

Environmental Initiatives

Environmental Vision	031
Climate Change	033
Resource Recycling	044
Safety and Security	056
Environmental Management	064
Biodiversity Protection	069
Overview of Environmental Impact	071



0.43%
Final Landfill
Disposal Rate



17.6%
reduction
Greenhouse gas emissions
(Base year: FY2021)

Environmental Initiatives: Environmental Vision

SHARP Eco Vision 2050 Long-term Environmental Vision



To accelerate our efforts toward the long-term environmental vision, Sharp is formulating medium-term environmental goals that define specific activities and quantitative targets in each field. To address climate change, Sharp aims to achieve net zero CO₂ emissions from its business activities by 2050, with interim reduction targets of 40% by 2030 and 60% by 2035^{*4}. 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.
- *4 See page 033.

The international community has recognized the urgent need to address increasingly serious environmental problems, such as climate change, resource depletion, and 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

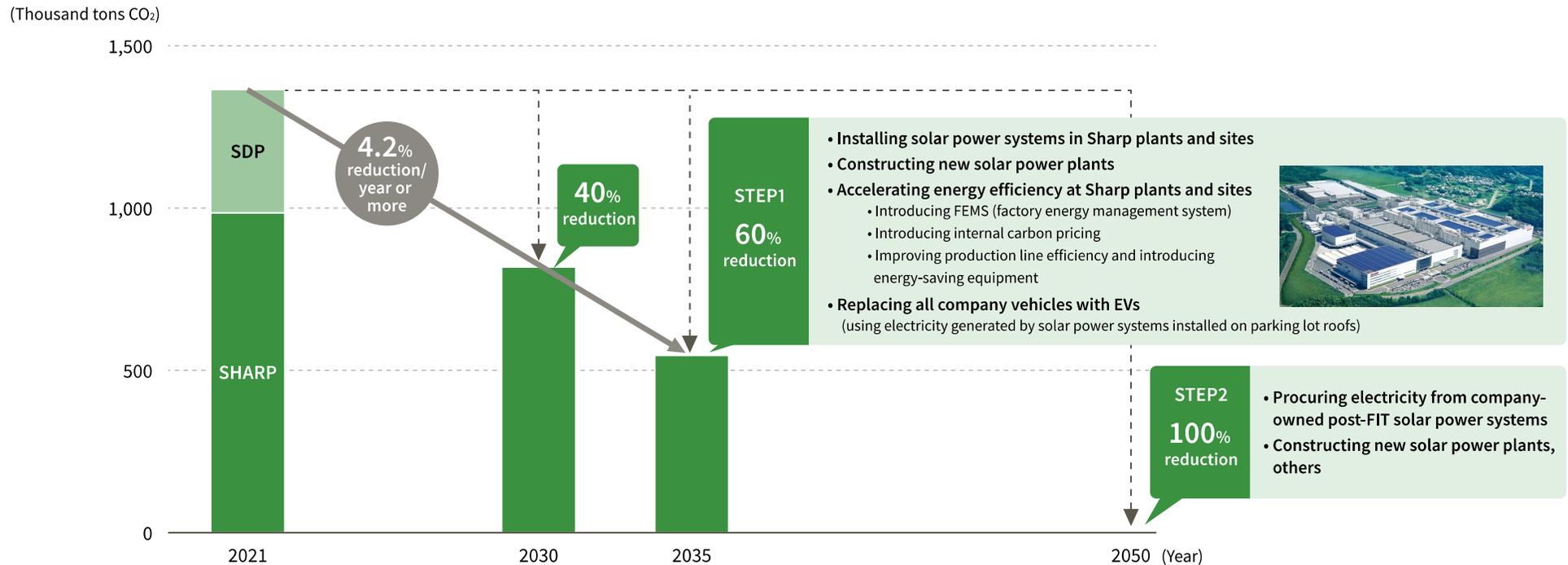
Medium-term Environmental Goals

Climate change is the most pressing and important issue currently facing humanity. It is driving an increase in natural disaster severity that significantly impacts, both directly and indirectly, not only our daily life but business as well. Sharp recognizes that climate change is a material management issue and is working to address this issue through its long-term environmental vision, SHARP Eco Vision 2050, which was created in 2019 and which encompasses a goal to “Achieve net zero CO₂ emissions in Sharp business activities.” To achieve our long-term environmental vision, we have also set new medium-term environmental goals—a 40% reduction in CO₂ emissions by 2030 and a 60% reduction by 2035*.

Going forward, Sharp will continue to steadily reduce CO₂ emissions by installing solar power systems in our plants and other sites, saving energy, building new solar power plants, and converting the company fleet to electric vehicles (EVs).

* Compared with fiscal 2021. Includes emissions from fiscal 2021 onwards from Sakai Display Products Corporation, which became a wholly owned subsidiary of Sharp Corporation in June 2022.

■ Medium-term Environmental Goals for Achieving Net Zero CO₂ Emissions from Corporate Activities



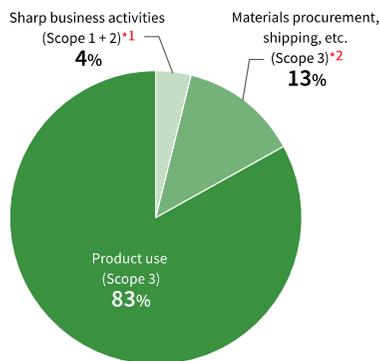
Environmental Initiatives: Climate Change

Sharp's Stance on Climate Change

Reducing Environmental Impact Associated with Product Usage

When greenhouse gas emissions for the entire Sharp value chain are calculated and analyzed, the results show that more than 80% of emissions are associated with the use of sold products. Based on this fact, Sharp has identified reducing environmental impact associated with product usage by customers (i.e., improving product energy efficiency) and Sharp business activities (i.e., manufacturing) as material issues in addressing climate change.

Breakdown for Sharp Greenhouse Gas Emissions (Fiscal 2022)



Ways to reduce GHG emissions by creating environmentally conscious products

- Quantifying and analyzing GHG emissions throughout the product life cycle
- Incorporating AIoT^{*3} devices and cloud technology to reduce GHG emissions during product use
- Reducing GHG emissions through the provision of conducive products and services (e.g., solar power systems and storage batteries)

Participation in Climate Crisis Initiatives and Other Efforts

Sharp participates in the Science Based Targets initiative (SBTi)^{*4}, which is focused on pursuing action that will achieve real and reliable results in the fight against climate change. Sharp has been certified for SBT WB2°C^{*5} (well below 2°C) and is now preparing to get certified for the 1.5°C target^{*6}. This will align the company with medium-term environmental goals we set in June 2022. We also aim to use 100% renewable energy in business activities and are preparing to join RE100, a global initiative for 100% renewable electricity.

In Japan, Sharp participates in the Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention^{*7}, which is a group focused on strengthening industry-wide decarbonization action. The members of this group share information about the latest energy-saving initiatives being implemented in factories, and they engage in discussion related to policy recommendations. Sharp also participates in the Japanese Ministry of Economy, Trade and Industry's GX League^{*8}, which fully launched in fiscal 2023. Through this, Sharp is ramping up its efforts to contribute to global carbon neutrality.



- *1 Direct GHG emissions from business activities.
- *2 Indirect GHG emissions from energy usage in business activities.
- *3 AIoT is a word coined by Sharp, combining the words AI (artificial intelligence) and IoT (Internet of things). AIoT is a vision of how products and services will connect to artificial intelligence via the cloud and become a people-oriented existence. AIoT is a registered trademark of Sharp.
- *4 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.
- *5 A target of keeping the increase in global average temperatures to well below 2°C above pre-industrial levels.
- *6 A target of limiting the increase in global average temperatures to 1.5°C above pre-industrial levels.
- *7 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.
- *8 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.

Progress towards Science Based Targets (WB2°C Target)

	Target	Fiscal 2022 Results	Base Year Comparison
Scope 1 + 2	By fiscal 2031, reduce GHG emissions by 33% compared with fiscal 2018	1,125 thousand tons CO ₂	4% increase
Scope 3 (Category 11)	By fiscal 2031, reduce GHG emissions by 33% compared with fiscal 2018	25,800 thousand tons CO ₂	6% reduction

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

Sharp’s long-term environmental vision, SHARP Eco Vision 2050, aims to achieve net zero CO₂ emissions from business activities by 2050. To reach this target, Sharp has set a medium-term environmental goal of reducing CO₂ emissions by 60%^{*5} by 2035. This goal, which is based on the SBT 1.5°C target, reflects our aim of reducing annual CO₂ emissions by at least 4.2%.

*1 See page 009.

*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 123.

*5 Includes emissions from fiscal 2021 from Sakai Display Products Corporation, which became a wholly owned subsidiary of Sharp Corporation in June 2022.

