Keeping environmental preservation in business in mind, we will thoroughly eliminate the loss of resources and energy in order to contribute to social development efficiently. We will dedicate ourselves to environmental protection by offering technologies and products designed to reduce the environmental burden.

Environmental Management - Vision

We conduct the environmental load reduction activity with all concerned people under IBIDEN way, aim "Harmony with nature" by reducing the bad effect on global environment generated in our business operation, and fulfill the role as enduring company.

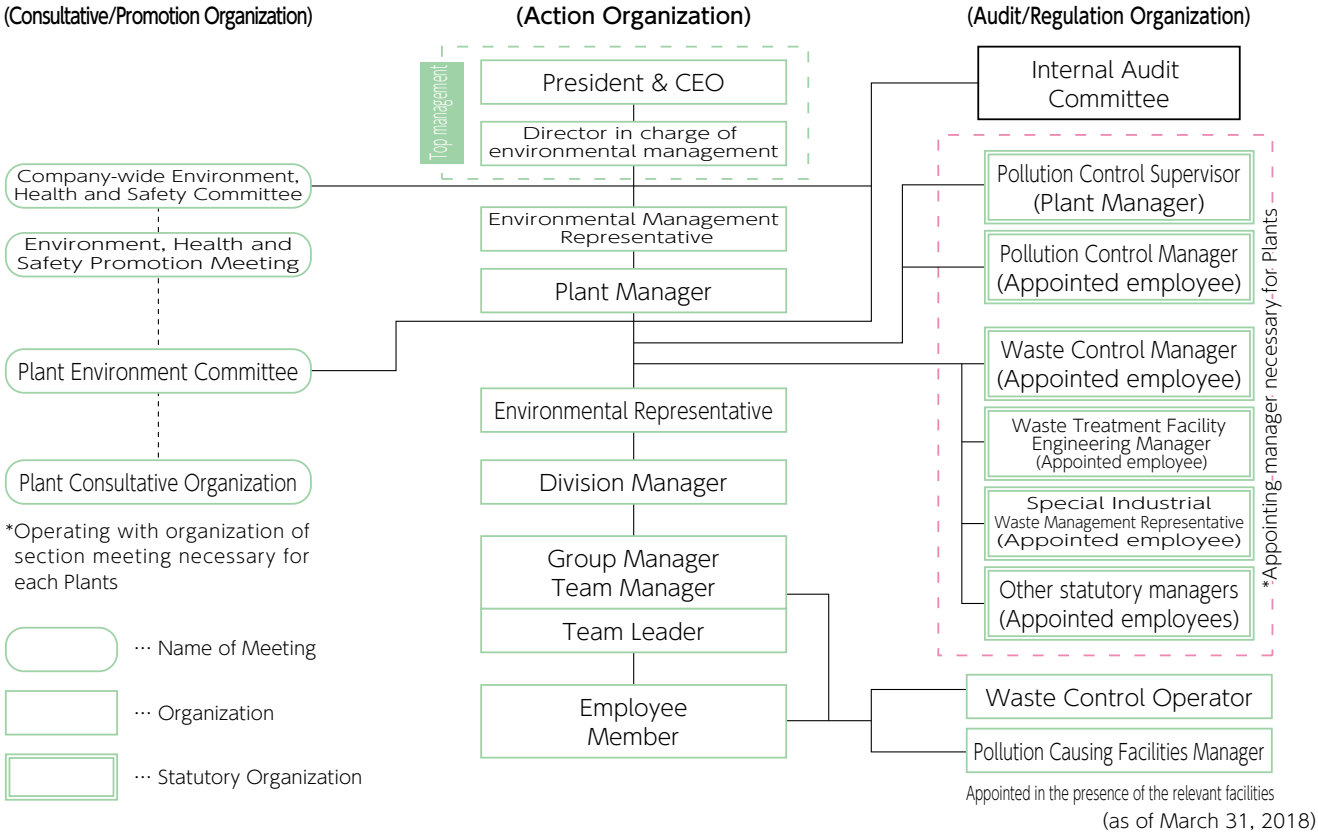
Environmental Policy

1. We contribute to protecting the global environmental by minimizing the environmental burden in every process of our company's activities. We especially value water and its benefits to the Earth.
2. We continuously promote positive and effective use of clean energy by developing and improving eco-technology that saves energy and resources.
3. We comply with environmental rules and regulations of domestic and international countries. We set our own standards and advance our environmental management capabilities.
4. We encourage all employees to share the purpose and goals of environmental protection and devote themselves to environmental protection activities. We accomplish this by utilizing an Environmental Management System.
5. We publicize this environmental policy by Employee portal site to promote awareness of environmental protection and to inspire each employee to act voluntarily.
6. We make this policy public and we make it available any time when requested.

Employee Carrying Environmental Policy Card

Organization chart of Environmental Management

Grounded in values that emphasize harmony with nature, we are working group-wide to promote environmental management. With the president as the head of the companywide environmental management system, we have established the workplace-based Environment Committee led by the head of each workplace to facilitate environmental management.



(as of March 31, 2018)

Apart from the activities mentioned above, we hold meetings organized by environmental protection promoters who are designated by each operational division, while the entire Group shares information on environmental protection mainly in the global environmental meetings along with eight major production bases and the energy conservation meetings attended by energy conservation promoters of each division.

Management System Certification Status

Domestic group companies certified with ISO 14001 and OHSAS 18001*1

We are pursuing ISO14001 and OHSAS18001*1 certification with an in-house management system as the means to continuously improve the environmental footprint caused by the Group's activities, products and services. Together with IBIDEN Graphite Co., Ltd., and IBIDEN Engineering Co., Ltd. (Water Treatment Section), which are directly linked to our business activities, we obtained ISO14001 certification in January 2000 and OHSAS18001 certification in March 2003. In fiscal year 2011, we began operating a management system that integrated ISO 14001 and OHSAS 18001. In fiscal year 2014, we merged our entire management system including the quality management system as the IBIDEN Management System (IMS) and started operating it.

Our management systems have been verified both by semiannual internal audit and annual external audit, which indicates that it has been properly established and operated. Through the improvement of items identified by internal and external audits, the level of our management system are upgraded further.

Each workplace has an assigned full-time head (Plant manager), and the each Environmental Committee and the each Health and Safety Committee are led by the head of each workplace based on the Plan-Do-Check-Act (PDCA) cycle of activities. A meeting consisting of heads of workplaces is held monthly where information is exchanged on inter-workplace activities, with a goal to increase the level of all IBIDEN workplaces.

Acquisition Status of the ISO14001 and OHSAS18001 Certifications for Domestic Group Companies						
Name of the Group Company	IBIDEN*2	IBIDEN Engineering (Head Office)	IBIDEN Greentec	IBIDEN Bussan	IBIDEN Industries	IBIDEN Jushi
ISO14001Cert.	Jan. 2000	Oct. 2002	Mar. 2004	May. 2005	Sep. 2005	Jun. 2009
OHSAS18001Cert.	Mar. 2003	Oct. 2013	Jan. 2013	May. 2013	Aug. 2012	Mar. 2013

*1 OHSAS18001: A standard for occupational health and safety management systems. OHSAS stands for Occupational Health and Safety Assessment Series

*2 The above certifications were acquired in Ogaki, Ogaki Central, Aoyanagi, Gama, Ogaki-kita, Kinuura, Godo, Head Office, and Energy Control division as well as some domestic group companies including IBIDEN Engineering Co., Ltd. (Water Treatment division), IBIDEN Graphite Co., Ltd., IBIDEN Chemicals Co., Ltd., and IBIKEN Co., Ltd. (Housing Materials division).

Overseas group companies certified with ISO 14001 and OHSAS 18001

In our Group, not only Domestic group companies but also Overseas group companies are working to obtain ISO 14001 and OHSAS 18001 certification. In April 2016, IBIDEN Porzellanfabrik Frauenthal GmbH. obtained OHSAS 18001 certification. Currently IBIDEN DPF France S.A.S. is working to acquire the certification. In the future, we will continue with efforts to obtain this certification for overseas group companies as well as domestic group companies.

Acquisition Status of the ISO14001 and OHSAS18001 Certifications for Overseas Group Companies								
Name of the Group Company	IBIDEN Philippines	IBIDEN Electronics (Malaysia)	IBIDEN Electronics (Beijing)	IBIDEN Electronics (Shanghai)	IBIDEN Hungary	IBIDEN DPF France	IBIDEN Porzellanfabrik Frauenthal	IBIDEN Mexico
ISO14001Cert.	Jun. 2003	Mar. 2013	Jul. 2003	Feb. 2005	Apr. 2007	Planning	Feb. 2002	Apr. 2018
OHSAS18001Cert.	Aug. 2013	Mar. 2013	Mar. 2007	—	Sep. 2014		Apr. 2016	Planning

Environment and Occupational Health and Safety-Related Laws and Regulations

The IBIDEN Group deals with chemicals at many of its plants, some of which are adjacent to residential areas. Issues such as air pollution, wastewater, and noise pollution therefore require our special attention.
The Group sets its own standards for what is required by national, regional, or municipal regulations for activities and operations that may have a significant environmental impact, and regularly measures and monitors compliance. (“Environmental Data for Individual Plants and Group Companies” (see pages 45 to 49)). To reassure the residents of surrounding areas, the Group, led by the plant managers, communicates with regional representatives about its business activities at its plants.

In fiscal year 2017, we received two recommendations for correction regarding occupational health and safety from the supervisory authorities, and made immediate improvements. Environmental data show that no emissions violating standards occurred. No leakages from our plants occurred that would seriously damage the environment. There were no records of penalties or sanctions incurred by the Group related to violations of environmental and occupational health and safety laws and regulations. We will continue to strengthen the management of pipe-end locations to prevent environmental effects on local residents from leakages, noise, or odor from our plants. The IBIDEN Group will continuously monitor soil pollution risk caused by leakage of chemical substances while conducting investigations, improvements, and maintenance of locations with potential risks through the Chemical Control Committee, in order to ensure compliance with laws and regulations.

Guidelines for Environmental Activities

In fiscal year 2017, we conducted environmental protection activities with all employees participating in accordance with the guidelines below. The focus was on environmental risk reduction, energy saving, and resource circulation, and the aim was to minimize business risk and contribute to boosting our competitiveness.

