

Contributing to society has been the management philosophy for Panasonic ever since its founding, and we have been taking measures against pollution since the 1970s. We announced the Environmental Statement in June 5, 1991, clarifying our approaches to address global environmental issues as a public entity of society. Since then we have been carrying out initiatives including matters on global warming prevention and resources recycling corporate-wide, aiming to attain a sustainable, safe, and secure society.

After the completion of the Green Plan 2010 which was established in 2001, the Green Plan 2018 was established in 2010 to clarify our targets for fiscal 2019 (from April 1, 2018 to March 31, 2019) as well as an action plan for all employees in order to achieve the targets. The Green Plan 2018 will continue our initiatives in five areas: CO₂ reduction, resources recycling, water, chemical substances, and biodiversity.

In 2013, the Panasonic Group introduced a new brand slogan, “A Better Life, A Better World,” aiming to realize a better life for all its customers, and is promoting environmental initiatives as an important element in achieving that goal. Based on this, the Green Plan 2018 was revised in 2013, followed by the newly-established Environmental Action Guideline. Furthermore, in response to rising demand by the society for CO₂ reductions following the 21st session of the Conference of the Parties (COP21) of the United Nations Conference on Climate Change, and to the need to make changes to our business structure, including growth in the automotive and B2B businesses, the Plan was revised again in 2016.

Additionally, we formulated the Environment Vision 2050 in 2017 to achieve “a better life” and “a sustainable global environment,” aiming for a society with clean energy and a more comfortable lifestyle. Under the Vision, through the development of products, technologies, and solutions relating to energy creation, storage, saving, and management, Panasonic will work towards creation and more efficient utilization of energy which exceeds the amount of energy used.

Environmental Policy

Environmental Statement

Fully aware that humankind has a special responsibility to respect and preserve the delicate balance of nature, we at Panasonic acknowledge our obligation to maintain and nurture the ecology of this planet. Accordingly, we pledge ourselves to the prudent, sustainable use of the earth's resources and the protection of the natural environment while we strive to fulfill our corporate mission of contributing to enhanced prosperity for all.

Environmental Action Guideline

Toward achieving a sustainable society, we will strive to develop our business through the creation of environmental value. For this purpose, we will address environmental challenges through our business activities and will expand our environmental initiatives based on collaboration with stakeholders.

(1) Initiatives to address environmental challenges

- We will reduce CO₂ emissions through production activities and products/services.
- We will work to efficiently use resources by pursuing Recycling-oriented Manufacturing.
- We will conserve water resources through efficient use of water and prevention of contamination.
- We will reduce the impact of chemical substances on human health and the environment.
- We will consider and conserve biodiversity.

(2) Initiatives based on collaboration with stakeholders

- We will provide products and services that create environmental value for customers with our technical strengths.
- We will expand our environmental contributions with our partner companies.
- We will deepen communications with local communities and work as a team to address environmental challenges.

Environmental Action Plan

Green Plan 2021 (see pages 16-17)

We strive to grow and develop our business through the creation of environmental value for customers with our technical strengths while each and every employee follows the Environmental Policy to address environmental challenges. Therefore, collaboration with stakeholders including our partners is essential. We will continue to sincerely work on environmental sustainability management through further collaboration with stakeholders.

Environment: Panasonic Environment Vision 2050

Panasonic Environment Vision 2050

While the global attention being paid to the social issues surrounding the environment and energy is intensifying, the focus on the Sustainable Development Goals (SDGs) set by the United Nations and the Paris Agreement—through which a number of countries allied together to work towards global warming prevention—indicates the seriousness of these issues worldwide.

In the UN Climate Action Summit 2019, held in September 2019, companies, civic groups, and the national and local governments of various countries discussed actions to take preventive measures for global warming. As the closing remarks of the summit appealed to companies to take more ambitious actions and the like against climate change, society's expectations for the role of companies in resolving global social issues are now increasing more than ever.

Aware that society's expectations of the role of corporations in resolving these global social issues is rising, Panasonic formulated the Panasonic Environment Vision 2050 in 2017 to determine our own initiatives in responding to the expectations and requests from our stakeholders.

The Environment Vision 2050 was formulated to promote activities for reducing the amount of energy to use, and creating and utilizing clean energy whose amounts exceed the amount of the "energy used" at the same time, aiming for increasing the number of societies where residents use clean energy and live a more comfortable lifestyle to realize 'A better life' and 'Sustainable global environment' compatibly.

At formulating the Environment Vision 2050, the total amount of the "energy created" (clean energy that is created and/or made available through Panasonic products and services, including photovoltaic power generation systems, storage batteries, and energy solutions) remained approximately one-tenth of the amount of the "energy used" (the energy used in our business operations such as in production and the "energy used" by our products at customers sites).

To realize their Environmental Vision, we will reduce the amount of the "energy used" as much as possible through development of technologies that will improve the energy-saving performance of our products, and innovations to our manufacturing processes. At the same time, we will increase the amount of the "energy created", by increasing opportunities to utilize clean energy through expansion of our energy-generation and storage businesses as well as contribution to building new social systems such as building a hydrogen society.

Through these efforts, Panasonic will endeavor to make the "energy created" exceed the "energy used" toward the year 2050.

Panasonic Environment Vision 2050

To achieve "a better life" and "a sustainable global environment,"
Panasonic will work towards
creation and more efficient utilization of energy
which exceeds the amount of energy used,
aiming for a society with clean energy and a more comfortable lifestyle.

Energy used < Energy created

Panasonic

Activities for Achieving the Environment Vision 2050

To achieve Environment Vision 2050, we are working on two main activities, considering “energy” and “resources” as our materiality.

One of the initiatives to realize the Environment Vision 2050 is “creating a safe and secure society with clean energy.” To be specific, we will work to provide eco-conscious and smart living spaces as well as contribute to eco-conscious and smart travel and transport.

Another initiative is “promoting businesses aiming for a sustainable society.” We will work to promote effective utilization of resources as well as promote the creation of factories with zero CO₂ emissions.

1. Panasonic will Create a Safe and Secure Society with Clean Energy

The eco-conscious and smart living spaces that Panasonic strives to provide means living spaces that create electricity and/or hydrogen using clean energy and then storing/transporting the created energy. Such living spaces offer a safe and secure life with clean energy enabled through appropriate energy management for energy-saving equipment and buildings with high insulation performances. Here, living spaces refer to not only homes of individuals but also working or learning spaces, and spaces for living or leisure. It refers to all spaces relating to people’s lives.

In order to realize this, Panasonic will work on development of environmental technologies from the four viewpoints of energy creation, energy saving, energy storage, and energy management.

As for energy creation, in particular, we will develop a next-generation solar cell technology and fuel cell technologies that use hydrogen derived from clean energy as energy source. At the same time, for energy storage, we will work on technologies relating to storing and/or supplying hydrogen, and storage batteries. These will expand the possibilities of utilizing clean energy anywhere in the society.

We will also work on developing environmental technologies to realize eco-conscious and smart travel and transport. With further development in technology of storage battery systems for eco-cars such as electric vehicles, we will contribute to promoting the shift from fossil fuels to clean energy. Additionally, for a safe mobility society, we will work on further development of support systems for autonomous driving and utilize our IoT technology etc. to realize next-generation logistics/transport solutions that help arteries in the society flow more smoothly.

As part of our efforts to promote the utilization of clean energy throughout society, we built the ‘H₂ Kusatsu Farm’, a hydrogen energy station, in the Kusatsu Factory premises of Appliances Company in Kusatsu City, Shiga Prefecture. Towards Zero CO₂ emissions from goods logistics in the premises, we have been testing usage of forklift trucks powered by hydrogen, electrolytically generated from water using renewable energy since FY2019. Also, in HARUMI FLAG, a residential estate to be built at the post Tokyo 2020 athlete’s village site, a pure hydrogen fuel cell generator installed in each town block will provide electricity for communal facilities, such as exterior lights and air conditioners.

Further, we plan to install residential fuel cells ‘ENE-FARM’ powered by hydrogen, which is reformed from city gas, in all approx. 4,000 houses in the town. This should reduce CO₂ emissions by 4,000 tons per year.



H₂ Kusatsu Farm



View of HARUMI FLAG

2. Panasonic will Promote Businesses Aiming for a Sustainable Society

As efforts to promote effective utilization of resources, we will aim for sustainable use of resources through reuse of parts and materials and product recycling. Establishing zero-CO₂ factories that we are working on is to promote reducing the amount of the “energy used” in our factories through utilization of advanced energy-efficient technologies and innovation in manufacturing, such as LED lighting and FEMS.¹⁾ at the same time, to promote manufacturing that does not emit CO₂ through increasing the amount of the “energy created” in our factories by utilizing photovoltaic power generation system, energy storage batteries, and the like.

Specifically to reduce CO₂ emission, while promoting manufacturing with minimum energy consumption through continued

energy-efficiency activities and their evolution, we will adopt renewable power generation equipment such as photovoltaic power generation systems and wind power generation systems at own sites. We will also procure 100% renewable energy electricity. In addition, we will realize zero CO₂ emission derived from energy sources in manufacturing through utilization of CO₂ credits to offset CO₂ emissions from fossil fuels, and the like.

In fiscal 2020, Panasonic Centroamericana S.A. (PCA), the dry-cell battery factory in Costa Rica, launched Costa Rica's first private-public project with the national government. As a part of this project, the factory was provided with 400 solar panels and 100% renewable energy electricity from the public power distribution company. The factory also utilizes CO₂ credits to achieve zero CO₂ emissions. As a result, the factory was certified as the 1st '100% renewable power factory' by Costa Rica government.

For realizing a zero-CO₂ factory, our respective factories across the world must devise means, because the appropriate types of energy conservation efforts depend on the characteristics of production in the factory, and the available renewable energy depends on regional characteristics. We will establish six zero-CO₂ factories across the world by adopting learning from internal and external precedents and combining them with factory-specific approaches by fiscal 2020. Furthermore, we will roll out this activity world-wide to steadily promote our Environment Vision 2050.

*1 Factory Energy Management System



Full view of Panasonic Centroamericana S.A.



Provided solar panels



Kick-off ceremony for the pilot project for decarbonation
President Nakanishi, PCA (left), the First Lady of Costa Rica (middle), and the Deputy Minister of Environment (right)

Environmental Action Plan “Green Plan 2021”

Having achieved the targets we set out in Green Plan 2018, we have created a new Green Plan 2021 for the period from fiscal 2020 to 2022 to move us forward towards Panasonic Environment Vision 2050, which aims for building societies based on clean energy and more comfortable lifestyles that will bring “A better life” and “Sustainable global environment” compatibly.

Green Plan 2021 sets targets that focus on “energy” and “resources,” which are the materiality to address to realize Environment Vision 2050. We also set out integrated and simplified targets as our continuing efforts for issues other than the above material issues, based on the Environmental Action Guidelines while taking account of environmental challenges and understanding society. We plan to direct our efforts to make “energy created” exceed “energy used” towards the year 2050, or even earlier.

To this end, in terms of “energy”, we will “increase amount of energy created” and “increase the size of contribution toward energy savings” in the area of products and services.

The size of contribution toward energy savings through our products and services is an index to indicate the amount of our efforts toward energy savings when our products and services are used by customers. We aim to increase the value of this index. The initiative to increase this index is similar to our aims concerning the size of contribution in reducing CO₂ emissions through our products and services, which indicates the amount of our efforts to reduce CO₂ emissions in order to bring forward the peak of total CO₂ emissions in whole society. When the size of contribution in reducing energy consumption is converted to CO₂ emissions, it can be transferred to the size of contribution in reducing such emissions.

As a means of “energy,” Panasonic factories will undertake “promoting zero-CO₂ model factories,” “increasing the use of renewable energy,” and “promoting energy efficiency in production.”

In our production activities, we are currently working to further reduce energy consumption and CO₂ emissions by employing thorough energy-saving measures in all factories across the globe.

In terms of “resource,” we will “create circular economy business models,” “reduce resources consumption and increase the use of sustainable materials,” and “achieve Zero Waste Emissions from factories globally.”

As other environmental sustainability goals, We will strive to take initiatives in solving issues concerning water, chemical substances, and biodiversity, as well as in promotion of community contributions and education for the next-generation, and to prevent pollution in factories and thoroughly comply with product-related laws and regulations.

To spread a positive influence across society, we are accelerating our environmental efforts by rolling them out beyond Panasonic across the entire supply chain through close collaboration with a variety of partners.

We will steadily put this environmental action plan into practice to achieve the set targets by fiscal 2022.

Environmental Action Plan “Green Plan 2021”

Category		2021 targets		FY2020		
Material Issues	Energy	Increase the ratio of total energy created to total energy used		Total energy created ^{*1} : total energy used ^{*2} = 1 : 8.5	1 : 9.0	
		Products & Services	Increase amount of energy created		Amount of energy created ^{*1} : 30 thousand GWh or more	26 thousand GWh
			Increase the size of contribution toward energy savings through products and services		Size of contribution toward energy savings through products and services ^{*3} : Direct ^{*4} : 25 thousand GWh or more Indirect ^{*5} : 2 thousand GWh or more	Direct: 28 thousand GWh Indirect: 2.3 thousand GWh
			Expand energy creation businesses			—
			Expand energy efficient products and services business, focusing on products and services utilizing IoT/AI			—
			Promote zero-CO ₂ model factories - Establish model factory using advanced hydrogen technology - Establish at least one zero-CO ₂ model factory in each region ^{*6}			—
		Factories	Increase the use of renewable energy through the generation of renewable energy on-site and procurement of renewable energy		Renewable energy generated on our sites ^{*7} : 40 thousand MWh or more	32 thousand MWh
			Promote energy efficiency in production - Reduce energy loss through IoT - Improve productivity through manufacturing innovation			—
			Create circular economy business models		Analysis of the development of circular economy options for existing businesses: 100%	—
		Resources	Reduce resource consumption and increase the use of sustainable materials		Recycled resin usage ^{*8} : 42 thousand tons or more (2019 to 2021 total)	13 thousand tons
Achieve Zero Waste Emissions from factories globally			Factory waste recycling rate ^{*9} : 99 % or more	98.9%		
Other environmental sustainability goals	Water	Reduce water consumption in production activities				
	Chemical substances	Minimize the environmental impact of chemical substances usage in production activities and products				
	Biodiversity	Promote procurement of sustainable materials				
	Local communities	Promote environmental initiatives to contribute to local communities and educate the next generation				
	Compliance	Ensure compliance with environmental laws and regulations				

*1 Clean energy that is created/efficiently utilized in business activities as well as for products/services made through such activities.

*2 Energy that is used in business activities as well as for products/services made through such activities.

*3 The amount of energy achieved by deducting the actual emissions from the amount that would have been emitted without the improvements by the energy-saving performance of our products.

*4 Size of contribution by our major products.

*5 Size of contribution by our solutions, or materials and components built into products of other companies.

*6 Five areas, covering: Japan; China & Northeast Asia; Southeast Asia & Oceania, India & South Asia, and Middle East & Africa; North America and Latin America; and Europe & CIS.

*7 Usage in Panasonic's sites of renewable energy (solar, wind, biomass, etc.) generated by renewable power generating facilities in Panasonic's sites.

*8 Mass of recycled materials contained in the recycled resin used in our products.

*9 Amount of resources recycled/(Amount of resources recycled + Amount of landfill).

Promoting Corporate-wide Environmental Sustainability Management Centering on PDCA

Striving for the creation of a sustainable society, we are following our initiative under the Chief Manufacturing Officer (CMO) (Yoshiyuki Miyabe Senior Managing Executive Officer, as of April 2020) and working to fulfill our corporate social responsibility through eco-conscious business activities as well as resolve environmental issues such as climate change, resources, water, etc. through our products and services. The Panasonic Group formulates its annual environmental management policy in accordance with the Group management policy, Environment Vision 2050, Environmental Action Guidelines, and the environmental action plan (Green Plan). The annual environmental policy is shared across the entire organization through the Operation Policy Meeting led by the CMO, whose authority is delegated by the president. Companies and business divisions establish their own environmental policies and targets based on this Group policy, and plan and promote their activities accordingly.

The progress and results of activities for the key environmental targets we pledged to society to achieve under the Green Plan 2021, as well as Environment Vision 2050, are examined in the Group Strategy Meeting. This meeting is attended by the presidents of the Panasonic Corporation and the Companies along with other members of senior management, for reviews of policy directions, issues, and, particularly important measures to be adopted.

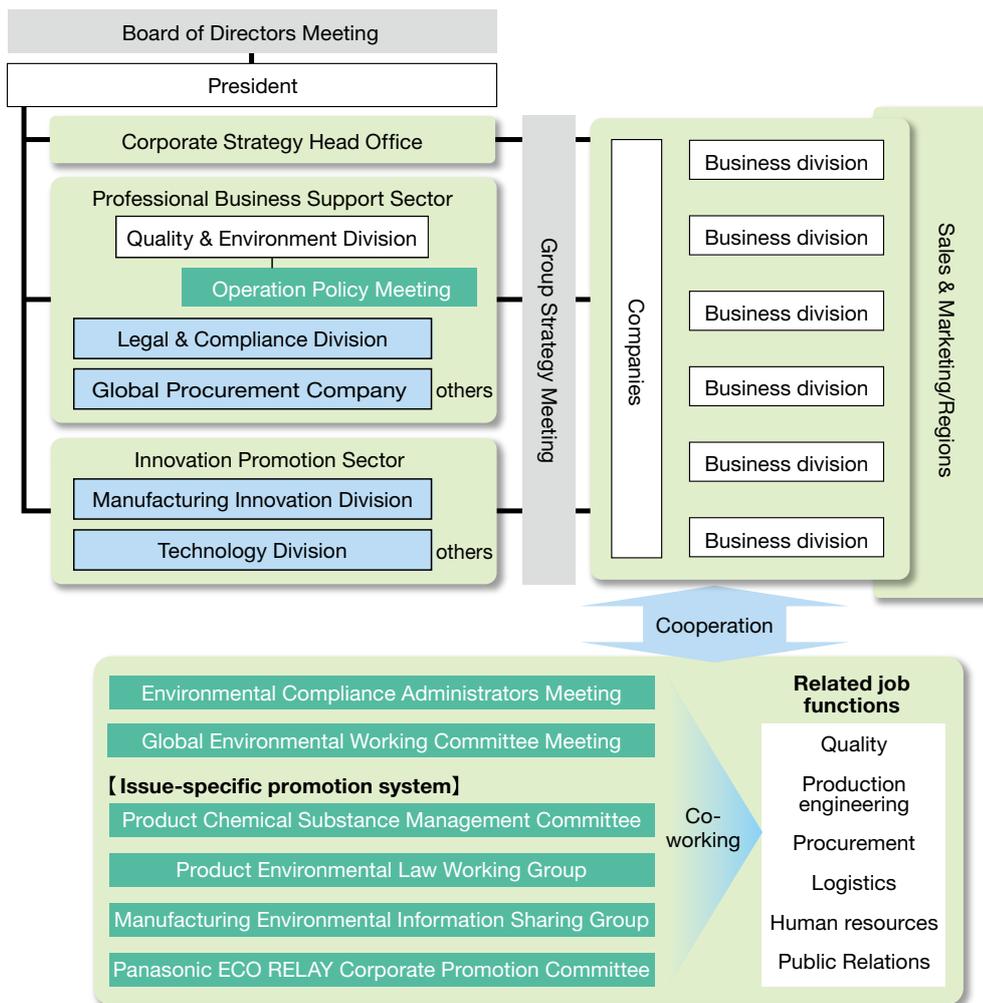
In fiscal 2017, the Environmental Compliance Administrators Meeting (held twice a year) attended by the executive officer in charge of environmental affairs and environmental compliance administrators at the Companies was newly established to accelerate decision-making for corporate-wide action in the area of the environment. In addition, as has been the way until now, successful practices, challenges in implementation, and approaches to mid-term to long-term targets at Companies and various regions are shared and discussed at the Global Environmental Working Committee Meeting, held twice a year, which consists of environmental compliance administrators and environmental operation administrators at Companies and Regional Headquarters, seeking to enhance the level of corporate-wide environmental sustainability management through the PDCA management cycle.

In principle, results of activities relevant to environmental targets are gathered and assessed on a monthly basis as environmental performance data, to identify the achievements, and additional measures are taken as needed. Feedback of annual performance data is given internally and disclosed externally after review, onsite audits, and independent assurance by a third-party. Moreover, reviews and feedback from stakeholders are utilized in subsequent measures to ensure further continuous improvement.

Promotion System for Environmental Sustainability Management

To implement key measures across the entire company, theme-specific committees and working groups are formed to set a promotional structure that enables coordinated action across Companies, related job functions, and Regional Headquarters outside Japan. Specific examples include the Product Chemical Substance Management Committee which deliberates and ensures the implementation of chemical substance management guidelines, and the Product Environmental Law Working Group which engages in information sharing regarding environmental laws and regulations for products and reviews the actions to be taken.

Promotion System of Environmental Sustainability Management in Fiscal 2021



Implementation of Environmental Sustainability Management Based on Environmental Management Systems (EMS)

As the foundation of environmental sustainability management, Panasonic set up EMS at all of our manufacturing sites across the world in fiscal 1999, and has continued to have the respective sites ISO14001 certified since then. Moreover, in order to further strengthen the environment management world-wide, we set up EMS also at all of our non-manufacturing sites; in principle, the respective sites also have obtained ISO 14001 certification. In October 2011, we published the Environmental Management System Establishment Guidelines that summarizes the EMS concepts for different business forms such as manufacturing, sales and services, and head office administration, aiming to build the EMS in accordance with the Basic Rules for Environmental Affairs on a global scale. Based on the Guidelines, we are implementing Environmental Sustainability Management to achieve the targets set in the Green Plan 2021.

Automotive Company and Industrial Solutions Company provide seminars for their members to learn the basics of the EMS, and training for auditors to work at different levels, such as internal and chief auditors. Internal audits held by Companies are conducted in a precise manner at each site in order to improve its management procedures.



Training session for internal auditors

Acquired status of the ISO 14001 Certification (as of March 31, 2020)

Region	Number of certifications obtained*1		Total
	Manufacturing	Non-manufacturing	
Japan	14	12	26
North America & Latin America	15	0	15
Europe & CIS	10	2	12
Southeast Asia, & Oceania	41	9	50
China & Northeast Asia	55	1	56
India, South Asia, Middle East & Africa	8	1	9
Total	143	25	168

*1 The above number includes the one for integrated certification. The number of acquired status varies every year depending on the situation such as reorganization or closure of BDs, or promotion to acquire integrated certification.

► Obtaining of ISO 14001 Certification

https://www.panasonic.com/jp/corporate/sustainability/pdf/eco_isolist2019.pdf

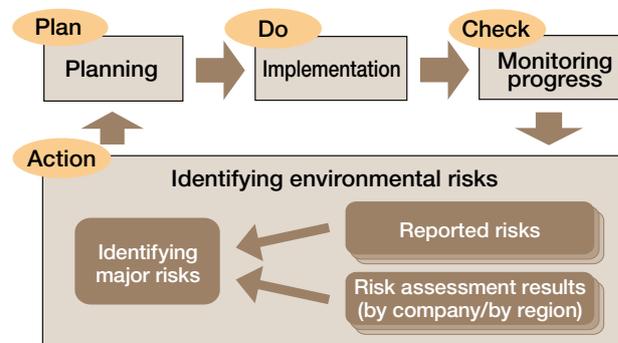
Group-wide Systems to Manage Environmental Risks

As a tool to continuously reduce environmental risks, Panasonic has established an Environmental Risk Management System specific to each Company. In accordance with the basic risk management policy for all Companies (see page 8), we promote (1) identification of environmental risks and group-wide risk management each year, and (2) ensuring quick responses to reported environmental risks.

To identify environmental risks and implement the management system, environmental risks are identified for each Company and for each region in the world each year. From these risks, environmental risks on a group-wide level are selected. The risks that show a high level of frequency or seriously impact business management are designated as major risks and prioritized in planning and executing risk-reducing measures. These measures are implemented for each major risk, and progress is monitored and followed up on a quarterly basis in the PDCA cycle.

When an environmental risk is found, the relevant Company, related job functions, and Regional Headquarters collaborate to promptly implement emergency measures and recurrence prevention measures adapted to the risk level. Also, the management flow in case of risk discovery is standardized to prevent the occurrence of secondary risks as a result of confusion.

Classification of Environmental Risks and Countermeasure Implementation



Environmental Compliance Management at Factories

Panasonic manages its environmental systems in full compliance with laws and regulations. We regularly measure emissions of gas, wastewater, noise, odor, etc., and introduce preventative measures for cases that may lead to serious violations.

Furthermore, key human resources are developed for information sharing among the Companies/Business Divisions, environment-related job functions, and Regional Headquarters, to ensure exhaustive compliance with legislation related to factory environment management in respective countries where Panasonic manufacturing sites are located. Specifically, activities to share information as well as specialized training are conducted for factory management officers in charge of the management of chemical substances, waste, wastewater, and exhaust gas, either by country or by region in Japan, Europe, China, and Southeast Asia. Field surveys on laws and regulations using checklists were conducted on a global scale to confirm comprehensive implementation of environmental compliance, and we also conducted verification of the effectiveness of various measures.

However, in fiscal 2019, we discovered three violations of environment-related legislation across the world. These cases were promptly reported to the respective authorities along with implementation of countermeasures against the causes of such violations and we have already corrected the issues in order to meet the standard requirements. We continue our efforts for thorough legal compliance and the prevention of any recurrence.

Case of Violations of Laws and Ordinances (e.g. excess of the standard legal level) in Fiscal 2020

Region	Environmental pollution					Other	Total
	Air	Water quality	Noise	Odor	Waste	Permission / Approval	
Global (including Japan)	2	0	0	0	1	0	3
(Japan)	(0)	(0)	(0)	(0)	(0)	(0)	(0)

Compliance with Environmental Regulations Relating to Products

Panasonic manages compliance with regulations relating to its products through a quality management system. Compliance with regulations is ensured with our Products Assessment System, a mechanism which incorporates environmental performance targets such as customer demands for environmental performance, the energy efficiency labeling program, and third-party certification systems, as well as evaluation of compliance with regulations on chemical substance management, energy efficiency, 3R, and recycling, to (1) set up overview for achieving targets at the product planning stage, (2) define concrete targets at the design planning stage and confirm compliance at the design stage, (3) conduct interim assessment at the design completion stage, and (4) conduct final assessment at the mass production decision-making stage. Additionally, incoming inspections are being conducted on a regular basis for purchased components to ensure compliance with the RoHS Regulations which regulates the content of six hazardous substances (see page 58 “Chemical Substances Management”).

