

UNITED SEMICONDUCTOR JAPAN Environmental Report 2021



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■ Contents

■ President's Message	2
■ Corporate Profile	2
■ Environmental Policy	3
■ Environmental Activity Plan	4
■ Data on Environmental Burden in Business Activities	5
■ Environmental Targets and Results	7
■ Providing Ultra-low Power Consumption Technology	7
■ Initiatives for Environmental Targets	8
■ Activities for the Reduction of Environmental Burden	12
■ Efforts to Enhance Safety and Security in Plant	14
■ Activities for the Regulations on Chemical Substances	14
■ Compliance with Environmental Laws and Regulations	15
■ Environmental Audit	15
■ Environmental Educational and Enlightenment Activities	16



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- UNITED SEMICONDUCTOR JAPAN Environmental Report 2021 describes the results of activities undertaken by United Semiconductor Japan Co., Ltd. (USJC) based on initiatives and efforts regarding environmental aspects of USJC.
 - The report covers our activities in 2020 (January 1 to December 31, 2020), and also includes some activities undertaken prior to January 1, 2020.

President's Message



President and CEO: Michiari Kawano

Contributing to the Sustainable Development Goals (SDGs) by enabling a smart society with our customers

Sustainable Development Goals (SDGs) were adopted by United Nations in 2015. To achieve the 17 targets of SDGs by 2030, business sectors are expected to play a big role in innovation to solve the global environmental issues, such as water, energy, sustainable production and consumption and climate change.

Since starting operations in 1984, Mie Plant has endeavored to continue business in harmony with society and the environment together with our employees through activities to prevent global warming, reduce chemical substances and reduce waste.

We aim to realize a smart society with our customers, and we contribute to the innovation to solve social and environmental issues in order to achieve SDGs by providing customers with technology platforms based on our strengths in semiconductors embedded in "automobile" and "IoT".

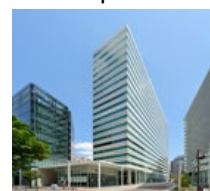
We also aim to contribute to efforts to realize a decarbonized society in 2050.



Corporate Profile

- Location
 - Principal Office: 2000, Mizono, Tado-cho, Kuwana, Mie, Japan
 - Headquarters: CONCURRED Yokohama, 3-1 Kinkocho, Kanagawa-ku, Yokohama, Kanagawa, Japan
- President and CEO: Michiari Kawano
- Date of Establishment: December 1, 2014
- Business Description: Semiconductor manufacturing
- Employees: 1,012 (April 1, 2020)
- Mie Plant: 2000, Mizono, Tado-cho, Kuwana, Mie, Japan
- Nagoya Design Center: Nagoya Prime Central Tower, 2-27-8 Meiki, Nishi-ku, Nagoya, Aichi, Japan

Headquarters



Mie Plant



Environmental Policy

USJC are constantly thinking about the role we should play in our business activities to realize a sustainable society, and we effort to reduce the environmental impact.

We have established an environmental policy and set " Important Themes" to prioritize our efforts toward realization.

■ Environmental Policy

We contribute to the conservation of a rich global environment with our customers, through the state-of-the-art semiconductor manufacturing technology with our expertise.

● Operational Principles

By applying the following principles, we work to prevent pollution of the global environment and reduce the environmental burden of our products throughout their lifecycles.

1. Conform to environmental regulations around the world and keep our promises to customers.
2. Effectively and continually improve our environmental management system, and work hard to improve our environmental performance.
3. Develop products with outstanding environmental characteristics.
4. Cooperate with the international environmental protection framework, and promote sustainable use of energy, water and resources in the semiconductor manufacturing life cycle.
5. Promote proper management of chemical substances to prevent pollution of the global environment.
6. Promote activities to make environmental and social contributions, and to preserve biodiversity.
7. Disclose environmental information and maintain ongoing communication with stakeholders.

● Important Themes

USJC will implement the following important themes items in compliance with USJC Environmental policies.

◆Reduction of environmental impact with the use of ultra-low power consumption technology

By developing environment-friendly technologies such as ultra-low power consumption technology and providing them to our customers, we will actively contribute to reducing the burden on our customers and the global environment.

◆Reduction of environmental impact in our foundry business

We will achieve reduction in environmental impact by promoting energy-saving, improvements in production efficiency, and recycling of waste.

◆Improvement of each employee's environmental consciousness

We will contribute to the community's environmental society, promote biodiversity conservation activities, and improve each employee's environmental consciousness.