1. Hedging against business risks through reduction, early detection, and preventive improvement of environmental risks
   - Ensure compliance with laws and regulations through global management of chemical substance-related laws and regulations.
   - Enhance the level of pipe-end management to prevent environmental impact on local residents from leakages, noise, or odor from our plants.
2. Ensuring effective use of energy according to fluctuations in production volume and reduce all unwanted energy
   - Cut energy costs through the promotion of organizational activities in accordance with the policy of each division and the environmental policy of plants.
   - Reduce costs to a competitive level by clarifying/optimizing the module target specs (MTS) of manufacturing conditions and clarifying operational management conditions.
3. Ensuring proper use of resources according to fluctuations in production volume, promoting waste reduction, and ensuring compliance with waste management
   - Promote valuable resource conversion and recycling of industrial waste and conduct compliance management of the process up to the final disposal of industrial waste.

*MTS: Abbreviation of Module Target Spec and target value for designs of each process in order to manufacture good products.

Coping with Climate Change Issues

Issues related to climate change are receiving increasing attention worldwide, and tighter laws and regulations on emissions are expected in the near future. These issues have the potential to become risk factors, such as increased energy/resource costs affecting the Group's business activities. On the other hand, it involves opportunities for us to contribute to solving problems and working to expand business at the same time by developing products that meet global regulations. Therefore, climate change is a very important issue for the Company.

In the structure for advancing risk management, the Environment & Safety Division, which is the division in charge of the environment, is responsible for risks related to climate change, which is environmental risk. Regarding the process for specifying assessments on climate change-related risks and opportunities, the energy conservation meetings conducts assessment of energy-related regulation risks. Action policies are broken down into company-wide priority activity items and policy management of the division in charge.

Under these circumstances, we have already set in motion our plan to comply and adapt to laws and regulations such as Japan's Act for Countermeasures against Global Warming and laws related to rationalization of energy usage (the Energy Conservation Act). Through private power generation initiatives to supply clean energy as well as energy conservation efforts in our manufacturing activities, we are working to cut direct greenhouse gas emissions.

Measures to Supply Clean Energy

The IBIDEN Group can trace its history back to a scheme aimed at building a hydroelectric power plant upstream on the Ibigawa River to supply power and attract industry and thereby help revitalize the nearby city of Ogaki. The Group was established under the name Ibigawa Electric Company in 1912, but over time began to utilize electricity to evolve into an electrochemical company. We have continued to expand our business since then, including areas such as carbides, carbon, building materials, ceramic products and electronic products, as we have grown and developed hand in hand with local communities.IBIDEN owns three hydroelectric power plants in the upstream section of Ibigawa River in Gifu Prefecture. Hydraulic power generation uses the potential energy of water to create clean energy without greenhouse gas emissions.

Repair Work on Hydroelectric Facilities and Electric Power Supply for Demanders

To maintain and increase its power output, IBIDEN implements repair work at its three hydroelectric power plants (Higashi Yokoyama Power Plant, Hirose Power Plant, and Kawakami Power Plant) systematically by repairing water supply tunnels and updating generators to the latest models. IBIDEN' s hydroelectric power plants satisfy the standards for the renewable energy buyback program (Feed in Tariff program). In March 2013, we established a facility at the Ogaki-Kita Plant for connecting our power grid to that of electric power companies. We made electricity generated by each hydroelectric power plant available for sale to local electricity users, contributing to reduced CO_2 emissions.IBIDEN Engineering Co., Ltd., one of the group companies, by making optimal use of the Company' s technologies that have enabled the development of equipment for hydroelectric power plants, operates various energy solutions businesses, including equipment for hydroelectric power plants, power substations and solar power generation plants. We also make wide-ranging proposals that contribute to environmental protection and energy saving, etc. (See page 41 “Environmental Contribution through Business and Products.”)

* Water supply tunnels: Tunnels for providing water to power plants

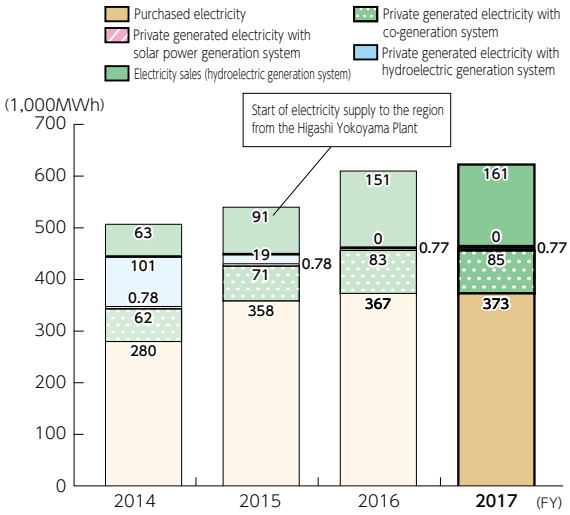
Hirose Power Plant (Updated in 2012)
Power output: 8,900kW

Kawakami Power Plant(Updated in 2014)
Power output: 4,400kW

Higashi-Yokoyama Power Plant
(Completed the update in 2015)
Power output: 14,600kW

In addition, we established a large-scale floating solar power generation system at the lumberyard parking site at the plant, and introduced high energy-efficient co-generation systems to our plants, which are generating electricity in-house.

To upgrade our private power generation systems, we are increasing hydroelectric power generation capacity and improving the efficiency of co-generation systems. We are continuously working to expand our use of natural energy and improve the efficiency of environmentally sound co-generation systems.



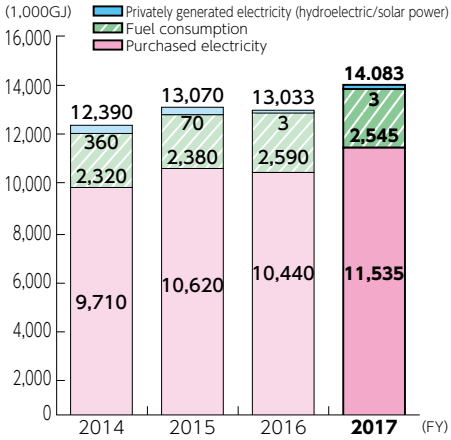
Electric power use and electricity sales (IBIDEN Domestic plants)

Energy Conservation

As the Group consumes a large amount of energy through its production activities—whether it is the temperature control during the manufacturing process of electronics or the electric furnaces used for ceramics—energy conservation is an important issue for us. All manufacturing divisions are therefore managing the energy unit load as well as the energy consumption and setting specific targets for each division to improve the energy conservation practices throughout the entire Group.

The Energy Conservation Meeting is held monthly, and attendees, including employees of the manufacturing divisions and related functional divisions, have discussions, create action plans, report progress status, present case examples with the aim to share improvement information, and provide advice from the management, to operate a PDCA cycle of energy conservation improvements with the participation of all employees. The Energy Conservation Meeting also monitors risk factors, such as energy cost increases, and works on improvements based on the idea that increasing energy efficiency is linked directly to enhancing the Company's competitiveness.

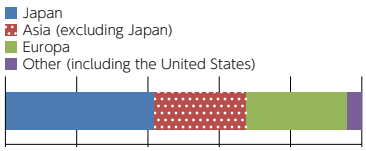
In fiscal year 2017, we promoted the efficient use of energy by adapting promptly to changes in production volume to minimize energy loss during production and energy use during production stoppages. In order to ensure implementation of energy-saving designs, we evaluate energy-saving points that need to be managed, such as energy use and heat insulation construction, in the environmental assessment at the time of establishment or relocation of manufacturing facilities.



Amount of energy consumption (IBIDEN Group)

*1 The conversion factor used in Japan (9.76 GJ/1,000 kWh) is used for converting the energy of purchased electricity. For others, the conversion factor of 3.6 GJ/1,000 kWh is applied to calculations.

*2 As a result of changes in calculation method, figures have been adjusted from the 2017 CSR Report.



Ratio of energy consumption by region [IBIDEN Group]

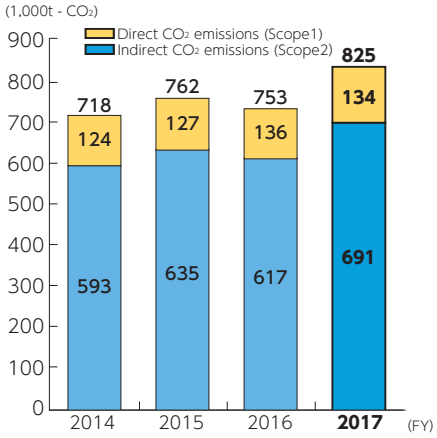
Trends of GHG emissions

Energy-saving activities are conducive to reducing emissions of CO2, a greenhouse gas (GHG), and GHG emission intensity (per production volume). The CO2 emission unit load rate per production volume*, with the results for fiscal year 2012 indexed to 100, in fiscal year 2017 improved to 104 by 2 percentage points from the fiscal year 2016 level, but deteriorated compared to the base year. This was due to the following: the start of supply of electricity generated at the Higashi Yokoyama Hydroelectric Generating Plant in fiscal year 2015, increased energy consumption due to more sophisticated products, and longer operating time of manufacturing facilities at production bases following the launch of new products.

*We use converted production volume for calculating production volume.

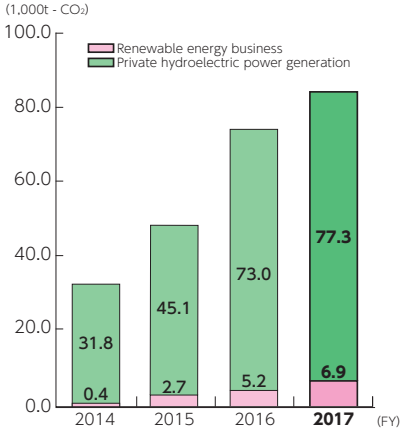
With respect to the medium-term CO2 emission target for fiscal year 2018 and thereafter, we will aim to reduce the basic unit per converted production per year by 5% (fiscal year 2017) over the period from fiscal year 2018 to 2022, compared to the fiscal year 2017 level. Going forward, we continue to aim to achieve the goal by cutting energy consumption through measures including energy conservation.

We also provide society with electricity equivalent to about 84,200 tons of CO_2 generated through private power generation using hydroelectric plants and in the renewable energy business at a Group company as clean energy without greenhouse gas emissions.



Trends of CO_2 emissions*1*2(IBIDEN Group*3*4)

*1: As a result of changes in calculation method for fuels and electric energy, figures have been adjusted from the 2017 CSR Report.
*2: CO_2 emissions show figures covering production-related locations in Japan and overseas. With regard to the CO_2 emission factor at the time of calculation, we used the factor provided by the "List of Calculation Methods/ Emission Factors in the Calculation, Report and Publication System" of the Ministry of the Environment and the Ministry of Economy, Trade and Industry in Japan as well as by gas distribution companies.
*3: CO_2 emissions indicate emissions from all production bases related to production in Japan and overseas.
*4: The results of CO2 emissions for fiscal year 2016 at IBIDEN domestic plants and its major overseas Group companies have been verified by external organizations.