■ Progress towards Reducing GHG Emissions (Fiscal 2022 Results)

Base Year (fiscal 2021 results ^{*5})	Fiscal 2035 Target (60% reduction compared with fiscal 2021)	Fiscal 2022 Results	Base Year Comparison
1,365 thousand tons CO ₂	546 thousand tons CO ₂	1,125 thousand tons CO ₂	17.6% reduction

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 resulting from customer use of Sharp products and from Sharp's business activities, including those in the 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.

^{*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 2022)

Category		Emissions (Thousand Tons CO ₂)	Notes
Scope 1 (direct GHG emissions from business activities)		331	Emissions from combustion of fuel, etc.
Scope 2 (indirect GHG emissions from energy usage in business activities)		794	Emissions from the use of electricity
Total of Scope 1 and Scope 2		1,125	
Scope 3 (indirect GHG emissions from outside the scope of business activities)	1. Purchased goods and services	3,232	Emissions from the manufacture of materials procured for the main products ^{*2} that the Sharp Group sold in the reporting year
	2. Capital goods	121	Emissions from the construction, manufacture, and transportation of Sharp Group capital goods (such as equipment, machinery, buildings, facilities, and vehicles)
	3. Fuel- and energy-related activities (not included in Scope 1 or 2)	207	Emissions from the procurement of fuels (natural resource extraction, manufacture, and transportation) consumed in the generation of electricity and heat the Sharp Group procures from other companies
	4. Upstream transportation and distribution	203	Emissions from the transportation of Sharp Group parts and materials and products manufactured
	5. Waste generated in operations	2	Emissions from waste disposal and treatment by the Sharp Group
	6. Business travel	2	Emissions from business travel by all employees of Sharp Corporation
	7. Employee commuting	5	Emissions from commuting by all employees of Sharp Corporation
	8. Upstream leased assets	—	Included in Scope 1 and 2 CO ₂ emissions
	9. Downstream transportation and distribution	29	Emissions from the transportation (from retailers to end consumers) of the main products ^{*2} that the Sharp Group sold in the reporting year
	10. Processing of sold products	260	Emissions from processing at destination of Sharp Group products
	11. Use of sold products	25,800	Emissions ^{*3} from the use of the main products ^{*2} that the Sharp Group sold in the reporting year
	12. End-of-life treatment of sold products	3	Emissions from recycling 4 types of appliances ^{*4} that Sharp Corporation sold in Japan
	13. Downstream leased assets	—	Not applicable
	14. Franchises	—	Not applicable
	15. Investments	—	Not applicable
Scope 3 total		29,864	
Scope 1 + 2 + 3 total		30,989	

Environmental Initiatives: Climate Change

Reducing Business Activity-Linked Greenhouse Gas Emissions

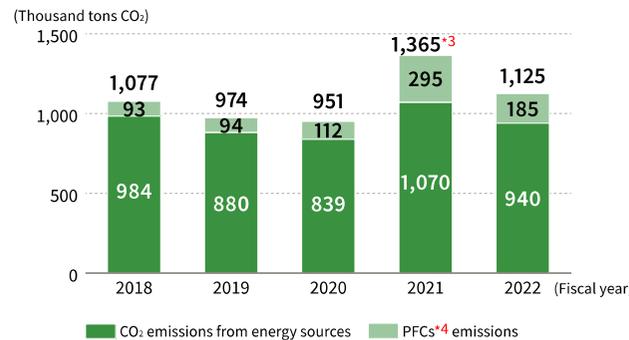
Fiscal 2022 Objectives	Fiscal 2022 Achievements	Self-Evaluation	Priority Objectives for Fiscal 2025
■ Reduce greenhouse gas emissions by 4.2% (baseline year: fiscal 2021)	■ Reduced greenhouse gas emissions by 17.6% (baseline year: fiscal 2021)	★★	■ Reduce greenhouse gas emissions by 16.8% (baseline year: fiscal 2021)

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

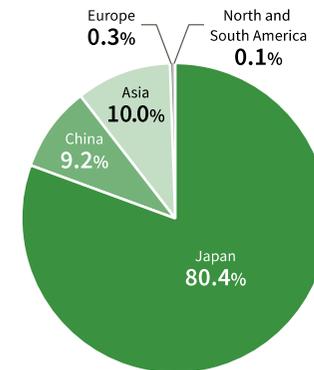
Under SHARP Eco Vision 2050—our long-term environmental vision—Sharp is aiming to achieve net-zero CO₂ emissions in its business activities. To achieve our long-term environmental vision, we have set medium-term environmental goals—a 40% reduction in CO₂ emissions by 2030 and a 60% reduction by 2035. We are also working to reduce GHG emissions associated with business activities. The Sharp Group’s GHG emissions from business activities in fiscal 2022 was down 17.6% to 1,125,000 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



■ GHG Emissions by Region (Fiscal 2022)



*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 Includes emissions in fiscal 2021 from Sakai Display Products Corporation, which became a wholly owned subsidiary of Sharp Corporation in June 2022.
 *⁴ HFCs, PFCs, sulfur hexafluoride (SF₆), nitrogen trifluoride (NF₃).

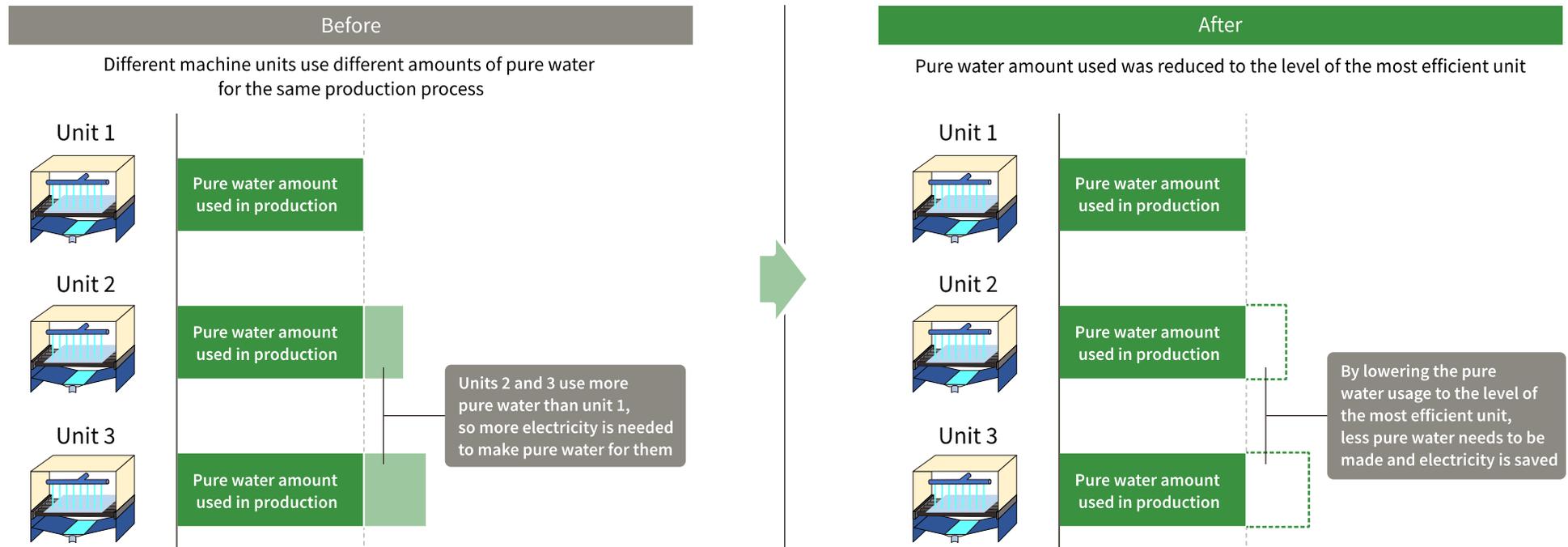
Environmental Initiatives: Climate Change

Reducing Business Activity-Linked Greenhouse Gas Emissions

Example

Reducing Greenhouse Gases in the Production Process

The Kameyama Plant (Kameyama, Mie Prefecture) recycles all pure water used in the production process by recovering it after use, removing impurities to once again make it pure water, and then reusing it. Previously, different units of the same machine used different amounts of pure water even though performing the same production process. But after adjusting the operating parameters of the various machine units and repeatedly confirming quality, the amount of pure water used was reduced to a unified low level. This allowed the plant to reduce the electricity needed to make pure water, resulting in an annual greenhouse gas reduction of 187 t-CO₂.