Environmental Activity Plan

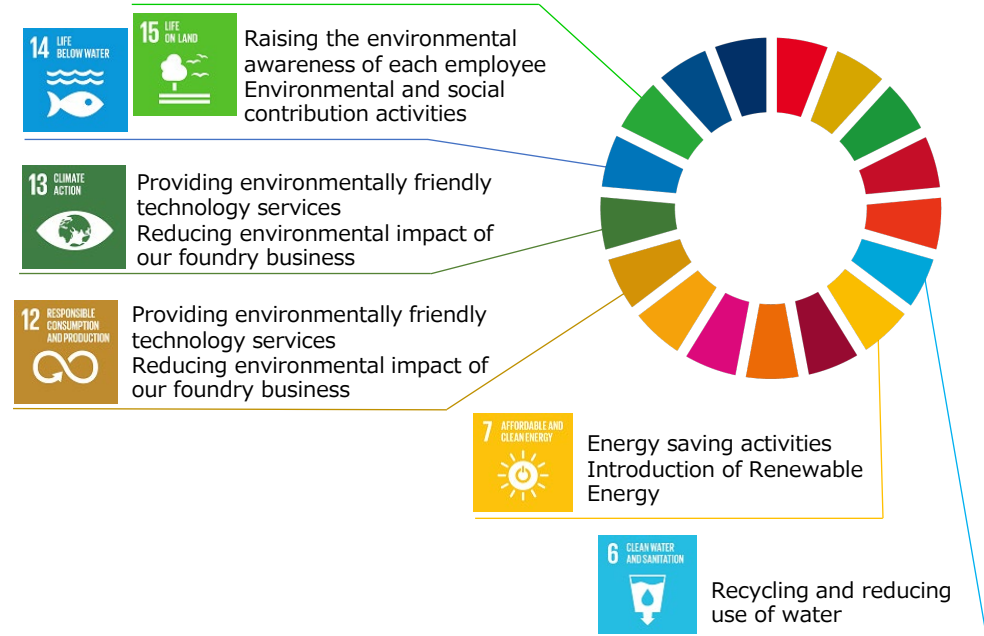
■ Environmental Management System

We are implementing an environmental action plan based on an environmental management system that conforms to ISO 14001:2015, and are working to continuously reduce our environmental impact.

Our environmental activities aim to contribute to realize a smart society by providing environmentally friendly technology services to our customers, and to realize a decarbonized society and the SDGs by addressing important themes.

Scope of Environmental Management System

- Mie Plant: Manufacture of LSI
- Headquarters: Customer engineering, Design Support, Business Control of LSI
- Nagoya Design Center: Design Support of LSI



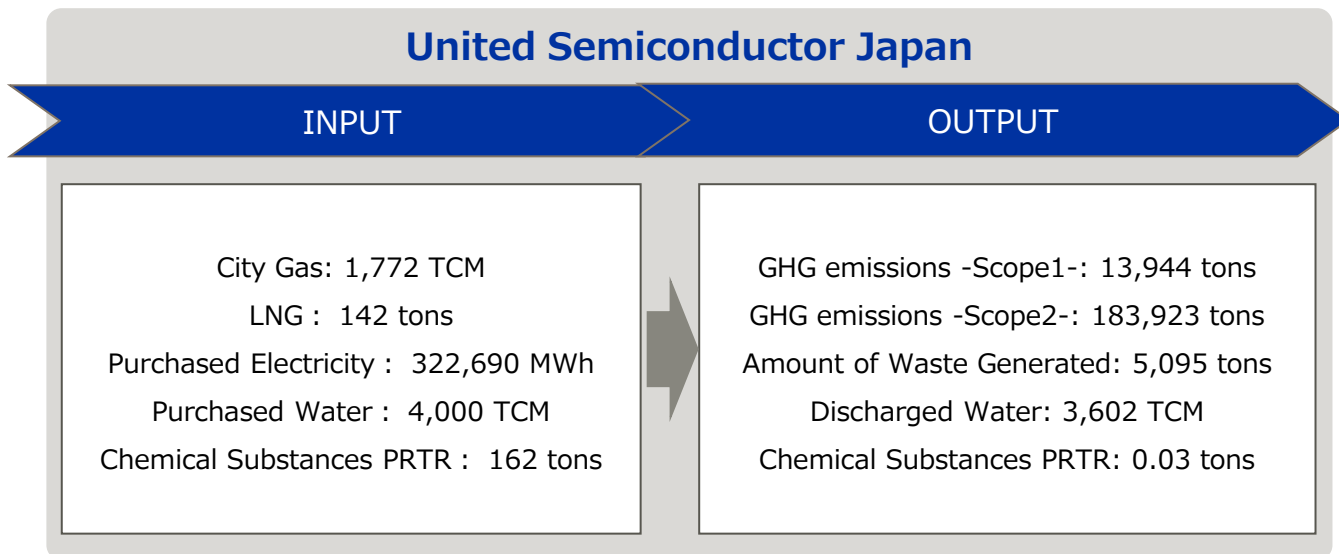
■ Environmental Targets

We have set environmental targets to be achieved by 2025 and aim to contribute to the SDGs through our environmental activities.