However, in fiscal 2020, four regulatory violation related to chemical substance management occurred overseas. We will tighten the criteria to judge potential inclusion of regulated substances to ensure thorough compliance with the laws and regulations.

Measures Against Soil and Groundwater Contamination and Air Pollution

In the latter half of the 1980s, soil and groundwater contamination due to chlorinated organic solvents was detected at some Panasonic sites. In response, we have conducted anti-contamination activities across the company. Specifically in 1991 we created the Manual for Preventing Contamination of Soil and Groundwater and began conducting necessary surveys and measures. In 1995 we discontinued the use of chlorinated organic solvents, and in 1999 created Guidelines on the Prevention of Environmental Pollution to ensure there would be no recurrence of similar problems at our sites. In fiscal 2003 we began enhancing our surveys and measures to comply with relevant laws and regulations, including the Soil Contamination Countermeasures Act, which was enforced in Japan in 2003, and in fiscal 2004 started implementing measures to place all our bases across the globe under management supervision with regard to soil and groundwater.

Specifically, we conduct onsite inspections and interviews at the bases, in addition to surveying their use of VOCs and heavy metals. Furthermore, we implement surface soil surveys within the premises. For the sites where contamination was detected beyond the regulatory pollution standards, we conduct detailed borehole surveys to identify the boundaries of the contaminated areas and take remedial measures.

As a result of these efforts, we were able to place all our bases under management supervision in 2008. Furthermore, in fiscal 2011, the management supervision scheme was purpose-specifically reorganized and reinforced to establish a new management supervision scheme. With the highest priority given to preventing dispersion of pollution beyond our premises, this new scheme is implemented across all operating sites to further improve the level of measures against contamination.

Soil and Groundwater Risk Management Policy

Conditions subject to management supervision	Procedure
Pollution dispersion prevention beyond Panasonic premises	<ol style="list-style-type: none"> 1. Conduct historical surveys 2. Determine and install monitoring wells at the premises' borders 3. Analyze groundwater at the borders 4. Check possibility of pollution from external sources 5. Report to management department 6. Determine the external pollution dispersion prevention methods 7. Install the external pollution dispersion prevention methods 8. Install assessment wells 9. Begin assessments (monitoring)
Thorough pollution source elimination	<ol style="list-style-type: none"> 10. Conduct brief status check 11-1. Horizontal direction detailed analysis 11-2. Vertical direction detailed analysis 12. Determine the magnitude of pollution 13. Discuss the areas and methods of purification 14. Conduct purification and install pollution dispersion prevention measures 15. Monitor pollution source (groundwater) after purification 16. Report purification completion to management department

Soil and Groundwater Pollution Surveys and Remedial Measures for Fiscal 2020

Region	Number of sites that completed remedial measures	Number of sites currently taking remedial measures
Global (including Japan)	0	41
Japan	(0)	(35)

In addition to the above, we implement measures for air pollution. The efforts made in factories are as matters of course, we are working as a company to comply with the Act Concerning Special Measures for Total Emission Reduction of Nitrogen Oxides and Particulate Matter from Automobiles in Specified Areas (Act No. 70 of 1992), which regulates nitrogen oxides and particulate matter emitted from company cars owned and/or managed by Panasonic.

The company cars owned and/or managed by Panasonic Japanese business sites are centrally managed on the corporate-wide vehicle management system. Annually required reports are submitted through the vehicle management system. Also each business site undertakes thorough regular vehicle checkup and fuel economy management on these cars, as well as taking the initiative in reducing air pollution, such as by advising employees on eco-driving techniques and hosting related workshops, and promoting introducing hybrid cars.

Initiatives for PCB Pollution

Our initiatives for PCB pollution are introduced on the following website.

<https://www.panasonic.com/global/corporate/sustainability/eco/governance/risk.html>

Environment: Response to TCFD



Panasonic endorsed the TCFD recommendations^{*1} in May 2019. As we recognize risks and opportunities concerning climate change as a critical management issue, we identify our business risks and opportunities and verify business resilience and strategy by thoroughly analyzing the scenarios, considering the TCFD's recommendation. We also disclose information on thematic areas recommended by TCFD, i.e. 'governance', 'strategy', 'risk management', and 'indices and targets', assuming future engagement with investors.

^{*1} TCFD: The task force was set up by the Financial Stability Board (FSB) in response to a request by the G20 Finance Ministers and Central Bank Governors. TCFD published its recommendations in 2017.

Governance

Our system to promote Panasonic Environmental Sustainability Management is headed by board of directors, so that information on environmental sustainability management from all of the group companies are reported to the board of directors. Also, the progress and results of activities for the key environmental targets we promised to society to achieve under the Green Plan 2021, as well as Environment Vision 2050, are examined and determined on the directions, issues, and particularly key measures in the Group Strategy Meeting where Panasonic president, presidents of group companies, and senior managers participate. In fiscal 2017, the Environmental Compliance Administrators (ECA) Meeting (held twice a year) was set up. Senior managers in charge of environmental affairs and persons in charge of environmental affairs in Companies participated in the ECA meeting and make decisions speedily on corporate-wide environmental management. In addition, examples of past good practices, challenges in implementation, and approaches to mid-term to long-term targets that respective Company and Regional Headquarters have are shared and discussed at the Global Environmental Working Committee Meeting, held twice a year, which consists of managers and persons in charge of environmental affairs in Companies and Regional Headquarters, seeking to enhance the level of corporate-wide environmental sustainability management through the PDCA management cycle. See pages 18-19 for more details.

Strategy

We have identified risks and opportunities in the business areas of home appliances, housing equipment, and automotive that are deemed to be affected by climate change. The identified risks are categorized into those related to transition to a low-carbon economy and others related to physical changes caused by climate change, and then discussed by the category. Opportunities are also being investigated to create new businesses mainly in the areas of business operation, products, and services.

In addition, towards realization of the Environment Vision 2050, we analyzed the impact of climate change on our business based on the external scenarios, discussed the measures, and verified the business resilience in our strategy.

See pages 26-27 for more details.

Climate change risks (typical examples)

Type	Scope	Risk Description
Transition risk	Home appliances business	If product design does not meet the requirements of regulation because of enhanced requirements for energy efficiency in the regulations, sales opportunities may be lost.
Physical risks	Manufacturing	In the case of our production sites and/or supply chain operations are damaged from extreme weather, such as flooding, it may affect product sales and/or require a large investment to recover the facilities.

Climate change opportunities (typical examples)

Type	Scope	Opportunity Description
Business management	Manufacturing and renewable energy	- Install energy management system in factory production and promote to use renewable energy. - Advance development of fuel cell technology to generate power from hydrogen and supply hydrogen electrolytically generated from water, using renewable energy to forklifts equipped with fuel cells.
Products and services	Housing equipment business	As the government subsidy system for purchase of energy-efficient houses has been introduced, work focusing on development, sales, and dissemination of energy-efficient houses, collaborating with other companies to create better ideas, products and services.
	Automotive business	As the number of electric vehicles is increasing because the regulations for engine-mounted vehicles have been more stringent, expand high-performance automotive battery business, collaborating with other companies.

Scenario analysis overview

Scenario	Situations	Potential influence on the group
2°C Scenario	More stringent regulations: Introduction of carbon pricing	Minor effects on our businesses, because we have been working on reduction of CO ₂ emissions from products and production through taking various measures, including enhancing the energy-efficiency of existing products, creating new energy-efficient products, and rolling out zero-CO ₂ factories.
	More stringent: Changes/modifications in environmental regulations	Minor effects on our businesses, as we continuously understand up-to-date information on environmental laws and regulations in the world through close collaboration with regional headquarters and environmental departments in respective regions.
4°C Scenario	Increase of extreme weather	Minor effects on our businesses, as we continue to strengthen the risk management system, through formulating Business Continuity Plan (BCP), and Business Continuity Management (BCM) Guidelines based on the BCP.

Risk Management

As a tool to continuously reduce environmental risks, Panasonic is working to establish Company-specific Environmental Risk Management Systems, in accordance with the basic risk management policy for all Companies (see page 8). The management policy includes (1) identification of environmental risks and group-wide risk management each year, and (2) ensuring quick responses to reported environmental risks.

In addition, the Global & Group (referred to as G&G, hereinafter) Risk Management Committee examines and discusses those major risks that require taking up as corporate risks from a corporate-wide points of view. The G&G Risk Management Committee also monitors progress of the measures as a means to improve and strengthen Group-wide risk management. In fiscal 2021 we listed natural disasters (earthquakes, flood damages) as one of our major risks. See pages 8-10,21 for more details.

Metrics and Targets

We announced the Environment Vision 2050 (see page 14), placing “energy” on the axis, and set up the Green Plan 2021 towards realizing Environment Vision 2050 with short-term targets based on the amount of energy as metrics.

In addition to these energy indices, we also set the medium- and long-term targets for the reduction of Green House Gas (GHG) emissions. These targets were accredited as Science Based Targets (SBTs)^{*1} in October 2017.

*1 SBT: an abbreviation of Science Based Target. It is a target to reduce GHG emissions in consistent with scientific knowledge toward the goals to limit the increase of global temperature to less than 2°C above pre-industrial levels.

See page 17 for more details on indicators for energy.

GHG emissions reduction targets (SBT accreditation)

	2030	2050
Emissions from business activities (Scope 1 and 2)	Reduce by 30% (compared to FY2014)	Zero
Emissions from use of our products (Scope 3)	Reduce by 30% (compared to FY2014)	

Environment: Climate Change Risks and Opportunities, and Resilience of Strategy through Scenario Analysis



Identifying Risks (Typical Examples)

Risks concerning Transition to a Low-Carbon Economy

The energy efficiency standards for products are becoming increasingly demanding and products that do not meet such standards may be banned from sale. In concrete terms, meeting with a minimum energy performance standard (MEPS) is legally stipulated under the laws and regulations such as US federal law, the California State law, and the EU ErP Directive. Not only in advanced countries, the standard is also legally binding as mandatory in many developing countries and sales of non-standard products are prohibited. Many countries also adopt energy efficiency labeling programs, under which the products display their energy efficiency level so that customers are able to choose eco-conscious products more easily. Minimum energy performance standards and energy efficiency labeling programs for electric and electronic products significantly contribute to CO₂ reduction during product usage, which occupies the largest percentage in the product lifecycle. These standards and programs are constantly reviewed and discussed for amendments and their scope of the covered products in each country or region continue to expand. As standards and programs in different countries rely on different criteria and measurements, if our products fail to comply with the requirements at the product design stage, for which we constantly keep understanding the latest trend, we may miss sales opportunities in the markets of the products that required massive investment in their development. This is a potential risk that may cause significant business losses.

Physical Risks

As the Panasonic Group operates its business globally, its production sites face physical risks in their operations that may be hindered by abnormal weather conditions associated with global warming, such as flooding. Other than direct damage to factory buildings and facilities, losses from the cessation or suspension of operations must also be taken into account. If such a situation should occur, the costs required to restore the business becomes excessive.

Identifying Opportunities (Typical Examples)

Business Operation

Panasonic has adopted Factory Energy Management System (FEMS) at factory sites, and optimized energy consumption in production. (See page 42 for more details.) We also proactively promote to adopt renewable energy, such as solar cells, which is suited to regional features, at our sites across the world. Panasonic promotes utilization of renewable energy among customers by expanding the energy solution business in addition to the manufacturing business of solar cell modules. (See pages 42-43 for more details.) We are also working to establish practical fuel cell technologies to generate electricity from hydrogen, a clean source of energy. Verification test of fuel-cell forklifts powered by hydrogen electrolytically generated from water using renewable energy started in fiscal 2020. (See page 15 for more details on the verification test.) In addition, we are working on to increase the number of zero-CO₂ factories, assuming future demand from BtoB clients for manufacture of products using renewable energy.

Products and Services

In 2018, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) introduced a financial support system to promote energy-efficient housing. The system provide incentives in proportion to the expenses paid for installation and construction when building a new house with high energy efficiency, when building a new house with high energy efficiency, renovating a house with installation of thermal insulation, and/or installing energy-saving equipment. As we offer a wide range of energy-creation and energy-storage products, enforcement of the subsidy by the government has created great business opportunities for us. Collaborating in creating better ideas, products and services with other companies, we work on focusing on developing, selling, and are spreading highly energy-efficient houses widely.

Because more countries are employing environmental policies concerning reduction of greenhouse gas emissions, the regulations for engine mounted vehicles are tightening. As a result, vehicles are becoming more electrified and HVs and EVs are expected to become ever more common. Panasonic produces and sells high performance automotive batteries. As HVs and EVs spread in society, demand for such secondary batteries, the core component of such vehicles, is expected to increase. To obtain the business opportunity, we started full-scale operation of the automotive battery factory in the US in 2017, while also strengthening our partnerships with other companies.

Strategy

We believe that more and more clean energy will be used in every corner of society, instead of fossil fuels. We formulated the Environment Vision 2050 to achieve “a better life” and “a sustainable global environment” compatibly. In the vision, we aim to reduce the amount of the “energy used”, generate more amount of the “energy created” than is that of used, and replace purchased energy with the “energy created” by ourselves. In other words, the size of our contribution through the creation and utilization of renewable energy sourced from our products must exceed the amount of the “energy used” in our factories and by our products. This vision is incorporated within our business policy as our corporate goal for 2050. As a part of the targets for reducing GHG emissions, energy consumption reduction targets for 2030 and 2050 have been set as SBT-accreditation in line with the standards for 2°C increase scenario goal agreed in the Paris Agreement.

Scenario Analysis

World Energy Outlook 2017 (WEO2017) issued by the International Energy Agency (IEA) presents the New Policies Scenario (NPS=4 degree scenario), a set of policies to realize the targets set by various countries in the Paris Agreement, and the Sustainable Development Scenario (SDS=2 degree scenario) that could “hold the increase in the global average temperature to well below 2°C above pre-industrial levels” if executed.

Towards realization of Environment Vision 2050, we analyzed the impact of climate change on our business based on the said scenarios, discussed the countermeasures, and verified the resilience of our strategy.

Respective SDS and NPS were created on the assumption that the average temperature would rise 2°C or 4°C by 2100. Assuming that we continue the current business activities, we analyzed the impact of climate change on our business as of 2030.

SDS, the 2°C rise scenario, forecasts rapid changes in society to restrain greenhouse gas emissions by 2030. For example, the scenario estimates that an emission restriction measure possibly charging more than 100 dollars per one ton of CO₂ emissions, may be adopted. Using this 2°C rise scenario as a reference, we analyzed the impact from regulation changes on our business by 2030, assuming that there will be no major impact to the business from physical risks from climate change, such as water shortages and more frequent abnormal weather conditions.

At the same time, using NPS, the 4°C rise scenario, we analyzed the impact from physical changes due to climate change to our business by 2030, assuming that such impact from physical changes would be greater than that from regulation changes.

Results of the analyses based on the 2°C increase scenario suggest that the burden of CO₂ emissions would increase as carbon pricing is adopted by the major countries. However, effects of the burden are minor, as we have worked on reducing CO₂ emissions with our products through increase in their energy-efficiency and creating and selling energy-creating products, as well as reduction of CO₂ emission in manufacturing through roll-out of zero CO₂ model factories, to realize the Panasonic Environmental Vision 2050.

When we identify issues that need to be addressed, we gather latest information on relevant environmental regulations, using the data base on environmental regulations, and shared the information to relevant departments. In the case that taking some measures is necessary, we share the information and situation with Companies and Business Divisions, and relevant parties necessary take actions in due time. This ensures that those issues have minor effects on our businesses.

When referring to the 4°C rise scenario, we need to take account of the impact from the predicted increase in abnormal weather conditions, such as flooding and tropical storms, on the supply chain, and reduced economic activity in society. For example, we experienced large scale flooding in Thailand in 2011 and we suffered massive losses. Although we established a range of countermeasures in case of a recurrence, if some disaster hinders our business operations—or those of any party in the supply chain—sales will be affected and we would still need to direct significant funds to recover damaged facilities. To prepare for such situations, we create Business Continuity Plans (BCP) based on past experience of damage from abnormal weather conditions. At the beginning of 2012, we established the Business Continuity Management (BCM) Guidelines that focus on minimizing various risks related to factories and operations in accordance with the BCM System. As a means to reinforce disaster and accident countermeasures, we have established the Disaster/Accident Countermeasure Committee under the Global and Group Risk Management Committee, which is chaired by the Chief

Risk Management Officer (CRMO), comprising directors of the Professional Business Support Sector (PBSS) under the head office. The Disaster/Accident Countermeasure Committee is now establishing a readiness against a range of serious risks from natural disasters, such as earthquake and flooding, to large scale accidents, including fire and explosion. We have also established working groups dedicated to different types of risk under the Disaster/Accident Countermeasure Committee to create concrete measures against risks through liaison between related departments. In procurement, we are securing suppliers for alternative materials and maintaining emergency stocks by evaluating the criticality and replaceability of the procured materials and parts in advance. With such activities, the effects on our business is expected to be minimum.

We plan to undertake further analyses on impacts from climate change on the supply chain and on markets and production areas that may be sensitive to climate conditions. Changes in social movements and the underlying scenarios will be monitored by environment departments, and promotion of investment and collaboration will be monitored by respective Companies.

* Note that these scenarios presented by the IEA are merely potential prospects with a high degree of uncertainty. The analysis results obtained based on these scenarios are our forecasts developed from those scenarios and our own medium- to long-term future prospects may be different in actuality.

Integrated Management of Corporate Environmental Information

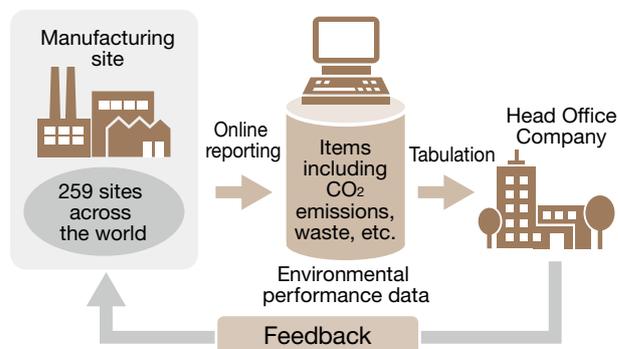
In order to implement the PDCA cycle for environmental sustainability management, it is essential to collect a significant amount of data, such as amounts of used energy, waste, valuables, discharged and transferred chemical substances, and used water, etc. at each business site in a prompt and accurate manner.

Panasonic has built and introduced an environmental performance system, the Eco System (Factory), to globally collect and manage environmental data from all of own business sites. With this system, monthly CO₂ emissions are managed in particular, allowing checking the progress of initiatives and identifying issues. The system plays an important role in achieving the reduction of CO₂ emissions by sharing the information and taking measures.

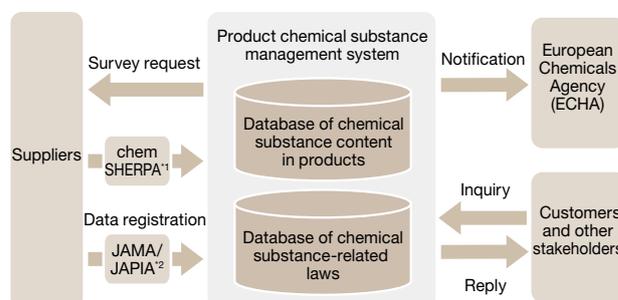
The Eco System (Factory) is also functioning as a scheme for sharing information on the status of compliance among sites across the world. In the event of complaints from local community residents or when a specific value exceeds ordinance-regulated levels, as soon as the person in charge at the business site inputs the data on the system, information of the data is instantaneously e-mailed to relevant persons at the Company and the Head Quarters. Thereby, the system enables rapid information-sharing and appropriate actions.

As for products, legislation relating to chemical substances in products is becoming more stringent, and communication and disclosure of chemical information in the EU supply chain are mandatory under the REACH Regulations. Panasonic developed own management system for chemical substances in products based on industry-standard information handling methods in order to respond to a wide range of regulations and requirements. In January 2017, Panasonic renewed the system to adopt chemSHERPA,^{*1} the new format for information handling of chemical substances in products led by the Ministry of Economy, Trade and Industry (METI). With the expansion of Panasonic automotive business, we also adopted the JAMA/JAPIA sheet,^{*2} the standard material data format for the Japanese automotive industry, in order to respond to increasingly complex and diverse regulations covering chemical substances used in products.

Mechanism of the Eco System (Factory)



Mechanism of the Product chemical substance management system



*1 New chemical information format led by METI and recommended by the Joint Article Management Promotion-Consortium (JAMP).

*2 A standardized datasheet for chemical compounds contained in automotive components in automotive industry.

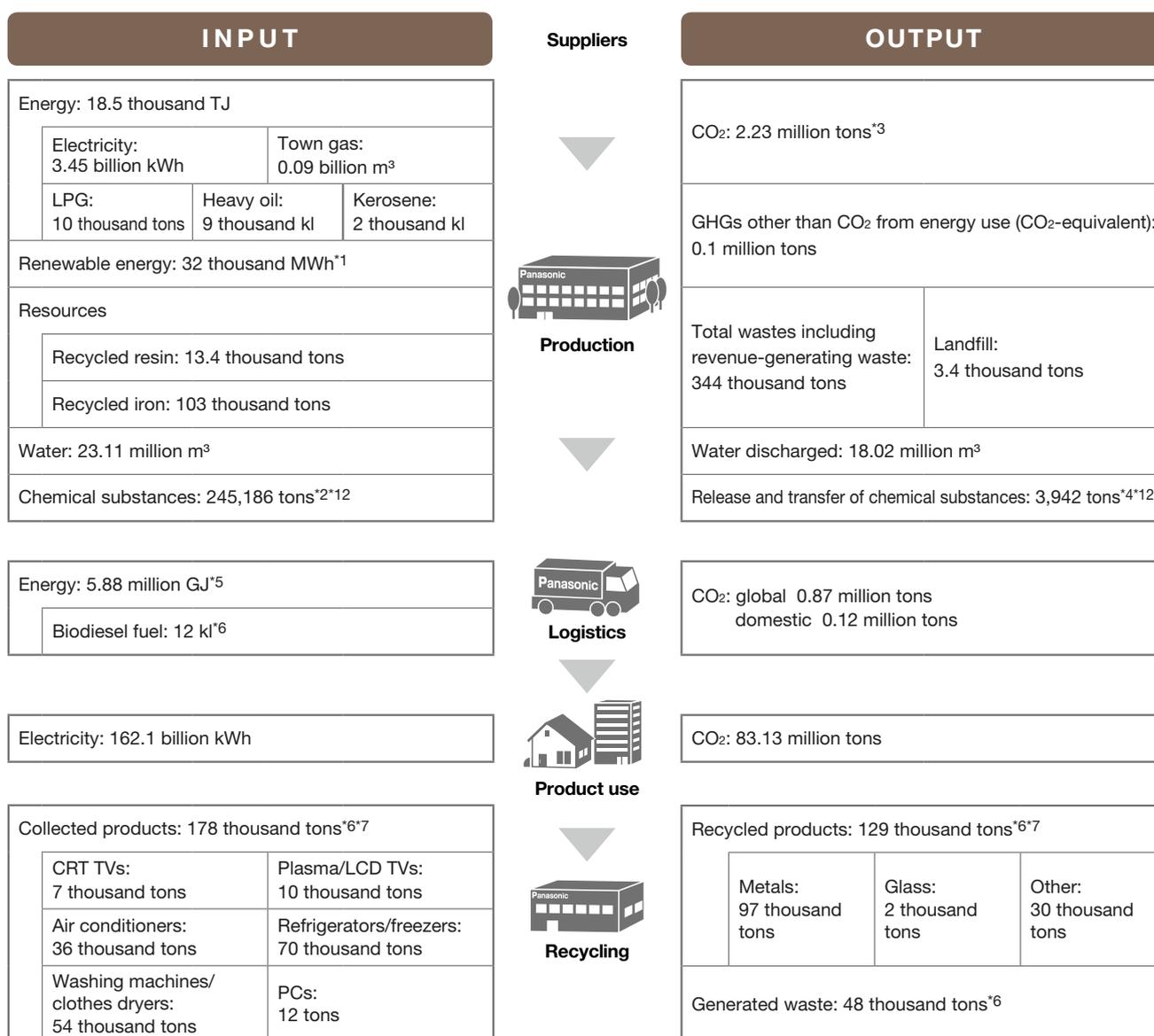
Environment: Overview of Environmental Impact and Environmental Accounting



Overview of Environmental Impact from Business Operation

In order to mainly manufacture and market electrical and electronic products, Panasonic consumes petroleum and electricity as energy sources and resources as raw materials of parts and components. As a result, we emit CO₂ and wastes into the environment. This diagram maps the environmental impact from our business operation from a procurement stage to recycling activities. Also, GHG throughout the entire supply chain is classified into Scope 1, Scope 2, and Scope 3 and assessed according to the GHG Protocol, the international calculation standard.

Overview of Environmental Impact from Business Operation



Production: 259 manufacturing sites

Logistics: Logistics stage of procurement, production, marketing and waste by partner companies and Panasonic.

Product use: Lifetime power consumption (a) of major products⁸ with large amounts of energy use and CO₂ emissions (b) associated therewith.

a = Annual power consumption of a model sold⁹ x Sales quantity x product life¹⁰

b = Annual power consumption of a model sold⁹ x Sales quantity x product life¹⁰ x CO₂ emission factor¹¹

Recycling: Recycling of products means to use by oneself or to make into a state available for sale or free of charge the components and materials of a separated product.

*1 Figures from photovoltaic, wind, and biomass sources. Heat pumps not included.

*2 Target substances include all substances in the Panasonic Group Chemical Substances Management Rank Guidelines (For Factories).

*3 The factors related to fuels are based on “the Guidelines for Calculation of Greenhouse Gas Emissions (version 4.3.1)” published by the Japanese Ministry of the Environment.

The latest figures from the “CO₂ Emissions from Fuel Combustion 2019 issued by the International Energy Agency (IEA) is used for the CO₂ emission factors for electricity purchased from different countries use.

*4 Release amount: Includes emissions to air, public water areas, and soil.

Transfer amount: Includes transfer as waste and discharge into the sewage system. Recycling that is free of charge or recycling where Panasonic pays a fee for treatment under the Waste Management and Public Cleaning Law is included in “Transfer.” (Different from the transferred amount reported under the PRTR Law.)

*5 Intra-region outside Japan not included.

*6 Figures for Japan.

*7 Air conditioners, TVs, refrigerators/freezers, washing machines/clothes dryers, and PCs.