Environmental Initiatives: Climate Change

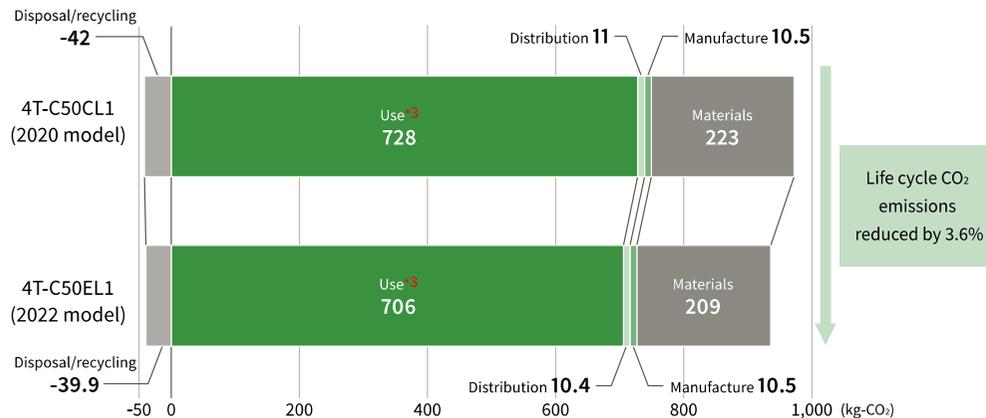
Product Life Cycle Assessment

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).

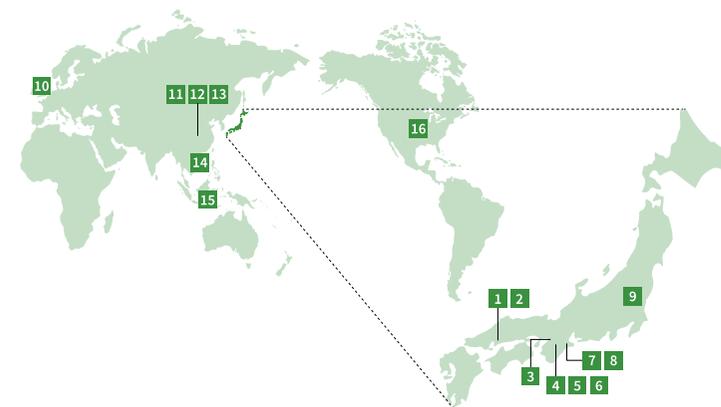
Utilizing Renewable Energy

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 2022, the launch of new PV systems at plants in Thailand and Indonesia greatly increased the amount of Sharp's electricity generation to 5.06 million kWh. Sharp also purchased 5.18 million kWh of green power.

This is equivalent to the annual energy consumption amount*⁴ of roughly 3,000 average households in Japan. Sharp will continue to expand the use of renewable energy sources.

*⁴ Calculated from data from the Federation of Electric Power Companies of Japan.

Solar Power Systems at Sharp Bases Worldwide



Domestic bases	
No.	Name
1	Hiroshima
2	Fukuyama
3	Yao
4	Katsuragi
5	Nara
6	Tenri
7	Kameyama
8	Mie
9	Tochigi
Overseas bases	
No.	Name
10	SUKM (UK)
11	Pinghu (China)
12	NSEC (China)
13	SOCC (China)
14	SATL (Thailand)
15	SEID (Indonesia)
16	SMCA (US)



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

BLACKSOLAR ZERO Residential Solar Cell Module Wins New Energy Foundation Chairman's Prize in 2022 New Energy Awards

Sharp's BLACKSOLAR ZERO residential solar cell module received the New Energy Foundation Chairman's Prize in the Products and Services category at the 2022 New Energy Awards. The awards are organized by the New Energy Foundation and supported by the Ministry of Economy, Trade, and Industry (METI).

This awards program seeks to accelerate society's adoption of solar power and other renewable energy by honoring outstanding developments in renewable-energy-related products and services, and applications of distributed energy.

BLACKSOLAR ZERO can be efficiently installed on various shapes of roofs thanks to its Roofit design: four types of modules, each a different size or shape, are combined to match the exact size and shape of a roof. This squeezes maximum power generation from available roof space and makes it possible to achieve large power generation capacity even for installations on limited-space or complex-shaped roofs, such as those in urban areas.

The New Energy Awards judging panel also gave high marks to the look of BLACKSOLAR ZERO. With all four module types completely black, a unified sense of design is realized. Joints between adjacent modules are inconspicuous and the installation harmonizes beautifully with the roof.

Sharp will continue to contribute to the creation and spread of clean energy through greater dissemination of its solar power generation and storage battery systems.



Conceptual image of BLACKSOLAR ZERO installation

Environmental Initiatives: Climate Change

Utilizing Renewable Energy

Example

Installing Solar Power Systems at Production Bases

Sharp's production bases are installing solar power systems to make full use of renewable energy and help achieve a decarbonized society. In December 2022, Thai production base SATL installed a PV system with an output of roughly 2.45 MW-dc. This system is expected to generate around 3,480 MWh annually, which is enough to cover about 10% of the plant's electricity use. In January 2023, the SOCC production base in China installed a 4.73 MW-dc PV system, which is expected to generate around 4,950 MWh annually. This is enough to cover about 50% of the plant's electricity use. Sharp will continue to actively use renewable energy sources.



Solar power systems installed on the roofs of Sharp production bases
(left: SOCC in China; right: SATL in Thailand)

Environmental Initiatives: Climate Change

Reducing Logistics-Related Environmental Impact

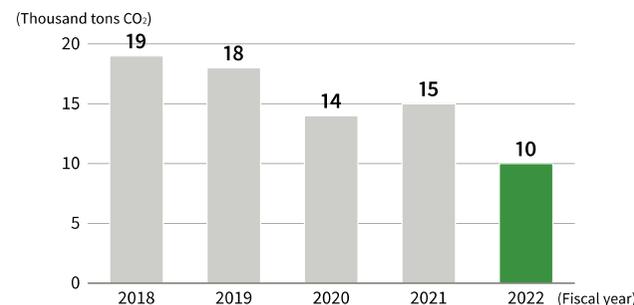
Reducing the Environmental Impact of Logistics in Japan

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 2022, Sharp Group greenhouse gas (GHG) emissions from shipping activities in Japan were down 34% from the previous fiscal year to 10,000 tons CO₂. For Sharp Corporation, energy intensity was improved by an average of 8.6% for the most recent five years (fiscal 2018 to 2022). 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 2022, Sharp's GHG emissions from international transport were 138 thousand tons CO₂.



Eco Rail Mark certification

Environmental Initiatives: Resource Recycling

Minimizing and Recycling Business Activity-Linked Waste

Fiscal 2022 Objectives	Fiscal 2022 Achievements	Self-Evaluation	Priority Objectives for Fiscal 2023
■ Final landfill disposal rate of less than 0.5%	■ Final landfill disposal rate 0.43%	★★★	■ 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 by the Sharp Group

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.

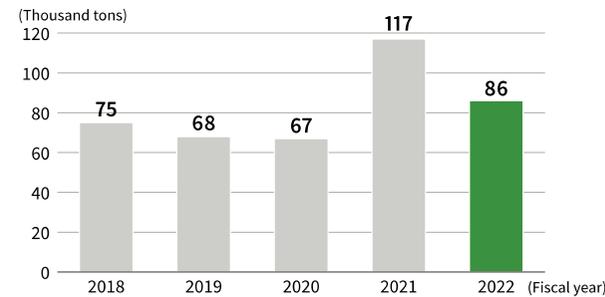
In fiscal 2022, the amount of waste, etc. generated by the Sharp Group decreased by 27% compared to the previous fiscal year to 86,000 tons, due to disposal of old equipment and expansion of production. The amount of recycling decreased by 15% from the previous fiscal year to 62,000 tons. Meanwhile, by reducing landfill disposal rates at overseas bases, the Sharp Group's final landfill disposal rate was 0.43%, thus achieving 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.

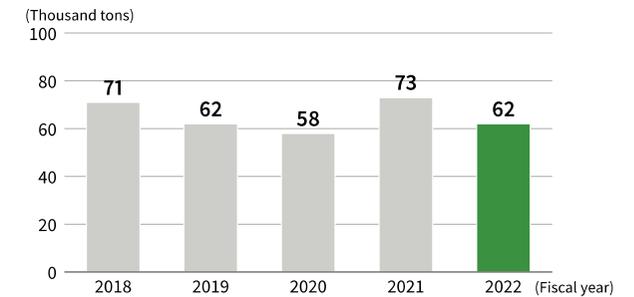
Appropriate Storage and Management of PCB Wastes

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.

