

A small, vibrant green plant with a rounded, bushy top and a few thin stems is growing out of a dark, textured surface that resembles asphalt or a similar material. The background is a solid, dark green color. The overall image conveys a message of environmental growth and sustainability.

United Semiconductor Japan Environmental Report 2020

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- United Semiconductor Japan Environmental Report 2020 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 2019 (January 1, 2019 to December 31, 2019), and also includes some activities undertaken prior to January 1, 2019.

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.

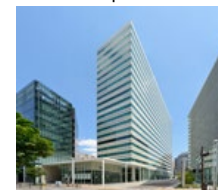
We aim to realize a smart society with our customers, and we contribute to the innovation to solve social and environmental issues in order to achieve SDGs by providing customers with technology platforms based on our strengths in semiconductors applied to "automobile" and "IoT".



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 Meieki, 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 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

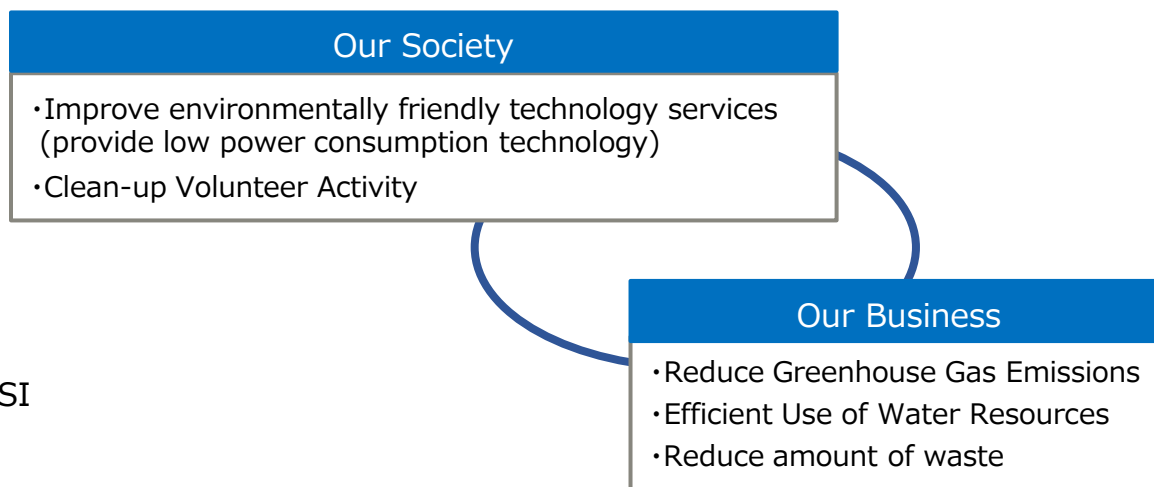
We will contribute to the community's environmental society, promote biodiversity conservation activities, and improve each employee's environmental consciousness.

Environmental Activity Plan

We aim to contribute to the realization of a carbon-free society by providing environmentally friendly technology services to our customers, and to contribute to the SDGs by focusing on important themes.

Currently, we have formulated an environmental activity plan based on the results of 2013, with the target year of 2020.









We have been working on environmental goals that contribute to the SDGs through environmental activities in the fields of "contribution to society" and "own business activities".



■ Environmental Management System

- ◆Mie Plant: Manufacturing LSI
- ◆Headquarters: Marketing, Design Support, Business Management of LSI
- ◆Nagoya Design Center: Design Support

■ Environmental Targets

Environmental Targets Items		CY2020 Annual Targets
1 Promoting activities relating to low-power consumption technologies	 	Implementing two promotional activities.
2 Reducing CO ₂ emissions per unit of energy consumption (RV: Results in FY2013)	 	214,110 tons (Compared with RV, 7% decrease)
3 Taking measures to reduce water usage		Implement one or more measures
4 Reducing the amount of waste generated (RV: Results in FY2013)		5,375 tons (Compared with RV, 3% decrease)
5 Implementing environmental and social contribution activities	 	6 times or more