*8 Household air conditioners, commercial air conditioners, lighting equipments and lamps, household refrigerators, commercial refrigerators, LCD TVs, washing and drying machines, fully-automatic washing machines, dish washer and dryers, IH cooking heaters, EcoCute, bathroom ventilation dryers, humidifiers, dehumidifiers, air purifiers, ventilation fans, electric fans, vending machines, electronic rice cookers, microwave ovens, electric bidet toilet seats, irons, hair dryers, electric showers, electric water heaters, under-rug heaters, vacuum cleaners, electric water boilers, range hoods, projectors, mounting machines, etc.

*9 For each product category, the model that was sold in the largest quantity in the region was selected.

*10 Number of years during which spare parts for the product are available (defined by Panasonic).

*11 Regional CO₂ emission factors (kg-CO₂/kWh) used: 0.522 (Japan); 0.331 (Europe); 0.421 (NorthAmerica); 0.623 (China & Northeast Asia); 0.718 (India & South Asia); 0.395 (Southeast Asia & Oceania); 0.297 (Latin America); and 0.709 (Middle East & Africa).

*12 Hussmann Parent Inc. and its consolidated subsidiaries not included.

GHGs from the Whole Supply Chain (by Scope)

Category		Emissions(10,000 tons)	
		FY2019	FY2020
Scope 1 ^{*13}		44	39
Scope 2 ^{*14}		200	193
Scope 3 ^{*15}	1. Purchased goods and services	1,395	1,805
	2. Capital goods	86	72
	3. Fuel- and energy-related activities	26	24
	4. Upstream transportation and distribution	95.0	86.6
	5. Waste generated in operations	1.8	1.6
	6. Business travel	2.8 ^{*16}	2.2 ^{*16}
	7. Employee commuting	3.1 ^{*16}	3.0 ^{*16}
	8. Upstream leased assets	2.0 ^{*16}	1.5 ^{*16}
	9. Downstream transportation and distribution	2.0 ^{*16}	2.2 ^{*16}
	10. Processing of sold products	–	–
	11. Use of sold products	5,723	8,313 ^{*17}
	12. End-of-life treatment of sold products	125	118
	13. Downstream leased assets	–	–
	14. Franchises	–	–
	15. Investments	–	–

*13 Direct emissions from facilities owned and controlled by Panasonic (e.g. emissions from use of town gas or heavy fuel oil).

*14 Emissions from production of energy consumed at facilities owned and controlled by Panasonic.

*15 Other indirect emissions, excluding Scope 1 and Scope 2.

*16 Figures for Japan.

*17 From fiscal 2020, this includes the following products: lighting equipment, lamps, electric fans, electric showers, electric water heaters, which were not included in the scope. GHG emission from these products was 30.55 million tons.

Environmental Accounting

Panasonic globally collects data on its environmental conservation costs and economic benefits obtained through its environmental activities in relation to generated/controlled environmental impact. This data is internally utilized as basic information for our continuing environmental sustainability management.

Environmental Accounting for Fiscal 2020

Environmental conservation in factories	
Investments*18	2,834 million yen
Expenses*18,*19	82 million yen
Economic benefit	658 million yen

*18 Includes all investments relating to environmental conservation. The difference or appropriate portions (divided proportionally) are not calculated.

*19 Expenses include a cost of capital investment depreciation. For example, if latest energy-saving facilities were installed, the value includes depreciation for the first year but not for the second year and later.

Environmental Conservation Benefits for Fiscal 2020 (in physical terms)

Categories	Emission reduction	Reference indicator: environmental impact	
		Fiscal 2019	Fiscal 2020
CO ₂ emissions from production activities	0.12 million tons	2.35 million tons	2.23 million tons
Human Environmental Impact	70 thousand counts	536 thousand counts	466 thousand counts
Landfill of waste	-0.3 thousand tons	3.1 thousand tons	3.4 thousand tons
Water consumption	1.58 million m ³	24.69 million m ³	23.11 million m ³

Fiscal 2020 data on the reduced amount of electricity and effect of reduced electricity costs through our energy-saving products are as shown in the chart below.

Economic Effects for Customers for Fiscal 2020

Electricity cost reduction from product usage (global)	
Reduced amount of electricity*20	28.6 billion kWh
Reduced electricity costs*21	545 billion yen

*20 Calculated under the same conditions as when determining the size of contribution in reducing CO₂ emissions through energy-saving products (see page 36-37).

*21 Electricity costs were set for each region based on IEA Statistics.

Panasonic is also engaged in research and development that will lead to new creation of environmental value. The R&D expenses related to environmental management were approx. 9.0 billion yen in fiscal 2020.

Initiatives for Eco-conscious Products (Green Products)

Based on the product assessment system where the environmental impacts of products and services are assessed from the planning and the design stages, Panasonic accredits own products and services that achieved high environmental performance as Green Products (GPs).

In the GP accreditation criteria, we assess the performance of our products in terms of prevention of global warming, effective utilization of resources, and management of chemical substances by comparing them not only with our own products but also with competitors' products. Since fiscal 2012, we have conducted various activities to further enhance our accreditation criteria by adding biodiversity and water conservation to existing items. This has in turn enabled the creation of a wider range of GPs. The products and services which have been developed from the conventional superb Green Products^{*1} starting from fiscal 2014, and which can accelerate the transition to a sustainable society, are newly defined as Strategic GPs.

Among these products, those that particularly create new trends are certified as Super GPs.

^{*1} Products and services that showed superb environmental performance to products in the same category in the industry.

Green Product Structure

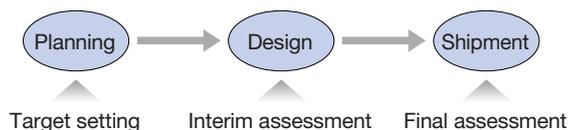


Definition of Strategic GPs

Products and services that accelerate the transition to a sustainable society:

- (1) Products and services that reduce environmental impact with top-level environmental performance in the industry**
(Energy-/Resources-/Water-saving products, etc.)
- (2) Products and services whose promotion and dissemination lead to reducing environmental impact**
(Recyclable or energy-creating products, energy-storing products, energy management systems, Smart Houses and Smart Cities, smart meters, products/services that support next-generation vehicles and environmental performances of stores, LED lighting, etc.)
- (3) Products and services that reduce environmental impact on a specific region, or support measures to address environmental impact**
(Air filtration devices, water filters, environmental engineering service, etc.)

Products Assessment System



Product Environmental Assessment		
Items for assessment		Assessment criteria
(1) Products	Prevention of global warming	CO ₂ emissions and energy saving
	Effective utilization of resources	Resource saving, light weight/downsizing, number of reused parts, durability, amount of recycled resources used, structure to recovery/recycling, etc.
	Water and biodiversity conservation	Water saving, consideration for biodiversity
	Comparison with competitors' products	
(2) Production process (of relevant products)	Prevention of global warming	CO ₂ emissions and energy saving
	Effective utilization of resources	Resource saving, mass of packaging materials to be wasted, amount of resources used, amount of waste from factories, etc.
(3) Packaging	Effective utilization of resources	Resource saving, light weight/downsizing, amount of foamed plastic used, amount of recycled resources used, etc.
(4) Instruction manual	Effective utilization of resources	Resource saving, light weight/downsizing, amount of recycled resources used
(1) (2) (3) (4)	Management of chemical substances	Panasonic's Chemical Substances Management Rank Guidelines (for products and factories)
LCA*2		Global warming
Information management		Green procurement, information provision across the supply chain, etc.

↑
Laws/regulations and criteria, guidelines, and environmental action plan of Panasonic

*2 Life Cycle Assessment: Method of quantitatively assessing the environmental impact of products at each life cycle stage.

Increase in sales volume of Strategic GPs

In fiscal 2014, Panasonic newly defined 'Strategic GP' in order not only to pursue the environmental performance of consumer products, but also to commit ourselves to further increase sales volume of various products and services which lead to mitigation of environmental impact in the course of structural reform of business such as expansion of B2B business. Based on the definition, we have worked to create such products and services. In addition to reducing environmental load on a global scale with top-level environmental performance, we aim to accelerate a shift to a sustainable society through various business operations, including products or services whose contribution to reduce environmental load can be expected by promoting diffusion of them, as well as whose contribution to reduce environmental load directly in specific regions can be expected. The sales ratio of Strategic GPs in fiscal 2019 accounted for approx. 25% of the total sales.

Initiatives for Eco-conscious Factories (Green Factories)

Panasonic is leading Green Factories (GF) activities in its efforts to cut down the environmental load caused by manufacturing. On the assumption of compliance of laws and regulations in each factory, concretely we formulate a plan to reduce environmental loads in manufacturing activities, such as amounts of CO₂ emission, generated wastes and valuables, water consumption, and discharged and transferred chemical substances, conduct Progress management for total reduction amount with basic unit of discharged amount and the like, and improve the activities. Thereby, we intend to achieve reduction of environmental loads and increase of our business at the same time. In fiscal 2011, we started the GF assessment system^{*1} aiming to further improve GF activities by visualizing the progress status in each factory.

In addition, we share information on global activities for reducing environmental loads, relevant laws and regulations, and social trends through the Manufacturing Environmental Information Sharing Group.

In Europe, Southeast Asia, China, and Latin America, we hold information exchanges and competitions on best practices by region to reduce environmental impact (presentation of awards for best practices and roll-out of good examples to other regions). By doing so, we promote GF activities suited to the issues in each region to expand and accelerate the activities.

In fiscal 2020, further learning opportunities in Japan were provided to trainees from two factories which achieved excellent results in their energy-saving projects in Southeast Asia competition. These trainees visited factories and Eco-Products Exhibition to learn more about environmental initiatives in Japan with the objective to develop more environmental projects for their factories.

As measures to strengthen the company-wide foundation aiming at improving the structures with energy efficiency, we have developed a BA (Before/After) chart search system to share and spread knowhow across the world on the Internet. With the system, each factory can register and share their best practices concerning managing CO₂, waste, chemical substances, water, etc.



Trainees from Southeast Asia

In addition to the above, in response to environmental regulations, as a new activity to further ensure regulatory compliance in our sites, particularly those in China and Southeast Asia where we have numerous productions sites, we support a Cross-Company Mutual Environmental Audit that is carried out by our factories located in the same region, crossing own company's boundary. In China, we increased the number of internal auditors to 53 in fiscal 2020 by providing trainings for in-house auditor, and audited 13 factories; as a result, we extracted points to improve at each audited factory. In Southeast Asia, the Cross-Company Mutual Environmental Audit is carried out among companies per country. In fiscal 2020, the audit was carried out in all six countries where our sites are located. We aim to further enhance the environmental activities by accelerating to carry out the mutual audits worldwide, and encouraging mutual learning among members through ensuring compliance with relevant laws and regulations, as well as utilizing expertise accumulated in our global sites.



cross-company compliance assessment (CCCA)

*1 The GF assessment system enables factories to evaluate themselves on a five-point scale across 19 environmental activity items, classified into six basic groups: emissions reduction; environmental performance enhancement; reduction activities; risk reduction; human resource development; and management. Factories then compare their self-assessment results with the results from other factories to obtain a relative assessment to identify issues to be addressed and determine corrective measures. The system was improved in fiscal 2014, in the way that items to assess could be added to the standard 19 items as required by each Company. For example, a Company may implement tasks concerning compliance with environmental laws and compliance management to strengthen risk management in its factories. Then, in the assessment questionnaire, they can set questions with their own standard values stricter than the legal requirements, for example, for their ventilation systems or other facilities that control air and water quality.

Approaches and Activities Relevant to Energy (Products)

Towards “a better life” and “a sustainable global environment” compatibly, in order to realize the Panasonic Environment Vision 2050 that aims to make societies where residents use clean energy and live a more comfortable lifestyle, we are striving to make the amount of the “energy created” exceed that of the “energy used.” In terms of energy relevant to our products and services, Green Plan 2021 sets “increase the amount of the energy created” and “increase the size of contribution towards energy savings” in products and services as quantitative targets.

The Paris Agreement that came into effect in November 2016 sets out a target to limit global temperature increases to less than 2°C above pre-industrial levels and a more ambitious target to keep global temperature increases to less than 1.5°C above pre-industrial levels, as well as sets the goal for CO₂ and other greenhouse gas emission levels for the second half of this century to be virtually zero. In order to achieve the goals set by the Paris Agreement, we must reduce greenhouse gas (GHG) emissions as much as possible. Therefore, all corporations are expected to further contribute to reduction in GHG emissions. Our efforts in line with the Panasonic Environment Vision 2050 also contribute to reducing GHG emissions. We set targets to reduce these emissions from our business activities and our products by 30% by 2030 (vs. 2013) and reach net zero by 2050, as well as reducing emissions from usage of our products by 30% by 2030 (vs. 2013). This last target obtained accreditation for the targets as a Science Based Target^{*1} (SBT) in October 2017.

^{*1} SBT: an abbreviation of Science Based Target. It is a target to reduce GHG emissions consistent with scientific knowledge toward the goals to limit global temperature increases to less than 2°C above pre-industrial levels.

The Amount of the Energy Created by Products and Services

“The amount of the energy created” by our products and services is composed of “creation” of the power generated by our products at customer sites, and “utilization” of the power stored at customer sites. In concrete terms, we regard the amount of the power generated by our solar photovoltaic systems and fuel cells as “creation,” and the used amount of the power stored in automotive batteries and on-site storage batteries as “utilization.” “The amount of the energy created” from our products and services refers to the sum of the “created” and “utilized” power. Using this “amount of the energy created” as an index to represent our continuous efforts to increase the energy to be created and utilized in customers’ premises, we set numerical targets.

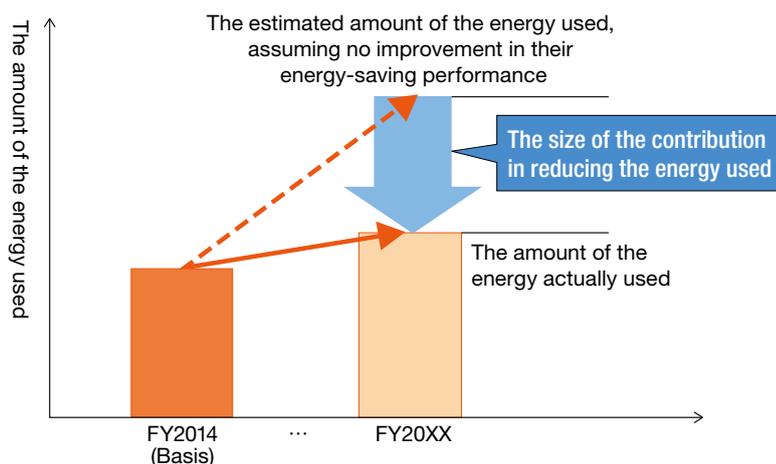
The fiscal 2020 result was 26 thousand GWh.

The Size of the Contribution in Reducing the Energy Used by Products and Services

We define the “energy used by our products and services” as the amount of the energy used by our products at consumer sites. We plan to continue reducing the amount of the energy used by our products and services by further improving their energy-saving performance.

In order to promote reduction of the amount of the energy used by our products and services, we introduced the concept of “size of the contribution in reducing the amount of the energy used.” We define the “size of the contribution in reducing the amount of the energy used” as the amount of the estimated energy used by our products after subtracting the amount of the energy actually used, assuming no improvement in their energy energy-saving performance since fiscal 2014. Using this “size of the contribution in reducing the amount of the energy used” as an index to represent our continuous efforts to reduce our energy consumption, we set numerical targets.

The size of contribution in reducing the amount of the energy used



Within the “size of the contribution in reducing the amount of the energy used,” we classify the contribution into two; 1) the contribution by our finished products, as “direct contributions”^{*2} and 2) the contribution by products and services except our finished products, as “indirect contributions.”^{*3}

The “size of the contribution in reducing the amount of the energy used” in fiscal 2020 was 30 thousand GWh. Of this, the direct contribution was 28 thousand GWh and the indirect contribution was 2.3 thousand GWh.

*2 Scope of the direct contribution: Household air conditioners, commercial air conditioners, lighting equipments and lamps, household refrigerators, commercial refrigerators, LCD TVs, washing and drying machines, fully-automatic washing machines, dish washer and dryers, IH cooking heaters, EcoCute, bathroom ventilation dryers, humidifiers, dehumidifiers, air purifiers, ventilation fans, electric fans, vending machines, electronic rice cookers, microwave ovens, electric bidet toilet seats, irons, hair dryers, electric showers, electric water heaters, under-rug heaters, vacuum cleaners, electric water boilers, range hoods, projectors, mounting machines, etc.

*3 Scope of the indirect contribution: Residential insulation materials, motors, etc.

Reduction of the amount of the energy used is also reduction in GHG emissions. The size of the contribution in reducing CO₂ emissions converted^{*4} from the size of the contribution in reducing the amount of the energy used was 16 million tons.

*4 CO₂ emission factors (kg-CO₂/kWh) used by region: 0.522 (Japan); 0.331 (Europe); 0.421 (North America); 0.623 (China & Northeast Asia); 0.718 (India & South Asia); 0.395 (Southeast Asia & Oceania); 0.297 (Latin America); and 0.709 (Middle East & Africa).

Examples of our products for Energy-saving/creating/storing energy are also on the following website.

<https://www.panasonic.com/global/corporate/sustainability/eco/co2/product.html>

Global Warming Mitigation

While people seek for affluent lifestyles, the acceleration of global warming caused by the increase in CO₂ emissions from people's daily lives and corporate activities is becoming a concern. Panasonic promotes measures to mitigate the progress of climate change and to minimize the impact by reducing the greenhouse gases emitted from its products and services as well as production activities.

As measures to mitigate the impact of our products and services, we offer energy-management products and solutions that link and control a range of energy-saving/creating/storing products.

AiSEG2, our home energy management product, is a core equipment of 'HOME IoT' for residential use that connects various home appliances and facilities with the Internet to work in conjunction. With the 'HOME IoT' upgraded in June 2019, conjunction of the home charger for electric vehicles and the solar photovoltaic system has been realized. A new charging function combined with a solar photovoltaic system 'AI Solar Charge®' is an AI-based function that identifies the excess amount of the power to be generated by the photovoltaic system for the following day by calculating the total power to be generated and the power to be used based on the weather forecast for the day. When the function identifies the excess amount, it utilizes the excess amount without loss of the power by reducing the amount of power for charging the vehicle over the night before.

In addition to the energy management of individual buildings, we are advancing the Sustainable Smart Town project to provide a better lifestyle throughout the entire town. Following the projects in Fujisawa and Tsunashima, as the third project, we formulated a plan for Suita Sustainable Smart Town in September 2019, together with 13 other companies from different industries. As our activities in energy field, throughout this project, we aim to create Japan's first '100% renewable energy town', where the net power used in the town is supplied from renewable energy source; and we plan to increase the town's energy resilience at the same time by utilizing storage batteries for houses and electric vehicles, and advanced gas equipment.



AiSEG2 (with a 7-inch monitor)

Global Warming Adaptation

Panasonic is also making efforts for adaptation to address unavoidable impacts on the global environment that cannot be addressed by mitigation measures. Such adaptation is based on the matters indicated by the Intergovernmental Panel on Climate Change (IPCC) etc., focusing on the impact of climate change on the ecosystem, society, and the economy. Further, we understand that it is important for the measures to take account of regional feature, as impacts of climate change vary according to the region.

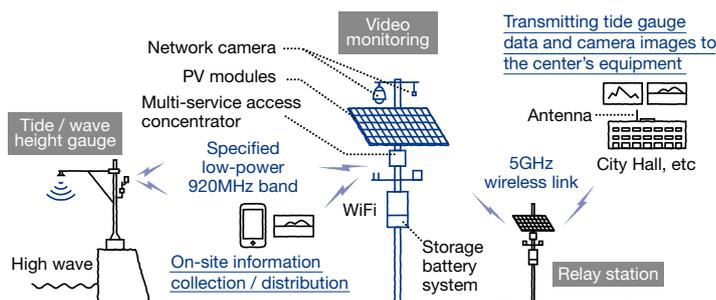
Our measures are currently implemented from the viewpoints of the following two aspects:

- (1) Activities to reduce the impact of climate change through our products, services, and solutions; and
- (2) Activities to reduce the impact on our corporate activities

Specific examples of (1) include the coastal monitoring system and the Green Air-Conditioner. Panasonic has developed the coastal monitoring system that sources power independently. This system always operates wireless network cameras and wireless transmission devices by photovoltaic power generation modules and storage batteries. It would contribute to preparing for high tides that are expected to increase due to climate change.



Coastal tsunami monitoring system in Higashi Matsushima City in Miyagi Prefecture



Coastal Tsunami Monitoring System Configuration

As for the Green Air-Conditioner, we commercialized it for the Olympic and Paralympic Games Tokyo 2020, etc. The green air conditioner was designed to provide relief from the summer heat in open spaces with dry-type mist made by mixing fine particles of water and air to minimize the sense of wetness, air curtains that create dome-shaped cooling spaces under shades, and the like. Also, in September 2019, following demonstration experiments that started in July, we launched sales of the compact Green Air-Conditioner Flex that can be installed with more flexible plumbing made of resin. Flex can not only be retrofitted with existing structures, but also be incorporated in the design of benches, public monuments, and the like. With these products, it is expected to reduce negative impacts on human life caused by global warming such as risks of heat stroke.

▶ Coastal tsunami monitoring system in Higashi Matsushima City in Miyagi Prefecture (An example of a coastal monitoring system) (Japanese)

<https://www2.panasonic.biz/es/solution/works/higashimatsushima.html>

▶ [Press release] Panasonic Launches Green Air Con Flex, Micro Mist Cooling System with Easy Installation

<https://news.panasonic.com/jp/press/data/2019/06/jn190625-2/jn190625-2.html>

As for (2), the first priority is to identify the issues to be addressed by assessing the impact of climate change on Panasonic. One such issue is the effect of water shortages on our production activities. Panasonic completed all water risk assessments for its production sites in fiscal 2018. As of now, we have not identify any visible water risk that may affect its business activities. For further details, please see Water Resource Conservation (Pages 56-57).



Green Air-Conditioner Flex



Nozzle unit



Installation image (Café)

Environment: The Amount of the Energy Used and Energy Created in Factories



Reducing the Amount of the Energy Used and CO₂ Emissions in Production Activities

Panasonic promote making its factories zero-CO₂ emission factories as a part of efforts towards the Environment Vision 2050. Zero-CO₂ emission factories contribute not only as measures for climate change, but also to reinforcement of environmental sustainability management through energy-saving measures in factories, reduction in CO₂ emissions, productivity improvement, and reduction in energy costs. We formulated an “Environmental Action Plan, Green Plan 2021” for the current medium term with a focus on ‘energy’ as one of the priority issues. Based on the plan, all our factories are working to ‘promote zero-CO₂ emission model factories’, ‘increase the use of renewable energy’, and ‘promote production with energy minimum.’”

As a part of efforts to ‘promote zero-CO₂ emission model factories’ in fiscal 2020, Panasonic Centroamericana S.A. (PCA) in Costa Rica realized zero CO₂ emissions.^{*1}

In the area of ‘increasing the use of renewable energy’, the amount of renewable energy adopted at our sites^{*2} in fiscal 2020 marked 32 thousand MWh and this figure shows steadily increasing transformation of the use of power towards the fiscal 2022 target of renewable energy generated at our sites of 40 thousand MWh.

As a part of efforts to ‘promote production with energy minimum’, each factory takes its own initiatives on the promotion. The fiscal 2020 investment to reduce the amount of energy used and CO₂ emissions by the efforts was 2.6 billion yen.^{*3}

These efforts in fiscal 2020 resulted in 18.5 thousand terajoules (TJ)^{*4} of the energy used in factories, which was reduced compared with the amount in fiscal 2019.

Until the completion of the “Environmental Action Plan Green Plan 2018”, we used all of the fixed CO₂ emission factors for calculating the amount of purchased electricity in each fiscal year. At formulating our Green Plan 2021, we replaced this fixed factors with factors by country and by fiscal year^{*5} and recalculated the CO₂ emissions, including those in previous years. With the calculation by the new factors, the CO₂ emissions in fiscal 2020 was 2.23 million tons.

In August 2019, Panasonic joined ‘RE100’,^{*6} an international initiative of corporations committed to change over to 100% renewable energy to be used for electricity in their business activities. We aim to replace all of our purchasing electricity across the world to 100% renewables by 2050, as well as to realize manufacturing with zero CO₂ emissions.

Additionally, Panasonic has participated in Keidanren’s “Action Plan for Low Carbon Society”, a voluntary action program to prevent global warming, collaborating all members of the whole electrical and electronic industry, with targets set for 2030. Specifically, we are steadily implementing energy-saving measures at our factories and offices to achieve the goals set by the industry in Japan, aiming to ‘improve the energy consumption per basic unit at our factories and large offices at an annual rate of 1% on average towards 2030’.

*1 See page 16 for relevant topics.

*2 The total amount of the adoption is subject to the amount of photovoltaic energy, wind power, and biomass energy including the amount of the renewable energy adopted at our non-manufacturing sites, excluding the amount of energy from heat pumps.

*3 The total amount includes all investments concerning reduction of the amount of the energy used and CO₂ emissions. Note that differences or proportions of the investment are not calculated.

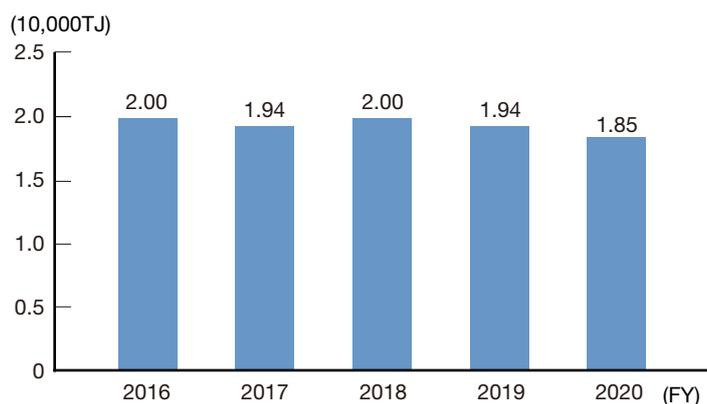
*4 In fiscal 2020, we reviewed the CO₂ emission factor to determine the amount of the energy used (TJ) in using electricity, and replaced 9.97 GJ/MWh of the thermal conversion factor for electricity (based on the Japanese Energy Conservation Act) with 3.6 GJ/MWh that is an energy unit. Because of the change, the amounts of the energy used in the preceding years were also recalculated with the new factors.