Trends in the volume of the contribution of the hydroelectric power generation/energy business (CO_2equivalent*5*6, IBIDEN domestic group company)

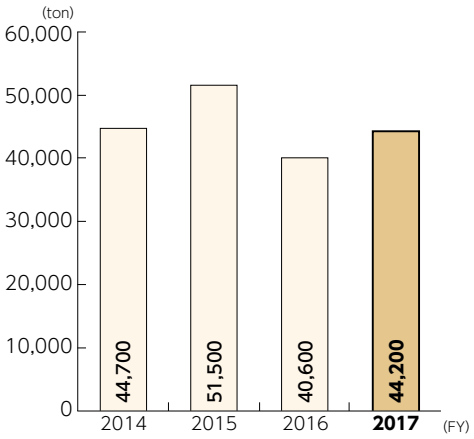
*5 The above is an estimated amount obtained by converting the contents of improvement activities to CO_2 reductions.
*6 Indicate CO_2 emissions reduction effect by comparing the aggregate amount of privately generated electricity sold to electricity users and the amount of electricity contributed by the Group in the energy business, such as solar power generation and small hydroelectric generation, with the power generation coefficient used by electric power providers (CO_2 emission coefficient of electric power companies—emission coefficient of power generation business × power generation in the power generation business)

Resource Circulation

Resource Circulating Activities

IBIDEN believes that it is an important responsibility of businesses to make effective use of the world's scarce resources and to take part in a global effort to conserve resources. We promote the so-called 3R activity, which consists of initiatives to Reduce, Reuse and Recycle the resources we consume. In doing so, we aim to improve the resources efficiency. Since 2004, IBIDEN has been maintaining a zero-emission* status in terms of solid waste.

The IBIDEN Group sets an index to control solid waste per production volume and has been taking action to implement such control. Our target is to improve it annually by 2% globally during the period between fiscal year 2013 and fiscal year 2017. Since fiscal 2013, we have been pushing ahead with on-site confirmation of waste management by promoting the recognition through visualization of the amount and cost of industrial waste. Through our taskforce team, we are pushing forward with turning what would have been waste into valuable resources by eliminating the difference between plants mainly concerning sorting of waste plastics.



Trends of amounts of solid waste (IBIDEN Group)

In fiscal year 2017, production volume increased significantly from fiscal year 2016, and the amount of solid waste increased year-on-year. However, through the promotion of valuable resource conversion and recycling of industrial waste, the amount of waste per production volume, with the results for fiscal year 2012 indexed to 100, achieved the target for fiscal year 2017 at 83 (target: 90). Regarding compliance with laws and regulations related to waste management, we maintain nearly 100% compliance through management using the electronic manifest system. For fiscal year 2018 and thereafter, we have set a target of reducing the solid waste unit load rate per converted production volume by 5% compared to the fiscal year 2017 level over the five years through fiscal year 2022. We will continue to promote proper use of resources and reduction of waste according to fluctuations in the production volume so that we will be able to achieve our reduction target. (Please refer to the Graph "Trends of amounts of solid waste".)

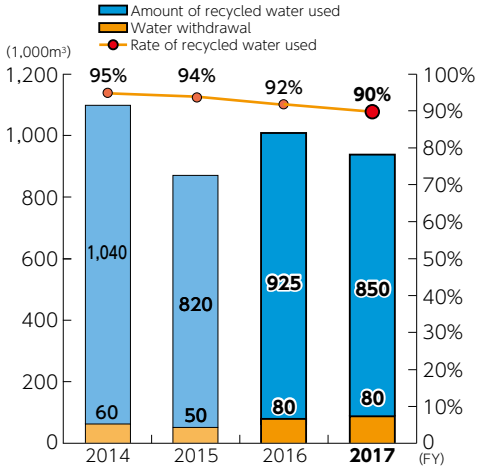
* IBIDEN defines zero emission as a state in which no solid waste emitted from the production process is dumped directly in landfills.

Effective Utilization and Reduction of Water Resources (Water Conservation Efforts)

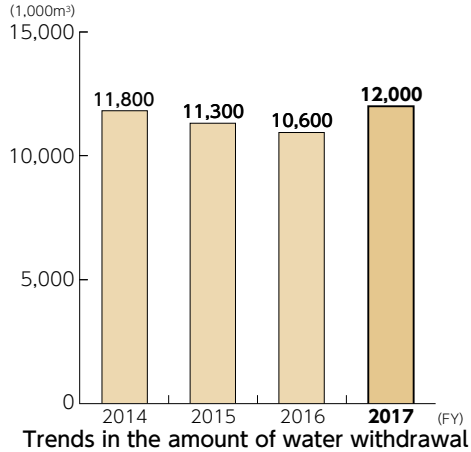
A large amount of water resources is used in the manufacturing process of electronic products, particularly for cleansing. Ogaki City in Gifu Prefecture, where our domestic production bases are concentrated, is rich in underground water thanks to the Ibigawa River system. However, water shortages are a serious problem in the world today. Based on the principle of so-called 3R activity—initiatives to reduce, reuse, and recycle resources—the Group carries out business activities by integrating environmental technologies into manufacturing technologies, which has reduced the amount of industrial water use. To ensure the optimum control of wastewater and effluent and the facilitation of 3R activity for water resources, relevant divisions have discussions monthly to check progress and report.

We carry out risk assessment of water resources in-house by referring to data released by the World Resources Institute (WRI) and other data, and we have thus identified IBIDEN Electronics (Beijing) Co., Ltd. and IBIDEN Mexico S.A. de C.V. as our Group companies with a high water resource risk. IBIDEN Electronics (Beijing), which uses particularly large amounts of water, has been increasing the use of recycled water inside its industrial park since fiscal year 2012. As a result of such efforts, the ratio of water recycling has been maintained at over 90%. (Please refer to the Graph entitled "Trends in the amount of water withdrawal")

The IBIDEN Group has worked to reduce the water withdrawal per production volume. Our target is to improve it annually by 2% globally between fiscal year 2013 and fiscal year 2017. We reexamined high water-use processes and reduced the amount of water withdrawal at plants that consume large amounts of water. As a result, the amount of water withdrawal per production volume in fiscal year 2017 stood at 72 (target: 90) with the result for fiscal year 2012 indexed to 100. We will continue with our efforts to reduce the water withdrawal unit load rate by saving and recycling water at all plants.



Trends in the amount of water withdrawal and recycled water used (IBIDEN Electronics (Beijing) Co., Ltd.)



Trends in the amount of water withdrawal (IBIDEN Group)

Appropriate Chemical Control

Responding to the Regulations regarding Chemical Substances in Products and Manufacturing Processes

IBIDEN uses various chemical substances in the plating process. Since chemical substances may cause pollution and human health hazards, management of chemical substances is subject to risks. As the laws and regulations on chemical substances in each country are increasingly rigorous, the management of chemical substance is one of the key issues for the Group from the point of view of compliance. To prevent chemicals from causing harm, we practice appropriate chemical control by reducing or completely eliminating the use of certain chemicals. We operate the Chemical Control Committee as an internal organization, establishing a system to swiftly identify and respond to community demands related to chemical substances as shown in the REACH system in Europe. We have also operated the systems for chemical control at overseas manufacturing bases. In Japan, we started to carry out risk assessments on chemical substances in fiscal year 2016 to address risk issues ahead of enforcement of the law that mandated the risk assessment.The Company takes part in the industry-wide discussion and information-sharing on issues such as regulations regarding chemical substances by serving as a trustee for the Japan Electronics Packaging and Circuits Association and participating in its Environmental Safety Committee.

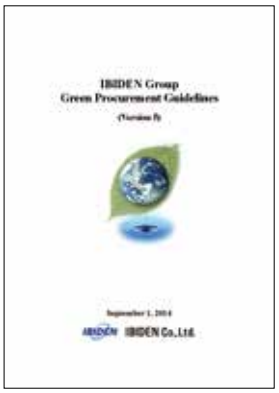
Storage and Management of Polychlorinated Biphenyl (PCB)

IBIDEN and its domestic Group companies are working systematically, based on the government' s basic plan, to complete the removal and disposal of PCB-containing equipment and waste ahead of deadline. We will successively replace PCB-containing equipment in accordance with the equipment replacement plan. At the same time, we will appropriately store and manage equipment that falls under PCB waste and transport it to disposal facilities at an appropriate time in accordance with laws and regulations to facilitate complete PCB disposal.

In fiscal year 2017, we disposed of 27 units of equipment that fell under low concentration PCB waste.

Approach to the Supply Chain

Cooperation throughout the entire supply chain is essential to address environmental issues including chemical control as well as to push forward with CSR. We have issued green procurement guidelines to our business partners in an effort to check the status of our business partners' measures for environmental management and chemical control, and conduct surveys on the status of inclusion of chemical substances that may cause a significant environmental burden. The Company conducts content examinations not only on substances already designated as examination items by regulation, but also those that are likely to receive such a designation in the near future. We are also organizing a structure that will allow us to work collaboratively with suppliers to address nations' environmental regulations in a timely manner. Furthermore, each Group company has developed guidelines and management systems to conduct their own investigations, and keeps track of the status of inclusion of chemical substances by conducting chemical substances inclusion surveys. The target of an investigation is selected by linking with the procurement system to prevent any omissions, and information on chemical substances that need to be controlled is gathered continuously. Moreover, the information gathered by the Company regarding chemical substance content is managed by an IT system that is designed to respond quickly to inquiries. We also systematically conduct on-site audits of priority suppliers (see pages 17 "CSR Management in the Supply Chain").



IBIDEN Group Green Procurement Guidelines

Released and Transferred Amounts of PRTR*-Listed Chemical Substances

With respect to domestic laws, to respond to the PRTR Law and the Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substances, we are enhancing in-house chemical control systems to build a management structure that prevents any omissions and errors.