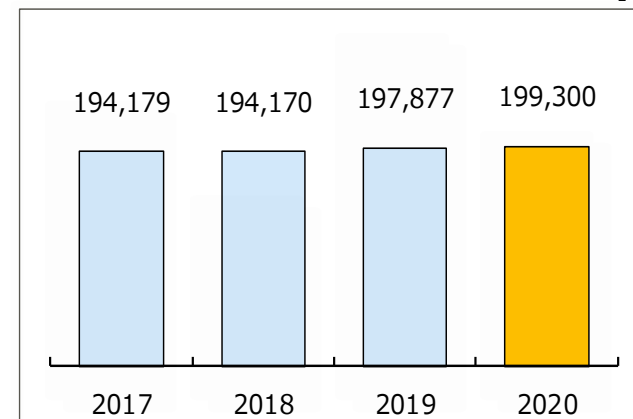
Environmental Targets Items		CY2025 Annual Targets	
1	Promoting activities related to technologies contributing to realize a smart society		Implementing 2 promotion activities
2	Reducing CO ₂ emissions per unit of energy consumption (RV: Results in 2020)		Decrease 5% compared with RV
3	Reducing water consumption per unit (RV: Results in CY2020)		Decrease 5% compared with RV
4	Reducing the amount of waste per unit (RV: Results in CY2019)		Decrease 7.5% compared with RV
5	Implementing environmental and social contribution activities		7 times or more

Data on Environmental Impacts of Business Activities

■ CY2020 Key Performance

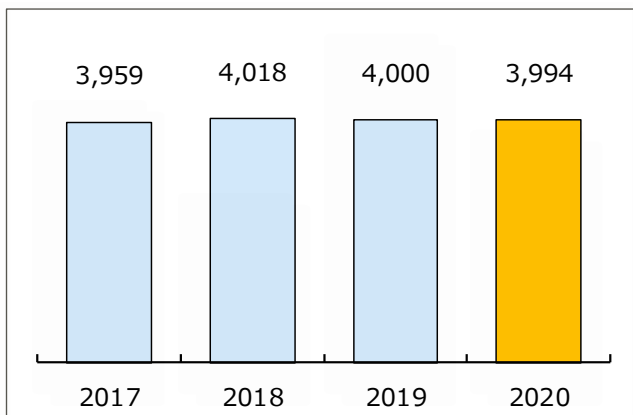


● GHG Emissions (Scope1,Scope2*)
Unit : Tons-CO₂

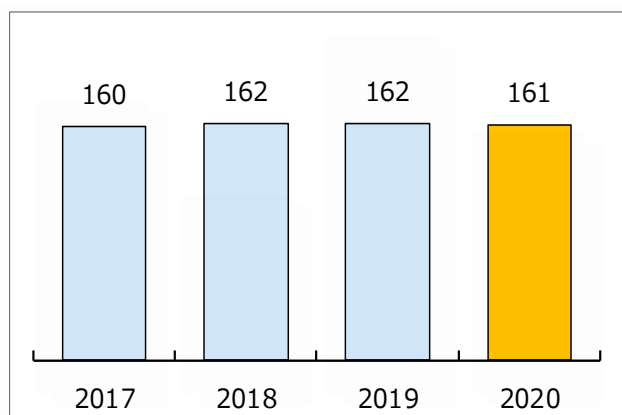


*) MWh power consumption = 0.570 Tons-CO₂

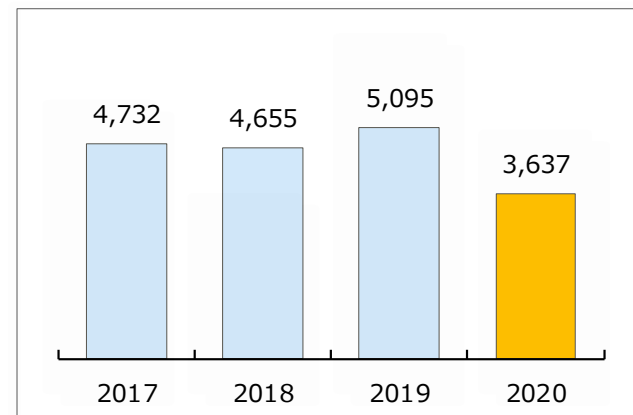
● Water Usage (Purchased volume)
Unit : TCM



● PRTR Chemical Substances Usage
Unit : Tons



● Industrial Waste
Unit : Tons



Data on Environmental Impacts of Business Activities

Greenhouse Gas (GHG) Emissions in 2020

We have started calculating our GHG emissions in 2020 in accordance with ISO14064-1:2018 and our carbon footprint (CFP) in accordance with ISO14067:2018.