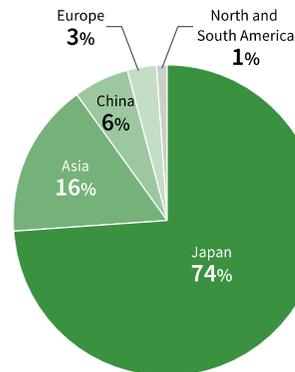
■ Amount of Waste, etc.



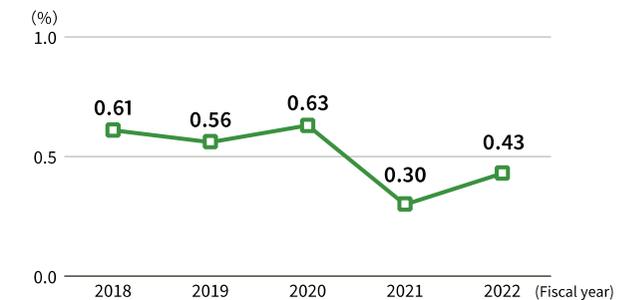
■ Amount of Recycling



■ Waste, etc. by Region (Fiscal 2022)



■ Final Landfill Disposal Rate



* 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.

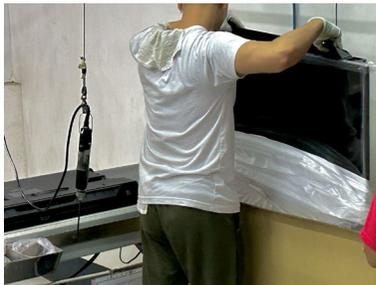
Environmental Initiatives: Resource Recycling

Minimizing and Recycling Business Activity-Linked Waste

Example

Reducing Consumption of Plastic

SPC, a Sharp production and sales base in the Philippines, reuses the plastic bags that are generated as waste in the LCD TV production process. The plastic bags used for wrapping LCD TV parts were previously disposed of as industrial waste, but by collecting them during production they can now be used in the packaging process of finished products that are shipped out. This has allowed SPC to reduce monthly plastic bag usage by approximately 12,000.



Unpacking parts



Preparing to collect and reuse the plastic bags during parts unpacking

Environmental Initiatives: Resource Recycling

Expanding the Recycling of Used Products

Fiscal 2022 Objectives	Fiscal 2022 Achievements	Self-Evaluation	Priority Objectives for Fiscal 2023
<ul style="list-style-type: none"> Pursue recovery of washing machine motor core parts by material 	<ul style="list-style-type: none"> Automated the process of recovering motor winding material (copper, aluminum) from washing machines by introducing a multi-axis robotic arm 	★★★	<ul style="list-style-type: none"> Improve the processing efficiency of indoor air conditioner units

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 in Japan (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 17 recycling plants in Japan. In fiscal 2022, Sharp collected 2.314 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 69,000 tons (down 1% 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 2022)

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	331	87	957	470	466	2,314
Processed and recycled units	Thousand units	336	88	964	476	478	2,344
Processed and recycled weight	Tons	13,707	1,943	15,296	28,330	19,091	78,367
Recycled weight	Tons	13,087	1,444	13,334	22,832	17,998	68,695
Recycling rate	%	95	74	87	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.

The motor of a washing machine uses copper windings. Separating and recovering materials like copper can boost the value of resources. Conventional equipment used a rotary blade to cut the copper winding, but the dust resulting from the cutting could potentially have an adverse effect on the operator's health or the functioning of the machine. In addition, to prevent aluminum—an increasingly common winding material—from getting mixed with copper, aluminum windings were dismantled by hand in a separate process.

In fiscal 2022, we introduced a multi-axis robotic arm to automate the cutting/recovery process. The robot cuts and recovers the copper windings and aluminum windings from the motors, using a dedicated cutting device for each type of material. Switching to a dust-free cutting method has greatly improved the work environment. Using a single piece of machinery to separate copper and aluminum has reduced the processing time per motor by about 30%.

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



The multi-axis robotic arm automates the cutting/recovery process



Recovered copper windings

Environmental Initiatives: Resource Recycling

Expanding the Recycling of Used Products

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 2023, 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.

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.



Classroom lecture



Dismantling a washing machine

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 2,900 collection points established for used products. MRM operates in accordance with the laws and regulations of each state and recycled a total of 60,000 tons of used products in fiscal 2022.

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

< 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 collaborates with established 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.

SBSUK, Sharp's sales base in the UK, won a Greener Path Landfill Diversion Award for achieving zero final landfill disposal in fiscal 2022.

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

< Vietnam >

In Vietnam, the introduction of a recycling law in 2017 has obliged manufacturers and importers to establish a collection scheme for products sold within the country. SVN, Sharp's Vietnamese sales base, collects used products at collection points established in Vietnam and ensures they are processed appropriately by licensed recyclers for proper disposal.

< 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.



Greener Path Landfill Diversion Award logo

Environmental Initiatives: Resource Recycling

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

Fiscal 2022 Objectives	Fiscal 2022 Achievements	Self-Evaluation	Priority Objectives for Fiscal 2023
<ul style="list-style-type: none"> Practical application of recycled flame-retardant polypropylene Basic development of environmentally friendly, halogen-free, flame-retardant recycled material 	<ul style="list-style-type: none"> Adopted recycled flame-retardant polypropylene in the internal parts of ceramic fan heaters Completed feasibility study on environmentally friendly, halogen-free, flame-retardant recycled material 	★★	<ul style="list-style-type: none"> Develop flame retardancy formulation for environmentally friendly, halogen-free recycled polystyrene (PS)

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

Expanding Closed-Loop Plastic Material Recycling Technology

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.

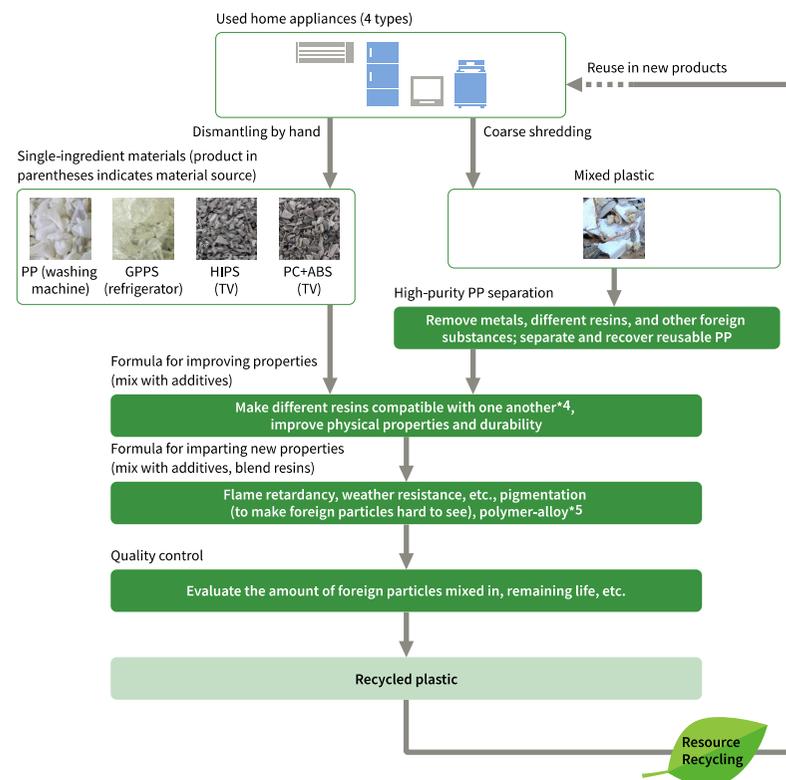
Sharp has been striving to make more plastic recyclable through the development of new technologies. These include a technology for recovering high-purity polypropylene (PP) from mixed plastic parts and parts that contain metal; a technology for improving the properties of recovered PP/HIPS*2 and PC+ABS*3 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