* PRTR : Pollutant Release and Transfer Register

■ 18 chemical substances subject to mandatory reporting to Gifu and Aichi Prefecture ■ Specified Class I Designated Chemical Substance: 2
■ Class I Designated Chemical Substance: 16 ■ Total amounts released or transferred: approx. 411t/ year

ID No.	Regulated Substance	Amount discharged (to air, public waterway, soil, or in-house landfill)				Amount transferred		Total amount discharged and transferred (kg/year)
		Discharged to air (kg/year)	Discharged to public waterway or river (kg/year)	Discharged to soil on facility grounds (kg/year)	Buried in landfill off-site facility grounds (kg/year)	Transferred to sewerage (kg/year)	Transffered off-side as waste material (kg/year)	
20	2-Aminoethanol	2,296	0	0	0	0	218,601	220,897
59	Ethylenediamine	0	0	0	0	0	0	0
71	Ferric chloride	0	0	0	0	0	0	0
76	ε-Caprolactam	0	0	0	0	0	103	103
80	Xylene	14	0	0	0	0	0	14
232	N.N-dimethylformamide	0	0	0	0	0	7	7
237	Mercury and its compounds	0	0	0	0	0	31	31
272	Copper salts(water-soluble, except complex salts)	0	742	0	0	49	56,429	57,220
296	1, 2, 4-Trimethylbenzen	17	0	0	0	0	0	17
308	Nickel	0	0	0	0	0	0	0
309	Nickel compounds	0	0	0	0	0	4,995	4,995
349	Phenol	30	0	0	0	0	0	30
368	4-tert-Butylphenol	0	0	0	0	0	23	23
395	Water-soluble salts of peroxodisulfuric acid	0	0	0	0	0	0	0
405	Boron compounds	0	0	0	0	0	2,887	2,887
408	Poly(oxyethylene)octylphenyl ether	0	0	0	0	0	0	0
411	Formaldehyde	1,452	0	0	0	0	111,275	112,727
412	Manganese and its compounds	0	0	0	0	0	12,040	12,040

【Surveyed】IBIDEN and IBIDEN Group companies covered by IBIDEN's environmental-management system 【Survey period】April 2017 through March 2018

Understanding the Influence on Biodiversity

Initiated from the power of water, the Group's business activities are blessed with the benefit of biodiversity such as maintaining a stable water supply. And our activities also have some impact in the area of biodiversity. Just as we need to cope with the issues of global warming due to climate change, biodiversity conservation is one of the most important tasks to tackle.

Aiming to contribute to constant social advancement, in line with the values stressing "Harmony with Nature," IBIDEN will act responsibly as a global enterprise by working together with society.

Conserving Biodiversity and Concrete Approach to its Sustainable Use

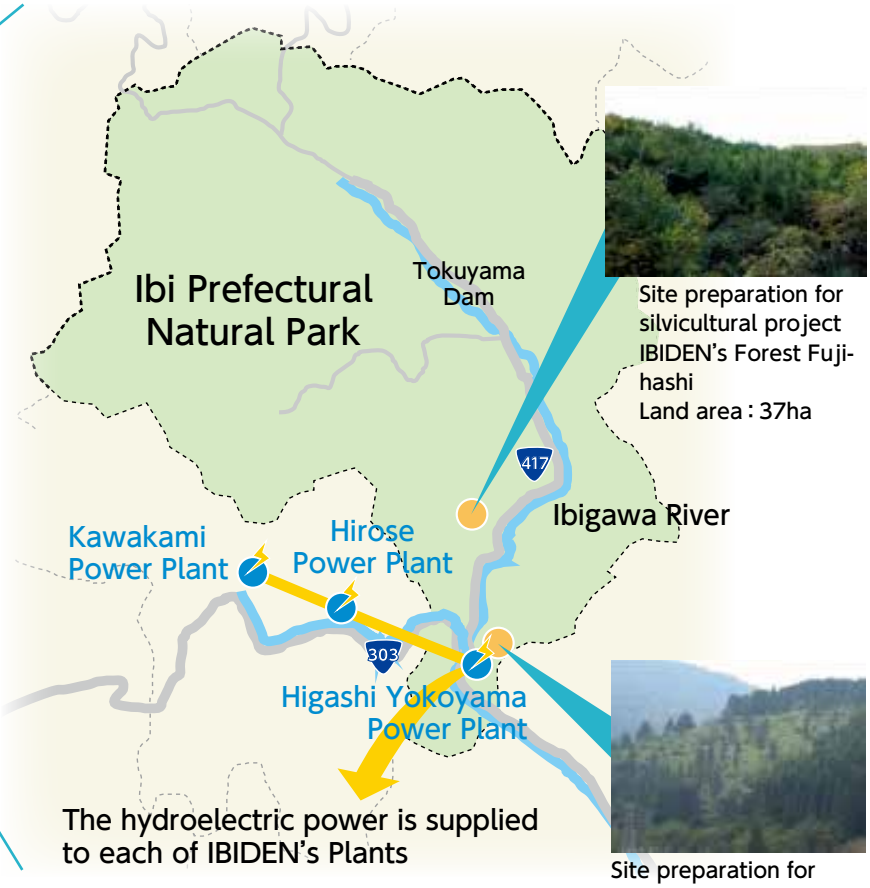
We will contribute to conserving biodiversity in local communities and its sustainable use by practicing forest conservation activities that support stable water source and social contribution activities in collaboration with the local community mainly upstream along the Ibi River, where the IBIDEN Group originated.

Forest Preservation Activity Areas

In August 2008, IBIDEN signed an Agreement on Lively Forest Creation with the Gifu Prefectural Government, the Ibigawa Town Government and the Ibi Shizen Kankyo Rangers (a nonprofit organization). According to this agreement, we will plant trees, thin the forests and conduct improvement cutting in IBIDEN's Forest Higashi Yokoyama Forest in the Higashi Yokoyama district and IBIDEN's Forest Fujihashi Forest in the Tsurumi district over the next 10 years, in an effort to support sustainable reforestation activities in the future.

→ For details on forest preservation activities, please refer to "Social Contribution" on page 50.

<Target Areas of Forest Preservation Activities (fiscal year 2008 to fiscal year 2017)>



Site preparation for silvicultural project
IBIDEN's Forest Fujihashi
Land area : 37ha

In collaboration with the local community, we held the nature study class in autumn

Site preparation for planting project
IBIDEN's Forest Higashi-Yokoyama
Land area : 4.31ha

Environmental Contribution through Business and Products

Product Life Cycle Assessment

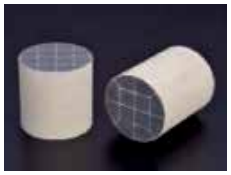
IBIDEN is promoting a design that takes into consideration safety/environmental rules and regulations, energy conservation and resource conservation from the initial stage of product development. In design reviews to examine product development/design, we have added environmentally conscious design guidelines for product and process safety, environmental regulations/safety of materials used and energy conservation consciousness reflected in the production process as examination items. We are building a system to confirm whether products developed and produced by IBIDEN are environmentally friendly.

By following environmentally conscious design guidelines, we conduct information searches on chemical substances in novel materials during the technical development phase. We promote environmentally conscious design as a routine activity by linking environmentally conscious design reviews with product design reviews. If any chemical substances in chemical substance information collected and extracted at the time of examining materials fall under control substances for compliance reasons, alternative substances are examined.

Automotive Exhaust System Components

Diesel Particulate Filter (DPF), which can trap 99% or more of the black smoke emitted by diesel engines*, have grown as a standard component of the industry due to their performance and reliability. In the category of Substrate Holding Mat (MAT), we also provide products that meet market trends, achieving a high reputation and share in the market. We will continue to develop high performance products and to reduce damage to the environment for the next generation.

* The Company's estimate



SiC-DPF (Diesel Particulate Filter)

Substrate Holding Mat (MAT)

Automobile NOx reduction catalyst

Projects to Promote Renewable Energy

IBIDEN Engineering Co., Ltd., a member of the IBIDEN Group, has initiated projects in the field of energy solution by making optimal use of the Company's technologies to maintain hydroelectric power plants as well as manage co-generation systems. Established an integrated approach, in which its business includes design proposal, construction and maintenance, IBIDEN Engineering has a track record in many power generation business such as ranging from equipment for hydroelectric power plants and power substations to systems for solar power generation plans and small hydroelectric power plans.

Amidst the supply of renewable energy is required as the environmental problems have become increasingly more of a concern, the Company constructed the Japan's largest water floating solar power generation plant, which employs in-house developed floats. The new plant started power generation (a certificated output of 1.99 MW and an annual output of approximately 2,400 MWh). Solar power generation output usually drops in the summer due to the rise in outside air temperature, however , the water floating system, possibly reflecting a cooling effect, is expected to boost power generation 5% compared to the land-based system. We will continue to promote business solutions for the energy problems.

Water floating solar power generation plant at the closed lumberyard parking site of the Kinuura Plan

Projects That Contribute to Both Disaster Prevention and Environmental Protection

Japan's mountainous terrain has seen numerous incidents of destruction, such as the collapse of slopes due to natural disasters and the spread of development. There is thus a frequent need to create artificial slopes. To boost protection of the slope and ultimately prevent loss of life from landslides, practices for securing artificial slopes in difficult weather and soil conditions have undergone many changes over the years through trial-and-error experimentation with methods and technologies. Traditionally, the most common construction method has been concrete-based centered on the ability to prevent disasters. Today, however, in addition to disaster prevention, consideration of the environment needs to be incorporated to establish a "greener" construction method.
IBIDEN Greentec Co., Ltd., a member of IBIDEN Group, has succeeded in developing technologies that respond to the needs of the time and help create a better society. We will continue to develop new construction methods such as our "Totally Green" method to achieve both disaster prevention and environmental protection, which will lead to an environment where everyone can live safely and peacefully.

Slope constructed using the GT frame®

Environmental Accounting

1. Environmental Accounting in Support of Environmental Management

In promoting environmental management, IBIDEN performs calculations and analyses to develop a quantitative understanding of investment and costs, seeking to understand the management resources spent on reducing the environmental burden and the results. We use environmental accounting to reflect the effects of investment and cost in the decision-making process at the management level.

2. Basis for Calculation

Accounting period	Fiscal year 2017 (April 1, 2017 to March 31, 2018)
Accounting scope	IBIDEN Co., Ltd. and major domestic manufacturing group companies (IBIDEN Engineering Co., Ltd., IBIDEN Graphite Co., Ltd., IBIKEN Co., Ltd., (Housing materials division) IBIDEN Jushi Co., Ltd., IBIDEN Bussan Co., Ltd.)
Calculation method	Calculations conform to the Environmental Accounting Guidelines (2005 edition) published by the Ministry of the Environment.