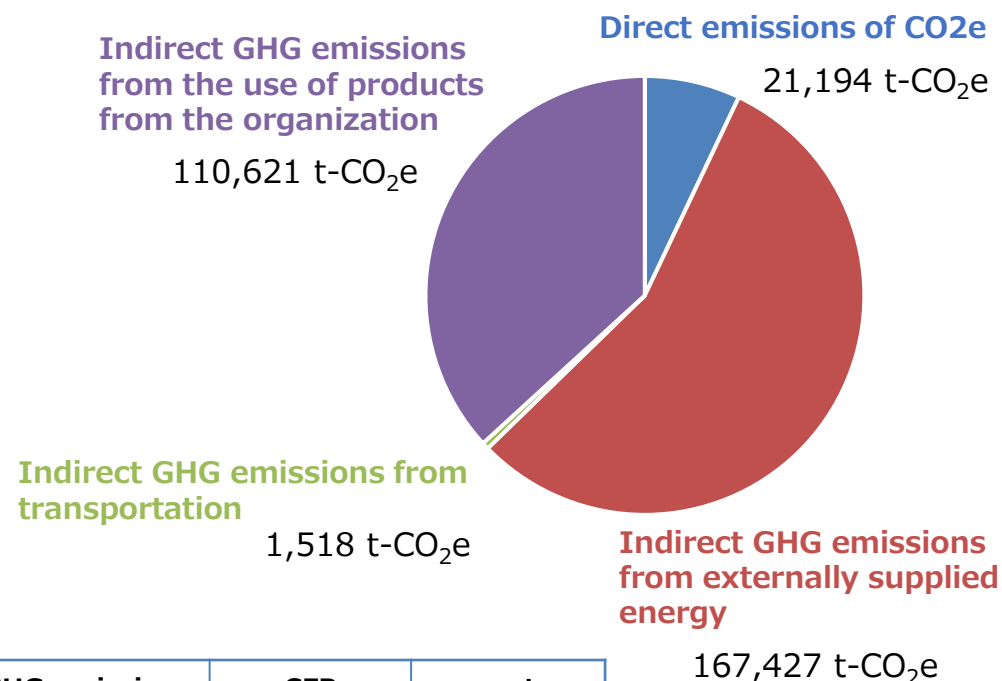
We will use this information to proactively engage in decarbonization with our customers.

- Calculation period: January 1, 2020 - December 31, 2020
- Total GHG emissions: 300,760 t-CO₂e
- CFP: 1,013 kg-CO₂e per sheet
[GHG emissions per wafer manufactured by USJC]









The calculation results were subjected to third-party verification/evaluation by DNV Business Assurance Japan K.K. and certified to meet the standards of ISO14064-1:2018 and ISO14067:2018.

Breakdown

Category of emission	GHG emissions (t-CO ₂ e)	CFP (kg-CO ₂ e/piece)	percentage (%)
Direct emissions of CO ₂ e	21,194	71	7.0
Indirect GHG emissions from externally supplied energy	167,427	564	55.7
Indirect GHG emissions from transportation	1,518	5	0.5
Indirect GHG emissions from products used by the organization	110,621	373	36.8
Indirect GHG emissions from the use of products from the organization	-	-	-
Other indirect GHG emissions	0	0	0.0
Total emissions	300,760	1,013	100.0



Environmental Targets and Results

Environmental Targets (CY2019-CY2020)		Contribution to SDGs	Results CY2020	Achievement Status
1	Promoting development of low-power consumption technology (TA: Implementing 2 promotion activities each year)	 	2 promotion activities 1 target unachieved *	Unachieved
2	Reducing CO ₂ emissions from energy consumption (RV: results for FY2013, TA: Decrease 7% compared with RV)	 	188,306 tons (Decrease 18% compared with RV)	Achieved
3	Taking measures to reduce water usage (TA: Implement one or more measures each year)		Implement of 2 measures	Achieved
4	Reducing amount of waste generated (RV: Average results for FY2013, TA: Decrease 3% compared with RV)		5,095 tons (Decrease 18% compared with RV)	Achieved
5	Implementing Regional Contribution activities (TA: Implement six or more measures each year)	 	6 times	Achieved

*) The unachieved activity was due to a change in the customer schedule and was rescheduled as requested by the customer and achieved in March 2021.

Note: The activity period is from January 2019 to December 2020, with the target year of 2020.

CO₂ emissions per unit of energy consumption while using electricity are calculated using the emission factor set by Electric Power Council for a Low Carbon Society from the base year (FY2013). The actual emission factor is 0.570 tons-CO₂/MWh (Pre-adjustment factor, no credit).

Providing ultra-low power consumption technology

In order to achieve the ultra-low power consumption that is essential for mobile and wearable devices, USJC developed technology for ultra-low voltage and ultra-low leak transistors. As a result, USJC has achieved approximately 50% reduction in power consumption at the same operating speed in comparison with conventional products.