Developing Recycled-Plastic Material with Added Value

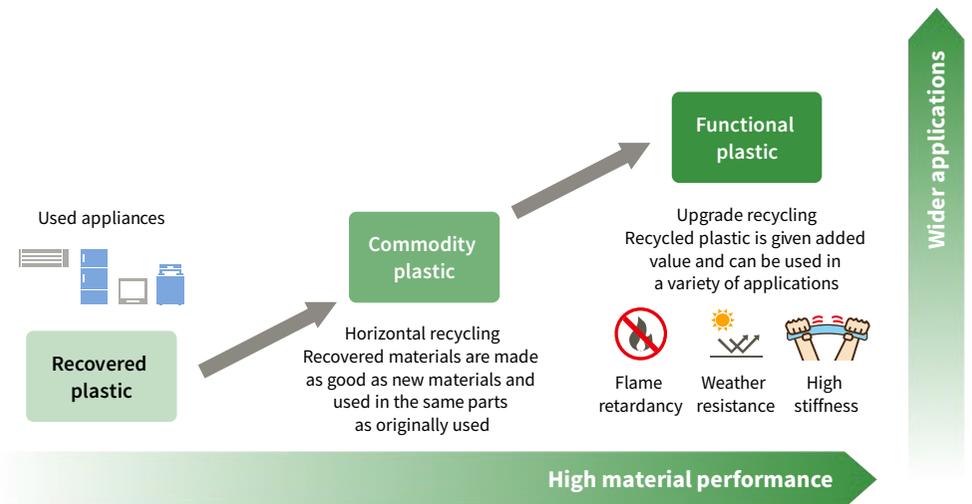
In response to the increasing seriousness of pollution from used plastic, countries are enacting and enhancing various laws and regulations related to plastic recycling. There is a push to move away from the traditional linear economy, characterized by mass production, mass consumption, and mass disposal, 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 Act on Promotion of Resource Circulation for Plastics*. 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 2022, Sharp developed mass-production technology for recycled flame-retardant polypropylene and used the material in the internal parts of ceramic fan heaters. Polypropylene recovered from used home appliances is given the physical properties, flame resistance, and long-term durability demanded in home appliances using Sharp's own formulation technology. Recycled flame-retardant polypropylene is difficult to make using conventional methods. This is because it requires mixing recovered polypropylene with a thermally decomposable flame retardant and multiple modifiers under high temperature. Sharp's new formulation and optimized process have enabled the mass production of high-performance, high-quality recycled flame-retardant material. This recycled material can be used in place of metal in parts that require a high level of safety, such as those used around power switches and heat sources. The practical application of this recycled plastic material holds promise for lighter and cheaper products, while also curbing the generation of waste plastic.

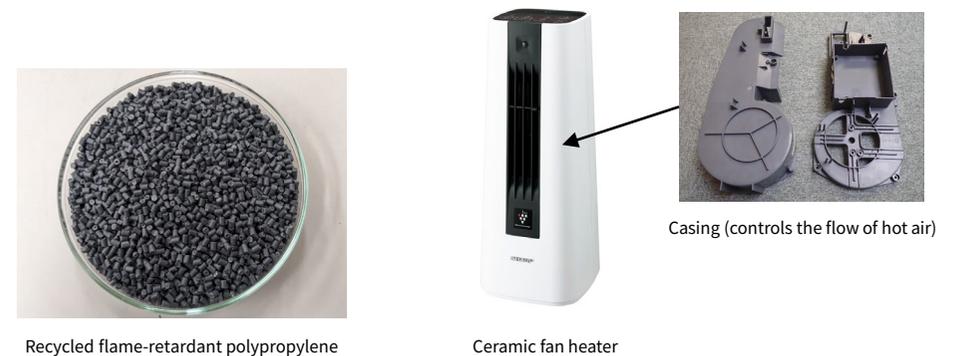
Going forward, Sharp will develop recycled materials that use no environmentally harmful substances such as halogen compounds, thereby contributing to a circular economy.

* 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



Using Recycled Flame-Retardant Polypropylene

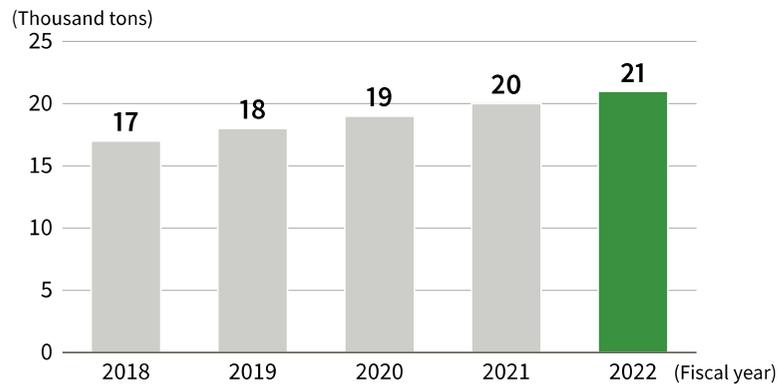


Environmental Initiatives: Resource Recycling

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

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 2022. In fiscal 2022, the cumulative total amount used since 2001 reached 21,000 tons.

■ Amount of Recycled Plastic Used



Related information: > [Closed-Loop Plastic Material Recycling Technology](#)

■ Examples of Recycled Plastic Use



Refrigerator



Washing machine



Air conditioner



Car Plasmacluster Ion generator



Handheld device (Handy Terminal) charger



Ceramic fan heater

Product	Recycled Plastic	Part	Source
Refrigerator	PP	Divider	Refrigerator vegetable case
		Duct cover	Refrigerator vegetable case
		Handgrips	Washing machine top plate, outer cabinet, other
	Evaporator cover	Washing machine spin tub, balancer, other	
	Flame-retardant PS	Substrate holder	Flat-panel TV back cabinet + refrigerator tray
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
	Flame-retardant PS	Substrate holder, substrate spacer	Flat-panel TV back cabinet + refrigerator tray
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
Ceramic fan heater	Flame-retardant PS	Casing	Air conditioner, refrigerator, and washing machine parts

Environmental Initiatives: Resource Recycling

Environmentally Conscious Products

Example

AQUOS wish3 Smartphone Uses Significantly More Recycled Plastic

Sharp released its AQUOS wish3 basic model smartphone in July 2023. The third edition of a smartphone series whose simplicity matches a user’s straightforward lifestyle, the wish3 is environmentally friendly and has a wealth of functions that are easy to use for the entire family.

This model continues with the lauded features of the AQUOS wish series, such as a smooth surface texture and a range of gentle, sophisticated color choices. In addition to its compact and easy-to-hold size and simple design, the wish3 is highly resistant to water, dust, and impact^{*1}.

The use of recycled plastic in the wish3’s casing has been upped to approximately 60%^{*2}. It now also adopts^{*3} recycled plastic around the camera and in some interior parts. And adding to the phone’s environmental friendliness is its use of a small and simple package using less paper than before.

The wish3 also includes Junior Mode, a new feature for children using a smartphone for the first time. The mode’s wealth of safety features includes Google Family Link for preventing the child’s overuse of the phone, and an emergency SOS signal activated by multiple pushes of the power button. Add the wish3’s Easy Mode giving large, bold onscreen text that even older users can read, and you have a smartphone offering usability and convenience for the whole family.

The wish3’s camera incorporates ProPix4 lite, Sharp’s new image engine using the high-quality-image technology of Sharp’s flagship model AQUOS R7. Users can easily take gorgeous photos thanks to features like AI Auto, which chooses the optimal image mode by automatically detecting the subject and surroundings, and Auto HDR, which takes great photos even against a bright backlight.

- *1 Tested for compliance with MIL-STD-810H, a standard of the United States Department of Defense for ensuring a product can withstand the conditions under which it will be used. There is no guarantee the product will not break or malfunction under all types of impact.
- *2 The AQUOS wish2, released in fiscal 2022, used approximately 35% recycled plastic.
- *3 Parts other than the casing use approximately 35% recycled plastic.



(Left) AQUOS wish3 in white, black, and green
(Right) Conceptual image of recycling

Environmental Initiatives: Resource Recycling

Effectively Using Water Resources

Fiscal 2023 Objectives	
■	Improvement rate of water intensity: 10% (baseline year: fiscal 2021)

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.

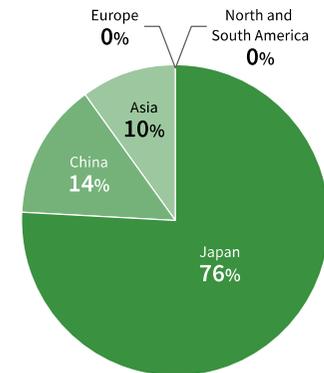
Reducing the Amount of New Water Used and Using More Recycled Water

The volume of new water used by the Sharp Group in fiscal 2022 decreased by 6% compared to the previous fiscal year to 10.2 million m³. To minimize the effects on business continuity of the risk of water shortages, Sharp assesses water risk at its plants using the Aqueduct 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

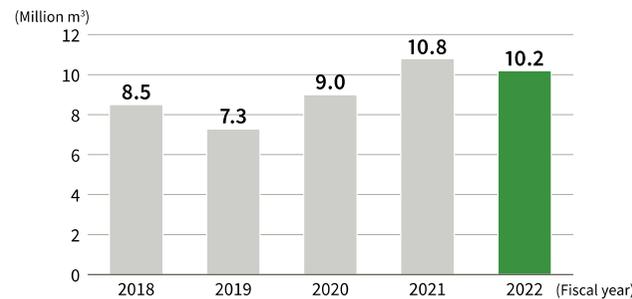
other products. All of the water discharged from the production process is collected and reused via a closed-loop recycling system adopted at both plants. Through measures such as this, the Sharp Group is maintaining a recycling rate* of at least 60%. Looking ahead, Sharp will pursue further water-use efficiency worldwide and boost production efficiency in accordance with business expansion. In fiscal 2022, 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).