*5 The CO₂ emission factors (kg-CO₂/kWh) for purchased electricity per fiscal year are as follows: The factors by country defined in “IEA CO₂ Emissions from Fuel Combustion 2017” (Book 2017) were used for FY2014 and FY2016; Book 2018 for FY2017; and Book 2019 for FY2018, FY2019, and FY2020.

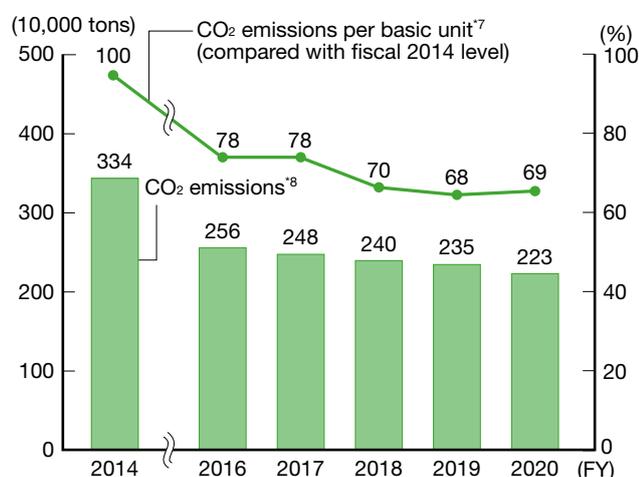
*6 Press release on August 30, 2019.

Panasonic Joins RE100 Aiming for Business Operations with 100% Renewable Energy
<https://news.panasonic.com/global/press/data/2019/08/en190830-2/en190830-2.html>

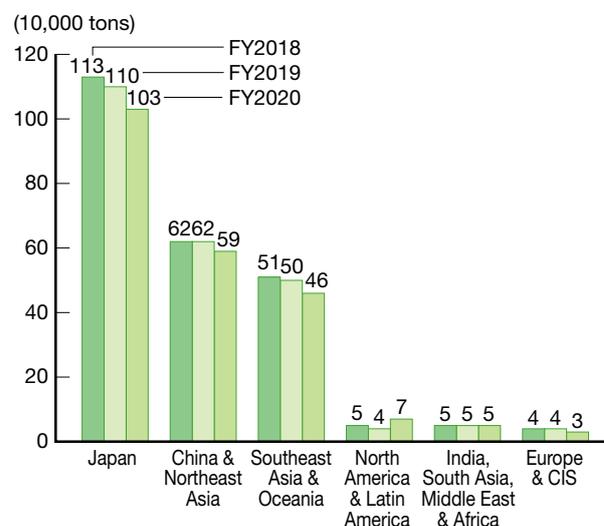
Energy Consumption in Production Activities



CO₂ Emission in Production Activities and CO₂ Emission Per Basic Unit



CO₂ Emission in Production Activities (by region)



*7 We calculated the improvement rate of the 'CO₂ emissions per basic unit' versus that of fiscal 2014, which was obtained by dividing CO₂ emissions by the revenue of all group companies.

*8 The CO₂ emission relevant to fuels was obtained by calculating with the factors stated in the "Guidelines for Calculation of Greenhouse Gas Emissions (version 4.6)".

Promotion of Zero-CO₂ Model Factories

In our regions across the world (Five regions: Japan; China & Northeast Asia; Southeast Asia, Pacific, India, South Asia, Middle East & Africa; North America & Latin America; and Europe & CIS), we set a target of realizing at least one zero-CO₂ emission factory in each region. We now have six zero-CO₂ emission factories across three regions.

In fiscal 2020, Panasonic Centroamericana S.A. (PCA) realized a zero-CO₂ emission factory by procuring power sourced from renewable energy, and the like, in addition to installing a solar photovoltaic system.

In Japan, Panasonic Eco Technology Center (PETEC), the Panasonic Group's home appliance recycling factory, realized a zero-CO₂ emission factory in fiscal 2019. In the North America & Latin America region, we realized total four zero-CO₂ emission factories: three in Panasonic Brazil (PANABRAS)'s sites in San José dos Campos, Manaus, and Extrema, and one in PCA. In the Europe & CIS region, Panasonic Energy Belgium N.V. (PECBE) realized a zero-CO₂ emission model factory. In addition to roll-out of the zero-CO₂ emission model factory within the region, we will promote increase the number of zero-CO₂ emission factories in other regions.

Promotion in Reducing the Amount of the Energy Used and CO₂ Emissions in Factories

To ensure steady progress in reducing the amount of energy used and CO₂ emissions in factories, it is important to visualize trend of the energy consumption of each facility in factory and the effects of the measures for specific emissions reduction. To date, we have worked on CO₂ reduction by adopting more than 40,000 measurement equipment systems and Factory Energy Management System (FEMS) at all of our global manufacturing sites, promoting METAGEJI (Meter and Gauge)⁹, which visualizes and analyzes energy consumption.

An example of factory energy-saving support service is on the following website.

<https://www.panasonic.com/global/corporate/sustainability/eco/co2/service.html>

⁹ METAGEJI is a coined word created by Panasonic which refers to visualizing energy consumption and implementing measurable reduction measures by adopting measurement instruments, such as meters and gauges.

Activities at Factories

Activities to promote to reduce the amount of energy used and CO₂ emissions are being proactively continued in each factory. Several factories in such activities were awarded the Energy Conservation Grand Prize 2019. One of the awards our factories won was the ECCJ (Energy Conservation Center, Japan) Chairman's Prize in the Energy Conservation Best Practices category under the Energy Conservation Grand Prize 2019 for the following activity.

Tsu Factory, Life Solutions Company, Panasonic Corporation

'Roll-out of Energy-Saving Practices corporate-wide including overseas factories through integration of energy-saving and Business Continuity Planning (BCP) led by the factory'

This is an example of activities conducted in Tsu Factory, which is a mother factory for wiring equipment. A range of energy-saving measures integrating with BCP have been promoted in the factory, and their best practices and expertise accumulated in the energy saving activities are rolled out to our other factories not only in Japan, but also overseas. Their cross-border collaboration with other departments and other companies, a solar photovoltaic system that was adopted in the factory as the BCP measures, and the like were highly evaluated by the ECCJ.



Received the Energy Conservation Grand Prize

In fiscal 2019, Manufacturing Innovation (MI) Division won the Grand Prize of the Minister of Economy, Trade and Industry (METI Energy-Saving Category) under the Energy Conservation Grand Prize 2018 for 'a Smart EMS (Energy management system)', an automatic energy saving management system. The 'Smart EMS' was rolled out to the factory of Panasonic Energy (Wuxi) in China by MI Division and adopted at the factory. In the factory, huge amount of the energy is used for air conditioning, because in the process of manufacturing electrode plate for batteries, maintaining low humidity environment is required to ensure the product quality. However, with the Smart EMS, some 13% of reduction in the amount of the energy used in the process was realized. This is because Smart EMS's energy saving automatic control, unlike the conventional manual control at certain condition, enables control of air conditioning without excessive or loss of energy used, by optimizing the amount of energy to be used, utilizing the automatic control function with AI that follows required load fluctuation. We will continue to roll out this technology more widely to other factories across the world to achieve reducing significant amount of CO₂ emissions.



Adoption of Smart EMS

Activities for Increasing Amount of Renewable Energy Use

In order to increase the amount of renewable energy use, Panasonic is actively promoting to adopt use of renewable energy suited to features of the region such as energy from photovoltaic cells in its sites across the globe. Representative examples of adoption of renewables in fiscal 2020 are adoption of solar photovoltaic systems in both China and Japan.

In China, we are working on adopting photovoltaic generation systems including Panasonic HIT[®] Photovoltaic Modules through a Panasonic third-party leasing scheme. Panasonic Industrial Devices (Qingdao) Co., Ltd. (PIDQD) adopted a 701 kW generator in April 2019. Panasonic Manufacturing (Shanghai) Co., Ltd. (PMFSH) adopted a 792 kW generator in June

2019. Further, Panasonic Potevio Mobile Communications Beijing Co., Ltd. (PMCB) adopted a 398 kW generator in September 2019, and produced 239 MWh in the second half of fiscal 2020, which supplied some 21% of the energy used in the site.

In Japan, an additional 330 kW photovoltaic system was adopted at Panasonic Eco Technology Center (PETEC), a home appliance recycling factory. Combined with the existing photovoltaic system, PETEC is now equipped with a photovoltaic power generation capability of 624 kW, which supplies some 9% of annual power consumption. Along with other energy-saving measures, including procuring electricity sourced from renewable energy and utilizing a non-fossil fuel certificate, as well as a credit to offset fossil fuel-derived CO₂ emissions, PETEC has been a zero-CO₂ emission factory since fiscal 2019.

Thanks to the series of efforts described above and the commencement of full-scale operations of existing photovoltaic systems in different sites, our in-house renewable energy adoption in fiscal 2020 for the entire company^{*10} reached 32 thousand MWh.^{*11} We are steadily making progress towards the 'target of generating 40 thousand MWh renewable energy across our sites'.

We are continuously promoting to adopt photovoltaic power generation system in other global sites in addition to those mentioned above. We will continue our efforts to achieve further reductions in CO₂ emissions, aiming to adopt a photovoltaic power generation system at sites where the system adoption is feasible by fiscal 2021.

Examples of the use of renewable energy are on the following website.

<https://www.panasonic.com/global/corporate/sustainability/eco/co2/site.html>

*10 The total amount of the adoption includes the amount of the renewable energy adopted at non-production sites.

*11 The total amount of the adoption is subject to the amount of photovoltaic energy, wind power, and biomass energy including the amount of the renewable energy adopted at our non-manufacturing sites, excluding the amount of energy from heat pumps.



Photovoltaic power generation system at PIDQD



Photovoltaic power generation system at PMFSH



Photovoltaic power generation system at PMCB



Photovoltaic power generation system at PETEC

Approach towards the CO₂ Emissions Trading Scheme in China

In China, an Emissions Trading Scheme (ETS) that targets at more than 1,700 companies in the power industry was implemented in December 2017. This scheme became stricter in 2019 and the trading volume is also increasing. As we have many business divisions located in China, we continue to take measures for the possible effects of the scheme on our businesses and the possibilities that Panasonic may be a target in the light of risks and opportunities, by making use of our strength in terms of reducing CO₂ emissions in production activities we have conducted.

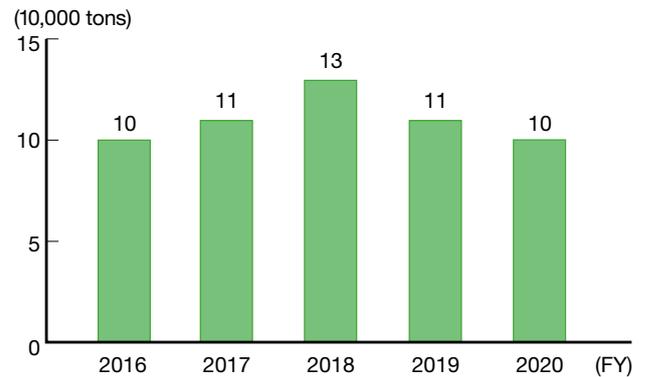
Reducing the Emissions of GHGs Other than CO₂ from Energy Use

GHGs other than CO₂ from energy use emitted by Panasonic include nitrogen fluoride (NF₃) and sulfur hexafluoride (SF₆) used as cleaning gases in LED and semiconductor factories, hydrofluorocarbons (HFCs) used in air conditioner factories as refrigerants for products. To reduce these gases, we implement a variety of measures, such as installing removal devices, preventing leakage of refrigerants, collecting and destroying refrigerants, and replacing the gas with substitute non-GHG.

GHG emissions other than CO₂ from energy use (CO₂-equivalent; hereinafter the same) in fiscal 2020 amounted to 10 thousand tons, which was 10 thousand tons less than the previous fiscal year.

*12 Hussmann Parent Inc. and its consolidated subsidiaries not included.

Emissions (CO₂-equivalent) of GHGs Other than CO₂ from Energy Use in Production Activities*12

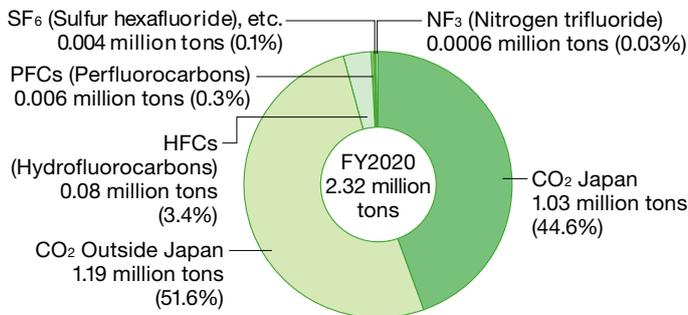


Breakdown of Total GHG Emissions (by gas and by scope)

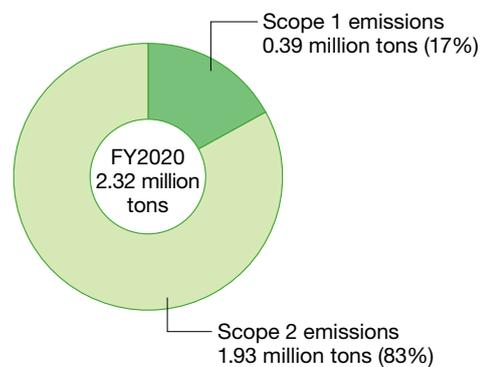
Our GHG emissions, including emissions from energy sources and other sources, reached 2.32 million tons in fiscal 2020, the breakdown being 17% for Scope 1 emissions*13 and 83% for Scope 2 emissions*13 (see page 31 for Scope 3 emissions).

*13 GHG emissions defined by the GHG Protocol, an international calculation standard for GHG emissions. Scope 1 emissions refer to all direct GHG emissions from facilities that are owned or controlled by the reporting entity (e.g. emissions from usage of town gas or heavy oil). Scope 2 emissions refer to GHG emissions from manufacturing of the energy that is consumed in facilities owned or controlled by the reporting entity (e.g. emissions from generation of electricity that the reporting entity purchased).

Breakdown of Total GHG Emissions (CO₂-equivalent) in Production Activities (by category)



Breakdown of Total GHG Emissions (CO₂-equivalent) in Production Activities (by scope)



Promotion of Circular Economy

Alongside changes in customer lifestyles, there is now a growing global trend for customers to use only specific functions of a product, rather than using or owning the whole product. In Europe, building a circular economy for sustainable economic growth has become a major economic strategy, in a move away from continuous resource consumption. This trend is spreading around the world along with the change in customers' sense of values. Amid this development, Panasonic is introducing the idea of the circular economy and moving forward in efforts to promote effective utilization of resources and maximization of customer value. The circular economy activities we promote have two aspects: 1) creation of circular economy businesses, and 2) evolution of recycling-oriented manufacturing.

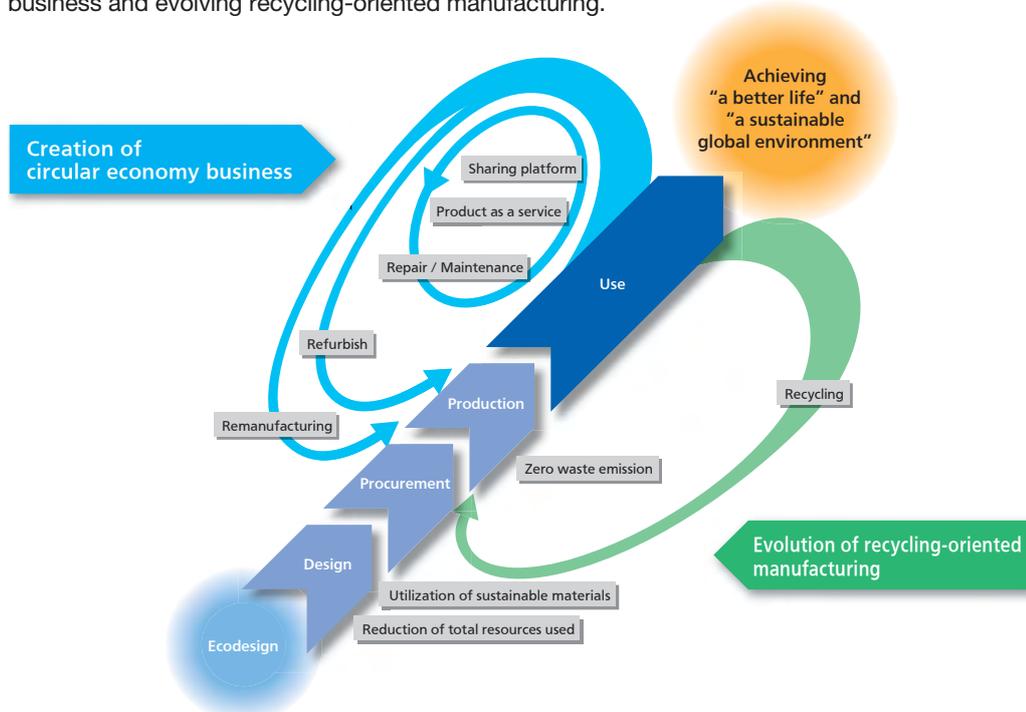
In order to realize the new value of using only product functionalities, instead of using or owning the whole product, we will strive to create circular economy businesses. These include a "Sharing service", where multiple users use the same individual product, a "Product as a service" where services are fulfilled based on functions, and "Repair and Maintenance, Refurbish and Remanufacturing", where functions, values, and the life cycle of a product are utilized in the most efficient manner by recycling or reusing the product itself or the components used in the products.

Alongside this, we continue to implement recycling-oriented manufacturing by reduction of the total resources used, utilization of circulative resources, zero waste emission, and recycling. Furthermore, we will develop recycling-oriented manufacturing to a higher level by using new materials and the latest digital technologies.

With all these activities, we aim to realize both "A better life" and a "Sustainable global environment" towards our Environmental Vision 2050, based on an eco-design concept which maximizes customer value in use by increasing resource efficiency at each process in design, procurement, and production.

Concept for the Actions toward Circular Economy

We will promote effective utilization of resources and maximization of customer value by creating circular economy business and evolving recycling-oriented manufacturing.



As specific activities, we will take actions to meet our targets regarding resources in Green Plan 2021. First, in order to create circular economy businesses, we will complete mapping of the relationships between our existing business and the circular economy, and then, to shift the existing business to circular economy businesses based on the mapping.

Next, we aim to use 42 thousand tons or more of recycled resin (cumulative from FY2020-2022), by further developing the actions needed to achieve necessary component features, securing stable amounts of supplied components, improving the use of components in manufacturing, and developing recycling technologies.

Furthermore, as Zero waste emission activities are important in utilizing resources, we will continue to work toward achieving 99% or more for factory waste recycling rate at each factory in fiscal 2020.

To accelerate these activities, Panasonic started the 'Global Circular Economy Project' in April 2020 with Panasonic Europe as the project lead.

Creation of Circular Economy Business

In our drive to promote the efficient use of resources and to maximize customer value, we are working to create businesses based on a circular economy model.

Our first business model is our "sharing service." The service consists of bicycle parking areas; three were created inside Tsunashima SST^{*1} and at Hiyoshi Station. On top of this, 30 IoT-linked electrically-assisted bicycles have been made available to residents of the town and employees at commercial facilities in a trial project to study how to operate and manage an IoT-linked electrically-assisted bicycle service.

Moreover, as a model for "products as a service," we have implemented a scheme to provide display cases with refrigerators/freezers, combined with a refurbishment service for those refrigerators and freezers:

This service to provide refrigeration does not involve marketing equipment to supermarkets, convenience stores or other food retailers. Instead, it is aimed at offering "food refrigeration" as a value. The refurbishment scheme focuses on inspecting and repairing display cases that have been used at retail chain stores and which will then be reused at other retail stores. These services are expected to reduce maintenance and energy costs, and at the same time it will facilitate cheaper, low-budget store renovations by making business management more efficient.

Furthermore, we are also promoting the following activities based on a circular economy concept. One example is building renovation: A building that we had used as a showroom and for other purposes for nearly 20 years was renovated through a joint effort with our partners. It has been transformed into a business and commercial complex named TENNOZ Rim^{*2} which includes a co-working space, studio, laboratory, lounge and café. We consider renovation projects enabling more effective use of existing structures with additional performance features to be better than activities related to new buildings, as a circular economy business.

We are also seeking to create new value from factory waste in the form of totally new products, through creative design. To date, waste from manufacturing processes for clothing irons, rice cookers and kitchen systems has been used to produce bookends, lighting equipment, tables and other furniture items in creative collaboration with our business partners. We plan to develop further projects of that kind and create new value through broader co-creation.

Through these activities, we are working to create businesses based on a circular economy. Likewise, we are making progress in transitioning existing businesses into businesses based on a circular economy model. To achieve this, we are working on analysis of the development of circular economy options for existing businesses indicated in the Green Plan 2021, in accordance with the guidelines we established in fiscal 2020.

*1 A next-generation sustainable smart town that was built in Yokohama City, Kanagawa Prefecture, in March 2018. It is being managed by the Tsunashima SST Council organized by Panasonic and 10 other companies in various industrial fields to engage in innovative, eco-friendly activities and to create new services through collaboration among urban community developers, residents and local governments.
(<http://tsunashimasst.com/JP/>)

*2 See <https://www.tennoz-rim.tokyo/>

Evolution of Recycling-Oriented Manufacturing

We use many kinds of resources, including iron (27% of total resources used) and plastic (10% of total resources used), because of our wide range of products and businesses, from home appliances, components such as semiconductors and batteries, housing, and B2B solutions. In recycling-oriented manufacturing, we are further working on reducing the input of virgin resources, while increasing the amount of recycled resources. And in that context, we are working to establish a circular system according to resource type and features.

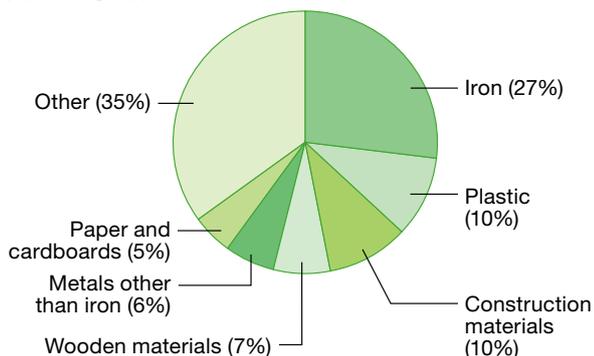
Furthermore, we are clarifying recycled resource use by identifying the volume of each type of resource used across the Panasonic Group. For example, in the case of recycled resin, we used approx. 13,400 tons of recycled resin in our products in fiscal 2020. We are developing the necessary actions to take in order to get the features required for components, securing stable amounts of supplied components, improving the components for the use phase at design and manufacturing sides, and developing new recycling technologies.

As stated above, we are making steady progress in achieving the goals of Green Plan 2021 for the effective use of recycled resin products as described here. In addition, we are developing materials with less environmental impact, such as resins that combine plant-derived materials, and incorporating them in products.

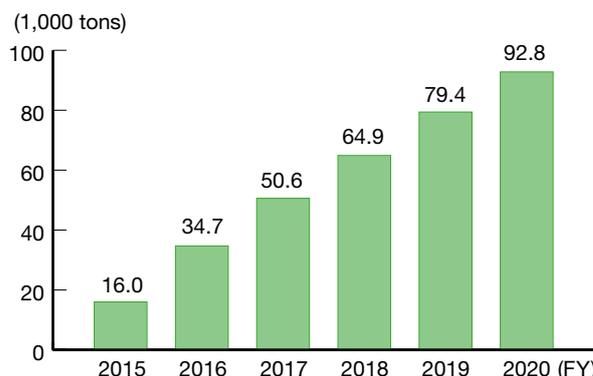
As for the factory waste recycling rate^{*3}, we had traditionally set different targets for Japan and countries outside Japan according to the relevant local infrastructures. However, given increased awareness of the importance of zero waste emission activities, we have set a globally standardized target since fiscal 2011 and are taking steps to improve the standard level of waste recycling across the entire Group. The factory waste recycling rate in fiscal 2020 was 98.9% compared to our target of more than 99%, falling short of the target (see page 50). We will analyze the issues and introduce measures to achieve the target in the future.

*3 Factory waste recycling rate = Amount of resources recycled/(Amount of resources recycled + Amount of landfill)

Breakdown of Input Virgin Resources Used in Fiscal 2020 (by category)



Results of Recycled Resin Usage (Cumulative total from fiscal 2015)



Reduction in Resources Used

To minimize the use of resources for production, we continuously look to reduce the weight of our products. Through the Product Environmental Assessment (see page 34), Panasonic has been promoting resource saving from the product planning and design stage, such as using less resources, making our products lighter and smaller, and using less components. We also implement various measures from the standpoint of resource recycling throughout the product life cycle, such as component reuse, longer durability, use of recycled resources, easier battery removal, and labels necessary for collection/recycling.

Examples of weight reduction and recyclable product design are also introduced in the following website.
<https://www.panasonic.com/global/corporate/sustainability/eco/resource/reduce.html>

Use of Sustainable Materials

Under the concept of “product-to-product”, we are enhancing our initiatives of utilizing resources recovered from used products. As for resin, we promote the reuse of resin recovered from our used home appliances (refrigerators, air conditioners, washing machines, and TVs) for our products. We also started recycling scrap iron recovered from used home appliances in our products in 2013.

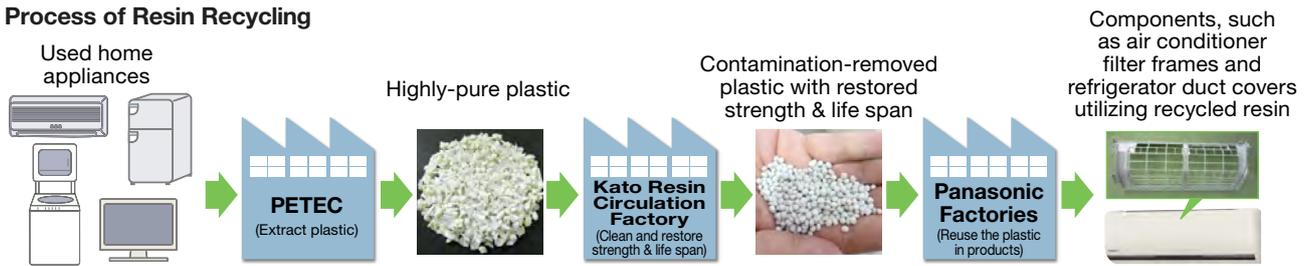
► Our approaches to Resources Recycling
https://www.panasonic.com/global/corporate/sustainability/eco/resource_sp.html



Enhanced Use of Recycled Resin

To efficiently utilize resin recovered from used home appliances in addition to metals such as iron, copper, and aluminum, our recycling factory, Panasonic Eco Technology Center Co., Ltd. (PETEC), and Kato Plastic Recycling Factory of the Appliances Company work together for resin recycling.