With this technology, USJC provides low power solutions that meet the various needs of our customers. USJC is the first in the world to manufacture such ultra-low voltage and ultra-low leak transistors, and is the only foundry mass-producing such products.



Initiatives for Environmental Targets

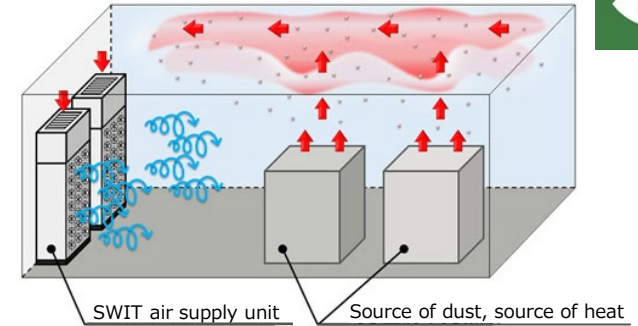
■ Reduce CO₂ emissions from energy consumption

USJC is continuing its efforts to use energy more efficiently.

The production lines of USJC' energy-saving plant used the most advanced technology available when they were constructed.

When the plant was expanded in 2015, it employed a swirling induction type HVAC system (SWIT) in the wafer fabrication clean room of the semiconductor front-end process for the first time in the world. We make efforts to manufacture high-quality products with less environmental impact than conventional air conditioning systems. USJC also pursues ongoing reduction measures by planning and executing efficient energy use to contribute to global warming prevention every year.

Furthermore, USJC will adopt the most advanced technology for energy efficiency, and work toward factories that even more energy efficient.



Overview of SWIT system



■ Introduction of High-efficiency centrifugal chiller with new refrigerant

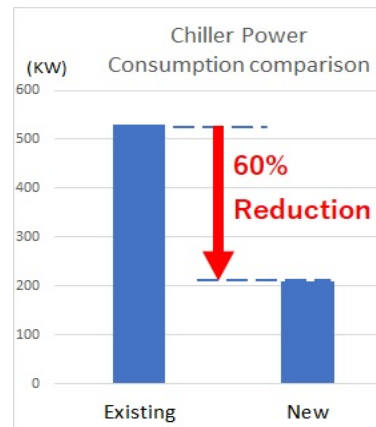
When we replaced the chiller in the plant area in CY2020, we selected the chiller that would help us address climate change that would be effective in both saving energy and reducing the load of refrigerant Freon as a measure to address climate change issues. With its highly efficient variable speed drive, the new centrifugal chiller reduced CO₂ emission through energy usage by 60%, (1,600 t-CO₂/year) compared to the previous unit. Moreover, the unit employs a new type of refrigerant — non-freon (R-514A) — that features a Global Warming Potential (GWP) of less than 2, which is a stark contrast to the 1,430 GWP of conventional refrigerants. This shows our contribution to the countermeasures against global warming.

We will continue our efforts to conserve energy and combat global warming by systematically introducing high-efficiency chiller that uses non-Freon refrigerants.

Chiller refrigerant comparison

	Existing	New
Refrigerant	R-134a	R-514A
Pressure	High	Low
Classification	Freon	Non-Freon
GWP※	1430	<2

※Global warming potential



Centrifugal chiller with Non-Freon refrigerant



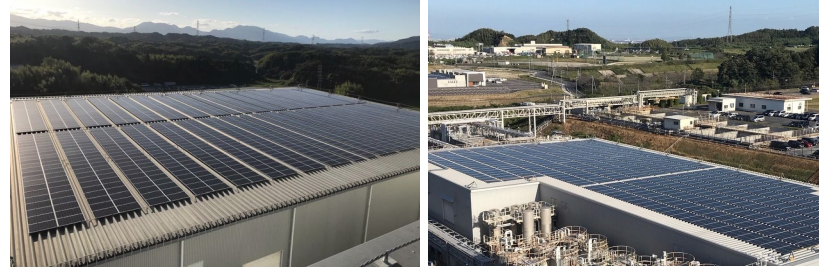
Initiatives for Environmental Targets

■ Efforts to improve the ratio of renewable energy

We will increase the ratio of renewable energy such as solar power among the electricity used in factories with the aim of contributing to a decarbonized society.

In 2020, we installed solar panels that generated a total of approximately 814 Mwh/year.

We will actively promote the conversion of electric power to renewable energy.



Solar power panel installed in Mie Plant



■ Implement measures for efficient use of water

USJC has been actively working to plan and implement water efficiency measures since FY2013.