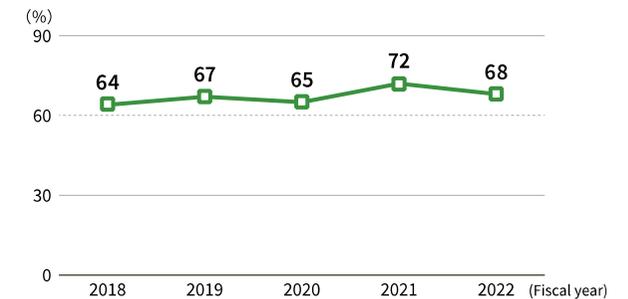
■ New Water Used by Region (Fiscal 2022)



■ Volume of New Water Used



■ Water Recycling Rate



Environmental Initiatives: Resource Recycling

Effectively Using Water Resources

Water Used and Drainage by Region (Fiscal 2022)

(m³)

Region	Water withdrawal*1			Effluent					Amount consumed*3	Amount recycled
	Third-party water*2	Groundwater	Total	Surface water	Sewerage	Seawater	Groundwater	Total		
Japan	7,018,688	757,353	7,776,041	3,800,411	343,123	1,990,662	0	6,134,196	1,641,845	21,063,228
Asia	974,903	14,854	989,757	36,561	532,347	0	0	568,908	420,849	115,310
China	1,362,880	29,883	1,392,763	0	1,133,171	0	0	1,133,171	259,592	207,197
North and South America	12,301	0	12,301	0	12,301	0	0	12,301	0	0
Europe	8,401	0	8,401	0	8,160	0	0	8,160	241	0
Total	9,377,173	802,090	10,179,263	3,836,972	2,029,102	1,990,662	0	7,856,736	2,322,527	21,385,735

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

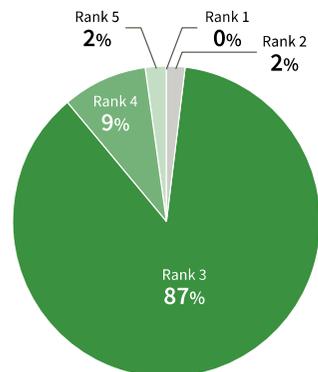
*2 Industrial-use water and tap water.

*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 2022)



Volume of New Water Used in Water Stressed Regions*5 (Fiscal 2022)

(m³)

Region	Third-party water	Ground-water	Surface water	Seawater	Produced water	Total
Japan	36,418	0	0	0	0	36,418
Asia	844,223	0	0	0	0	844,223
China	123,689	0	0	0	0	123,689
North and South America	0	0	0	0	0	0
Europe	0	0	0	0	0	0
Total	1,004,330	0	0	0	0	1,004,330

Environmental Initiatives: Resource Recycling

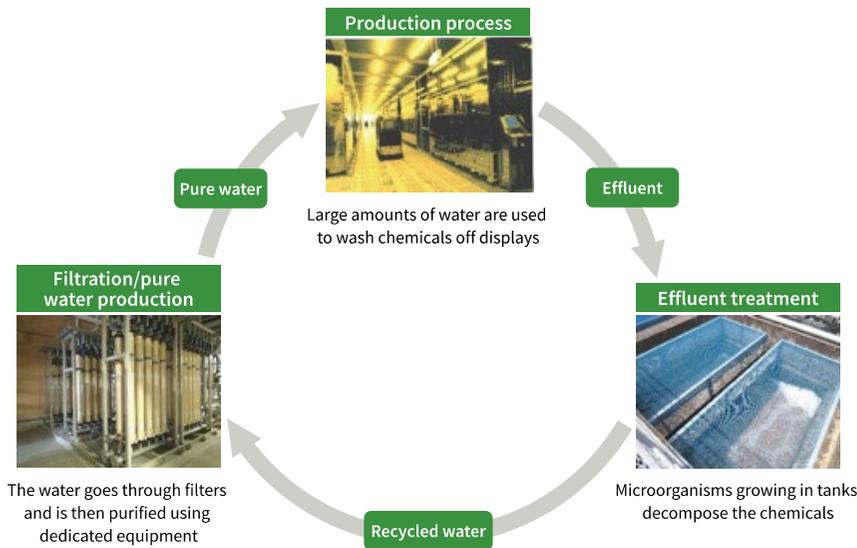
Effectively Using Water Resources

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 88,000 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.

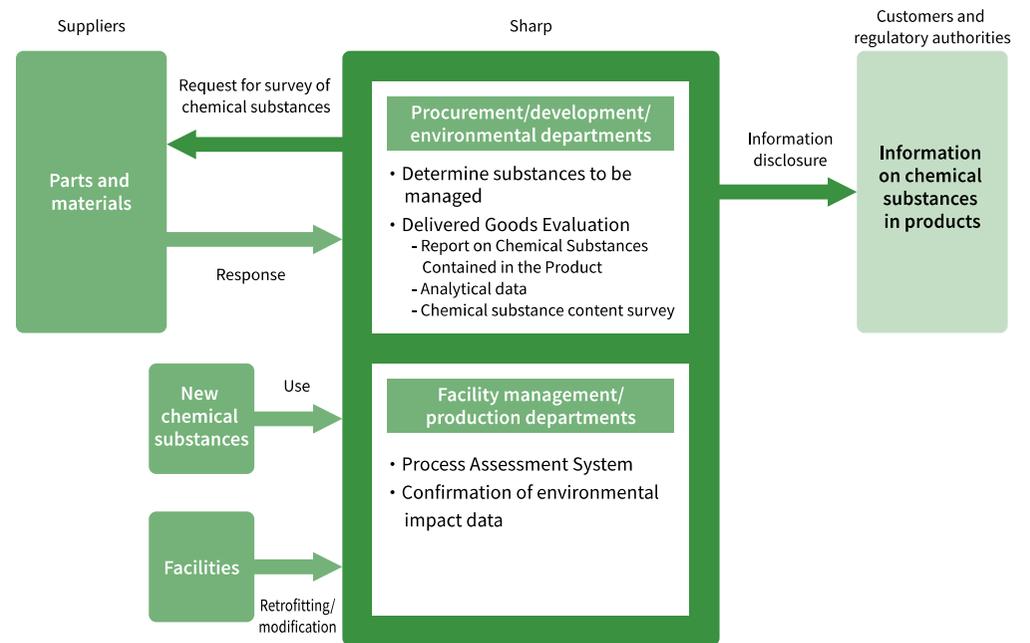
In accordance with our Basic Environmental Policy of "Creating an Environmentally Conscious Company with Sincerity and Creativity," the Sharp Code of Conduct stipulates the management of chemical substances as follows, on the precondition of compliance with applicable environmental laws, regulations,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

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

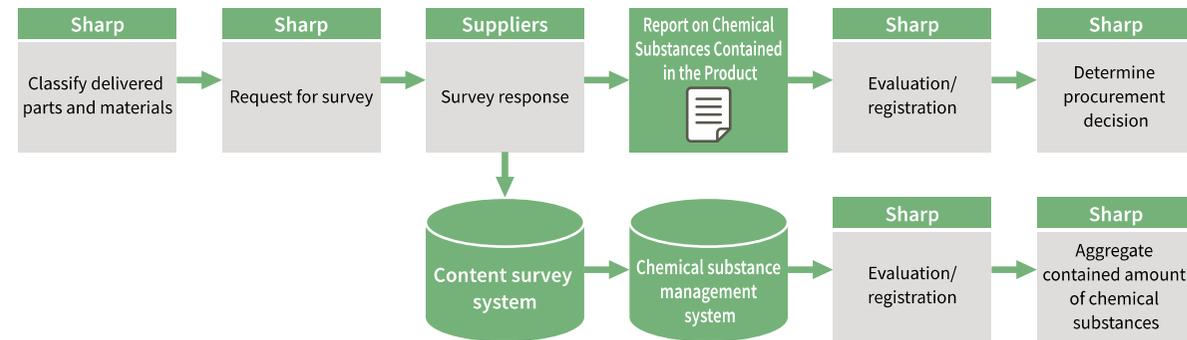
Managing Chemical Substances Contained in Products

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. Of these PRTR chemicals, 17 were handled in Japan and five overseas^{*2} in quantities of 500 kg or more by one or more plants during fiscal 2022.