Process of Resin Recycling



Using technologies such as our original near-infrared identification technology, PETEC is capable of sorting shredder residue of waste home appliances into three major types of resins with different purposes and properties—polypropylene (PP), acrylonitrile butadiene styrene (ABS), and polystyrene (PS)—at a material purity of over 99%.

The recycled single resins sorted and recovered at PETEC are then transferred to the adjacent Kato Plastic Recycling Factory to be further purified and processed to recover their chemical properties. Kato Plastic Recycling Factory is a manufacturing and development site that demonstrates promotion of use of recycled resin at our Appliances Company, a home appliance manufacturer and seller. The factory plays an important role in enhancing recycled resin utilization by developing recycling technologies, such as a more efficient method for improving the purity of recycled resins. Recycled resin is generally weaker in strength and has a shorter life than new resin. This is why its chemical properties have to be recovered to the level of new resin to make them usable as materials and components in new products. Because of the differences in the physical properties required by different products, we have been examining the properties of recycled polypropylene and polystyrene and have developed technologies to create new formulas for resin components, adding our own proprietary antioxidant and mixing recycled resin with new resin.



Near-infrared sorting machine that can sort three types of resin simultaneously

Development and Use of New Sustainable Materials

Cellulose fiber can be derived from various natural resources such as wood residues from forest thinning and other organic wastes, and it is now drawing attention as a resource with low environmental impact. In fiscal 2019, Panasonic developed a composite polypropylene (PP) resin containing plant-derived cellulose fiber as an additive. The new eco-friendly PP resin with cellulose fiber is currently used in structural components for cordless stick-type vacuum cleaners, contributing to their principal feature of lighter weight. We have also succeeded in developing a technology for blending resin with more than 55% cellulose fiber and technology to produce white products in fiscal 2020. The technology has been used to create reusable cups, jointly with Asahi Breweries, Ltd. We intend to develop more new products with this technology, focusing also on developing new recyclable resources.

▶ Launched two new "POWER CORDLESS" stick vacuum cleaners

<https://news.panasonic.com/press/jp/data/2018/07/jn180720-1/jn180720-1.html>

▶ Developed a high-density cellulose fiber molding material which has flexibility in design

<https://news.panasonic.com/jp/press/data/2019/07/jn190708-1/jn190708-1.html>

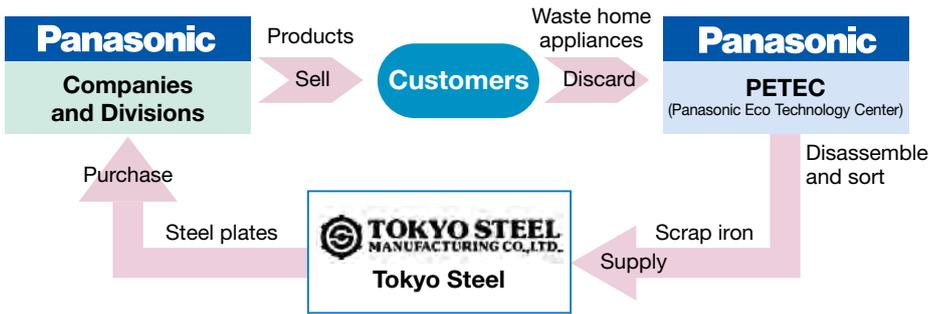
▶ Started providing an environment-friendly reusable cup utilizing a high-density cellulose fiber molding material

<https://news.panasonic.com/jp/topics/166351.html>

Building a Recycling Scheme for Scrap Iron

Jointly with Tokyo Steel Co., Ltd., we started a recycling scheme for scrap iron in July 2013. In this scheme, we recover the scrap iron from used home appliances and Tokyo Steel makes it into steel sheets. We then purchase the sheets back as a material for our products. Supplying scrap iron for recycling and repurchasing the recycled iron is the first scheme of its kind in the Japanese electrical manufacturing industry.

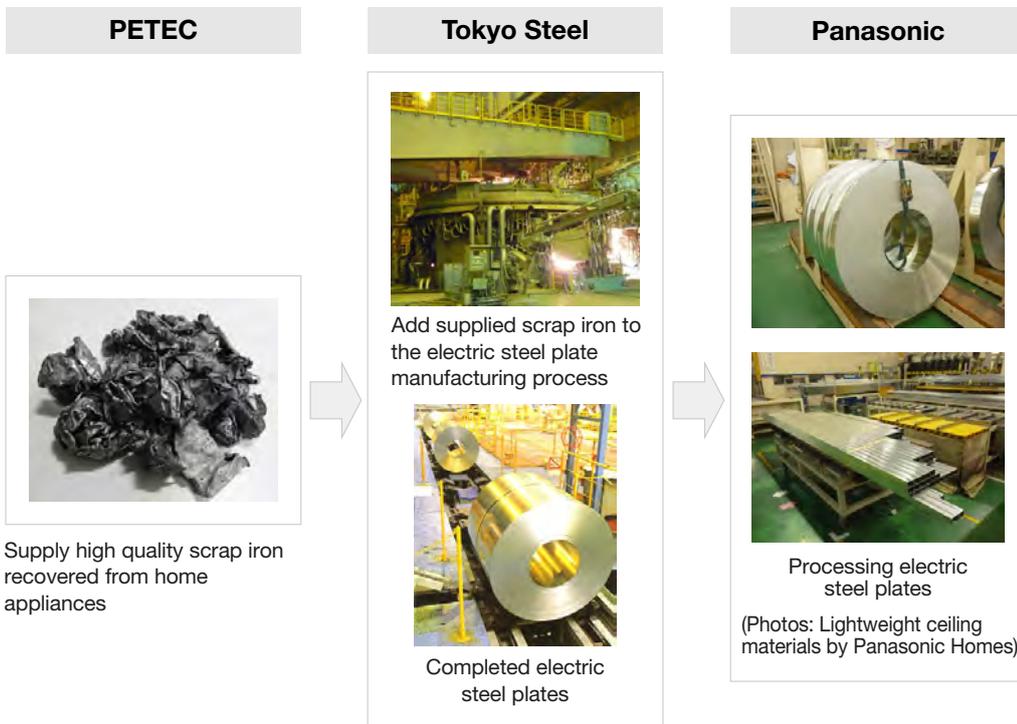
Self-recycling Scheme for Electric Steel Plates



Specifically, scrap iron from home appliances collected and treated at PETEC is supplied to Tokyo Steel’s Okayama Plant, where the scrap iron is processed into electric steel plates.^{*4} Panasonic procures the recycled steel plates and utilizes them in products. Discussions with Tokyo Steel commenced in 2010, and we have worked together since then to improve the quality of recycled iron to a level sufficient for production use, as well as developing the technology to improve the applicability of the recycled iron. From this we identified the optimum application of the electric steel plates, and refined its specific features (e.g. shape, strength, and weldability) to meet application-specific requirements. Use of thin electric steel plates in our products was first made possible in 2011. Through this close collaboration, we materialized this recycling scheme in 2013, a scheme where a home appliance recycling company that we own supplies scrap iron to be used to make electric steel plates.

The amount of scrap iron we initially supplied to Tokyo Steel was about 50 tons per month. In fiscal 2019, it reached over 2,700 tons, and the recycled steel is being used in our products, including washing machines and ceiling materials for housing.

Self-recycling Scheme Process



The increase in electric steel plate usage leads to an increase in the usage of scrap iron, which is one of the most important resources in Japan. In addition, producing steel plates from scrap iron emits much less CO₂ compared with producing steel plates from scratch. This scheme also stabilizes the procurement price, because the price of scrap iron supplied from PETEC and the price of electric steel plates procured from Tokyo Steel are determined by the scrap iron fluctuation rate agreed between the two companies. We will further expand this recycling scheme for more efficient resource utilization, CO₂ emissions reduction, and stabilization of procurement prices.

*4 Steel produced from scrap iron melted and refined in an electric arc furnace.

Zero Waste Emissions—Improving Factory Waste Recycling Rate

From the viewpoint of effective usage of resources, we believe that generation of waste and revenue-generating waste at factories must be minimized, even if such waste could be sold as valuable commodities. Based on this belief, we identify the amount of generated waste (including both revenue-generating waste and factory generated waste) and classify it into: (1) recyclable waste (including those that can be sold and those which can be transferred free of charge or by paying a fee), (2) waste that can be reduced by incineration or dehydration, and (3) landfill (waste with no option other than being sent to landfills).

We reduce the emission of waste by boosting yield in our production process and increasing the recycling rate of our waste materials. Accordingly, we strive globally toward achieving our Zero Waste Emissions from Factories^{*5} goal by reducing the amount of landfill to nearly zero. We have reinforced such efforts particularly in China and other Asian countries, where many of our factories are located.

With the waste plastic import control introduced in China, the volume of material being recycled has dropped, leading to an increase in landfill waste disposal. As a result, the factory waste recycling rate in fiscal 2020 was 98.9%, falling short of the 99% target in our Green Plan 2021. We will introduce more activities which aim to maintain and improve the factory waste recycling rate.

As a means to reduce the generation of waste, we are fostering resource-saving product design. In our production activities, we are engaging in resource loss reduction, employing our own unique material flow analysis methods. We consider materials that do not become products and excessive use of consumables as resource losses, and make the material flow and lost values for each process visible in order to resolve the issues with close collaboration with the design, manufacturing, and other relevant business divisions. In the future, we will promote further reductions in resource losses through the Resource Loss Navigation, our original system developed to automatically display information to help reduce resource losses.

As measures to reduce the amount of landfill of waste and revenue-generating waste, we constrain the amount of waste materials that are particularly difficult to recycle, such as thermosetting resin. We are also strictly adhering to waste sorting practices in production processes to further expand the reuse of resources.

Because waste recycling rates in our overseas factories lag behind those in Japan, we have worked to improve the average level of recycling activities by sharing information within and between regions outside Japan. Specifically, in addition to accelerating the information sharing on waste recycling issues between our local factories and group companies in Japan, we also promote the sharing of excellent examples and know-how among our factories across regions by utilizing BA Charts^{*6} prepared by each region, following our long-standing approach toward CO₂ reduction activities.

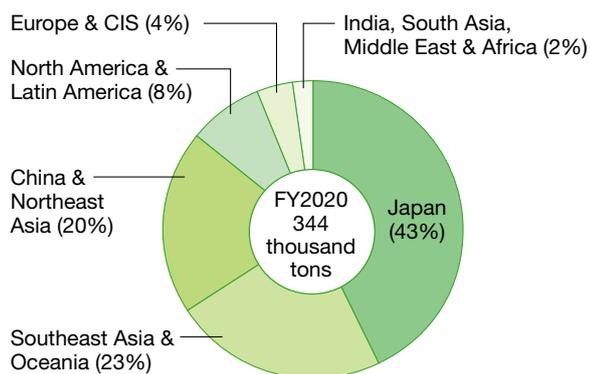
*5 Definition by Panasonic: Recycling rate of 99% or higher. Recycling rate = Amount of resources recycled/(amount of resources recycled + amount of landfill).

*6 A chart-format summary of comparisons between “before and after” implementation of waste reduction and recycling measures.

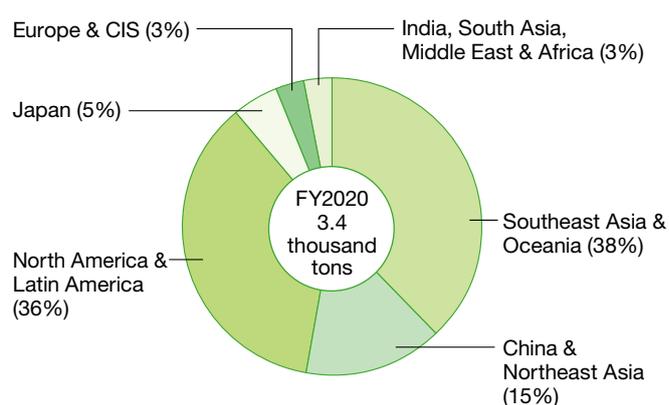
Amount and Recycling Rate of Total Wastes Including Revenue-generating Waste



Breakdown of Total Wastes Including Revenue-generating Waste (by region)



Breakdown of Landfill (by region)



Breakdown of Total Wastes Including Revenue-generating Waste for Fiscal 2020 (by category)

(1,000 tons)

Items	Total wastes	Recycled	Landfill
Metal scrap	141	141	0.5
Paper scrap	38	38	0.05
Plastics	41	38	1
Acids	22	14	0.09
Sludge	12	9	0.5
Wood	30	26	0.06
Glass/ceramics	6	5	0.2
Oil	22	20	0.06
Alkalis	19	17	0.03
Other *7	14	12	0.9
Total	344	320	3.4

*7 Combustion residue, fiber scraps, animal residue, rubber scraps, debris, ash particles, items treated for disposal, slag, infectious waste, polychlorinated biphenyls (PCBs), waste asbestos.

Global Initiatives for Used Product Recycling

For the purpose of efficient use of natural resources and prevention of environmental pollution, many countries around the world have been enacting recycling laws and developing their recycling systems. Examples include: the Law for Recycling of Specified Kinds of Home Appliances (Home Appliance Recycling Law) and the Act on the Promotion of Effective Utilization of Resources in Japan, the WEEE Directive in the European Union, and recycling-related laws in many states in the United States as well as in China. In addition to complying with the Basel Convention which controls the transfer of hazardous waste to non-OECD countries as well as with related laws in respective countries, the Panasonic Group strives to establish the most efficient recycling system in each country that is in line with its local recycling infrastructure, including the utilization of third parties.

Product recycling results in fiscal 2020 are as shown below. As for the situation outside Japan, with the decrease in the volume of collection and recycling due to recent reforms of business areas in various countries, the weight of collected products is on a flat or downward trend.

FY2020 Results

Japan	Processed approx. 177,570 tons of four kinds of used home appliances
Europe	Collected approx. 25,811 tons of used electronic products
USA	Collected approx. 450 tons of used electronic products

Product Recycling Initiatives in Japan

In response to the Home Appliance Recycling Law of 2001, which covers four specified kinds of home appliances^{*1}, manufacturers were grouped into two groups, Group A and Group B, to collect and recycle the four specified kinds of used home appliances. Panasonic belongs to Group A, and to work on recycling, it has established Ecology Net Co., Ltd. jointly with Toshiba Corporation to operate and manage a geographically dispersed recycling network through the effective use of existing recycling facilities nationwide. This management company supervises 324 designated collection sites (shared by Group A and Group B) and 29 recycling plants, based on consignment from Group A manufacturers (17 companies including Panasonic). Additionally, Panasonic invests in Panasonic Eco Technology Center Co., Ltd. (PETEC), Panasonic Eco Technology Kanto Co., Ltd. (PETECK), and Chubu Eco Technology Co., Ltd. (CETEC)^{*2} and exchanges information with product manufacturing divisions to develop easy-to-recycle designs, as well as conducts research and development to efficiently recover and supply more resources. In fiscal 2020, we recycled approx. 177,570 tons of the four specified used home appliances.



Machine to turn over air conditioner outdoor units at PETECK

Although the statutory recycling rate^{*3} is being raised in phases, Panasonic recycling factories have been achieving recycling rates higher than the legal requirement by reviewing and improving recycling equipment and processes in view of the characteristics and materials of respective products as well as higher recycling efficiency.

In the summer of 2019, PETECK automated a part of its air conditioner processing line, using an articulated robot to turn over and transfer air conditioner outdoor units during the dismantling process. The recognition device identifies the position and size of the outdoor unit, and based on the identified information the articulated robot picks up and moves the unit to the standard dismantling process or to the process for dismantling special items such as window-type units. This has enabled safe and efficient air conditioner processing, relieving workers of dangerous work that required physical strength to turn outdoor units (weighing 33 kg in average) upside down.

PETEC is promoting high grade plastic recycling using the plastic recognition equipment. See page 48 for more details.

*1 Air conditioners, TVs, refrigerators/freezers, and washing machines/clothes dryers.

*2 PETEC is a company fully invested by Panasonic, and PETECK and CETEC are joint ventures between Mitsubishi Materials Corporation and Panasonic.

*3 Statutory recycling rate = Recycling rate specified by law (Valuable resource weight/Total weight of used home appliances).

The statutory recycling rates were raised in 2009 and 2015, and are currently at least: 80% for air conditioners, 55% for CRT TVs, 74% for LCD and plasma TVs, 70% for refrigerators and freezers, and 82% for washing machines and clothes dryers.

► Overview of Recycling of Specified Home Appliances(Japan)

<https://www.panasonic.com/global/corporate/sustainability/eco/resource/recovery/recycling.html>

► Panasonic Eco Technology Center Co., Ltd. (PETEC)

<https://panasonic.net/eco/petec/>

► PC Recycling

<https://www.panasonic.com/global/corporate/sustainability/eco/resource/recovery/pc.html>

Recycling Efforts in the Europe / CIS Region

In 2019, we collected approx. 25,811 tons^{*4} of used products covered by the WEEE Directive across Europe.

Circular Economy

The EU Circular Economy (CE) Waste Package has entered into force on July 4, 2018 with new requirements on EPR (Extended Producer Responsibilities) for WEEE, Packaging and Batteries.

This Waste Package is the EU's approach towards "closing the loop" of product lifecycles through greater recycling and re-use measures. The provisions include setting ambitious recycling targets for waste recycling and measures on extended producer responsibility.

These new requirements will be further strengthened with the EU CE Action Plan, published in March 2020, which will speed up the EU's transition towards a circular economy.

Panasonic Europe has been assigned within Panasonic Group as the global lead function on CE. From April 2020 onwards, a 'Global Circular Economy Project' at Panasonic aims to develop and implement pilot business cases.

The French Circular Economy law, adopted in February 2020, is pushing ahead of the EU legislation, which implies the potential for a different legislative situation across EU Member States. Panasonic Group organizations with business in France have started preparations and take all necessary actions to comply with the French CE related obligations. Panasonic also takes a leading role at the European trade association DIGITALEUROPE to closely monitor the CE developments in European countries, aiming to promote the industry shift towards a more circular business.

Russia

Producers and importers must manage waste from their product and packaging waste either through self-compliance or a collective organization, or pay an environmental fee. The WEEE collection target increased in 2019 from 5% to 10%. To tackle low waste stream volume, a federal operator was established to coordinate regional schemes and invest in infrastructure. 14 members (including Panasonic) are registered as members of the collective organization EPR E-WASTE RECYCLING (WEEE scheme). To increase the access to WEEE, the WEEE scheme concluded additional contracts in 2019 with recyclers and retailers.

Panasonic is working on further developing appropriate regulations and on improving the recycling infrastructure in Russia through the industry association RATEK.

^{*4} Calculated by multiplying the weight of collected products per collection system by Panasonic market share in terms of weight per collection system.

Promoting Recycling Activities in North America

Panasonic continues its leadership role in establishing and operating a recycling system for waste batteries and consumer electronic products in North America. Following the startup of a state recycling law in Minnesota in July 2007, we established the Electronic Manufacturers Recycling Management Company, LLC (MRM), jointly with Toshiba Corporation and Sharp Corporation in September of the same year, and began recycling TVs, PCs, and other electronic equipment.

With collaborative ties to several recycling companies, MRM operates collection programs on behalf of 43 companies across 20 states and the District of Columbia. The cumulative total of collection by MRM has exceeded 1 billion lbs. (approximately 450 thousand tons) since its inception in 2007. With the changes in Panasonic's business strategies in the US in 2016, our remaining collection obligations are de-minimis, MRM will continue operating its collection programs on behalf of the manufacturers it serves.

As for waste batteries, we established Call2Recycle in 1994 jointly with other battery manufacturers, and now provide recycling programs for rechargeable batteries throughout the US and Canada. Call2Recycle provides collection programs and a robust retail collection network for over 300 companies, and collected more than 61,500 tons of primary and rechargeable batteries in the U.S. and Canada since the organization's inception. In terms of accessibility, 86% of US

residents live within 10 miles of a Call2Recycle collection site. A collection site is any person or organization that collects batteries. This includes public (retailers and municipalities) and private (hospitals, military bases, businesses and government agencies) sites. Call2Recycle has more than 30,000 public and private collection sites throughout the U.S. and Canada.

Recycling end-of-life products in Canada started in 2004 with the Alberta Government Extended Producer Responsibility (EPR) Regulation. Since then a total of ten provinces and two territories have legislated WEEE, each with their own unique parameters and requirements. In an effort to harmonize these programs, Panasonic Canada takes an active role in the governance of the Electronic Product Recycling Association, a not-for-profit management organization which was established with the mandate to standardize operations and bring about economies of scale on a national basis through 3,211 collection sites. They are now responsible for managing all the provincial programs with the exception of Alberta and the two territories, as these three programs are under the direct jurisdictions of their governments and not industry. The currently active provincial EPR programs have proven to be very effective in diverting e-waste as reflected in last year's totals, where 110,770 tons in Canada were collected.

As the number of heavy CRT televisions entering the e-waste stream is on the decrease and the trend of light weighting of our products continues, coupled with the maturing of these programs collection weights are on a decrease year over year. It is therefore apparent that a new measurement/target must be agreed upon as weight collection alone is no longer a valid indicator of program performance.

Initiatives in China

In China, through the Executive Committee of Foreign Investment Companies (ECFIC) and other organizations, we are engaged in activities to clarify the products covered by the Second Catalog (published in February 2015) of the Regulation for the Administration of the Recycling and Treatment of Waste Electrical and Electronic Products, which was published in May 2012 and enforced in July of the same year. In addition, we actively gather information and submit comments on setting unit-based rates for the covered products, toward early disclosure of information by Chinese governmental organizations such as the Ministry of Environmental Protection and the Ministry of Finance.

We are also carrying out an assessment of the development of the Plan on Promoting Extended Producer Responsibility promulgated by the government in January 2017 and reviewing our response.

International Collaboration in Southeast Asia and Oceania

Vietnam

Since the introduction of recycling law in Vietnam in July 2016, producers and importers are required to establish a take back scheme for their products sold in Vietnam. Panasonic Sales Vietnam has since set up 7 collection points in Hanoi, Ho Chi Minh, Hai Phong, Thanh Hoa, Vinh, Danang, and Can Tho. In 2019, 8 tons of e-waste were collected and sent to licensed recyclers for proper treatment.

Australia

The National Television and Computer Recycling Scheme was established in Australia in 2011.

Panasonic Australia is a member of the EPSA, a co-regulatory arrangement approved by the Australian government to fulfill its obligation under the national scheme. Between January 2019 and December 2019, 1,188 tons of e-waste were recycled. In March 2020, Panasonic Australia announced it will exit the Australian Television market. This decision will result in significant reduction in Panasonic's obligations under this scheme.

Panasonic Australia has played an active role with the Australian Battery Stewardship Council in designing a Stewardship program for battery recycling which, pending Government approval, will commence implementation in 2020.

Other Southeast Asia countries

Regulators in Malaysia, Thailand, and Singapore are also gearing towards the global trend of mandating responsible end-of-life product recycling. Discussions with regulators and industry bodies are in progress. Such examples include Malaysia Department of Environment-Japan International Cooperation Agency (JICA) e-waste management mechanism development project and Thailand local industry association.

Through such engagements between the government and industry bodies, Panasonic hopes to contribute to the formulation of sustainable e-waste management policy in each country.

Recycling Efforts in India

In India, the new e-waste recycling law has been implemented by the Ministry of Environment, Forests and Climate Change (MoEFCC) from the 1st of October 2017, with Extended Producer Responsibility (EPR) targets based on end-of-life (EoL) defined in the e-waste (Management) rules 2016. To fulfill the compliance, we will collect and recycle waste home appliances through the “I Recycle” program already established by Panasonic India (PI).

Panasonic has also been taking part in the Consumer Electronics and Appliances Manufacturers Association (CEAMA), which promotes an analysis of current recycling activities in India as well as a long-term plan for waste problem solutions.

We are having various dialogues with the Indian government, jointly with CEAMA, about the EPR target and EoL definition for recycling management.

We are also actively engaged in different active associations including the Federation of Indian Chambers of Commerce and Industry (FICCI) and Confederation of Indian Industry (CII) to establish an even more efficient and robust recycling system and to submit industry comments to the Indian government for a better governance system.

Recently, Government of India has come up with Battery recycling Rules draft for managing efficient recycling of batteries of all types. We are reviewing the draft rules with different business stakeholders and industry associations for preparation of appropriate inputs to be sent to Government before the final rules are published in gazette.

Recycling Initiatives in Latin America

In response to a growing trend in stricter environmental laws in Latin American countries, discussions on the establishment of recycling laws and actual enforcement are being conducted.

In Brazil, a sectoral agreement on home appliances was concluded in October 2019, and a Federal Decree specifying a system to collect and recycle household electrical and electronic equipment was published in February 2020. For many years, Panasonic has been continuing discussions with the government through industry groups (ELETROS/ABINEE), proactively participating in collection campaigns in various major cities, and has contributed to the formulation of the decree. As one of the main members of a waste home appliance management body (ABREE), we also started actions in advance in preparation for the establishment of a reverse logistics system (a system to collect used products) which will start in 2020, aiming for efficient collection and treatment of used products.

In Peru, under the recycling law that came into force in 2016, we joined a nonprofit waste management organization (ASPAGER) as a leading member, and started a used-product recovery program. We also conduct activities at local elementary schools on a regular basis to raise awareness about recycling.

In Colombia, a framework law for home appliance recycling was enacted in 2018. Panasonic has been a member of a used-product collection program (Red Verde/Lumina) conducted by an industry group (ANDI) since 2014, prior to the enactment of operational rules.

In Mexico, a collection program is implemented under the government-approved recycling management plan.

In Chile, the legislation is being considered, and preparations for setting up a collection program are underway through continuous discussions with the government.

In Argentina, we are participating in the Latin American Battery Association (ALPIBA) and engaging in continuous discussions with the government for effective legislation on the regulation of dry cell batteries.

Approaches to Water Resource Conservation

It is said that available fresh water is only about 0.01% of the Earth's total water resources. In addition, the World Economic Forum, host of the Davos meetings, has stated in its annual report on global risks that the water crisis continues to be one of the top risks with global impact, in view of the increase in water consumption to be caused by future economic growth and population increases.