Data on Environmental Impacts of Business Activities

■ CY2019 Key Performance

United Semiconductor Japan

INPUT

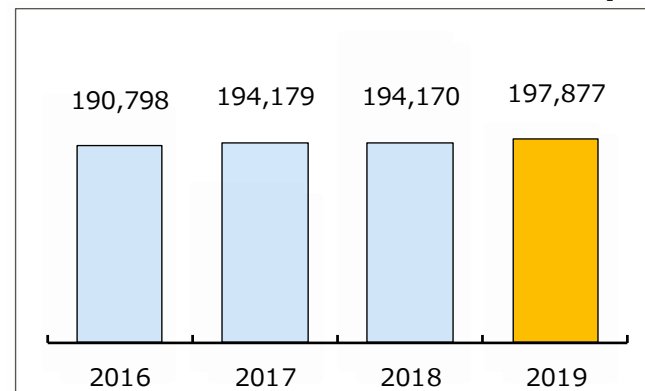
OUTPUT

City Gas: 1,772 TCM
 LNG : 142 tons
 Purchased Electricity : 322,690 MWh
 Purchased Water : 4,000 TCM
 Chemical Substances PRTR : 162 tons

GHG emissions -Scope1-: 13,944 tons
 GHG emissions -Scope2-: 183,923 tons
 Amount of Waste Generated: 5,095 tons
 Water Discharge: 3,602 TCM
 Chemical Substances PRTR: 0.03 tons

● GHG Emissions (Scope1, Scope2*)

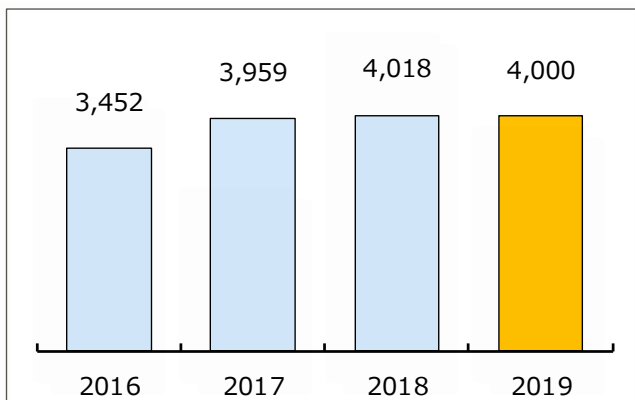
Unit: Tons-CO₂



*: MWh power consumption = 0.570 Tons-CO₂

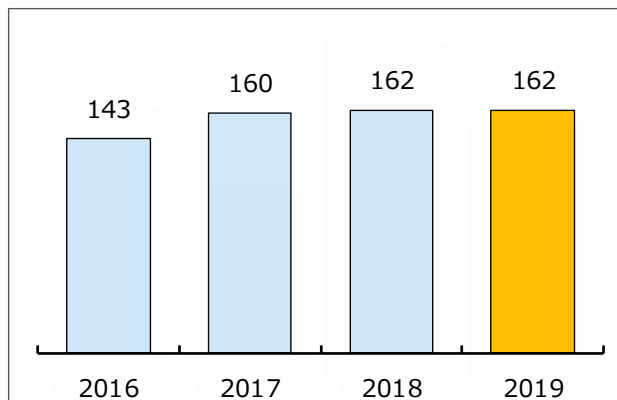
● Water Usage (Purchased volume)