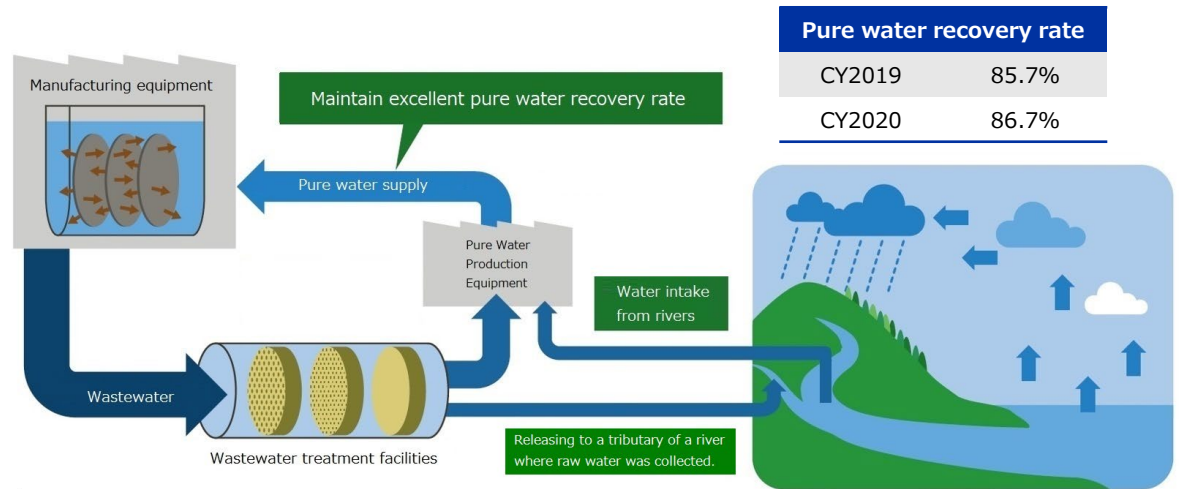
Water resources cycle

On production lines, USJC works to conserve water resources by recovering process effluent after pure water use, and recycling effluent into pure water again.

Acid-alkaline and hydrofluoric acid effluent are collected, recycled, and reused to replenish circulating water in exhaust-gas treatment equipment, as washing water, and so on.

USJC is working to realize water resources cycle by returning clean water, properly treated with water treatment systems based on the latest technology, to the rivers joining main rivers from which industrial water is drawn.

Going forward USJC will actively strive to improve its water recycling rate and achieve even more effective use of water resources.



Overview of water resources cycle

Initiatives for Environmental Targets

■ Reduce industrial waste generation

To reduce environmental burden, USJC actively implements 3R (Reduce, Reuse, and Recycle).

USJC has also installed stirred type crystallizers developed for high concentration fluorine-containing effluent treatment and formed particulate fluorite from recovered high concentration hydrofluoric acid effluent. Through installation of such equipment and sales to chemical manufacturing companies, the company has achieved a mechanism for sourcing recycled hydrofluoric acid. We are also working on the effective use of resources by collecting waste sulfuric acid used at plants and selling it for reuse in wastewater treatment.

Additionally, separating the collected waste oil and waste solvents in a proper way, implementing reusing renewable fuels as raw materials and using fuel sources in place of fossil fuels will be expected to contribute to the establishment of a Sound Material-Cycle Society.

As a result of these initiatives, we have reduced our waste generation in 2020 by approximately 1,460 tons compared to 2019.



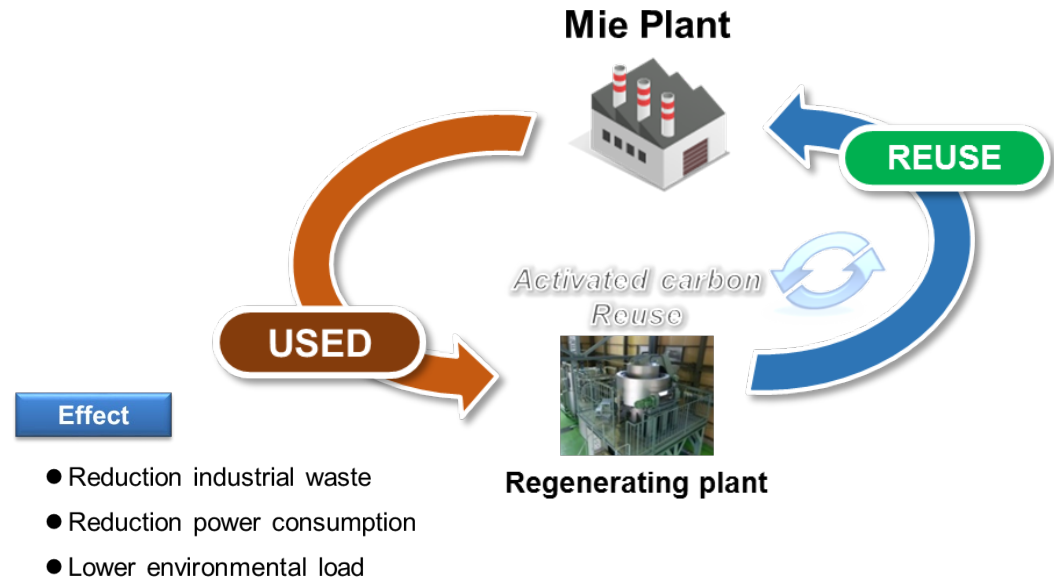
■ The world's first challenge of waste reduction through regeneration of activated carbon technologies.