As risks of extreme water shortages is becoming higher as one of social issues, Panasonic is working to conserve water resources both in its products and production activities, in order to fulfill its social responsibility and to reduce risks in the management. Our Environmental Policy (Refer to page 13). stipulates that we make efforts to conserve water resources by using water efficiently and preventing water pollution. In accordance with the "Green Plan 2021", our environmental action plan, we are continuously working on reducing the water used in our production operations. As for risk management, we had conducted water conservation activities, aiming to complete our water risk assessment at all our production sites by fiscal 2019, and have completed 100% of the assessments.

Specifically, we evaluated the scale of water risk at all regions where our production sites are located, in order to identify and mitigate effects of water on our business activities. In the evaluation, we utilized evaluation tools such as Aqueduct supplied by the World Resources Institute (WRI) and the Water Risk Filter supplied by the World Wide Fund for Nature (WWF), which can evaluate risks in various aspects; not only from physical risks such as water shortages, but also from the risks in water-related regulations as well as reputation risks in each region. We also made use of public databases available from respective national governments. In areas with higher water risks, we collected information through public local information as well as through hearings with relevant organizations, etc. By conducting detailed analyses and close examination of the local information and the site data including water use volumes, we, more specifically, identified the effects on our business activities. We steadily proceeded processes of the water risk assessments, and in fiscal 2018, completed water risk assessments at all of our production sites. At present, no water risks that could affect our business activities have been reported. Yet, we will continue to make efforts to reduce water consumption in our production activities in the future under the water risk assessment that had been implemented.

For promoting these activities, we have developed a structure for the promotion of environmental management, including water management (see pages 18-19). We are now conducting environmental activities using PDCA cycle under the structure, and are upgrading the environmental management level. In addition, we have organized an Environmental Risk Management Structure to continuously reduce environmental risks; under the structure, we (1) identify environmental risks and promote company-wide risk management every fiscal year and (2) promptly respond to the risk when it arises (see page 21). Through these activities, we will continue to manage our environmental risks.

Moreover, we have participated in the Water Project, a public-private partnership project aimed at boosting awareness of water conservation, which was launched under the initiative of Japan's Ministry of the Environment in 2014. Objectives of the project are to maintain a sound water cycle and promote its recovery. The project distributes water-related activities conducted by corporations, and water-related information including importance of water. We will work in cooperation with the Japanese government and other companies to conserve water resources.

Water Resource Conservation through Products

By thoroughly analyzing the use of water through our products, we have developed functionalities that allow a considerable amount of water conservation by utilizing water at a maximum level through improvement of water flow control and cyclic use. In fiscal 2012, we enhanced one of the criteria, water conservation, in our Green Product accreditation criteria (see page 33), and has accelerated the development of industry-leading products that contribute to water saving.

▶ Example of water-saving products are introduced in the following website.

<https://www.panasonic.com/global/corporate/sustainability/eco/water.html>

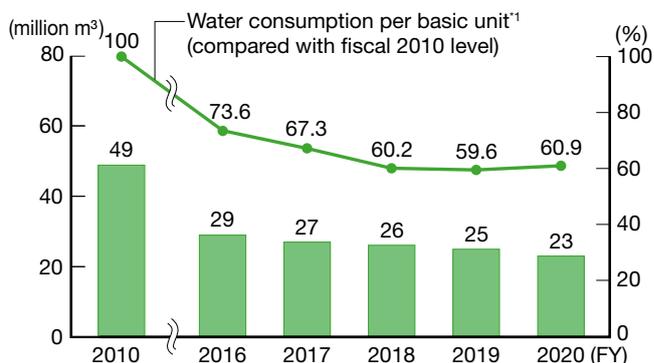
Initiatives for Water Resource Conservation through Production Activities

By collecting and reusing wastewater from our manufacturing processes and air conditioning systems, we are reducing the amount of makeup water used and wastewater effluent. Through these activities, we reduce environmental loads on water resources due to the intake and effluent of water in production activities. As many regions around the world are threatened by water shortages, we are conducting production activities, balancing water resource conservation in focused regions. The amount of water used at factories in fiscal 2020 resulted in 23.11 million m³, which is reduced by 6.4% versus the fiscal 2019. The water used at our factories per basic unit of production^{*1} got worse year-on-year due to effects of structural reform, and the like. Our use of recycled water^{*2} in fiscal 2020 was 4.4 million m³, accounting for 19% of the total amount of water used. The amount of discharged water in fiscal 2018, 2019, and 2020 resulted in 20.47 million m³, 19.25 million m³, 18.02 million m³, respectively.

*1 Water used at factories per basic unit of production = Water used at factories / Production volume.

*2 The calculation excludes the water circulating for a single purpose (e.g. water in a cooling tower).

Water Consumption in Production Activities and Water Consumption Per Basic Unit



Note: Then-SANYO Electric and Panasonic Liquid Crystal Display not included in fiscal 2010.

FY2019 Breakdown of Water Consumption (by region)

(10,000 m³)

Region	Consumed	Consumed			Discharged	Discharged	
		Municipal water/ industrial water	Groundwater	Rivers/lakes		Sewer systems	Waterways
Japan	1,414	465	949	0	1,194	177	1,017
China & Northeast Asia	460	459	1	0	312	243	69
South East Asia, & Oceania	352	306	46	0	248	171	77
North America & Latin America	37	22	15	0	20	17	3
Europe & CIS	22	10	13	0	21	10	11
India, South Asia, Middle East & Africa	24	2	22	0	7	7	0
Total	2,311	1,265	1,045	0	1,802	625	1,177

In Panasonic's Industrial Solutions Company (at 76 sites), which uses the highest amount of water in Panasonic group, 13.64 million m³ of water was actually used, which is reduced by 6.6% versus the fiscal 2020. However, the achievement rate for reduction of the amount of water used per basic unit was 98.7%, which did not reach the target due to reduction of the production volume caused by the effects of COVID-19. In the Automotive Company (at 13 sites), the actual amount of the water used was 702 thousand m³ compared to the target of 586 thousand m³, mainly because of effects caused by production increase of automotive batteries in a new factory.

Panasonic Industrial Devices (Qingdao) Co., Ltd. is located in Qingdao, China, where water shortage is their concern. In the factory, water is used to treat hydrochloric gas produced during manufacturing processes of electrostatic capacitance-type touch panels. In order to take measures for increase in the amount of water to use because of product expansion, expansion, they introduced a system in which alkaline drainage water discharged in other processes. With the system, efficient neutralization of the treated alkaline water, i.e. acid water has become possible, which has contributed to reduction in the amount of used water. Panasonic continue our efforts to conserve water resources.



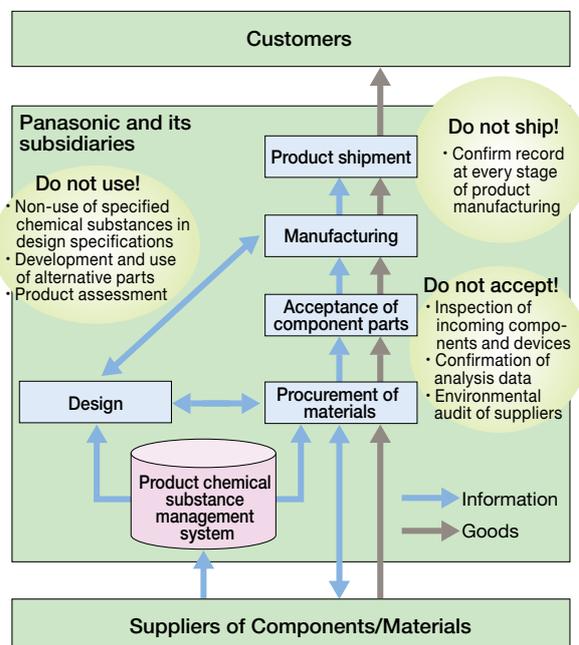
Panasonic Industrial Devices (Qingdao) Co., Ltd.

Approaches to Reduce the Environmental Impact of Chemical Substances

In order to prevent contents of hazardous substances prohibited under the EU RoHS Directive^{*1}, published in 2002 and revised in 2011, and the like to Panasonic products, it is important not only to pay attention to the contents at the stage of product design, but also to ensure that specified substances are not contained in products to purchase.

Therefore, Panasonic has rolled out the “Do not accept! Do not use! Do not ship!” campaign throughout the each production process from designing to shipment inspection in production activities at business sites across the world since October 2005. Specifically, as for the stage of inspection for incoming components, we have established a mechanism to check and analyze whether specified chemical substances are included by introducing an analyzer. In addition, we have supported to establish a Product Chemical Substances Management Structure, by periodically conducting environmental audits for suppliers of components/materials which may have high risks of containing specified chemical substances.

Specified chemical substance management system

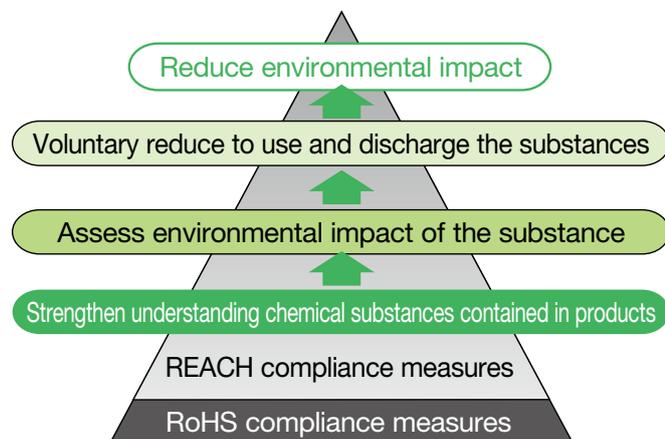


Meanwhile, as represented by the enforcement of the REACH regulation^{*2} in the European Union, the world is moving toward the goals agreed at the World Summit on Sustainable Development (WSSD) held in 2002, which is to produce and use all chemical substances in a manner that minimizes their impact on human health and the environment. In support of the precautionary approach proposed in the Rio Declaration made at the Earth Summit in 1992, Panasonic aims at manufacturing products in line with our basic policy of reducing the use of chemical substances that might adversely affect human health and the environment throughout their lifecycles. As for concrete activities, we have worked to comply with relevant regulations such as EU RoHS, as a matter of course. In addition, we have worked to reduce the environmental impact of our products by (1) identifying hazardous substances contained in our products, (2) evaluating these substances on their environmental impact, and (3) voluntarily reducing or discontinuing their use in case of any environmental risks.

*1 Directive on the Restriction of the use of certain Hazardous Substances in electrical and electric equipment

*2 Regulations on the registration, evaluation, authorization, and restriction of chemical substances.

Process to Reduce the Environmental Impact of Chemical Substances



To promote our initiatives clearly, we set forth our Chemical Substances Management Rank Guidelines, which prohibit or specify certain substances for management in terms of our products and factory activities. Companies in the Panasonic Group are requested to follow the Guidelines, and suppliers are also requested for support as necessary. In fiscal 2013, we added Level 3 to the Chemical Substances Management Rank Guidelines (For Products) to review the timing for the prohibition of further substances that may adversely affect humans and the environment, in addition to the current and forthcoming prohibitions.

Chemical Substances Management Rank Guidelines (For Products) and relevant documents, which prohibit or specify certain substances for management, can be downloaded from the website shown below (Green Procurement).

► Green Procurement (Download of Chemical Substances Management Rank Guidelines (For Products))

<https://www.panasonic.com/global/corporate/management/procurement/green.html>

Chemical Substances Management Rank Guidelines (For Products)

Rank		Definition
Prohibit	Level 1	(1) A substance contained in products that is prohibited by existing laws and regulations; or a substance where the upper limit of concentration is specified. (2) A substance that will be prohibited in products by laws and regulations or where the upper limit of concentration will be specified within one year of the revision of these Guidelines.
	Level 2	(1) Substances other than those specified as the Level 1 Prohibited Substances that will be prohibited in products after a certain period by a treaty, law, or regulation. (2) Substances that are prohibited in products by the Panasonic Group prior to the effective period specified by a treaty, law, or regulation. (3) Substances whose use is voluntarily restricted by the Panasonic Group.
	Level 3	Any substance other than those specified as a Level 1 or Level 2 Prohibited Substance that is reviewed for prohibition by legislation etc., and the clarification of substitution-related issues as well as the timing for prohibition is reviewed by the Panasonic Group in light of future legislation trends.
Manage		Substances whose consumption needs to be monitored and for which consideration needs to be given to human health, safety and hygiene, adequate treatment, etc. The intentional use of these substances is not restricted, but their use and contained concentration must be monitored.

Note: Covered legislation and chemical substances include: Class I Specified Chemical Substances under the Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.; substances whose manufacture etc. is prohibited by Article 55 of the Industrial Safety and Health Act; EU RoHS Directive; and Annex XVII of the EU REACH Regulation. For more details, see the chapter on Specified Managed Substances in the Chemical Substances Management Rank Guidelines (For Products).

Chemical Substances Management Rank Guidelines (For Factories)

Rank	Definition
Prohibit	Use of the following substances should be immediately discontinued: Carcinogens for humans Ozone depleting substances Substances whose use is prohibited by Panasonic Chemical substances designated as Class I Specified Chemical Substances by the Japanese Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. Substances whose manufacture is prohibited by the Japanese Industrial Safety and Health Act Substances whose manufacture and use are prohibited by international treaties
Reduce	Substances whose use, release and transfer should be identified and reduced. Substances other than prohibited substances that might pose risks to human health and the environment.

Note: Covered legislation include: PRTR Act (chemical substances), environmental criteria under the Basic Environment Act; the Industrial Safety and Health Act; and the Stockholm Convention. For more details, see the contents on The Aim of Establishing the Chemical Substances Management Rank Guidelines (For Factories) in the Chemical Substances Management Rank Guidelines (For Factories).

History of Our Initiatives to Reduce the Environmental Impact of Chemical Substances

Social trends	1989: The Montreal Protocol entered into force	1992: Earth Summit in Rio de Janeiro— Agenda 21	1996: Discontinuance of the use of specified chlorofluorocarbons by industrialized countries	2002: WSSD in Johannesburg	2006: The RoHS Directive entered into force	2007: The REACH Regulation entered into force		
	1990	1995	2000	2005	2010	2015		
Panasonic								
All products		1992: Discontinued use of PVC resin in packaging materials		March 2003: Discontinued use of lead in solders globally ^{*3}	October 2005: Discontinued use of six RoHS substances globally ^{*3}	March 2009: Discontinued use of PVC in internal wiring of new products to be sold in Japan ^{*3}	March 2011: Discontinued use of PVC in internal wiring of new products globally ^{*3}	July 2018 Discontinue use of the four phthalates specified by the RoHS Directive in new products globally
Individual products	1991: Released mercury-free manganese dry cells	1992: Released mercury-free alkali dry cells	1995: Discontinued use of CFC refrigerant in refrigerators globally	2002: Discontinued use of HCFC refrigerant in air conditioners (Japan)	2004: Refrigerators in Japan market became fluorocarbon-free (Japan)	2006: Released lead-free plasma display panels	2010: Released fluorocarbon-free freezers using CO ₂ refrigerant and compatible display cases	2013: Released air conditioners using new refrigerant R32 with low Global Warmer Potential (GWP) (Japan)
Chemical substances used at factories		1996: Discontinued use of chlorinated organic solvents	1997: Began identification work for PRTR	1999: Launched the “33/50” reduction activity ^{*4}	2004 (Japan): Achieved Voluntary Action Plan Reduced use by 75% Reduced release and transfer amount by 62% compared to fiscal 1999 level	2010 (Global): Achieved Voluntary Action Plan Reduced release and transfer amount of key-reduction target substances by 46% compared to fiscal 2006 level		

^{*3} Excluding applications where the quality such as safety cannot be ensured, or applications where the material is designated by laws and regulations.

^{*4} A reduction activity that promotes cutbacks in the use, release, and transfer of chemical substances by 33% in three years and by 50% in six years, compared to the fiscal 1999 level.

Management of Chemical Substances in Products

To minimize the environmental impact of chemical substances contained in products, we endeavor to identify chemical substances used in the components and materials of our products. In addition, for substances that are prohibited in products in major developed countries because of laws and regulations such as the European RoHS Directive, we manage the substances not to be used and/or contained in our products by designating them as prohibited substances except the substance for specific usage which is unavoidable to use its substitution. We will also conduct environmental impact assessments for the managed substances contained in our products. As for a substance whose impact on human health and/or the environment cannot be ignored, we plan to reduce or prohibit use of the substance.

Keep understanding updated information concerning chemical substance contents

The electrical and electric products Panasonic manufactures and sells consist of various raw materials and components supplied through a long supply chain from material manufacturers to many component manufacturers. To contribute to the achievement of the global goals set at the WSSD, it is important for us to disclose and communicate information on the chemical substances used in our products across the supply chain, for which we must promote cross-industrial initiatives to establish and disseminate an effective system. Panasonic is a member of the Joint Article Management Promotion consortium (JAMP). Approx 440 major companies from various industries, such as chemical, component, and equipment manufacturers are also members of JAMP. We are proactively formulating, utilizing, and disseminating chemical substance management standards and systems through this organization.

We have started up a product chemical substance management system in fiscal 2005. From July, 2009, Panasonic’s 10,000 suppliers of materials and components provided us the data on chemical substances contained in their products, using JAMP’s data transmission formats (JAMP_AIS and JAP_MSDSplus).

Meanwhile, in Japan alone, the workload of upstream suppliers increased, as a number of hazardous substance inspections were carried out throughout the supply chain using own company format. Having recognized the issues obtained from the inspections, the Ministry of Economy Trade and Industry proposed a new scheme to introduce “chemSHERPA,” for sharing and exchanging information on chemicals contained in components and products. Because the format adopted for chemSHERPA complies with IEC62474, the international standard on material declaration for the electrical and electronic machinery industry and their products, we agreed to use chemSHERPA format, and in January 2018, started full-scale use of chemSHERPA as a data gathering format. With the supply chain expanding to a global scale, it is particularly important for overseas suppliers to deepen their understanding on the handling of hazardous chemical substances. Therefore, we carried out education programs for persons in charge of chemical substance management and suppliers at more than 100 of our business sites in ten countries including China and other Asian countries. At the same time, we completed conversion from JAMP format to chemSHERPA by June, 2018, when the JAMP format became unusable.

► chemSHERPA website: <https://chemsherpa.net/>

(The JAMP website was merged into chemSHERPA on March 15, 2019)

Companies that procure electronic components need to fully understand the information on the substances contained in the components at the point of selection or usage in order to comply with the EU RoHS Directives and REACH regulations. Particularly, as the REACH Substances of Very High Concern (SVHC) List is updated every six months, those companies expect their suppliers to speedily provide information on the latest substance to Panasonic. In order for the companies procure electric components to speedily and effectively understand information on chemical substance contents, we have published a table of RoHS and REACH compliance status on our website since November 2012. The table covers our RoHS Directive compliance information and the substances designated in the RoHS / REACH Confirmation Report for all our major generic electronic components.

▶ RoHS / REACH Confirmation Report for major generic electronic components

<https://industrial.panasonic.com/ww/downloads/rohs-reach>

For products covered by the Act on the Promotion of Effective Utilization of Resources of Japan, the Panasonic Group does not manufacture, import, or sell products that contain specified chemical substances which exceeds the limited value in non-exempt parts. For more details, see Information on the Content of specified chemical substances Chemical Substances in Covered Products below.

▶ Information on the Content of specified chemical substances Chemical Substances (Japanese)

<https://www.panasonic.com/jp/corporate/sustainability/eco/chemical/jmoss.html>

In June 2015, the Act on Preventing Environmental Pollution of Mercury was enacted to implement measures agreed in the Minamata Convention on Mercury. The act requires manufacturers of products containing mercury to provide information such as labelling so that such products are appropriately sorted and discharged when being disposed of. In order to communication information concerning the mercury used in our products to customers, we have established a new webpage, Information Based on the Act on the Preventing Environmental Pollution of Mercury, in May 2017.

▶ Act on Preventing Environmental Pollution of Mercury

https://members.wto.org/crattachments/2015/TBT/JPN/15_2560_00_e.pdf#search=%27Act+on+Preventing+Environmental+Pollution+of+Mercury%27

▶ Information Based on the Act on Preventing Environmental Pollution of Mercury (Japanese)

<https://www.panasonic.com/jp/corporate/sustainability/eco/chemical/jmoss/mercury.html>

Assessing the Impact of Chemical Substances

Scientifically identifying the impact on human health and the environment of products containing chemical substances is vital to the development of products with low environmental impact. We are engaging in activities designed to assess the levels to which customers are exposed to substances of very high concern (SVHC), as well as safety during product usage.

To date, we have assessed effects of ceramic fibers used in certain models of commercial microwave ovens. As part of our efforts to comply with the EU REACH regulation which requires preparing information for the safe use of products containing a certain amount of SVHC, we have created and publicized the safety assessment document. The exposure was considered to be nominal with little concern for any effects on human health. Furthermore, usage of ceramic fibers in our products was discontinued in December 2010.

▶ Management of Chemical Substances in Products

https://www.panasonic.com/global/corporate/sustainability/pdf/RCF_Professional_microwave_oven.pdf

Reduction in Use and Discharge of Chemical Substances

Fluorocarbons (CFC) used as refrigerants, insulating materials, and the like for freezers and air conditioners, have properties which are known to cause ozone layer depletion and global warming. Therefore, Panasonic has devoted to develop the technology to use CO₂ as a refrigerant which has extremely low effects on ozone depletion and global warming, and has sold a home water heater using the low CO₂ refrigerant since 2001. Although the low CO₂ refrigerant is suitable for heating to maintain a certain degree of temperature, it was difficult to be used in refrigerators and freezers, especially in large



OCU-CR2001MVF, a fluorocarbon-free freezer using CO₂ refrigerant



FPW-EV085, a display case compatible with a fluorocarbon-free freezer

commercial equipment due to insufficient cooling efficiency and size. However, with support from the New Energy and Industrial Technology Development Organization (NEDO), Panasonic developed a refrigeration system using CO₂ refrigerant, and has delivered CFC-free freezers and refrigeration showcases to supermarkets and convenience stores with the CO₂ refrigerant in Japan since 2010. For wall-mounted home air-conditioners (AC), we are promoting changing over from non-inverter types of AC, not only to more eco-friendly inverter types of AC with high energy-efficiency, but also to the AC with new refrigerant R32 whose Global Warming Potential (GWP) is low.



Window air-conditioner unit with the new R32 refrigerant, CW-HZ180YA

In fiscal 2020, we introduced into Hong Kong's window air-conditioner market new models with the industry's first inverter system using the new R32 refrigerant, which has contributed to reduce environmental loads.

In addition, as measures against ozone depletion caused by HCFCs, a refrigerant called R410 that does not deplete the ozone layer was used in room air conditioners; however, this substance has an issue of its very high very high Global Warming Potential (GWP). Therefore, Panasonic developed a model that uses a new refrigerant R32, which has a lower GWP and introduced it launched sales of the model in 2013. Furthermore, PT. Panasonic Manufacturing Indonesia, which owns the factory for manufacturing room air conditioners in Indonesia, redesigned its production facility that used an ozone-depleting HCFC refrigerant R22 to one using R32 in fiscal 2015, and started supplying new R32-based air conditioners. Thereby, Panasonic contributed to the Indonesian government's initiative to eliminate the use of HCFCs.

Mercury lamps are currently widely used as the light source for projectors, because they provide high luminosity easily. However, mercury can have a serious impact on human health and the environment if not treated properly, and the short life of the lamps causes high consumption of resources as well as high environmental impact. For these reasons, Panasonic is developing products that adopt laser light sources. The PT-RZ31K Series are projectors for professional use that provide high luminosity by employing a high-output semiconductor laser light source module and a heat-resistant phosphor wheel. In addition, the cabinet does not use halogenated flame retardant, making the projector an eco-friendly product that contributes to reducing the use of hazardous substances.



PT-RZ31K Series, a laser projector for professional use

Restriction on Use of PVC Resin

Polyvinyl chloride (PVC) is a material of concerns to the generation of hazardous substances from inappropriate disposal, as well as the harmful effects of certain additive agents (phthalates) used to render PVC more pliable. In light of the significant potential for inappropriate disposal of the PVC resin used in the internal wiring of products, due mainly to difficulties associated with the sorting of this resin from used products, we have switched our new products launched from April 2011 to non-PVC.

▶ List of Our PVC-free Products https://www.panasonic.com/jp/corporate/sustainability/pdf/eco_pvclist2016.pdf

Restriction on Use of Phthalates

Phthalates are often used in PVC products, and the use of four phthalates⁵ will be restricted under the EU RoHS2 from July 22, 2019.

Panasonic classified these substances as Level 1 Prohibited Substances in our Chemical Substances Management Rank Guidelines Ver. 11 (for products) issued in July 2018, and delivery of materials and components contain the phthalates will be prohibited from July 22, 2019. We have classified other phthalates as Level 3 Prohibited Substances, and are promoting their substitution.

We are currently working on creating an analysis and management structure for the four phthalates to ensure their substitution. Since phthalates have a migration characteristic (where a substance from another article migrates through contact), materials may be contaminated by migration from production facilities as well as process equipment containing the four phthalates, which are specified as Level 1 Prohibited Substances. Accordingly, we are also discussing introducing preventive measures against contamination through contact.

To build a structure for incoming inspection for phthalate, we amended the standard for incoming inspection and determined to conduct incoming inspections on supplied components with a high chance of containing phthalates, such as PVCs, elastomers and glues. We have already selected and assessed an analyzer for phthalates to use for these inspections, and installed the analyzer at our business division. The phthalates contained in our products exported to Europe used to be as high as 10 tons. However, total elimination of the phthalates has been completed as of March 31, 2019.

*5 Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP), and Diisobutyl phthalate (DIBP).

Activities to Reduce Negative Environmental Impact at Factories

Panasonic is working to minimize environmental impact by identifying the hazardous substances used in our products, assessing the impact of such use, and voluntarily discontinuing the use or reducing the release of such substances. Since 1999, we have been conducting the 33/50 Reduction Activity to materialize reduction by 33% in three years and by 50% in six years. In Japan, we started promoting reduction of amounts to use, release, and transfer specified chemical substances at our factories in fiscal 2000. Against the target in our voluntary action plan, a reduction by 50% from the fiscal 1999 level, we achieved a 75% reduction in the chemical substance use and a 62% reduction in the release and transfer in fiscal 2005. Since then we have been continuing the activity, focusing on substances with particularly large amounts of release and transfer, setting a voluntary action target of reduction by 30% compared to the fiscal 2006 level. As a result, we achieved a 46% reduction in the amounts of release and transfer of specified key reduction-target substances across all factories worldwide in fiscal 2011.