Unit: Tons



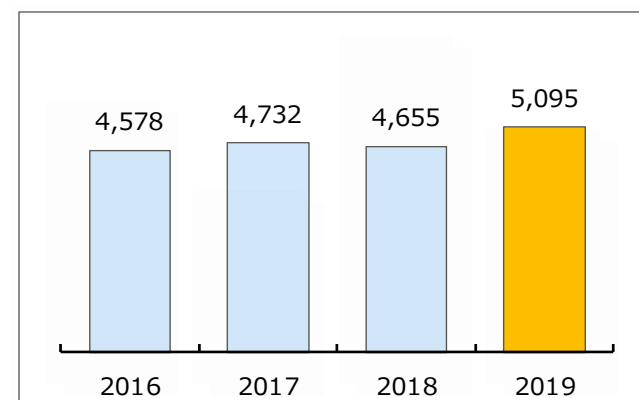
● PRTR Chemical Substances Usage

Unit: Tons











● Amount of Waste Generated

Unit: Tons



Environmental Targets and Results

	Environmental Targets (CY2019-CY2020)	Contribution to SDGs	Results CY2019	Achievement Status
1	Promoting development of low-power consumption technology (TA: Implement 2 promotion activities each year)	 	Implement 2 promotion activities	Achieved
2	Reducing CO ₂ emissions from energy consumption (RV: results for FY2013, TA: Compared with RV, 7% decrease)	 	188.306 tons (Compared with RV, 18% decrease)	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: Compared to RV, 3% decrease)		5,095 tons (Compared with RV, 18% decrease)	Achieved
5	Implementing Regional Contribution activities (TA: Implement six or more measures each year)	 	6 times	Achieved

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.

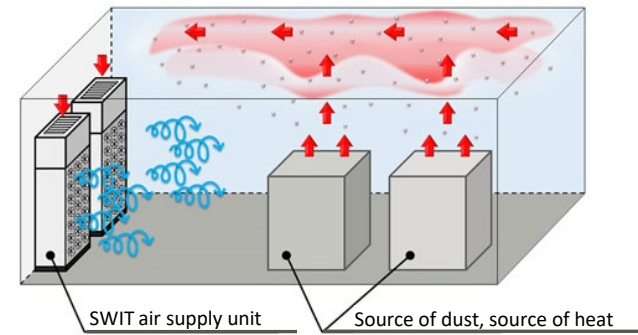
USJC is the first in the world to manufacture such as ultra-low voltage and ultra-low leak transistors, and is the only foundry mass-producing such products.



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.



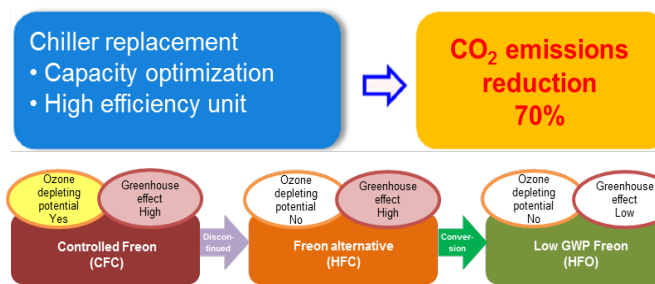
Overview of SWIT system

■ Introduction of High-efficiency centrifugal chiller with new refrigerant

When we replaced the chiller for office area in FY2017, we selected the chiller that would help us address climate change in order to use power efficiently and reduce the environmental load of refrigerant. With its highly efficient variable speed drive, the new centrifugal chiller reduced CO₂ emission through energy usage by 70% (2,743 t-CO₂/year) compared to the previous unit. Moreover, the unit employs a new type of refrigerant — hydrofluoroolefin (HFO) — that features a Global Warming Potential (GWP) of 1, which is a stark contrast to the 1,300 GWP of conventional refrigerants. This shows our contribution to the countermeasures against global warming. We will continue to seek out and introduce eco-friendly equipment.

[Comparison of refrigerant]

	Existing refrigeration unit HFC (Conventional refrigerant)	New refrigeration unit HFO (New refrigerant)
GWP	1,300	1
Atmospheric lifetime	13.8 years	26 days
Fluorocarbons Emission Control Law	Applicable	Not applicable
High Pressure Gas Safety Law	Special handling required	Special handling not required
Rated COP (200Rt type)	6.1	6.3



Centrifugal chiller with new refrigerant

Initiatives for Environmental Targets

■ Efforts to improve the ratio of renewable energy

From 2020, we have been increasing the ratio of renewable energy such as solar power among the electricity used in factories with the aim of contributing to a decarbonized society.