*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 2022)

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	
1	Zinc compounds (water-soluble)	1,728	0	0	0	1,629	0	99	0
20	2-Aminoethanol	2,312,109	1,053	0	0	46,511	0	1,975,126	289,419
44	Indium and its compounds	30,240	0	0	0	5,843	2,840	21,557	0
71	Ferric chloride	70,147	0	0	0	2,126	0	14,089	53,932
80	Xylene	3,966	20	0	0	0	0	0	3,946
135	2-methoxyethyl acetate	109,000	718	0	0	0	0	82,700	25,582
232	N, N-dimethylformamide	21,942	0	0	0	0	0	0	21,942
272	Copper salts (water-soluble, except complex salts)	40,213	0	0	0	37,955	0	0	2,258
296	1,2,4-trimethylbenzene	18,450	23	0	0	693	0	13,160	4,574
297	1,3,5-trimethylbenzene	3,304	0	0	0	165	0	3,139	0
343	Pyrocatechol (also called catechol)	1,474	0	0	0	1,474	0	0	0
374	Hydrogen fluoride and its water-soluble salts	672,955	2,165	0	440	432,767	0	46,213	191,370
401	1,2,4-benzenetricarboxylic 1,2-anhydride	2,179	0	0	0	174	2,005	0	0
405	Boron compounds	4,363	29	0	0	3,990	57	287	0
412	Manganese and its compounds	18,733	0	0	0	147	18,586	0	0
438	Methylnaphthalene	11,669	53	0	0	0	1,635	0	9,981
453	Molybdenum and its compounds	11,563	29	0	0	3,089	347	8,098	0
	Total	3,334,035	4,090	0	440	536,563	25,470	2,164,468	603,004

(kg)

Environmental Initiatives: Safety and Security

Release and Transfer of PRTR-listed Substances

■ Overseas PRTR Data (Fiscal 2022)

(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	
71	Ferric chloride	2,909	0	0	0	0	2,909	0	0
82	Silver and its water-soluble compounds	1,223	0	0	0	171	1,052	0	0
300	Toluene	8,513	8,513	0	0	0	0	0	0
392	N-hexane	40,315	40,315	0	0	0	0	0	0
448	Methylenebis(4,1-phenylene) diisocyanate	2,220,350	0	0	0	44,585	2,175,765	0	0
Total		2,273,310	48,828	0	0	44,756	2,179,726	0	0

Environmental Initiatives: Safety and Security

Managing Environmental Load into Air and Water Areas

Fiscal 2022 Objectives	Fiscal 2022 Achievements	Self-Evaluation	Priority Objectives for Fiscal 2023
■ VOC emissions into the atmosphere: 204 tons or less (fiscal 2010 levels)	■ VOC emissions into the atmosphere: 73 tons	★★	■ VOC emissions into the atmosphere: 204 tons or less (fiscal 2010 levels)

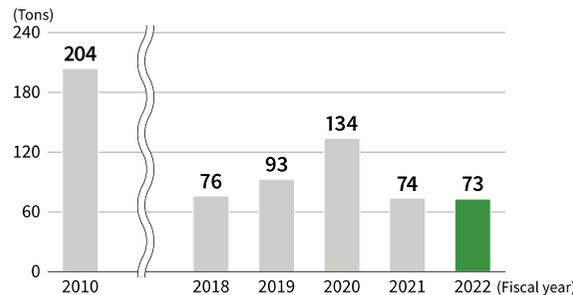
Self-evaluation: ★★★ Achieved more than targeted / ★★ Achieved as targeted / ★ Achieved to some extent

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 2022 VOC emissions were 73 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

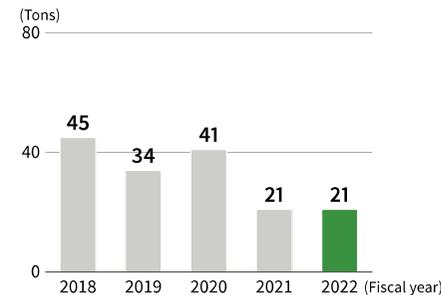


Managing Environmental Load into Air and Water Areas

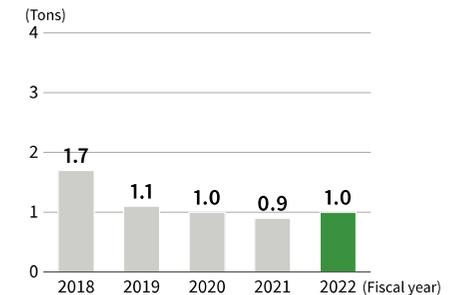
Sharp properly manages pollutants that affect air and water quality by establishing voluntary standards that are stricter than those set forth in laws and regulations and stricter than those agreed upon with local communities. It also actively conducts risk communication with local communities.

< Atmospheric Emissions in Japan >

■ NOx Emissions



■ SOx Emissions

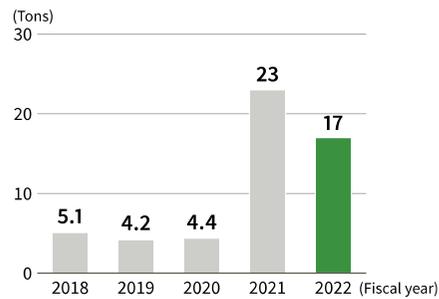


Environmental Initiatives: Safety and Security

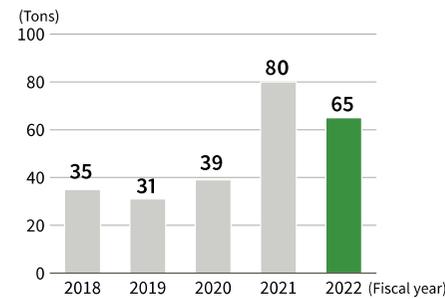
Managing Environmental Load into Air and Water Areas

< Emissions into Water Areas in Japan >

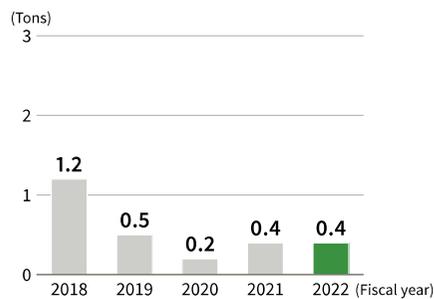
■ COD (Chemical Oxygen Demand)



■ 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.

Promoting Sustainable Management

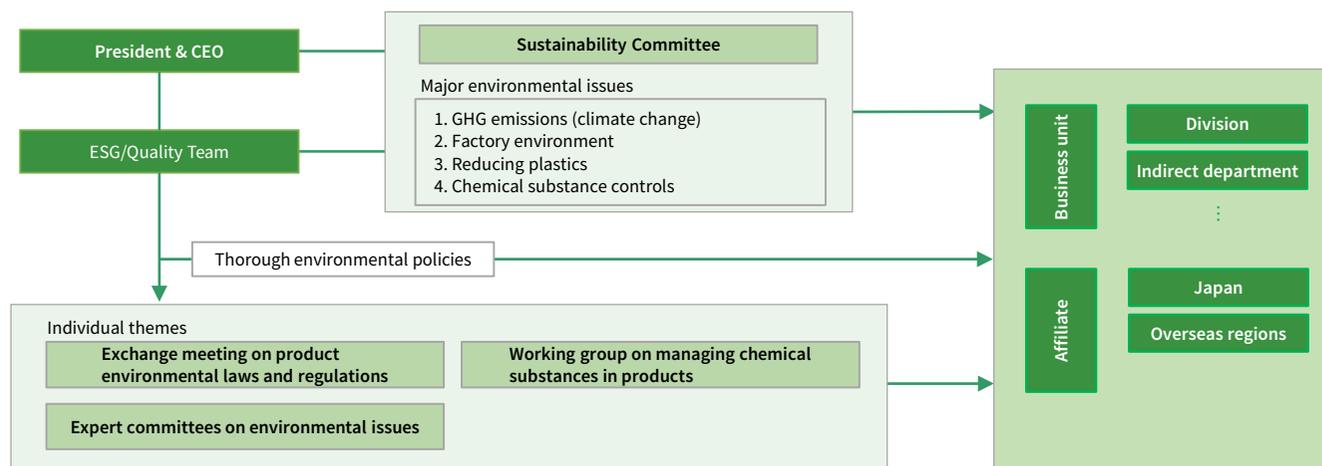
Sharp has set up the ESG/Quality Team to formulate and carry out the company's environmental vision, policies, and targets, and to strengthen environmental governance. The ESG/Quality Team formulates important environmental policies, strategies, and measures at the corporate level regarding sustainable 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/Quality Team 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 expert committees are also established as required to address environmental issues that call for cross-functional efforts.

* See page 009.