We have been working on the world's first activated carbon regeneration technology. In 2018, we started actual operation optimized based on the results of the verification test and continue stable operation.

The technology applies the force of a supercritical fluid to high-performance activated carbon used at the exhaust processor and has proven to be more successful at prolonging the lifetime of activated carbon compared to the conventional method.

As a result, we reduced the amount of activated carbon waste to one-third of the previous level.

Going forward, we will take the initiatives to reuse and make efforts to eliminate the waste.



Overview of the reuse of activated carbon

Initiatives for Environmental Targets

■ Implement Regional Contribution activities

USJC works to improve the individual environmental consciousness of our employees, to help them become good environmental citizens, promote the biodiversity conservation, and make environmental and social contributions in their local communities.

■ Kuwana City Adopt Program

As initiatives for Environmental Targets, USJC carries out clean-up activities in the area surrounding the plant, including the neighborhood park, four times every year.

CY 2020 Total Number of Participants: 146

Note: The Adopt Program provides cleaning and beautification activities for roads, parks, and other public spaces by specifying locations for volunteer citizens and businesses.



ADOPT PROGRAM



■ Clean-up Volunteer Activity

USJC participates in a “River and Sea Cleanup Campaign” every October, an external event sponsored by Ministry of Land, Infrastructure, Transport and Tourism (MLIT) at Ibi River relevant to the Mie Fab. USJC calls on employees and their families to participate as volunteers in the event and actively join in.

Note: Cancelled in 2020 to prevent COVID-19 infection.

We also cleanup the Oku-Osugidani River once a year where we discharge factory wastewater.



River and Sea Cleanup Campaign



Clean up of the Oku-Osugidani River



■ Activities to provide killifish

Every May, we provide neighboring elementary schools with medaka fish (killifish) that have been bred in the Mie Plant for monitoring discharged water.



Killifish

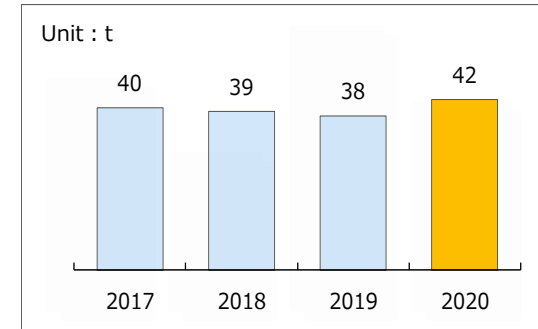


Activities on reduction of environmental burden

■ Reduce discharges of VOCs

USJC sets up exhaust-gas treatment equipment for emission prevention of acid and alkaline gas, takes measures to remove organic exhaust-gas (VOCs) by adsorption systems using activated charcoal, and works to reduce the effects on the environment.

VOCs emissions

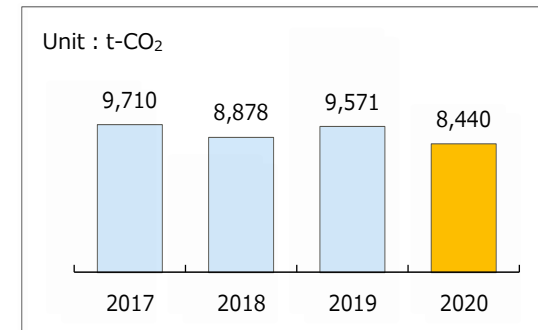


■ Reduce PFCs emissions

USJC has been making effort to reduce GHG emissions other than CO₂ (PFC, HFC, NF₃, SF₆). On production lines, catalytic decomposition systems have been installed on all equipment producing GHG, and USJC aggressively promotes GHG emission reduction.

Moreover, USJC implements appropriate operation management regarding systems to maintain their performance.

PFCs emissions



■ Activities on forest conservation

We have been using FSC forest certification paper in our offices since the purchase in 2019 and cooperating in sustainable forest conservation. FSC certification clarifies that products from well-managed forests suitable for environmental, social and economic benefits are certified with the FSC logo. As more products with this logo enter the market and purchased, it is expected that properly managed forests will be protected, and timber can be consumed while preventing deforestation.

FSC logo is one of the environmental labels used as a guideline for green procurement.



Activities on reduction of environmental burden

■ Reducing CO₂ emissions by cutting down shipments by air through logistics management.