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



Solar power panel introduction plan



■ Implement measures for efficient use of water

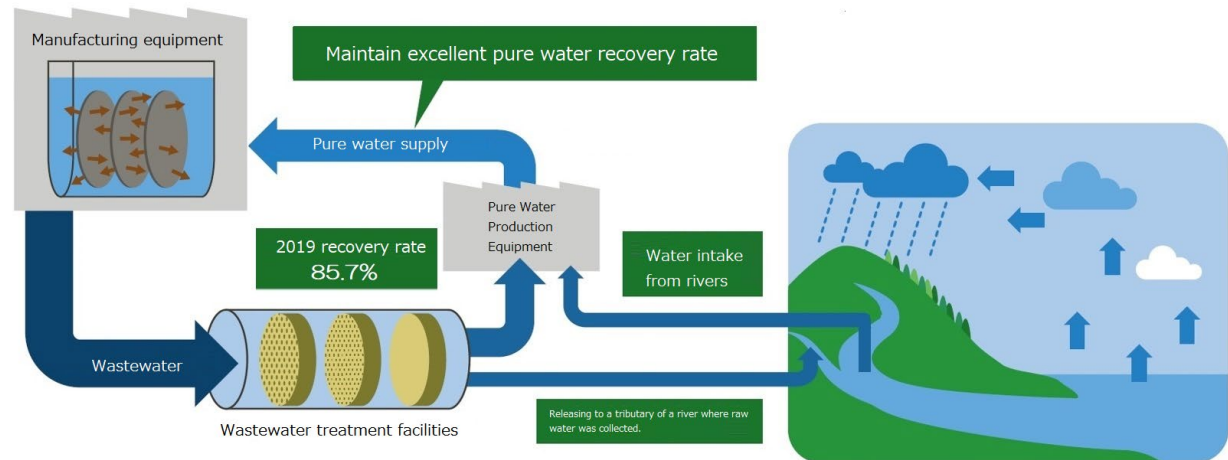
USJC has been actively working to plan and implement water efficiency measures since FY2013.

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.

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.



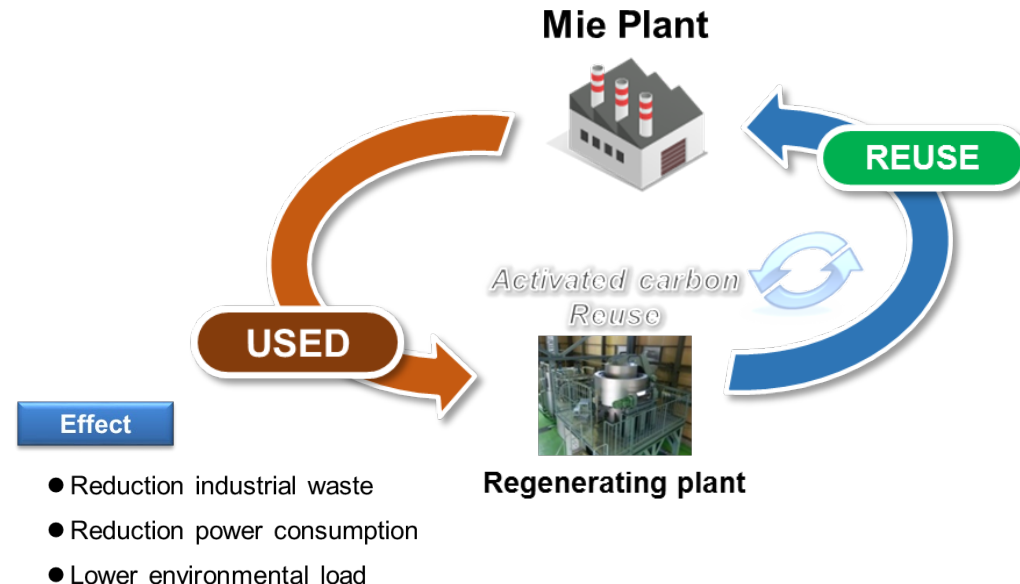
■ The world's first challenge of waste reduction through regeneration of activated carbon technologies.

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.

FY2019 Total Number of Participants: 161

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.



River and Sea Cleanup Campaign

■ Activities to provide killifish

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

This is useful for science classes in which 5th grade children raise and observe killifish.