Reflecting international trends in chemical substance management, our reduction measures have focused increasingly on particularly hazardous substances from fiscal 2011. Our Chemical Substances Management Rank Guidelines (for Factories) was established in 1999 as a guideline to help manage the above chemical substance reduction activities. In Version 1, the guidelines specified a list of chemical substances to be managed, mainly focusing on carcinogenic substances. The guidelines were later updated to Version 2 in 2000 to include rules concerning the Japan PRTR Law. Version 3, introduced in 2004, additionally covered a list of substances specified by chemical substances management legislation in Japan. The chemical substances covered by Version 4 and later from 2009 are those specified in legislation on human health and environmental impact in Japan, the U.S., and Europe, as well as those specified under international treaties.

Under our Chemical Substances Management Rank Guidelines (For Factories), we have focused our management on select chemical substances that are hazardous to human health and the environment. Further, we have created a unique indicator, the Human Environment Impact,^{*6} which is used globally in all our factories. Conventionally the chemical substances were managed by “quantity,” such as usage amount or emissions/release. However, such quantity-based management has a problem in that some highly hazardous substances do not become subject to reduction or management if the usage amount was small, and therefore would fall out of the scope of impact assessments. In addition, the toxicity criteria varied according to substance types and regional legislation, which made standardized management across the Group difficult. To address this issue, Panasonic worked together with experts from both within and outside the company, reclassified chemical substances based on an overall assessment of their hazardousness, and specified a hazardousness factor for each classification. Specifically, we set a hazard classification to each substance by utilizing carcinogen risk assessments issued by international organizations, together with publically available hazard information and lists of ozone depleting substances. For substances that have multiple hazard information items, the item ranked with the highest hazard risk is used for classification. We utilize this internal indicator as the Human Environmental Impact indicator to promote efforts to ensure reduction of highly hazardous substances with greater environmental impacts, such as carcinogens and ozone depleting substances, according to the risk level. The Panasonic Group Chemical Substances Management Rank Guidelines is also available on the website on our Green Procurement activities to promote collaboration with our suppliers, encouraging them to offer materials that do not contain hazardous substances.

▶ Green Procurement (PDF Download of Chemical Substances Management Rank Guidelines (For Factories))

<https://www.panasonic.com/global/corporate/management/procurement/green.html>

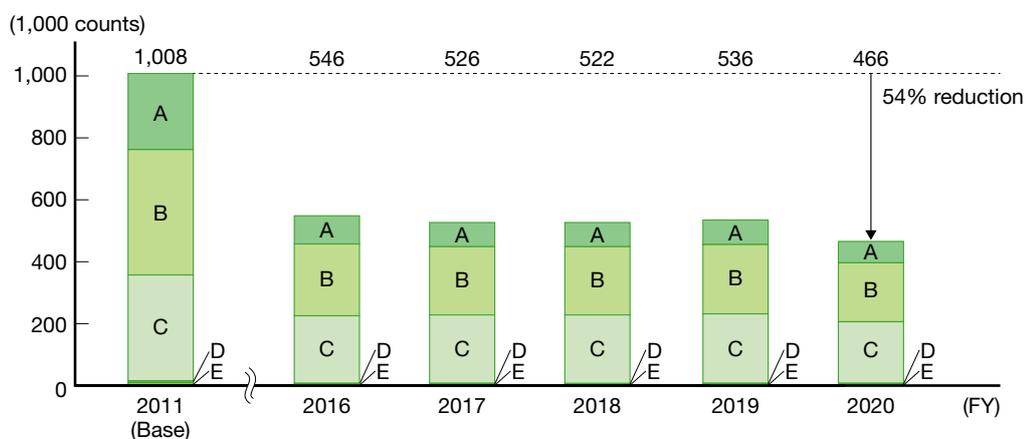
*6 Human Environmental Impact = Hazardousness factor x Release and transfer amount.

Classification of Hazards

Classification	Hazards*7	Hazardousness factor
A	Carcinogenicity/Ozone layer depletion	x 10,000
B	Serious or direct impact	x 1,000
C	Medium impact	x 100
D	Small or indirect impact	x 10
E	Minor impact or not assessed	x 1

*7 In addition to carcinogenicity, hazards to human health include genetic mutation, reproductive toxicity, and acute toxicity. In addition to ozone depleting substances, hazards to substances with impact on the environment include ecological toxicity, substances that impact global warming, and substances that generate photochemical oxidants.

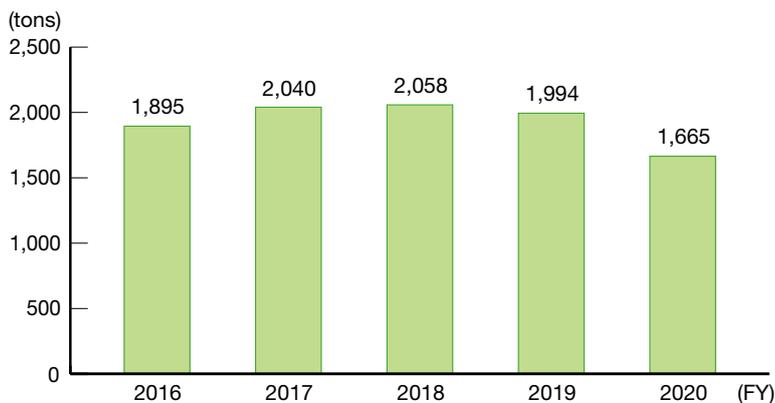
Human Environmental Impact



Note: Overseas sites of former SANYO Electric not included in fiscal 2011.

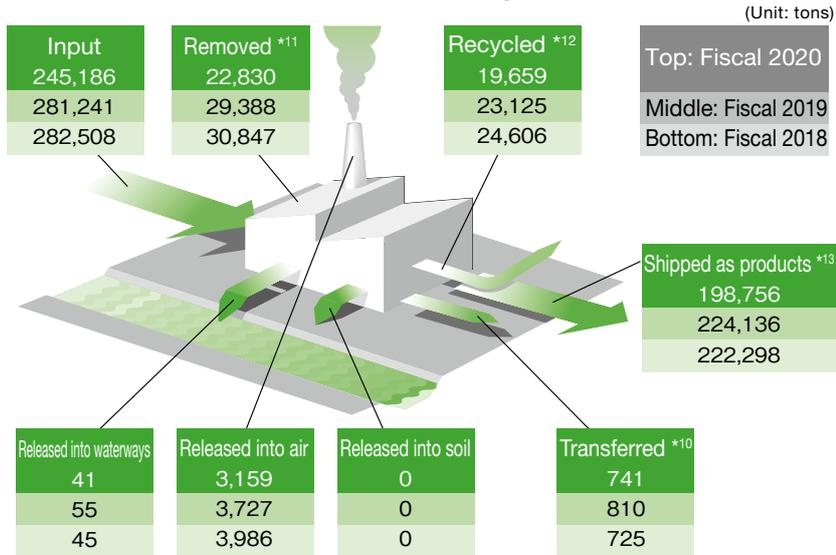
In fiscal 2020, we were able to reduce Human Environmental Impact by 54% compared to fiscal 2011 by substituting highly hazardous substances in paints, improving yields, promoting recycling, introducing substances with low-solvents and hazards, and improving processes, including reviewing the amount of paint or the number of washing cycles, as well as improving the efficiency of removal/deodorization equipment. We will continue our initiatives to minimize the amount of substances with environmental impact released through our production activities.

VOC*8 Emissions



*8 Emissions of Volatile Organic Compounds (VOC) into the air caused by use. The calculation covers 100 major VOC substances that Panasonic selected from those listed in the Air Pollution Control Act.

Material Balance of Substances in the Management Rank*⁹



*⁹ Based on the Chemical Substances Management Rank Guidelines (for factories). Includes all the substances specified in the Pollutant Release and Transfer Register Act.

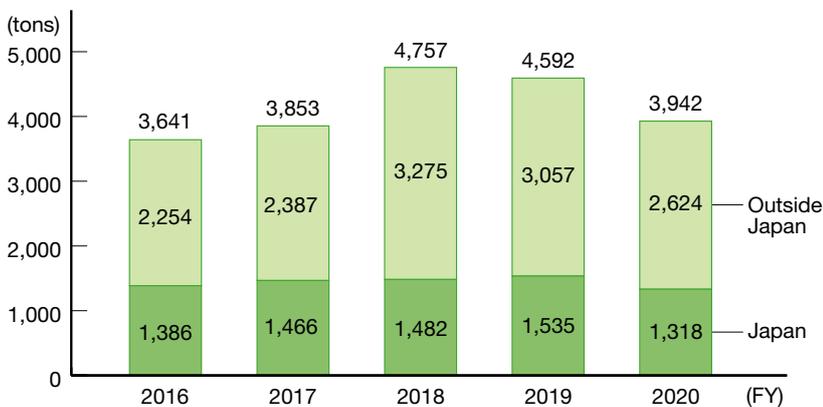
*¹⁰ Includes substances transferred as waste, as well as those discharged into the sewage system. Recycled amount which is free of charge or accompanies treatment cost under the Waste Management Law is included in "Recycled." (Different from the transferred amount reported under the PRTR Law.)

*¹¹ The amount of substances converted into other substances through neutralization, decomposition, or other chemical treatment.

*¹² The amount of substances recycled with revenue, as well as those recycled free of charge or with any payment.

*¹³ The amount of substances that have been changed to other substances as a result of chemical reactions, and/or those that are contained in or accompanied with products and shipped out of factories.

Release/Transfer of Substances Requiring Management*¹⁴



*¹⁴ Hussmann Parent Inc. and its consolidated subsidiaries not included.

Approaches to Biodiversity

Business management and human life in our society is founded on the ecosystem services—a multitude of blessings from nature provided by our natural capital, including soil, air, water, and animals and plants. In achieving the Sustainable Development Goals (SDGs) and realizing societies where people and nature live harmoniously, which is the long-term goal of the United Nations Convention on Biological Diversity, measures to address climate change, resources recycling, and biodiversity have been recognized as being closely linked each other.

The year 2020 is the final year for the Aichi Biodiversity Targets of the UN Convention on Biological Diversity, and IPBES¹ has already published a report stating that blessings from nature, i.e. ecosystem services, are deteriorating on a global scale and that the targets relevant to the protection of nature and sustainable use of nature cannot be achieved if no drastic measures are taken. However, transformative changes across the economy, society and other areas reportedly hold potentials of achieving the targets by 2030 or later.

To date, Panasonic have properly understood the impact of our business activities on biodiversity and made efforts to achieve our target of contributing to its conservation. We formulated our “Green Plan 2021” to work towards realizing “a better life” and “a sustainable global environment” compatibly as stated in the “Panasonic Environmental Vision 2050”. The conservation of biodiversity in the “Green Plan 2021” is in line with the “Biodiversity Action Plan (BAP)” under the Convention on Biological Diversity. We formulated the plan with targets set for 2030 and later, based on the reviewed results of our past activities, and the status of the achievement, considering global trends.

We consider that in conducting our business activities, taking actions by the companies involved in the entire supply chain is important for the conservation of biodiversity. Therefore, focusing on ‘sustainable procurement of raw materials’, we have decided to continue ‘to use land’ considering conservation of biodiversity at all our sites and ‘to provide products and services’ that contribute to biodiversity which we have worked so far. We will continue to work on conserving biodiversity through efforts focusing on business activities in the three targets and at the same time through social contributions.

*1 IPBES : Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

Initiatives for Sustainable Procurement of Raw Materials

Starting with the “Green Plan 2021”, we have decided to aim for the ‘sustainable procurement of raw materials’ to cover not only procurement of wood materials, but also procurement of raw materials considering conservation of biodiversity. In these procurements, we will also consider social issues such as human right that have been growing concerns, in addition to compliance of laws and regulations. In regard to procurement for wood, we discussed extensively with World Wide Fund for Nature (WWF) Japan over our green procurement; and formulated the “Panasonic Group Green Procurement Guidelines for Wood” aiming for conservation of biodiversity and sustainable use of natural resources. Also we stated consideration for conservation of biodiversity in our “Green Procurement Standards” for all companies involved in our supply chain as a whole, to take actions for conservation of biodiversity.

Exclusion of timbers and wood materials whose regulatory compliance in their logging has not been confirmed (Category 3)

In fiscal 2020, the total procurement of timber and wood materials was approx. 320,000 m³. By category, this breaks down to 82.2% in Category 1 ‘Priority’ procurement standards (Difference from the previous fiscal year + 2.9 points), 17.8% in Category 2 ‘Acceptable’ (Difference from the previous fiscal year – 2.9 points), and 0% in Category 3 ‘Avoiding’ (Difference from the previous fiscal year +/- 0 points). Ever since the formulation of our “Green Procurement Guideline”, we have worked on to achieve zero procurement for the Category 3, and have achieved zero procurement for the Category 3 consecutively since fiscal 2015. We will continue our efforts and maintain zero procurement for the Category 3.

Green Procurement Guidelines for Wood Consulted and Formulated with WWF



At the end of every fiscal year, we confirm the progress status, and review and discuss the measures for the subsequent fiscal year.

▶“Green Procurement Guidelines for Wood”

https://www.panasonic.com/jp/corporate/management/procurement/green/pdf/green_wood_J.pdf

▶“Green Procurement Standard”

<https://www.panasonic.com/jp/corporate/management/procurement/green.html>

▶How to respond to the “Act on Promoting the Distribution and Use of Legally Harvested Wood and Wood Products” (called Clean Wood Law) (Japanese)

<https://www2.panasonic.biz/es/sumai/law/cleanwood/>

Activities for Land Use

Green areas in our business divisions have a lot of potential to contribute to conserving biodiversity in that area. In particular, hardly any natural environments where wild animals can live and breed remain in urban areas. Therefore, even small areas of green in corporate premises can become a precious habitats of a variety of living things if they have indigenous vegetation and a watery environment.

Preservation of Biotopes in Collaboration with Governments and Experts

Once an ecological network that connects greenery in our business divisions, neighboring woodlands and parks is formed, living things such as birds, butterflies, and dragons in each area can move around wider areas for flowers and water through the ecological networks, and their habitats are expanded. In addition, the Ministry of the Environment and municipalities designate rare species of living things in local areas as endangers species for their preserving. Therefore, we have conducted preservation activities, in collaboration with environmental officers and experts. For example,) Biotope of Panasonic Life Solution Company in Kadoma City, through a Biodiversity Partnership (BP) Agreement concluded with Osaka prefectural government, Osaka Prefecture University, and Research Institute of Environment, Agriculture Fisheries (RIEGF) under Osaka prefectural government.

Examples of activities are introduced in the following website.

<https://www.panasonic.com/global/corporate/sustainability/eco/biodiversity.html>

Acquisition of Eco-Certification Based on Quantitative Evaluation from external accredited body

Kusatsu Factory of the Panasonic Appliances Company in Kusatsu City, Shiga Prefecture, obtained an eco-certificate from the Association for Business Innovation in harmony with Nature and Community (ABINC) in March 2018, as a business site for its contribution to biodiversity. In the course of assessment, we received high ratings for how we are making green corridors to be suited to diversified living creatures by appropriately conserving the natural environment, keeping invasive non-native species under proper management by continuously monitoring to understand their status, and the active use of woodland nearby the factory, in liaison with external eco-related organizations and local people, such as the local public bodies and primary school students.

In the monitoring survey we have conducted since 2011, 840 species of flora and fauna were confirmed. At the same time, the survey result has indicated that the woodland is an important biotope in the area where urbanization is taking place, which contributes to the formation of local ecological networks. In addition, our continuing implementation of the environmental learning program on acorns for elementary school students was highly evaluated; and won an Award of Excellence in the 2nd ABINC award held in January 2020, as an ‘activity contributing to the biodiversity mainstreaming’”



ABINC Certification
(Excellence Award)



Three-star rating in Shiga
Biodiversity Action Certification
Program³



Panasonic Appliances Company's Sustainable Forest

² ABINC is a certification system by third-party evaluation on greenery improvement and management at business divisions based on the land use score (biodiversity quantitative assessment tool in environmental assessment) and Guidelines for Sustainable Business Sites developed by the Japan Business Initiative for Biodiversity (JBIB).

³ Shiga Biodiversity Action Certification Program is the first system in Japan for rating wide range of activities conducted by business enterprises in the area of biodiversity conservation with 1 to 3 stars granted by governor.

<https://panasonic.co.jp/ap/ecological/index.html>

The Matsumoto Factory of the Automotive & Industrial Systems Company^{*4} obtained rank A in the JHEP Certification^{*5} in September 2015. The certification is updated annually through assessment and our biodiversity preservation activities for greening are maintained continuously.

*4 The company name: Automotive & Industrial Systems when it received the certification

*5 A quantitative biodiversity assessment method developed by Ecosystem Conservation Society Japan based on the Japan Habitat Evaluation and Certification Program (HEP) used for environmental assessments.

Initiatives for Products and Services

In collaboration with Bird Life International, an international NGO, we have formulated a third-party evaluation method in order to provide customer with information on our product that contribute to conservation of biodiversity. Using this method, we have evaluated products which are closely linked to biodiversity. In addition, with our Green Product accreditation criteria (see page 33), we define our products that contribute to conservation of biodiversity because biodiversity-friendly materials are used in their main components, and/or they include functions to contribute to conservation of biodiversity.

In addition, Panasonic has developed Sustainable Smart Towns (SSTs) in Fujisawa City and Yokohama City in Kanagawa Prefecture. We are currently planning to develop another SST in Suita City in Osaka Prefecture. In Fujisawa SST, the guidelines for developing community adopts the idea of biodiversity for greening towns as well as plans for reducing greenhouse gas emission, in order to establish sustainable towns by planting indigenous trees as the base in the towns, and by forming ecological networks that coexist in communities. The guidelines is used to develop a sustainable town. Furthermore, in terms of conservation of forest resources, Panasonic Life Solutions Company is working on reducing its use of natural resources. Information relevant to flooring products (wooden flooring materials) are on the following website.

<https://www.panasonic.com/global/corporate/sustainability/eco/biodiversity.html>

Conservation of Biodiversity through Collaboration with and Support for NGOs and NPOs

Introduction of MSC-ASC certified sustainable seafood at employee canteens

Panasonic has been involved in marine protection activities^{*6} for some 20 years through collaboration with WWF Japan. Main activity at present is continual supply of MSC- and ASC-certified^{*7} sustainable seafood^{*8} to employees' canteens that started for the first time in Japan at Panasonic headquarters in March 2018. This fiscal year, we formulated a scheme to drastically reduce the cost and workload involved in CoC certification^{*9} for catering companies, and supported other companies in adopting the scheme and acquiring the CoC certification; as a result, five catering companies (cumulative total reaching 11 companies) obtained the CoC certification, and two other companies (cumulative total of 5 companies) adopted the sustainable seafood to their canteens. As of fiscal 2020, in Panasonic, 30 new sites adopted the sustainable seafood to the canteens, increasing the cumulative total to 42 sites. In fiscal 2021, in addition to adoption of the sustainable seafood at all of our employees' canteens, we plan to challenge starting up a network among user companies of sustainable seafood. Through the supply of sustainable seafood at employees' canteens, we are promoting to transform consumer behavior of our employees to contribute to SDG 14 'Conservation of richness of marine life', as well as to make biodiversity mainstream. As these activities were highly evaluated, we won a champion in the Initiative Category of the 1st Japan Sustainable Seafood Award, and certified as a partnership project of the Japan Committee for UNDB (United Nation Decade on Biodiversity) in 2019.



Champion in the Initiative Category of the 1st Japan Sustainable Seafood Awards



Fried oysters using ASC certified oysters harvested from Tokura in the Minami-Sanriku coastal region (Northeast of Japan)

*6 Including supports for the conservation of the tidal flats in Ariake Sea (2001 to 2006) and the Yellow Sea Ecoregion (2007 to 2015).

*7 MSC certification is certified by Marine Stewardship Council for sustainably and properly managed fisheries. ASC certification is certified by Aquaculture Stewardship Council for responsible fish farming to minimize environmental load on the environment and society.

*8 Seafood that has been certified sustainable production with MSC and ASC certification and managed under CoC certification

*9 CoC is the acronym for Chain of Custody. Certification on securing management and traceability in processing, distribution, and marketing.

Promotion of activities for conservation of biodiversity around the world through NGOs and NPOs

Panasonic actively participates in Keidanren Committee on Nature Conservation, aiming to promote activities for biodiversity collaborating with industrial sectors, as well as activities for conservation of biodiversity on a global scale through NGOs and NPOs. Through the Keidanren Nature Conservation Fund which collects donations from corporation including donations from Panasonic and individual persons, Keidanren Committee on Nature Conservation (KCNC) provided support worth approx. ¥4.2 billion for 1,490 NGO projects in Japan and overseas in cumulative total till fiscal 2020. Panasonic not only supports the projects initiated by KCNC in funding and participation, but also fulfills responsibilities to check progresses of the projects through visiting the local sites of the projects, and the like.

In fiscal 2020, we visited the Galapagos Islands, a World Natural Heritage site, where scalesia shrub and tree (family Asteraceae), which are endangered species listed in the Red List, grow, in order to observe local conservation activities, and plant scalesia trees there. Although KCNC has supported the project for conservation of scalesia for 20 years, only 1% of the scalesia species has been recovered. Local researchers of the Charles Darwin Foundation for the Galapagos Islands explained that continuously increasing the number of scalesia is necessary because scalesia serves as habit for endemic species in Galapagos.



Scalesia trees planted by KCNC project

Involvement in the Japan Business Initiative for Biodiversity with Other Companies

Panasonic involves in the Japan Business Initiative for Biodiversity (JBIB) and the Biodiversity Conservation Committee of the Japan Association of Industries and Environment (JAIE). We try to properly grasp global trends and risks in biodiversity, referring to the post-Aichi Biodiversity Targets and the like, and policies set by the government in Japan; and give the feedback to our businesses. In addition, JBIB conducted a workshop to raise awareness on marine plastic issues for high school students, collaborating with the member companies including us.

In involving in the Biodiversity Working Group of four Electrical and Electronic Industry Associations^{*10}, we took up marine plastic issues which have had an impact on marine life in fiscal 2020. With the cooperation of Arakawa Clean Aid Forum, NPO, the working group cleaned up the banks of the Arakawa River, and added a case example of the marine plastic issue to "Let's Try Biodiversity," a booklet with collected examples of biodiversity conservation activities. Furthermore, regarding Keidanren's 'industry-specific plastic-related target', aiming to 'conduct activities to address marine plastic waste issues that would contribute to conservation of biodiversity' in the field except products and factories,, we will summarize that even an activity such as cleaning up around own workplace contributes to reduce marine plastic wastes, and will promote such activities to raise awareness on marine plastic wastes to the member companies of the four associations.

As a member company supporting the 'Declaration of Biodiversity by Keidanren, and the like' for the 2020 Biodiversity COP15, we independently submitted our action policy and case examples of activities, aiming to have more attention to our global activities on conservation of biodiversity. Additionally, we are participating in the Clean Ocean Material Alliance (CLOMA) to accelerate innovation in solving marine plastic waste issues.



"Let's Try Biodiversity!" for Marine plastic waste issues

^{*10} Four industry associations: The Japan Electrical Manufacturers' Association (JEMA), Japan Electronics and Information Technology Industries Association (JEITA), Communications and Information Network Association of Japan (CIAJ), and Japan Business Machine and Information System Industries Association (JBMIA).

Protection of Natural Monuments in Collaboration with Citizens Groups

Panasonic members of companies located in Japan, and their labor unions and retiree association conduct a variety of environmental protection activities as Panasonic Eco Relay Japan (PERJ) in a one team.

PERJ is working on conservation of 'itasenpara bitterling', a designated species as natural monument, engaging in the Yodo River and Johoku Wand Conservation Activity as a partner of the Citizens' Network for Conservation of Itasenpara bitterling in the Yodo River System. Specifically, the activities are to conserve biodiversity including clean-up of wastes at

the Yodo River Wand^{*11}, a precious natural habitat remains in Osaka City, eradication and researches of non-native species, and conservation of endangered species such as 'itasenpara bitterling'.

Also, PERJ's following activities are highly evaluated: continued clean-up in Tsurumi Ryokuchi Park and Nakanoshima Park, and contribution to nurturing persons who will play important roles in environmental activities for the next generation, in cooperation with local businesses, universities nearby, and citizens groups. As a result, PERJ won the Osaka City Environmental Award in February 2020.

*11 Wand is terrain just like a small pond surrounded by river structures, although Wand is connected to a main stream of the river. Wand provides stable habitats for fish and other aquatic life, and at the same time, it is breeding grounds for a variety of plants.

▶ Panasonic ECO RELAY Japan (Japanese)

<https://www.panasonic.com/jp/corporate/sustainability/citizenship/environment/perj.html>

▶ Panasonic ECO RELAY Japan won the Osaka City Environmental Award

<https://panasonic.co.jp/citizenship/activity/2020/03/post-81.html>



PERJ activities



Itasenpara bitterling

Summary of Contributions to the Aichi Biodiversity Targets and the SDGs (FY2011–2020)

	Activities	Aichi Biodiversity Targets	SDGs
Green procurement for wood	<ul style="list-style-type: none"> Wood procurement based on the “Green Procurement Guidelines for Wood” to eliminate procurement of illegal wood, zero since 2014 	<ol style="list-style-type: none"> Promotion and awareness Production and consumption 	<ol style="list-style-type: none"> Responsibilities to produce and to use Conservation of richness of life on land
Land use	<ul style="list-style-type: none"> Woodlands and biotopes made considering conservation of biodiversity at our sites where ecological networks are connected with surrounding areas (for use in environmental education & awareness-raising activities) Kusatsu site (ABINC certification) Matsumoto Factory (JHEP certification) Two locations in Osaka Prefecture 	<ol style="list-style-type: none"> Promotion and awareness Protection of natural habitats Eradication of non-native species Nature reserve areas Ecosystem services 	<ol style="list-style-type: none"> Conservation of richness of life on land
Products & services	<ul style="list-style-type: none"> Low insect attract lighting equipment ‘Tafna-Ray’ Ballast water treatment system Guidelines for planting, considering biodiversity in SST (Implementation to eradicate invasive non-native species) Fit Floor flooring (using recycled wood) 	<ol style="list-style-type: none"> Protection of natural habitats Eradication of non-native species Knowledge and technologies 	<ol style="list-style-type: none"> Making infrastructures for industry & innovation Making towns where the residents are willing to live a life longer. Responsibilities to produce and consume Conservation of richness of marine life Conservation of richness of life on land
Social contribution activities	<ul style="list-style-type: none"> Adoption of sustainable seafood at employee canteens (MSC/ASC certified seafood) Conservation activities at undeveloped woodland at Unitopia Sasayama Conservation activities of ‘itasenpara bitterlings’ at Wando of the Yodo River System Tree planting and conservation activities through ‘Nagaki no Mori’ project (aiming for long-term forest conservation) , Wakayama Prefecture. There are many other activities conducted by PERJ in Japan as well as overseas such as planting and CSR activities. Support for conservation activities through donation, and participation in supporting programs 	<ol style="list-style-type: none"> Promotion and awareness Production and consumption Protection of natural habitats Prevention of overfishing 	<ol style="list-style-type: none"> Conservation of richness of marine life Conservation of richness of life on land Achievement of the target through collaboration with partnerships (Targets for contribution by ripple effects.) Eradication of Poverty Concrete actions for climate change

Collaboration with Suppliers and Transportation Partners

As a company backed by a number of suppliers, we must consider the environmental impacts of our entire supply chain, and not just of our own operations. Through our coordination efforts with suppliers and transportation partners, who form an integral part of our business operations, we strive to minimize our environmental impact across the entire supply chain, focusing on the reduction of CO₂ emissions, resource recycling, chemical substance management, and biodiversity conservation.