3. Main Environmental Protection Costs

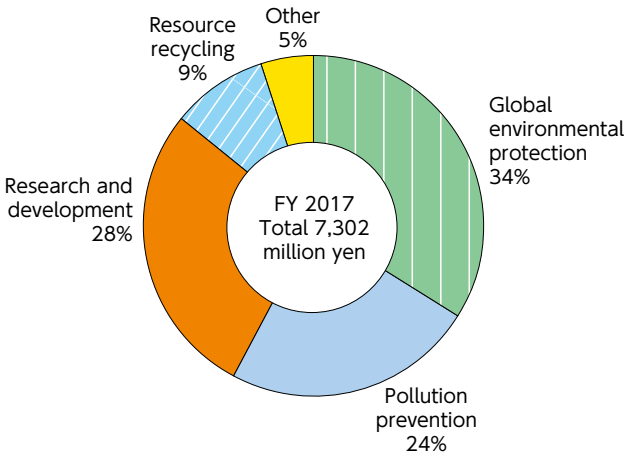
The amount of investment during fiscal year 2017 rose approximately ¥700 million, or 130%, from the previous fiscal year. This mainly reflected the construction of co-generation facilities at the Gama Plant and new development expenses at technology development divisions. Costs in the fiscal year did not change greatly, and were around the same amount as in the previous fiscal year.

(Unit: Million yen/year)

Category		Investments (Note 1)			Costs (Note 1)		
		FY 2016	FY 2017	Year to Year	FY 2016	FY 2017	Year to Year
Business area cost	(1) Pollution prevention costs	21	20	−7%	1,835	1,772	−3%
	(2) Global environmental conservation costs	56	283	408%	2,727	2,465	−10%
	(3) Resources circulation costs	5	4	−18%	638	672	5%
(4) Upstream and downstream costs		0	0	—	50	99	99%
(5) Administration costs		84	94	12%	203	201	−1%
(6) Research & Development costs		357	805	125%	1,754	2,074	18%
(7) Social activity costs		0	0	—	20	19	−8%
(8) Environmental remediation costs		0	0	—	0	0	—
Total		523	1,206	130%	7,226	7,302	1%

Note 1: In cases when the total amount of investments and costs cannot be deemed to constitute environmental protection costs, we have calculated the difference or the proportional share.

4. Distribution Ratio of Total Cost of Environmental Protection



- Research and development costs include the cost of researching and developing next-generation DPFs and other environmentally responsible products, aimed at controlling the environmental burden.
- Global environmental protection costs include maintenance and administration costs of hydroelectric power generation and cogeneration facilities.
- The environment is the main objective of costs associated with hydroelectric power generation and research and development of environmentally responsible products. The total cost is aggregated, as there is no appropriate pro rata basis.

5. Economic Results and Real Effects of Environmental Protection Measures (Note 2)

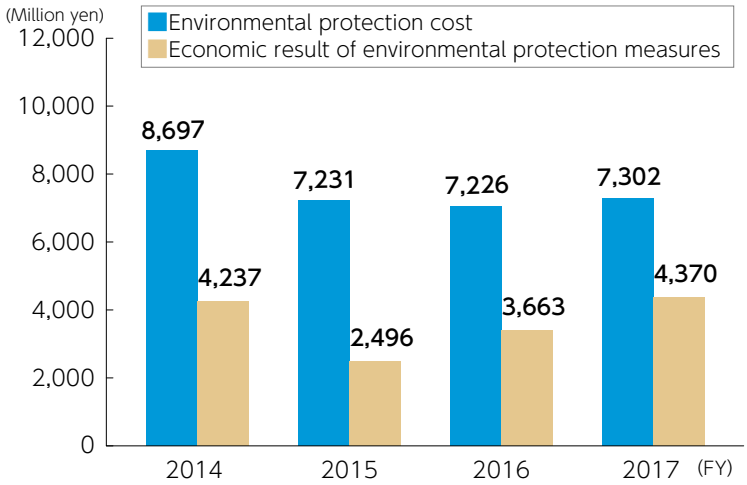
The economic effects of energy conservation for fiscal year 2017 increased about ¥500 million, or 20%, compared to the prior fiscal year. The increase mainly reflected the greater effect of hydroelectric power generation, as the amount of river water was larger than in previous years. The economic effects of resource recycling for fiscal year 2017 rose approximately ¥200 million, up 20% from the previous fiscal year. The major factor behind this increase was a higher gain on sales of valuables, such as liquid waste containing precious metals, as a result of higher production volumes of electronics manufacturing operations. Accordingly, the overall real effects rose approximately ¥700 million, or 19%, compared to fiscal year 2016.

(Unit: Million yen/year)

Description of effects		Amount		Year to Year
		FY 2016	FY 2017	
Real effects	1. Energy conservation effect and electric power marginal profit effect Results of effective hydroelectric power generation, improved power generation efficiency, reduced idle operation loss, improved productivity, improved air conditioning, improved steam energy, and thorough maintenance and control	2,515	3,018	20%
	2. Economic effects of resource recycling (1) Reduced waste ・Effects of reduced liquid waste treatment costs, improved yield rates, and reduced waste as a result of loss improvement (2) Recycling of waste ・Effects of effective use of waste ・Effects of disposal by sale of substrates containing precious metals, liquid waste containing precious metals, sludge containing copper and waste plastics	1,148	1,352	18%
Total		3,663	4,370	19%

Note 2: These figures are not including estimated measure (assumed effect).

6. Fluctuations in Environmental Protection Costs and Economic Results



The IBIDEN Group's Material Balance (Input and Output)

The IBIDEN Group procures a variety of raw materials and is engaged in manufacturing activities using many of the Earth's resources, including water and energy. To provide earth-friendly products to our customers, we seek to grasp the environmental burden caused by our business activities on a global basis. We will continue to provide high-value-added products while setting medium- and long-term targets and reducing our environmental burden.

Energy use

Category		IBIDEN *1	Group *2
electricity (MWh) *3	Purcahsed electricity	373,193	1,181,770
	Renewable energy	774	774
Natural gas (1,000m³)		34.353	51.824
LPG (t)		1,480	1,832
Kerosene (1,000ℓ)		298	298
Diesel Oil (1,000ℓ)		141	1,823
Heavy oil (1,000ℓ)		0	1,753

Water resources

Category	IBIDEN	Group *4
Groundwater (1,000m³)	5,405	7,359
Water works (1,000m³)	19	4,602

Raw Materials

Category	IBIDEN *1	Group *2
Metals (t)	1,234	6,553
Plastics and resins (t)	5,392	10,272
Glass (t)	0	20
Ceramic material,etc. (t)	13,991	52,603
Wood (t)	290	494
Paper (t)	4,233	4,966
Agricultural product (t)	0	22,289
Chemicals (t)	73,093	131,351

*1 IBIDEN: IBIDEN Domestic 7 Plants
*2 Group: IBIDEN Domestic Plants and, five Japanese Group companies and ten overseas Group companies
*3 Electric power: Privately generated electricity by the Group's thermal power other than above (85,200 MWh for IBIDEN)
*4 Groundwater of the Group includes 58,000 m³ of rivers
Water works include 851,000 m³ of recycled water at industrial parks.

INPUT

IBIDEN Group

OUTPUT

Atmosphere

Category		IBIDEN *1	Group *2
CO2 (1,000 t)	Scope 1 *4	83	134
	Scope 2 *4	179	684
	Scope 3 *4, 5	115	115
NOx emissions (1,000 t)		0.06	0.10
SOx emissions (1,000 t)		0.000	0.005

Water system

Category		IBIDEN *1	Group *2
Water system	Discharge to public sewer (1,000m³)	514	2,799
	Discharge to river (1,000m³)	3,097	5,876
	COD contamination (t)	10	68
	Nitrogen contamination (t)	7	7
	Phosphorous contamination (t)	0.2	0.2
Industrial wastewater (1,000 t)		14	72

Waste

Category	IBIDEN *1	Group *2
Material recycling (t)	11,626	31,279
Thermal recycling (t)	542	3,967
Reuse (t)	602	2,125
Amount of landfill waste after intermediate treatment (t)*6	1,816	4,790
Landfilled industrial waste (t)	0	1,997
Total generated waste (t)	14,585	44,158

*1 IBIDEN: IBIDEN Domestic 7 Plants
*2 Group: IBIDEN Domestic Plants and, five Japanese Group companies and ten overseas Group companies
*3 This does not mean amount of final landfill disposal. Amount of waste which is finally disposed in a landfill (amount before volume reduction treatment by incineration and such.)

*4 About scope 1, 2, and 3

Scope 1	CO_2 emissions with direct greenhouse gas effects	Emissions from fuel used at plants and emissions of greenhouse gases other than CO_2
Scope 2	Indirect CO_2 emissions	Emissions from the generation of purchased electricity
Scope 3	Other indirect emissions	CO_2 emissions along the supply chain that are not included in scope 1 and 2

*5 Scope 3 Emissions by category

Category		Amount of emission (t −CO_2)	Source of emissions
3	Fuel and energy-related activities not included in Scope 1 and 2.	71,040	Emissions from procurement of fuel and energy used by the IBIDEN Group
4	Transportation/shipping (upstream)	27,330	Emissions from transportation work undertaken by IBIDEN Group companies engaged in logistics operations based on contract from IBIDEN Co., Ltd.
5	Waste from plants	12,400	Emissions from treatment of waste discharged from plants of IBIDEN Co., Ltd.
6	Business trip	920	Emissions from employees of IBIDEN Co., Ltd. who were on business trips in Japan by passenger train using coupons and emissions from employees of IBIDEN Co., Ltd. who took business trips overseas by air on flight routes that have a large total number of passengers transported.
7	Commuting	3,020	Emissions from commuting of employees of IBIDEN Group companies(Japan)

Ogaki Plant

< No.1 Wastewater Measurement >

Item	Unit	National standard	City standard	Voluntary standard	Average	Maximum
pH		5.8～8.6	5.8～8.6	6.0～8.3	7.3	8.1

< No.2 Wastewater Measurement >

Item	Unit	National standard	City standard	Voluntary standard	Average	Maximum
pH		5.8～8.6	5.8～8.6	6.0～8.3	7.3	7.9
BOD	mg / L	160	15	5	6.6	10.0
COD	mg / L	160	Regulation of total emission	Regulation of total emission	5.0	7.3
SS	mg / L	200	30	30	6	12
Copper	mg / L	3	2	1	0.29	0.49
Lead	mg / L	0.1	0.1	0.03	0.01	0.01
Cyanide	mg / L	1	0.1	0.1	<0.01	<0.01
n-H mineral oils	mg / L	5	5	5	<1	<1
Nitrogen	mg / L	120	60	60	2.5	3.9
Phosphorus	mg / L	16	8	8	0.06	0.10
Boron and boron compounds	mg / L	10	10	10	0.14	0.23
Ammonia and ammonium compounds, nitrite and nitrate compounds	mg / L	100	100	100	1.2	2.6