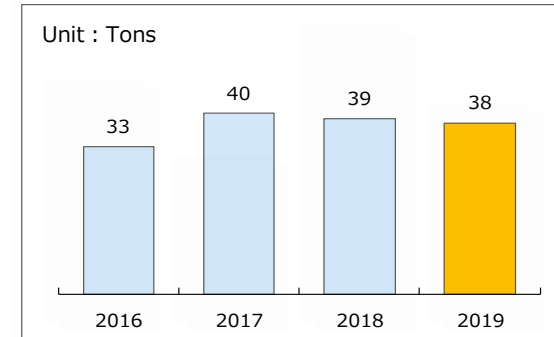
killifish

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.

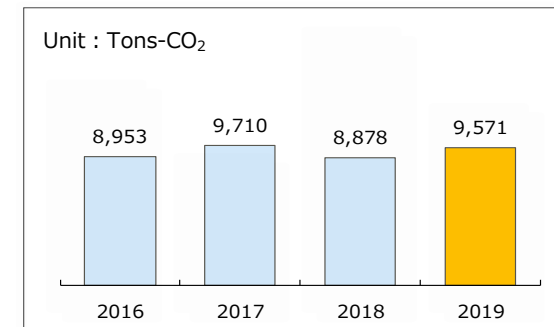
VOCs emission



■ 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 emission



■ 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. 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



Extermination activity

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.

Additionally, we achieved the objective of total elimination of chemicals containing PFOS, suspected of damaging ecosystems, at all Group factories by FY2009.

In addition to PFOS, we have started evaluation in order to replace chemicals containing PFOA, persistent organofluorine compound. We continuously work to completely eliminate these materials from all products in 2020



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 FY2012, 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

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 2019.
- In March 2019, we confirmed leakage of treated wastewater on plant premises, and reported this accident as stipulated in the Water Pollution Control Law. The soil was not polluted, because the wastewater did not contain hazardous materials regulated by the Soil Pollution Countermeasure Law. We immediately took measures to prevent a recurrence.
- 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, 2019 as a regular report required once a year.
- USJC confirmed that there were no problems related to other regulations or requirements.

Environmental Audit

In FY2018, we separated from the Fujitsu Group Integrated Environmental Management System.

After undergoing ISO14001: 2015 audit by Japan Environmental Certification Organization (JACO), we 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 the FY2019 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

■ Environment Exhibition

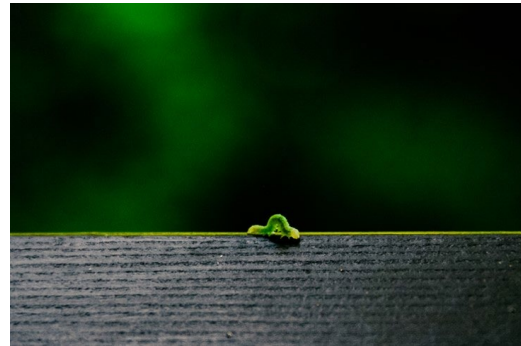
USJC has continued effort to enlighten employees by raising environmental consciousness around the time of National Environment Month every June through environmental events.

USJC also holds Environment Exhibitions every year and works to raise consciousness of issues such as global warming, biodiversity conservation, and so on.

■ 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.

First Prize



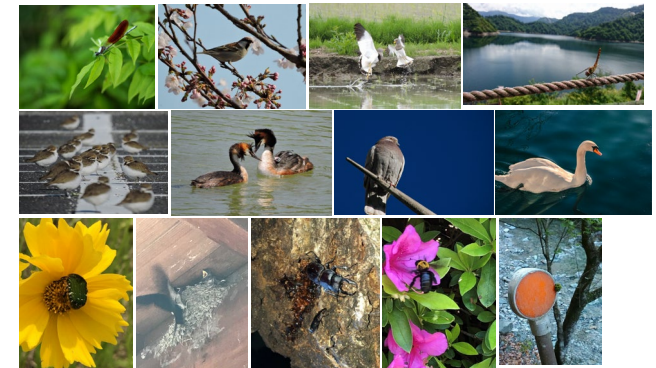
Prize for Excellence in Quality



Environment Exhibition 2019



Some Entries in 2019 Environmental Photo Contest



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