: Using CO₂ emission coefficient by electric power company (adjusted) published by Japan's Ministry of the Environment and the Ministry of Economy, Trade, and Industry Overseas: Using emission coefficients published in the environmental reports, etc. of electric power companies, or emission coefficients published in the IEA Emissions Factors CO₂ emissions from consumed fuel Using emission coefficient published in the Ministry of the Environment's Greenhouse Gas Emission Calculation and Reporting Manual Greenhouse gases other than CO₂ Using global warming potential published in the 5th Assessment Report by the Intergovernmental Panel on Climate Change (IPCC) 	
	Drainage	Annual drainage into public water areas and sewer system	
	Chemical substances released and transferred (PRTR-listed)	Among the substances covered under the PRTR Law, the total amount of substances (handled annually at one or more plant in quantities of 500 kg or more) that were released and transferred	
	Chemical substances released (VOCs)	Among the 20 types of volatile organic compounds (VOCs) specified by Japan's four major electrical and electronic industry associations, the total amount of substances (handled annually at each plant in quantities of 1 metric ton or more) that were released and transferred	
	NOx emissions	Annual emissions	
	SOx emissions	Annual emissions	
	COD (chemical oxygen demand)	Drainage into public water areas	
	Nitrogen pollutant load	Drainage into public water areas	
	Phosphorous pollutant load	Drainage into public water areas	
	Product shipments	Total weight of major products* sold in the reporting year, plus packaging material used (estimate)	
	Waste, etc.	Industrial waste + general office waste + valuable resources recovered	
	Final landfill disposal	Final landfill disposal of industrial waste + final landfill disposal of general office waste	
	Logistics	CO ₂ emissions	Revised ton-km method
	Product use	CO ₂ emissions	Amount of CO ₂ emitted by major products* sold in the reporting year, based on their energy consumption (estimate)

Environmental Initiatives: Overview of Environmental Impact

Calculation Standards for Environmental Performance Data

■ Recycle

Environmental Performance Indicators		Calculation Method
Disposal, recycling	Home appliances (4 kinds)*	Amount of used home appliances (4 kinds) recycled
	Copiers/MFPs	Amount of recycled copiers and MFPs
	PCs	Amount of recycled PCs
	Disposal after recycling	[Weight of 4 kinds of home appliances, PCs, and copiers/MFPs collected] – [Weight recycled into new products or materials, or reused]

* TVs (CRT TVs, flat-panel TVs), air conditioners, refrigerators/freezers, washing machines/dryers.