< Air Measurement >

Item	Equipment	Unit	National standard	City standard	Voluntary standard	Average	Maximum
Soot	Boiler No.15	g / m³N	0.3	0.27	0.27	0.002	0.002
	Boiler No.16	g / m³N	0.3	0.27	0.27	0.002	0.002
	Boiler No.17	g / m³N	0.3	0.27	0.27	0.003	0.003
	Boiler No.18	g / m³N	0.3	0.27	0.27	0.004	0.004
	Boiler No.19	g / m³N	0.3	0.27	0.27	0.003	0.003
	Boiler No.20	g / m³N	0.1	0.09	0.09	0.003	0.003
	Boiler No.21	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	Boiler No.22	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	Boiler No.23	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	Boiler No.24	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	Boiler No.25	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	Boiler No.26	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	Gas Turbine No.1	g / m³N	0.05	0.05	0.05	<0.01	<0.01
	Gas Turbine No.2	g / m³N	0.05	0.05	0.05	<0.01	<0.01
NOx	Boiler No.15	ppm	260	260	260	89	89
	Boiler No.16	ppm	260	260	260	95	95
	Boiler No.17	ppm	260	260	260	86	86
	Boiler No.18	ppm	260	260	260	88	88
	Boiler No.19	ppm	260	260	260	98	98
	Boiler No.20	ppm	150	150	150	91	91
	Boiler No.21	ppm	150	150	150	47	47
	Boiler No.22	ppm	150	150	150	51	51
	Boiler No.23	ppm	150	150	150	47	47
	Boiler No.24	ppm	150	150	150	48	48
	Boiler No.25	ppm	150	150	150	49	49
	Boiler No.26	ppm	150	150	150	45	45

< Noise Measurement >

Place	Unit	National standard	City standard	Voluntary standard	Average	Maximum
North (morning·evening)	dB	65	65	65	52	55
East (morning·evening)	dB	65	65	65	46	49
South (morning·evening)	dB	65	65	65	46	50
West (morning·evening)	dB	65	65	65	57	59
North (night)	dB	60	60	60	52	55
East (night)	dB	60	60	60	45	49
South (night)	dB	60	60	60	46	47
West (night)	dB	60	60	60	55	59

Aoyanagi Plant

< No.5 Wastewater Measurement >

Item	Unit	National standard	City standard	Voluntary standard	Average	Maximum
pH		5.8～8.6	5.8～8.6	6.0～8.3	7.1	7.4
BOD	mg / L	160	15	5	1.9	5.3
COD	mg / L	160	Regulation of total emission	Regulation of total emission	1.0	3.0
SS	mg / L	200	30	30	6	18
Copper	mg / L	3	2	1	0.29	0.54
Lead	mg / L	0.1	0.1	0.03	<0.01	<0.01
Fluorine	mg / L	8	8	5	<0.1	0.10
Cyanide	mg / L	1	0.1	0.1	<0.01	<0.01
Ni	mg / L	–	–	–	0.02	0.04
n-H mineral oils	mg / L	5	5	5	<1	<1
Nitrogen	mg / L	120	60	60	1.7	2.9
Phosphorus	mg / L	16	8	8	0.08	0.16
Boron and boron compounds	mg / L	10	10	10	0.1	0.1
Ammonia and ammonium compounds, nitrite and nitrate compounds	mg / L	100	100	100	1.3	2.0
Selenium and its compounds	mg / L	0.1	0.1	–	<0.01	0.01

< No.6 Wastewater Measurement >

Item	Unit	National standard	City standard	Voluntary standard	Average	Maximum
pH		5.8～8.6	5.8～8.6	6.0～8.3	7.8	7.9
BOD	mg / L	160	15	10	0.6	1.2
COD	mg / L	160	Regulation of total emission	Regulation of total emission	0.7	1.4
SS	mg / L	200	30	30	1.3	4
Cyanide	mg / L	1	0.1	0.1	<0.01	<0.01
Phenol	mg / L	5	0.4	0.4	0.18	1
n-H mineral oils	mg / L	5	5	5	<1	<1
Nitrogen	mg / L	120	60	60	0.8	1.1
Phosphorus	mg / L	16	8	8	0.06	0.10

< Air Measurement >

Item	Equipment	Unit	National standard	City standard	Voluntary standard	Average	Maximum
Soot	Boiler No.2	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	Gas Turbine No.1	g / m³N	0.05	0.05	0.05	<0.001	<0.001
	Gas Turbine No.2	g / m³N	0.05	0.05	0.05	<0.001	<0.001
NOx	Boiler No.2	ppm	150	150	150	87	87
	Gas Turbine No.1	ppm	70	70	70	21	22
	Gas Turbine No.2	ppm	70	70	70	17	24

< Noise Measurement >

Place	Unit	National standard	City standard	Voluntary standard	Average	Maximum
East (morning·evening)	dB	65	65	65	52	53
South (morning·evening)	dB	65	65	65	50	52
West (morning·evening)	dB	65	65	65	49	55
North (morning·evening)	dB	65	65	65	46	49
East (night)	dB	60	60	60	51	53
South (night)	dB	60	60	60	49	51
West (night)	dB	60	60	60	48	52
North (night)	dB	60	60	60	44	47

Gama Plant

< No.1 Wastewater Measurement >

Item	Unit	National standard	City standard	Voluntary standard	Average	Maximum
pH		5.8～8.6	5.8～8.6	5.8～8.6	7.4	7.7
BOD	mg / L	160	15	5	1.6	4.3
COD	mg / L	160	Regulation of total emission	Regulation of total emission	1.1	2.9
SS	mg / L	200	30	30	4.2	16
Copper	mg / L	3	2	1	0.19	0.93
Lead	mg / L	0.1	0.1	0.1	<0.01	<0.01
Fluorine	mg / L	8	8	8	<0.1	<0.1
Cyanide	mg / L	1	0.1	0.1	<0.01	<0.01
n-H mineral oils	mg / L	5	5	5	<1	<1
Nitrogen	mg / L	120	60	60	2.3	3.5
Phosphorus	mg / L	16	8	8	<0.05	<0.05
Boron and boron compounds	mg / L	10	10	10	0.11	0.19
Ammonia and ammonium compounds, nitrite and nitrate compounds	mg / L	100	100	100	1.9	4.8
Selenium and its compounds	mg / L	0.1	0.1	–	<0.01	<0.01

< No.2 Wastewater Measurement >

Item	Unit	National standard	City standard	Voluntary standard	Average	Maximum
pH		5.8～8.6	5.8～8.6	6.0～8.0	7.9	8
BOD	mg / L	160	15	5	0.4	1.3
COD	mg / L	160	Regulation of total emission	Regulation of total emission	0.7	1.4
SS	mg / L	200	30	30	1	1
n-H mineral oils	mg / L	5	5	5	<1	<1
Nitrogen	mg / L	120	60	60	0.94	1.10
Phosphorus	mg / L	16	8	8	0.05	0.08

< Air Measurement >

Item	Equipment	Unit	National standard	City standard	Voluntary standard	Average	Maximum
Soot	Boiler No.13 Gas	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	Boiler No.14 Gas	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	Boiler No.15 Gas	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	Boiler No.16 Gas	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	Boiler No.17 Gas	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	Boiler No.18 Gas	g / m³N	0.1	0.09	0.09	<0.001	<0.001
NOx	Boiler No.13 Gas	ppm	150	150	150	24	24
	Boiler No.14 Gas	ppm	150	150	150	36	36
	Boiler No.15 Gas	ppm	150	150	150	29	29
	Boiler No.16 Gas	ppm	150	150	150	26	26
	Boiler No.17 Gas	ppm	150	150	150	36	36
	Boiler No.18 Gas	ppm	150	150	150	42	42

< Noise Measurement >

Place	Unit	National standard	City standard	Voluntary standard	Average	Maximum
East (morning･evening)	dB	65	65	65	46	51
South (morning･evening)	dB	65	65	65	48	51
West (morning･evening)	dB	65	65	65	55	57
East (night)	dB	60	60	60	44	47
South (night)	dB	60	60	60	47	50
West (night)	dB	60	60	60	55	57

Ogaki Central Plant

< Wastewater Measurement >

Item	Unit	National standard	City standard	Voluntary standard	Average	Maximum
pH		5.8～8.6	5.8～8.6	6.0～8.3	6.8	7.0
BOD	mg / L	160	15	5	7.3	12
COD	mg / L	160	Regulation of total emission	Regulation of total emission	4.7	8.0
SS	mg / L	200	30	30	2.9	13
Copper	mg / L	3	2	1	0.31	0.79
Lead	mg / L	0.1	0.1	0.03	<0.01	<0.01
Cyanide	mg / L	1	0.1	0.1	<0.01	<0.01
n-H mineral oils	mg / L	5	5	5	<1	<1
Nitrogen	mg / L	120	60	60	3.4	4.6
Phosphorus	mg / L	16	8	8	0.05	0.08
Boron and boron compounds	mg / L	10	10	10	0.1	0.3
Ammonia and ammonium compounds, nitrite and nitrate compounds	mg / L	100	100	100	1.8	2.9

< Air Measurement >

Item	Equipment	Unit	National standard	City standard	Voluntary standard	Average	Maximum
Soot	B-1-1 Boiler	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	B-1-2 Boiler	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	B-1-3 Boiler	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	B-1-4 Boiler	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	B-1-5 Boiler	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	B-1-6 Boiler	g / m³N	0.1	0.09	0.09	0.001	0.001
	B-1-7 Boiler	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	B-1-8 Boiler	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	B-1-9 Boiler	g / m³N	0.1	0.09	0.09	<0.001	<0.001
	B-1-10 Boiler	g / m³N	0.1	0.09	0.09	<0.001	<0.001
NOx	B-1-1 Boiler	ppm	150	150	150	36	36
	B-1-2 Boiler	ppm	150	150	150	36	36
	B-1-3 Boiler	ppm	150	150	150	33	33
	B-1-4 Boiler	ppm	150	150	150	33	33
	B-1-5 Boiler	ppm	150	150	150	36	36
	B-1-6 Boiler	ppm	150	150	150	35	35
	B-1-7 Boiler	ppm	150	150	150	39	39
	B-1-8 Boiler	ppm	150	150	150	34	34
	B-1-9 Boiler	ppm	150	150	150	34	34
	B-1-10 Boiler	ppm	150	150	150	32	32