<p>Basic Environmental Philosophy</p> <p>Creating an Environmentally Conscious Company with Sincerity and Creativity</p>	<p>The Sharp Group Charter of Corporate Behavior (excerpt)</p> <p>Contribution to Conservation of the Global Environment</p> <p>The Sharp Group will make efforts to further contribute to global environmental conservation by strengthening our development of proprietary technologies for protecting the global environment and by carrying out business activities in an environmentally conscious manner.</p>	<p>The Sharp Code of Conduct (excerpt)</p> <p>Contribution to Conservation of the Global Environment</p> <ol style="list-style-type: none"> 1. To Conserve the Environment 2. To Develop Environmentally Conscious Products and Services, and Conduct Our Business Operations in an Environmentally Conscious Manner
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Related information: > [Sharp Group Charter of Corporate Behavior \(Contribution to Conservation of the Global Environment\)](#)
[Sharp Code of Conduct \(IV. Contribution to Conservation of the Global Environment\)](#)

System for Promoting Sustainable Management in the Environmental Area



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 2022, Sharp held training on product environmental laws and regulations. Individual plants also held their own training sessions. For example, the Katsuragi Plant (Katsuragi, Nara Prefecture) held a session on environmental management systems for environmental committee members and training for employees who handle chemical solutions and gases. At SSEC, Sharp's production base in China, employees underwent online training led by outside experts on energy conservation and energy-saving best practices.

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 established a 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.

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*. To strengthen governance and reduce risks, our survey in fiscal 2022 was focused on interviews at sites that have just joined the Sharp Group through M&A or other partnerships.

* See page 012.

Legal Violations, Accidents

In fiscal 2022, 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 2022, sales of those products reached 131.2 billion yen, with SGP sales accounting for 28% 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



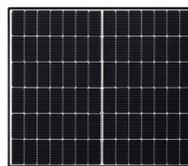
Plasmacluster washing machine/dryer ES-X11A



Smartphone AQUOS sense7



Digital full-color MFP BP-70C45



Solar module NU-259AM

Example

Developer Interviews

Sharp has the “Always Thinking Green” website, which features interviews with product planning staff, engineers, designers, and other staff involved in product development. The site conveys their commitment to environmentally conscious manufacturing and the difficulties they have faced. Through this site, Sharp aims to boost the added value of products by communicating the products’ appeal from an environmental perspective. In fiscal 2022, the site featured AQUOS wish/wish2 smartphones and a front-loading washer/dryer.

Related information: > [Always Thinking Green](#)



The smartphone development team



The front-loading washer/dryer development team

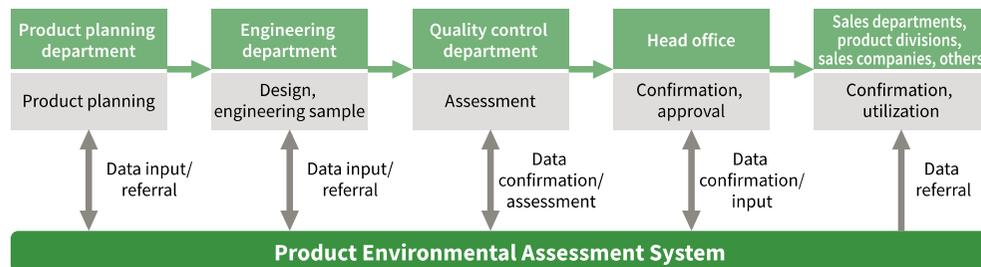
Environmental Initiatives: Environmental Management

Developing Environmentally Conscious Products and Devices

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: Biodiversity Protection

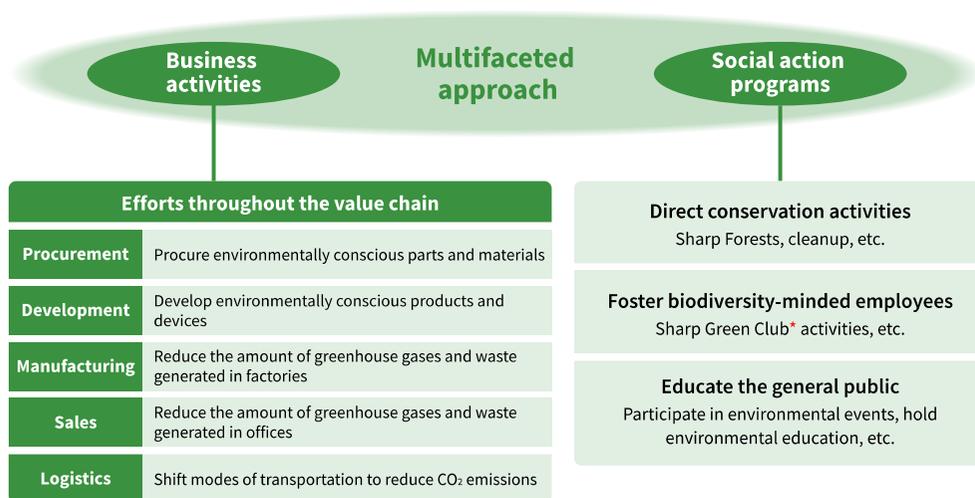
Protecting Biodiversity

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



* A joint Sharp labor-management volunteer organization.

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

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 maintain the area by periodically cutting down withered bamboos, weeding the grounds, and gathering and planting seeds.



Cutting down withered bamboos and weeding



Gathering seeds



Planting seeds



Bamboo lilies, a rare wild plant native to the area

Example

Preserving Biodiversity at Overseas Bases

Indonesian production and sales base SEID works with the local community to preserve biodiversity. On the annual International Day for Biological Diversity (May 22 each year), the company held an event where activities included employees and local students planting mangroves and cleaning up the beaches on the island of Panggang Island, Jakarta.



Planting mangroves



Participants after the beach cleanup

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		
			2022		
Procurement, R&D, product manufacture		TJ※1	21,262		
	Energy	Electricity	Million kWh	1,816	
		Renewable energy※2	Million kWh	10	
		City gas	Million m ³	56	
		LPG, LNG	Tons	5,379	
		Heavy oil, kerosene, gas oil, gasoline	Kl	1,887	
		Hot water, cold water, steam	TJ	727	
	PFCs purchased	Tons	1,441		
	Water resources		Million m ³	31.4	
		Water withdrawal		Million m ³	10.2
			Third-party water※3	Million m ³	9.4
		Groundwater	Million m ³	0.8	
	Water reused	Million m ³	21.4		
	Chemical substances handled (PRTR-listed)	Tons	5,605		
	Chemical substances handled (VOCs)	Tons	3,167		
	Materials consumed※4		Thousand tons	746	
		Recycled plastic※5	Thousand tons	1	
Logistics	Energy consumed (vehicle fuel)※6	TJ	152		
Product use	Energy consumed (electricity)※7	Million kWh	4,809		

Greenhouse gases Water Chemicals Resources

Output

Item		Unit	Fiscal Year		
			2022		
Procurement, R&D, product manufacture	Greenhouse gases		Thousand tons CO ₂	1,125	
		CO ₂	Thousand tons CO ₂	940	
		Gases other than CO ₂ (converted into amount of CO ₂)		Thousand tons CO ₂	185
			HFC	Thousand tons CO ₂	2
			PFC	Thousand tons CO ₂	81
			SF ₆	Thousand tons CO ₂	50
	NF ₃	Thousand tons CO ₂	53		
	Effluent		Million m ³	7.9	
		Public water areas	Million m ³	5.8	
		Sewerage	Million m ³	2.1	
	Chemical substances released and handled (PRTR-listed)	Tons	635		
	Chemical substances released and handled (VOCs)	Tons	73		
	Atmosphere※6	NOx emissions	Tons	21	
		SOx emissions	Tons	1	
	Water areas※6	COD (chemical oxygen demand)	Tons	17	
		Nitrogen pollutant load	Tons	65	
		Phosphorous pollutant load	Tons	0.4	
Product shipments※8	Thousand tons	660			
Waste, etc.		Thousand tons	86		
	Final landfill disposal	Thousand tons	0.4		
Logistics	CO ₂ emissions※6	Thousand tons CO ₂	10		
Product use	CO ₂ emissions※7	Thousand tons CO ₂	2,576		

Recycle

Item		Unit	Fiscal Year
			2022
Amount recycled※6	Home appliances (4 kinds)	Thousand tons	69
		Copiers/MFPs	Thousand tons
	PCs	Tons	5
	Amount of closed-loop material recycling of plastic	Thousand tons	1
Disposal after recycling※6	Thousand tons	10	

- *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 Amount recycled through closed-loop plastic material recycling technology.
- *6 In Japan.
- *7 Annual energy used and amount of CO₂ emitted by major products sold in the reporting year (estimate).
- *8 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 4th 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
	Amount of closed-loop material recycling of plastic	Amount of recycled plastic used, which was produced through closed-loop material recycling
	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