Activities for Green Procurement

Since the publication of the “Green Procurement Standards” in 1999, we have been promoting the manufacture of eco-conscious products in partnership with our suppliers. In the “Green Procurement Standards”, we set up groups of suppliers who support our Environmental Policy in supplying products and goods in order to materialize the targets in supplier collaboration in our “Green Plan 2018”. In addition to cooperation in ‘reducing environmental loads in supplier’s business operation areas’ and ‘sharing achievements through collaboration with us’, we are asking our suppliers to ‘seek the cooperation of upstream business partners’ to expand the scope of activities of reducing environmental load throughout the entire supply chain. As a result, we have achieved our targets in almost all items.

Also, we formulated an “Environment Vision 2050” in 2017 towards “a better life” and “a sustainable global environment” compatibly, aiming for societies where residents use and live a more comfortable lifestyle. Under the vision, through the development of products, technologies, and solutions relevant to energy creation, storage, saving, and management, Panasonic will work towards creation and more efficient utilization of energy which exceeds the amount of energy used. To realize the vision, we set up a “Green Plan 2021” as an environmental action plan to address priority issues in the area of energy and resources and to continuously address ongoing issues. Under the “Green Plan 2021”, we revised the “Green Procurement Standards” in September 2019 not only for Panasonic Corporation alone, but also for our business partners in our whole supply chain to collaborate more closely, in order to have a broader positive impact on societies.

Also, based on the Green Procurement Standards, we have been conducting the Green Procurement Survey, where we monitor the implementation status of our suppliers regarding our requests, to promote environmental impact reduction activities more effectively with our suppliers. In fiscal 2013, we conducted a trial survey targeted at our major global suppliers. We received responses from 415 companies, and were able to confirm the level of activity in areas such as environmental management system development, thorough implementation of chemical substance management, reduction of greenhouse gas emissions, promotion of resource recycling, and biodiversity conservation. From fiscal 2014, we have replaced surveys conducted on a group-wide scale with surveys at a site level as a means of communication with our suppliers.

In China, seminars on our CSR Procurement Policy and Chinese environmental regulations were held in September 2016 for more than 400 suppliers in Guangzhou, Dalian, and Shanghai. By calling for exhaustive implementation of CSR through the supply chain by using the CSR self-assessment checklist as well as sharing China’s latest environmental regulations, we are making efforts to grasp the risks and reduce environmental impacts across the supply chain. In fiscal 2018, self inspection using the CSR self-assessment checklists was expanded to other Asian countries besides China to gain a wider understanding of environmental impact from our business activities.

In response to the enhancement of regulations such as EU RoHS Directive, we have been engaging in continual environmental quality assurance audits of our suppliers since 2005 to improve the management level throughout the entire supply chain. In fiscal 2020, we assessed the environmental quality assurance systems of some 1,000 suppliers and have supported their efforts to upgrade their management levels.

▶ Green Procurement Standards

<https://www.panasonic.com/global/corporate/management/procurement/green.html>

Estimation of Environmental Impacts in Business Activities by Suppliers

In order to assess greenhouse gas (GHG) emissions across the entire supply chain (scope 3¹), we made our original calculations based on the Greenhouse Gas Protocol, the international accounting standard for GHG emissions. Since fiscal 2012 we have conducted assessment surveys on four occasions, with the cooperation of 185 suppliers in the areas of raw materials, electrical and electronic components, and processed parts.

From fiscal 2012, we started estimating our overall GHG emissions in the upstream range by multiplying the volume of materials purchased with the resource-specific GHG emissions per basic unit based on the Input-Output Table published

by the Japanese government. The estimation results based on fiscal 2019 data is 18.05 million tons, roughly 8 times the GHG emissions of our own production activities.

*1 Other indirect emissions, excluding Scope 1 (direct emissions from facilities owned and controlled by Panasonic) and Scope 2 (emissions from production of energy consumed at facilities owned and controlled by Panasonic).

Sharing Achievements through Collaboration

Since fiscal 2010, we have been implementing the ECO-VC Activity^{*2} Activity with our suppliers. This program is a collaboration between Panasonic and our suppliers, aimed to both reduce environmental impact as well as reinforce product capability and achieve further rationalization for our products and our suppliers. In fiscal 2010, the target for reducing environmental impact was limited to energy saving (CO₂ emission reduction). However, this was extended in fiscal 2011 to Recycling-oriented Manufacturing aiming at saving resources and using recycled materials. The geographical range of our activities has also extended. Initially centered in Japan, actions accelerated to China and other parts of Asia in fiscal 2013, and later extended to a global scale in fiscal 2015.

We have stored case examples of ECO-VC Activity in a database for broader and effective use throughout the company. At the same time, as for outstanding activities, we provide awards in occasions such as ‘ECO-VC Activity award and information exchange meeting’.

Furthermore, we formulated an “Environment Vision 2050” in 2017 to achieve ‘a better life’ and ‘a sustainable global environment’ compatibly, aiming for societies where residents use clean energy and live a more comfortable lifestyle. Under the vision, through the development of products, technologies, and solutions relevant to energy creation, storage, saving, and management, Panasonic will work towards creation and more efficient utilization of energy which exceeds the amount of energy used.

Based on the Environmental Vision 2050, we plan to implement these ECO-VC Activities, which are aimed at long-term sustainability, through energy conservation (CO₂ emission reduction) and cost reduction, resources conservation and recycled materials, with renewable energy as an additional evaluation item added in fiscal 2019.

*2 ECO-VC Activity: Value Creation Activities

Environmental Achievements Made through Proposals

Items	FY2016	FY2017	FY2018	FY2019	FY2020
Number of proposals	933	622	354	820	772
CO ₂ reductions derived from proposals	484,532 tons	253,265 tons	58,448 tons	30,499 tons	280,000 tons
Use of recycled resources derived from proposals	19,153 tons	18,421 tons	2,671 tons	80 tons	100 tons
Reduction in resources used derived from proposals	21,243 tons	20,224 tons	1,090 tons	3,027 tons	19,900 tons

Collaboration with Environmental NGOs

In fiscal 2016, Panasonic started asking its suppliers (approx. 7,000 in number) in China, where a large number of its production sites are located, to fill in and submit ‘a CSR self-assessment sheet’. At the end of fiscal 2019, the ‘CSR self-assessment sheet’ from all existing suppliers were collected. Since fiscal 2019, we have implemented an on-site CSR and environment inspections of key suppliers (approx. 20 companies), in collecting their ‘CSR self-assessment sheet’ at the same time.

In face of rising social demand in China for suppliers to take necessary actions for environmental issues, providing guidance for the suppliers has become an important issue from points of CSR. For this reason, in the CSR and environmental inspections conducted in China, we conduct an audit focusing on suppliers’ actions for environmental issues, in addition to conducting the CRS audit. Through the CSR and environmental inspections, we have asked our suppliers to improve their condition, if necessary, and also have conducted follow-up inspections.

At the same time, we are working on to improve our suppliers’ actions in terms of environment through communications with Institute of Public and Environmental Affairs (IPE), China’s environmental NGO. In the Green Supply Chain ranking (CITI Index) of suppliers’ among major business corporations published by IPE since fiscal 2015, Panasonic has been rated in high ranks every year. In fiscal 2020, Panasonic was ranked as the sixth in IT industry classification and the 1st in overall ranking in Japanese-affiliated company classification.

Environment: History of Environmental Activities



Era	Year	Panasonic Group	World	Japan
~1970s	1967			• Basic Law for Environmental Pollution Control enacted
	1968			• Air Pollution Control Law enacted
	1970	• Pollution Survey Committee established		• Water Pollution Control Law enacted • Waste Disposal and Public Cleansing Law enacted
	1971			• Environment Agency established
	1972	• Environmental Management Office established	• U.N. Conference on Human Environment held in Stockholm (Declaration of Human Environment adopted)	
	1973		• First oil shock occurred	
	1975	• Environmental Management Regulations enacted		
	1979		• Second oil shock occurred	• Energy Conservation Law enacted
1980s	1985		• Vienna Convention for the Protection of the Ozone Layer adopted	
	1987		• Montreal Protocol on Substances that Deplete the Ozone Layer adopted • World Commission on Environment and Development (the Brundtland Commission) advocated the concept of sustainable development	
	1988	• CFC-reduction Committee established		• Ozone Layer Protection Law enacted
	1989	• Environmental Protection Promotion Office established		
1990s	1991	• Matsushita Environmental Charter (Environmental Statement and Code of Conduct) enacted • Matsushita Product Assessment adopted and implemented		• Keidanren Global Environment Charter enacted by Japan Federation of Economic Organizations • Law for Promotion of Effective Utilization of Resources enacted
	1992	• Environmental Policy Committee established	• The Earth Summit held in Rio de Janeiro, Brazil; Agenda21 and Rio Declaration on Environment and Development adopted • United Nations Framework Convention on Climate Change adopted	
	1993	• Matsushita Environmental Voluntary Plan (Year 2000 targets) adopted • Matsushita Group' global environmental internal audits launched		• The Basic Environment Law enacted
	1995	• Acquired Environmental Management System Certification at AV Kadoma Site (first in the Matsushita Group)	• First Conference of Parties to the U.N. Framework Convention on Climate Change (COP1) held in Berlin	• Containers and Packaging Recycling Law enacted
	1996		• ISO 14001 International Standard on Environmental Management Systems launched	
	1997	• Corporate Environmental Affairs Division (CEAD) established • Environmental Conference established (held semi-annually)	• COP3 held in Kyoto and adopted the Kyoto Protocol	• Keidanren Appeal on the Environment announced by Japan Federation of Economic Organization
	1998	• Love the Earth Citizens' Campaign commenced • Recycling Business Promotion Office established • First environmental report (1997) published		• Home Appliance Recycling Law enacted (took effect in 2001) • Law Concerning the Promotion of the Measures to Cope with Global Warming enacted • Energy Conservation Law revised: Top Runner Approach introduced
1999	• Green Procurement launched • Chemical Substances Management Rank Guidelines established • Acquired ISO14001 Certification in all manufacturing business units		• PRTR (Pollutant Release and Transfer Register) Law enacted	
2000s	2000	• Lead-free Solder Project commenced • Held first environmental exhibition for general public in Osaka	• Global Reporting Initiative (GRI) issued The Sustainability Reporting Guidelines	• Basic Law for Establishing the Recycling-based Society enacted • Law for Promotion of Effective Utilization of Resources enacted
	2001	• Environmental Vision and Green Plan 2010 adopted • Held Environmental Forum in Tokyo and Freiburg, Germany • Panasonic Eco Technology Center launched	• Reached final agreement on the actual rules of Kyoto Protocol in COP7 held in Marrakesh	• Reorganized into the Ministry of the Environment • Law Concerning Special Measures against PCBs enacted
	2002	• Panasonic Center Tokyo opened	• Johannesburg Summit (Rio+10) held	• Kyoto Protocol ratified • Vehicle Recycling Law enacted • Law for Countermeasures against Soil Pollution enacted
	2003	• Declared 'Coexistence with the Global Environment' as one of the twin business visions • Factor X advocated as an indicator for Creating Value for a New Lifestyle • Completely introduced lead-free soldering globally • Super GP Accreditation System launched • Achieved zero waste emissions in Japanese manufacturing business sites (ongoing program) • Held Environmental Forum in Tokyo	• EU's WEEE Directive was enacted	

Era	Year	Panasonic Group	World	Japan
	2004	<ul style="list-style-type: none"> Environmental Vision and Green Plan 2010 revised PCB Management Office established Superior GP Accreditation System launched 		<ul style="list-style-type: none"> Prohibited manufacturing and use of products containing asbestos in principle
	2005	<ul style="list-style-type: none"> Participated in Expo 2005 Aichi, Japan as an official sponsor Green Plan 2010 revised Continued with the nationwide Lights-out Campaign 3R Eco Project launched Completed the elimination of specified substances (6 substances) in products Matsushita Group's Green Logistics Policy established CF Accreditation System introduced Panasonic Center Osaka opened Eco & Ud HOUSE opened Installed the first commercial household fuel cell cogeneration system in the new official residence of the Japanese Prime Minister Won the first place in Nikkei Environmental Management Survey 	<ul style="list-style-type: none"> Kyoto Protocol entered into force 	<ul style="list-style-type: none"> Expo 2005 Aichi, Japan held National campaign against global warming "Team -6%" launched Marking for the presence of the specified chemical substances for electrical and electronic equipment (J-Moss) established
	2006	<ul style="list-style-type: none"> Environmental specialist position established ET Manifest introduced into all manufacturing sites of Panasonic in Japan Realized lead-free plasma display panels and introduced them to the market Full-fledge introduction of biodiesel fuel in logistics 	<ul style="list-style-type: none"> Restriction of Hazardous Substances (RoHS) Directive took effect in EU 	<ul style="list-style-type: none"> Relief Law for Asbestos Victims enacted Energy Conservation Law revised: new cargo owner obligations, widened product scope of its application, and top runner standard revision
	2007	<ul style="list-style-type: none"> Energy conservation activities at our factories in Malaysia approved as CDM project by the U.N. A new environmental mark 'eco ideas' introduced Panasonic Center Beijing opened Environmental Forum in China held "Declaration of Becoming an Environmentally Contributing Company in China" announced Panasonic 'eco ideas' Strategy announced 	<ul style="list-style-type: none"> The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) released Registration, Evaluation, Authorisation and Restriction of Chemicals entered into force in EU Framework for CO₂ reduction agreed at Heiligendamm Summit (G8) The Bali Road Map for the post Kyoto Protocol agreed at COP13 Administration on the Control of Pollution Caused by Electronic Information Products (China RoHS) came into effect 	<ul style="list-style-type: none"> 'Cool Earth 50' announced by Prime Minister Abe '21st Century Environment Nation Strategy' formulated 'The Third National Biodiversity Strategy of Japan' formulated 'Ministerial ordinance partially amending the Enforcement Regulation of the Waste Management and Public Cleansing Law' promulgated 'Domestic Emissions Trading Scheme Review Committee' established 'The Second Fundamental Plan for Establishing a Sound Material-Cycle Society' formulated
	2008	<ul style="list-style-type: none"> Established the Corporate CO₂ Reduction Promoting Committee Held environmental exhibitions, 'eco ideas' World Home Appliances Company announced environmental statement in which named its Kusatsu site as 'eco ideas' Factory Announced 'eco ideas' Declaration in Europe Established Environmental Strategy Research Center 	<ul style="list-style-type: none"> G20 (conference of key countries' environmental and energy ministers) held Hokkaido Toyako Summit held 	<ul style="list-style-type: none"> Cool Earth Promotion Program announced by Prime Minister Fukuda Mislabeling incident of waste paper pulp percentage Long-term Energy Demand and Supply Outlook announced Japan's Voluntary Emission Trading Scheme started
	2009	<ul style="list-style-type: none"> Opened the 'eco ideas' House to demonstrate a lifestyle with virtually zero CO₂ emissions throughout the entire house Announced the Asia Pacific 'eco ideas' Declaration Announced 'eco ideas' factories (in Czech, Malaysia, Thailand, and Singapore) Sanyo Electric joined the Panasonic Group 	<ul style="list-style-type: none"> China WEEE law promulgated New framework for countermeasures against global warming on and after 2013 (post-Kyoto Protocol), the Copenhagen Accord, was adopted at the COP15 (Copenhagen conference) Seeking to emerge from the Lehman collapse, countries throughout the world accelerated actions for the Green New Deal 	<ul style="list-style-type: none"> Energy Conservation Law amended: Covered area expanded from factories to commercial sector facilities Flat-panel TV and clothes dryer added as covered products under the Home Appliance Recycling Law 'Eco point' system started
2010s	2010	<ul style="list-style-type: none"> Announced "Vision looking to the 100th anniversary of our founding in 2018" Announced new midterm management plan, "Green Transformation 2012 (GT12)" Announced 'eco ideas' Declarations (Latin America, Asia Pacific, and Russia) Established 'eco ideas' Forum 2010 in Ariake, Tokyo Commenced business of Factory Energy Conservation Support Service Announcement of Green Plan 2018 	<ul style="list-style-type: none"> COP10 held in Nagoya—Nagoya agreement made APEC meeting held in Yokohama Ruling party lost in US midterm election—changes in anti global warming policy Cancun agreement made in COP16—Post-Kyoto framework still to be discussed 	<ul style="list-style-type: none"> Draft legislation of Basic Law of Global Warming Countermeasures submitted but remained in deliberation Obligatory greenhouse gas emissions reduction started as a part of Tokyo Emissions Trading Scheme Waste Management and Public Cleansing Law amended: self treatment regulations tightened Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. (CSCL) and Law concerning Pollutant Release and Transfer Register (PRTR) amended
	2011	<ul style="list-style-type: none"> Announced North America & Taiwan 'eco ideas' Declarations Announced establishment of Panasonic Dadi Dowa Summit Recycling Hangzhou Co., Ltd. Announced the Fujisawa Sustainable Smart Town Project Established Corporate Electricity Saving Division that bridges functions across the organization 	<ul style="list-style-type: none"> Rare earth prices soared Revised RoHS directives enforced in EU COP17 (Durban Climate Conference): Agreement made on long-term future of the scheme, and the second commitment period for the Kyoto Protocol (Japan announced non-commitment) 	<ul style="list-style-type: none"> Home appliance eco-point incentive program finished The Great East Japan Earthquake Revised Air Pollution Control Act and Water Pollution Control Act enforced Act on Special Measures Concerning Procurement of Renewable Electric Energy by Operators of Electric Utilities enacted (Feed-in tariff system to be enforced July 2012)
	2012	<ul style="list-style-type: none"> Business reorganization due to full acquisition of Panasonic Electric Works and SANYO Electric Commenced sales of Resources Recycling-oriented Product series Terminated production of household incandescent light bulbs Establishment of Environmental Management Group, Environment & Quality Center, Global Manufacturing Division Communication of 'eco ideas' Declaration (Vietnam) 	<ul style="list-style-type: none"> United Nations Conference on Sustainable Development (Rio +20) "Doha Climate Gateway" adopted at COP 18 Doha 2012, to lay down a future legal framework in which all nations can participate by 2020 and onwards Revised WEEE Directive implemented in Europe 	<ul style="list-style-type: none"> The Recycle Resource Project, national campaign by Ministry of the Environment, commenced 2012 Japan Tax Reform Bill enacted (Environment tax came into force in October 2012) Feed-in tariff for recyclable energy put into effect

Era	Year	Panasonic Group	World	Japan
	2013	<ul style="list-style-type: none"> Announced new midterm management plan Cross-Value Innovation 2015 Announced new brand slogan "A Better Life, A Better World" PETEC's home appliance recycling reached a cumulative total of 10 million units Announced 'eco ideas' factory (Philippines) 	<ul style="list-style-type: none"> Phase I of the Kyoto Protocol ends. Japan's target expected to be achieved in combination with forest CO₂ absorption and application of the Kyoto Protocol mechanisms. GRI announced G4, the next guidelines for CSR reports Minamata Convention on Mercury to internationally regulate import and export of mercury adopted at UN conference IPCC Fifth Assessment Report (Working Group 1) announced the possibility of human activity being the principal cause of global warming observed since the mid-20th century is "extremely high." Global average surface temperature is expected to rise as high as 4.8°C COP 19 Warsaw reaffirmed participation of all nations in the future framework of the Convention for 2020 and later. Nations were asked to submit emission pledges well in advance of 2015 	<ul style="list-style-type: none"> Home Appliance Recycling Law for small household appliances enforced Basic Plan for Establishing a Recycling-Based Society implemented Keidanren's "Action Plan Towards Low-Carbon Society" started (until FY 2021) Amended Law Concerning the Rational Use of Energy and Amended Law Concerning the Promotion of the Measures to Cope with Global Warming established. Amended Act on the Rational Use and Management of Fluorocarbons promulgated (June) Voluntary Action Plan by the electric and electronics industry terminated. Achieved improvement by 48% in CO₂ emissions per basic unit in average actual production output for fiscal 2009-2013 (compared with fiscal 1991 level) to the target of 35% Japan announced in November its fiscal 2021 reduction target of 3.8% over fiscal 2006 and registered this with UNFCCC Office (but with a possible review of the tentative target, which does not include possible resumption of nuclear power plant operations)
	2014	<ul style="list-style-type: none"> Panasonic DADI DOWA Summit Recycling Hangzhou Co., Ltd., started operation Opening of Fujisawa Sustainable Smart Town Announced Eco Declaration (Southeast Asia & Pacific) Communication of housing & town development at the International Greentech & Eco Products Exhibition & Conference (IGEM) (Malaysia) 	<ul style="list-style-type: none"> Targets for product environmental regulations in Europe begin to shift from energy saving to resource efficiency and environmental impact EU Parliament reelection results in the appointment of Mr. Jean-Claude Juncker as President of the European Commission. Review of the circular economy package was decided. IPCC 5th Assessment Report analyzed that the current multiple ways to achieve control of global temperature rise to less than 2°C cannot be materialized unless the target becomes nearly zero by the end of the century. Attention to "adaptation" is growing. COP12 Convention on Biodiversity, PyeongChang concluded the interim assessment of the Aichi Biodiversity Targets as "progress has been made but remains inadequate" COP 20 (Peru) reached agreement on the policy of developing reduction targets based on common rules for publication of "a new legal framework beyond 2020 applicable to all Parties" 	<ul style="list-style-type: none"> The amended Energy Conservation Act was enforced, incorporating action on power conservation during peak periods into existing qualitative reduction targets Phase II of the Commitment to a Low Carbon Society, a voluntary program promoted by Keidanren as measures against global warming, was newly established in response to government request, setting the target year to 2030 Toyota Motor launched fuel-cell vehicle MIRAI into the commercial market
	2015	<ul style="list-style-type: none"> Won Zayed Future Energy Prize 2015 Wonder Japan Solutions (Tokyo) held for the first time Announced the introduction of indirect contributions through housing, automotive, and B2B solutions in the size of contribution in reducing CO₂ emissions Announced the Tsunashima Sustainable Smart Town development project, together with Yokohama City and Nomura Real Estate Development Company 	<ul style="list-style-type: none"> Paris Agreement on the international legal framework for global warming control from 2020 and later was adopted at COP21 (Paris) 2030 Agenda for Sustainable Development was adopted at the UN Summit, focusing chiefly on sustainable development goals (SDGs) 	<ul style="list-style-type: none"> Draft proposal to cut greenhouse gases by 26% over 2013 levels as its 2030 greenhouse gas reduction target announced by the Japanese government COOL CHOICE, a new nationwide movement for greenhouse gas reduction, started
	2016	<ul style="list-style-type: none"> Establishment of Environmental Management Department, Quality & Environment Division Announced R&D 10-Year Vision Revised Green Plan 2018 Announced participation in Future Living Berlin, the first Smart City project in Germany Announced collaboration with Tesla Motors for solar batteries 	<ul style="list-style-type: none"> G7 Toyama Environment Ministers' Meeting held; ministers representing the G7 nations and the EU discussed policies on seven themes including resource efficiency and 3R, biodiversity, climate change, and related measures UK decided to leave the EU (Brexit) in a national referendum GRI announced "GRI Standard," the new guidelines for CSR reports COP 22 held in Marrakesh, Morocco. Agreement reached on establishing a rulebook to make the Paris Agreement effective by 2018 Donald Trump won the US presidential election COP 13, the 13th meeting of the Conference of the Parties on Biological Diversity, held in Cancun, Mexico 	<ul style="list-style-type: none"> The 2016 Kumamoto Earthquake The Plan for Global Warming Countermeasures was decided by the Cabinet. Direction of Japan's global warming countermeasures to achieve the Intended Nationally Determined Contributions under COP 21 was clarified. Long-term goal of reducing greenhouse gas emissions by 80% by 2050 was set Act on Promotion of Global Warming Countermeasures was amended; focuses on promoting the enhancement of Cool Choice, the reinforcement of international cooperation, and regional global warming countermeasures
	2017	<ul style="list-style-type: none"> Announcement of Panasonic Environment Vision 2050 Opening of Tsunashima Sustainable Smart Town 	<ul style="list-style-type: none"> France, UK, and China announced the prohibition of sales of gas and diesel cars and the conversion to EVs in the future 	<ul style="list-style-type: none"> Revision of the Charter of Corporate Behavior delivering on the SDGs through the realization of Keidanren Society 5.0
	2018	<ul style="list-style-type: none"> Announcement of Monozukuri (Manufacturing) Vision Achievement of zero-CO₂ factories at Panasonic Eco Technology Center Co., Ltd. (PETEC), Panasonic Energy Belgium N.V. (PECBE), and Panasonic do Brazil (PANABRAS) 	<ul style="list-style-type: none"> COP24 was held. The policy based on the Paris Agreements to be uniformly applied to all member countries was adopted 	<ul style="list-style-type: none"> The fifth Basic Environment Plan was decided by the Cabinet. Set up six cross-field strategies utilizing the concepts of SDGs
	2019	<ul style="list-style-type: none"> Announcement of Green Plan 2021 Participation in 'RE100', an international initiative for the use of 100% renewable energy as electricity used in business operations 	<ul style="list-style-type: none"> UN Climate Action Summit was held. Rising trend of achieving net zero greenhouse gas emissions, with a target of limiting global temperature rise to 1.5°C COP25 was held in Spain. The statement urging governments to increase the GHG reduction targets was adopted 	<ul style="list-style-type: none"> G20 Osaka Summit was held. "Osaka Blue Ocean Vision", which aims to further reduce pollution caused by marine plastic wastes, was shared