< Noise Measurement >

Place	Unit	National standard	City standard	Voluntary standard	Average	Maximum
North (morning･evening)	dB	50	50	50	44	47
EastNo.1 (morning･evening)	dB	50	50	50	44	46
EastNo.2 (morning･evening)	dB	60	60	50	43	48
South (morning･evening)	dB	60	60	60	39	44
West (morning･evening)	dB	50	50	50	39	43
North (night)	dB	45	45	45	42	45
East No.1 (night)	dB	45	45	45	43	44
East No.2 (night)	dB	50	50	50	42	47
South (night)	dB	50	50	50	38	44
West (night)	dB	45	45	45	38	43

Ogaki-Kita Plant

< Total Wastewater Measurement >

Item	Unit	National standard	Town standard	Voluntary standard	Average	Maximum
pH		5.8～8.6	5.8～8.6	6.0～8.3	7.5	7.8
BOD	mg / L	160	30	20	2.2	8.4
COD	mg / L	160	Regulation of total emission	Regulation of total emission	6.9	15
SS	mg / L	200	30	25	2.7	12
Copper	mg / L	3	2	1	0.01	0.02
Fluorine	mg / L	8	8	8	<0.1	<0.1
Phenol	mg / L	5	0.4	0.4	<0.1	<0.1
n-H mineral oils	mg / L	5	5	4	<1	<1
Nitrogen	mg / L	120	60	50	11.4	21.0
Phosphorus	mg / L	16	8	7	1.4	2.9
Boron and boron compounds	mg / L	10	10	10	<0.1	<0.1
Ammonia and ammonium compounds, nitrite and nitrate compounds	mg / L	100	100	100	7.3	15.0

< Air Measurement >

Item	Equipment	Unit	National standard	Town standard	Voluntary standard	Average	Maximum
Hydrogen sulfide	Vacuum incinerator	ppm	0.02	0.02	0.02	<0.0005	<0.0005

< Noise Measurement >

Place	Unit	National standard	Town standard	Voluntary standard	Average	Maximum
North (morning·evening)	dB	60	60	60	45	57
East (morning·evening)	dB	60	60	60	47	56
South (morning·evening)	dB	60	60	60	45	53
Western angle of Building D (morning·evening)	dB	60	60	60	46	58
West (morning·evening)	dB	60	60	60	46	49
Graveyard (morning·evening)	dB	60	60	60	47	58
Graveyard West (morning·evening)	dB	50	50	50	43	48
North (night)	dB	50	50	50	44	49
East (night)	dB	50	50	50	45	49
South (night)	dB	50	50	50	44	49
Western angle of Building D (morning·evening)	dB	50	50	50	43	49
West (night)	dB	50	50	50	45	47
Graveyard (night)	dB	50	50	50	45	49
Graveyard West (night)	dB	45	45	45	42	44

Godo Plant

< Wastewater Measurement - West >

Item	Unit	National standard	Town standard	Voluntary standard	Average	Maximum
pH		5.8～8.6	5.8～8.6	5.8～8.6	7.5	8.2

< Wastewater Measurement - East >

Item	Unit	National standard	Town standard	Voluntary standard	Average	Maximum
pH		5.8～8.6	5.8～8.6	5.8～8.6	7.5	7.9

< Noise Measurement >

Place	Unit	National standard	Town standard	Voluntary standard	Average	Maximum
East (morning·evening)	dB	65	65	65	42	51
West (morning·evening)	dB	65	65	65	42	48
South (morning·evening)	dB	65	65	65	42	50
North (morning·evening)	dB	65	65	65	43	52
East (night)	dB	60	60	60	38	48
West (night)	dB	60	60	60	41	48
South (night)	dB	60	60	60	39	46
North (night)	dB	60	60	60	41	51

Kinuura Plant

< Wastewater Measurement >

Item	Unit	National standard	City standard	Voluntary standard	Average	Maximum
pH		5.8～8.6		6.0～8.4	7.3	7.5
BOD	mg / L	160		20	8.7	14
COD	mg / L	160		30	15	21
SS	mg / L	200		20	10	17
Total chromium	mg / L	3		0.2	0.01	0.01
Fluorine	mg / L	8		3.0	0.17	0.17
Phenol	mg / L	5		0.2	0.1	0.1
n-H mineral oils	mg / L	5		1	1	1
Nitrogen	mg / L	120		30	25	25
Phosphorus	mg / L	16		3	1.2	1.2
Soluble manganese	mg / L	10		3	0.01	0.01
Zinc	mg / L	2		1	0.02	0.02
Solubility iron	mg / L	10		3	0.44	0.44
Copper	mg / L	2		1	0.02	0.02
Coliform bacilli	piece/cm³	3,000		1,000		9,100*
Boron and boron compounds	mg / L	10		3	0.1	0.1
Ammonia and ammonium compounds, nitrite and nitrate compounds	mg / L	100		50	7.1	7.1

* Countermeasures have been completed.

< Air Measurement >

Item	Equipment	Unit	National standard	City standard	Voluntary standard	Average	Maximum
Soot	Once-through boiler No.1	g / m³N	0.3		0.3	0.001	0.001
	Once-through boiler No.3	g / m³N	0.3		0.3	0.001	0.001
	Once-through boiler No.4 Gas	g / m³N	0.1		0.1	0.001	0.001
	Once-through boiler No.5 Gas	g / m³N	0.1		0.1	0.001	0.001
NOx	Once-through boiler No.1	ppm	260		100	49	60
	Once-through boiler No.3	ppm	260		100	65	73
	Once-through boiler No.4 Gas	ppm	150		100	14	14
	Once-through boiler No.5 Gas	ppm	150		100	12	12
SOx	Once-through boiler No.1	m³N / h	0.13		0.13	0.001	0.001
	Once-through boiler No.3	m³N / h	0.13		0.13	0.001	0.001

< Noise Measurement >

Place	Unit	National standard	City standard	Voluntary standard	Average	Maximum
East (daytime)	dB	65		65	57	61

IBIDEN Engineering Co., Ltd

< Wastewater Measurement >

Item	Unit	National standard	City standard	Voluntary standard	Average	Maximum
pH		5.0～9.0	5.0～9.0	5.0～9.0	7.1	7.2
BOD	mg / L	600	600	600	3.9	14
COD	mg / L	–	–	–	3.0	5.7
SS	mg / L	600	600	600	7.2	19
Copper	mg / L	3	3	3	0.02	0.05
Lead	mg / L	0.1	0.1	0.1	0.01	0.04
Chromium	mg / L	2	2	2	<0.02	<0.02
Hexavalent chromium	mg / L	0.5	0.5	0.5	<0.02	<0.02
Fluorine	mg / L	8	8	8	0.33	1.50
Cyanide	mg / L	1	1	1	<0.01	<0.01
1·1·1 Trichloroethane	mg / L	3	3	3	<0.0005	<0.0005
1·1·2 Trichloroethane	mg / L	0.06	0.06	0.06	<0.0006	<0.0006
1.3 Dichloropropanes	mg / L	0.02	0.02	0.02	<0.0002	<0.0002
1·2 Dichloroethane	mg / L	0.04	0.04	0.04	<0.0004	<0.0004
1·1 Dichloroethylene	mg / L	1	1	1	<0.002	<0.002
Cis- 1·2 Dichloroethylene	mg / L	0.4	0.4	0.4	<0.004	<0.004
Trichloroethylene	mg / L	0.3	0.3	0.3	<0.002	<0.002
Tetrachloroethylene	mg / L	0.1	0.1	0.1	<0.0005	<0.0005
Dichloromethane	mg / L	0.2	0.2	0.2	<0.002	<0.002
Carbon tetrachloride	mg / L	0.02	0.02	0.02	0.0025	0.0064
Cadmium	mg / L	0.03	0.03	0.03	<0.002	<0.002
Phenol	mg / L	5	5	5	<0.10	<0.10
n-H mineral oils	mg / L	5	5	5	<1	<1
Arsenic	mg / L	0.1	0.1	0.1	<0.01	<0.01
Alkyl mercury	mg/L	ND	ND	ND	ND	ND
Organic phosphorus	mg / L	1	1	1	<0.01	<0.01
Polyhalogenated biphenyl	mg / L	0.003	0.003	0.003	<0.0005	<0.0005
Zinc	mg / L	2	2	2	0.04	0.08
Manganese	mg / L	10	10	10	0.07	0.17
Benzene	mg / L	0.1	0.1	0.1	<0.001	<0.001
Boron and boron compounds	mg / L	10	10	10	<0.10	<0.10
1,4-dioxane	mg / L	0.5	0.5	0.5	<0.05	<0.05

IBIDEN Bussan Co., Ltd

< Wastewater Measurement >

Item	Unit	National standard	Prefectural standard	Voluntary standard	Average	Maximum
pH		5.8～8.6	5.8～8.6	6.1～8.3	7.4	7.7
BOD	mg / L	160	100	80	2.8	8.4
COD	mg / L	160	160	128	7.8	21
SS	mg / L	200	90	72	4.0	10
n-H mineral oils	mg / L	10	10	8	<1	1
Nitrogen	mg / L	120	120	96	4.9	19
Phosphorus	mg / L	16	16	12.8	0.1	0.3

< Air Measurement >

Item	Equipment	Unit	National standard	Prefectural standard	Voluntary standard	Average	Maximum
Soot	Boiler No.1	g / m³N	0.3	0.3	0.24	0.014	0.014
NOx	Boiler No.1	ppm	180	180	114	73	73

IBIDEN Electronics (Beijing) Co., Ltd.

< Wastewater Measurement >

Item	Unit		City standard	Voluntary standard	Average	Maximum
pH			6.5～9	6.8～8.4	7.25	7.62
BOD	mg / L		300	150	25.61	55.0
COD	mg / L		500	250	97.98	254.00
SS	mg / L		400	200	24.50	72.00
Copper	mg / L		1	0.5	0.27	0.64
Cyanide	mg / L		0.5	0.25	0.01	0.02
Ni	mg / L		0.4	0.2	0.06	0.23
n-H mineral oils	mg / L		10	5	0.06	0.13
animal oil and vegetable oil	mg / L		100	25	0.73	1.51

< Air Measurement >

Item		Unit		City standard	Voluntary standard	Average	Maximum
Scrubber Emissions	H_2SO_4	mg / m³		5	4.5	0.59	1.99
	HCl	mg / m³		30	25	1.31	3.39
	HCN	mg / m³		0.5	0.45	0.11	0.18
Deodorization tower	Ammonia	mg / m³		30	25	0.84	1.01
	Hydrogen sulfide	mg / m³		5	4.5	0.10	0.16
Air Exhaust	Soot	mg / m³		20	18	2.06	7.20
	Toluene	mg / m³		12	10	0.16	0.44
	NMHC	mg / m³		20	18	2.63	15.10

< Noise Measurement >

Time	Unit		City standard	Voluntary standard	Average	Maximum
Daytime	dB (A)		65	64.5	55.0	57.8
Nightime	dB (A)		55	54.5	49.0	53.00

IBIDEN Electronics Malaysia Sdn. Bhd.