By strengthening time management and shipping by land instead of air, CO₂ emissions from logistics have been reduced. Through this activity, we will contribute to the reduction of CO₂ in customer's product life cycle.



■ Reducing the number of engineering lots by TCAD

We use a simulation tool, Technology CAD (TCAD), to reduce environmental burden of technology development. TCAD narrowed down experimental conditions and analyzed failures, resulting in a decrease in the number of experimental lots. This led to a reduction in environmental burden.



■ Collaboration with Suppliers in Environmental Activities

Recent global trends in reducing environmental burden and the needs of external stakeholders require us to cooperate with suppliers in environmental activities. USJC has built long term relationships with local onsite gas manufacturers since FY2018 and has been working and exchanging opinions with them to (1) reduce CO₂ emissions, (2) conserve biodiversity and (3) conserve water resources.



■ Alien Species Extermination Activities

Every May, as an alien species extermination activity, we get rid of a specific alien species plant "Lance-leaved coreopsis", which is spreading around the site. We will continue to promote activities aimed at complete extermination around the site.



Lance-leaved coreopsis



Before Extermination



After Extermination

Efforts to Control Chemical Substances

USJC has been working to respond appropriately to regulations of each country on chemical substances contained in products, and has developed a system for issuing non-use certificates of specified chemical substances in response to customer requests. In May 2020, we completely abolished for all products the use of chemicals containing PFOA, which is a persistent organic fluorine compound that may have an adverse effect on the ecosystem.



Efforts to Enhance Safety and Security in Plant

Since the days of FSL Mie Fab, we have been making ongoing efforts to reduce impacts on aquatic environments, such as contamination of effluent quality with hazardous substances, COD, nitrogen, or phosphorus, through appropriate operation management including adoption of a water-treatment system using the latest technologies.

As for monitoring of effluent quality, we continuously monitor killifish and their breeding in discharged water for biodiversity conservation. The Killifish have bred repeatedly since FY 2012, the year following the start of monitoring.

USJC set up a new aquarium for monitoring killifish in June 2013 and donates the killifish for educational purposes to local elementary schools as a part of its regional contribution activities. As other efforts to enhance safety and security in the plant, USJC conducts environmental analysis and confirms compliance with environmental regulations.

As part of its safety risk management, USJC also holds safety promotion liaison conferences with partner companies every year. USJC continuously cooperates with partner companies and meets customer's expectations as a safe and secure factory.



Aquarium for monitoring killifish Breeding



Killifish



Regular environmental analyses



Safety promotion liaison conference with partner companies

Compliance with Environmental Laws and Regulations

■ Legal Compliance

USJC maintains the management condition of legal compliance through established quarterly survey and confirmation procedures. USJC also works to take actions at early stages by gathering the latest information regarding amendments of laws and trends in new regulation.

【Compliance】

- USJC reaffirmed compliance through an internal audit based on its environmental management system and verified that there were no problems.
- There was no occurrence of accidents or exceeding of regulatory value according to the results of environment analyses related to wastewater and exhaust gas in 2020.
- We reported to Mie Prefecture and Kuwana City about soil contamination found on the premises of Mie Plant in May 2020. We took measures to prevent diffusion of soil contamination in the detected sites. Mie Prefecture confirmed that this measure was appropriate.
- Regarding the soil contamination reported to Mie Prefecture and Kuwana City in May 2008, USJC continues purification work by pumping up contaminated water and monitoring the surrounding environment. USJC submitted the results to Mie Prefecture and Kuwana City in January, 2020 as a regular report required once a year.
- USJC confirmed that there were no problems related to other regulations or requirements.

Environmental Audit

USJC underwent ISO14001:2015 audit by Japan Environmental Certification Organization (JACO), and acquired ISO14001:2015 certification in March 2019.

In addition, we strive to maintain and improve our environmental management system through an environmental audit every year by internal auditors trained within our company.

To make audits effective, auditor education programs are implemented each year to help improve the competency of its internal auditors. USJC also enhances its auditing system through audits for company-wide legal compliance by auditors with external credentials.

Regarding the matters pointed out in CY2020 internal audit, corrective actions were taken, including measures to prevent any recurrence, and this information is being effectively used for continuous system improvement.

Environmental Education and Enlightenment Activities

■ Environment Exhibition

USJC has continued effort to enlighten employees by raising environmental consciousness around the time of National Environment Month every June through environmental events. Through environmental education and photo exhibitions, we strive to raise awareness of employees for contribution to the SDGs, global warming issues, and biodiversity conservation.

■ Environmental Photo Contest

As an opportunity for raising awareness of biodiversity, every year USJC asks employees to submit photos relating to biodiversity, and a biodiversity photo exhibition is held to display the most outstanding works. Through these efforts, we will continue to strive to raise awareness among employees so that they will be more interested in protecting the natural environment.

First Prize in 2020



Prize for Excellence in Quality



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