< Wastewater Measurement >

Item	Unit	National standard	Voluntary standard	Average	Maximum
pH		5.5 - 9.0	6.2-8.3	6.6	7.0
BOD	mg / L	50	50	7	17
COD	mg / L	200	100	37	56
Total Suspended Solids, TSS	mg / L	100	100	29	50
Copper	mg / L	1	0.5	0.16	0.50
Lead	mg / L	0.5	0.5	0.01	0.05
Chromium (Hexavalent)	mg / L	0.05	0.05	0.01	0.01
Cyanide	mg / L	0.1	0.1	0.01	0.01
Nickel	mg / L	1	1	0.04	0.12
Color	ADMI	200	200	15	29
Oil & Grease	mg / L	10	10	5.0	5.0
Iron (Dissolved)	mg / L	5	5	0.56	1.06
Manganese (Dissolved)	mg / L	1	1	0.10	0.12
Formaldehyde	mg / L	2	2	0.05	0.10

< Noise Measurement >

Time	Unit	National standard	Voluntary standard	Average	Maximum
Daytime (7 am - 10 pm)	dB	70	70	60.8	
Nightime (10 pm - 7 am)	dB	60	60	58.7	

IBIDEN Jushi Co., Ltd

< Air Measurement >

Item	Equipment	Unit	National standard	City standard	Voluntary standard	Average	Maximum
Soot	Boiler No.1	g / m³N	0.3	0.3	0.24	0.007	0.007
	Boiler No.3		0.3	0.3	0.24	0.005	0.005
NOx	Gas Turbine	ppm	70	70	60	43	45
	Boiler No.1		180	180	144	43	43
	Boiler No.3		180	180	144	54	58
SOx	Boiler No.1	m³N / h	7.07	7.07	5.65	0.03	0.03
	Boiler No.3		3.68	3.68	2.95	0.03	0.03

IBIDEN Philippines,Inc.

< Wastewater Measurement >

Item	Unit	Industrial park standard	Voluntary standard	Average	Maximum
pH		6.5 - 9.0	6.7-8.8	7.3	8.3
BOD	mg / L	500	400	172	327
COD	mg / L	800	700	353	640
Total Suspended Solids, TSS	mg / L	350	280	13	35
Copper	mg / L	1	0.8	0.14	0.38
Lead	mg / L	0.3	0.24	0.10	0.16
Chromium (Hexavalent)	mg / L	0.1	0.08	0.02	0.07
Cyanide	mg / L	0.2	0.16	0.08	0.15
Nickel	mg / L	0.5	0.4	0.13	0.28
Color	mg / L	150	120	73	126
Oil & Grease	mg / L	5	4	1.6	3.5
Iron (Dissolved)	mg / L	10	8	0.1	0.3
Manganese (Dissolved)	mg / L	1	0.8	0.07	0.11
Formaldehyde	mg / L	1	0.8	0.17	0.44

< Air Measurement >

Item	Unit	National standard	Voluntary standard	Average	Maximum
NOx	mg/㎥	2,000	1,600	39	42.0
SOx	mg/㎥	1,500	1,200	4	5.0
Particulate Matter (PM)	mg/㎥	150	120	7	7.0
Carbon Monoxide (CO)	mg/㎥	500	400	16	17.0

< Noise Measurement >

Time	Unit	National standard	Voluntary standard	Average	Maximum
Morning (5am - 9am)	dB	65	56	55	57
Daytime (9am - 6 pm)	dB	70	57	54	56
Evening (6 pm - 10 pm)	dB	65	55	54	54
Nighttime (10 pm - 5 am)	dB	60	56	52	52

IBIDEN Graphite Korea Co.,Ltd.

< Air Measurement >

Item	Unit	National regulations	Voluntary standard	Average	Maximum
NOx	ppm	200	200	1	8
SOx	ppm	400	400	14	231
PM	mg /m³	100	100	1	3

IBIDEN Hungary Kft.

< Wastewater Measurement >

Item	Unit	National standard	Industrial park standard	Voluntary standard	Average	Maximum
pH	-	6.5-10.0	6.5-10.0	6.5-10.0	8.5	8.8
Electrical conductivity	µS/ cm	2,500	2,500	2,500	1,158	1,455
Volume of sediment	ml / L	-	-	-	<5	5
Available chlorine	mg / L	30	30	30	<0.2	0.2
Chemical Oxygen Demand	mg / L	1,000	1,000	1,000	246	298
Biochemical Oxygen Demand	mg / L	500	500	500	117	124
Total inorganic nitrogen	mg / L	120	120	120	18	29
Total nitrogen	mg / L	150	150	150	26	32
Ammonium	mg / L	100	100	100	18	29
Total phosphorus	mg / L	20	20	20	3.9	7.5
Sulphate	mg / L	400	400	400	21	25
Organic solvent extract (grav.)	mg / L	50	50	50	11	15
Phenols	mg / L	10	10	10	0.02	0.04
Fe	mg / L	20	20	20	0.8	0.9
Mn	mg / L	5	5	5	0.03	0.06
Sulphide	mg / L	1	1	1	<0.01	0.02
Total dissolved solid	mg / L	2,500	2,500	2,500	826	1,108
Total solids	mg / L	2,500	2,500	2,500	520	676
Fluoride	mg / L	50	50	50	0.2	0.3
Total hydrocarbons (TPH, C5-C40)	µg / L	-	-	-	2,761	5,800
Tars	mg / L	5	5	5	<2	2.0

< Noise Measurement >

Time	Unit	National standard	Industrial park standard	Voluntary standard	Average	Maximum
Nightime (22 pm - 6 am)	dB	40	40	40	35	40

IBIDEN Porzellanfabrik Frauenthal GmbH

< Wastewater Measurement >

Item		Unit	National standard	Voluntary standard	Average	Maximum
pH	pH		6.5 - 8.5	6.5 - 8.5	7.3	7.6
Temperature	Temp.	℃	30	30	19.4	1.1
Chemical Oxygen Demand	COD	mg / L	80	80	39	44
Total Suspended Solids, TSS	TSS	mg / L	70	70	7	10
Iron (Dissolved)	Fe	mg / L	2	2	0.52	0.66
Aluminium	Al	mg / L	2	2	0.22	0.31
Ammonium	NH_3	mg / L	10	10	6.04	6.82
Fluoride	F	mg / L	20	20	1.70	2.40

< Air Measurement > *1

Item	Unit	National standard	Voluntary standard	Average	Maximum
Nitrogen Oxides (NOx)	mg/Nm³	350	120	39	40
Particulate Matter (PM)	mg/Nm³	20	20	0.9	1.7
Carbon Monoxide (CO)	mg/Nm³	100	100	1.2	1.2
Ammonia	mg/Nm³	30	10	9.1	9.7

< Noise Measurement>

Time	Unit	National standard	Voluntary standard	Average	Maximum
Daytime (6am - 10 pm)	dB	55		51	54
Nightime (10 pm - 6 am)	dB	45		42	45

IBIDEN Mexico, S.A. de C.V.

< Wastewater Analysis >

Item	Unit	Industrial park standard	Voluntary standard	Average	Maximum
pH	-	6.5 - 8.5	6.5 - 8.5	8.1	9*1
Temperature	℃	20 - 35	20 - 35	24.0	28.0
Biochemical Oxygen Demand,	mg/L	350	350	171	327
Chemical Oxygen Demand	mg/L	630	630	423	606
Total Suspended Solids	mg/L	350	100	21	37
Total Nitrogen, Kjeldahl	mg/L	80	30	7.0	13.1
Total Nitrogen	mg/L		30	7.1	13.0
Total phosphorous	mg/L	25	20	1.8	5.1
Oils and greases (Organic solvent extract)	mg/L		50	6	11
Settleable solids (10 min)	mg/L	3	3	0.8	4*1
Total arsenic	mg/L		0.2	0.02	0.02
Total cadmium	mg/L		0.2	0.02	0.02
Total cyanide	mg/L		2	0.03	0.03
Total copper	mg/L		4	0.02	0.02
Hexavalent chromium	mg/L		1	0.03	0.10
Total Mercury	mg/L		0.01	0.001	0.001
Total Niquel	mg/L		2	0.02	0.02
Total Lead	mg/L		0.5	0.02	0.02
Total Zinc	mg/L		10	0.1	0.2
Fecal coliforms	NMP/L	1.00E+07	1.00E+07	211	2,400
Electrical conductivity	mS/cm		1,500	761	825
Total dissolved solids (total salt 600℃)	mg/L		1,000	509	677
Flotating material	-		ND	ND	ND
Sulfates	mg/L		35	12.5	34.9
Active substances to methylene blue	mg/L		2	0.50	1.7
Phenols	mg/L		0.01	0.01	0.03
Total phosphate	mg/L	5	5	5	15*1
Free chlorine	mg/L		1.5	0.1	0.2
Amoniacal nitrogen	mg/L		18	0.7	3.0
Total alcalinity	mg/L	250	250	184	223
Helmint Eggs	Eggs/L	0	0	0	0

*1 Countermeasures have been completed.

< Air Measurement >

Item	Unit	Industrial park standard	Voluntary standard	Average	Maximum
CO	ppm	500	500	183	324
NOx	ppm	375	375	8	118
Hg	ppm	0.025	0.025	0.0089	0.0089
Dust	mg/m³	1,500	1,500	22	39
CO_2 from electric consumption	ton	25,000			31,709*2

*2 In accordance with applicable regulatory requirements, emissions exceeding 25,000 tons are reported to the Ministry of the Environment.

< Noise Measurement >

Place	Unit	Industrial park standard	Voluntary standard	Average	Maximum
North(Morning)	dB	68	68	48	50
South(Morning)	dB	68	68	52	54
East(Morning)	dB	68	68	56	56
East(Night)	dB	65	65	56	57
West(Morning)	dB	68	68	51	53

* Measurement data of IBIDEN DPF France S.A.S. will be disclosed on our website at a later date.