

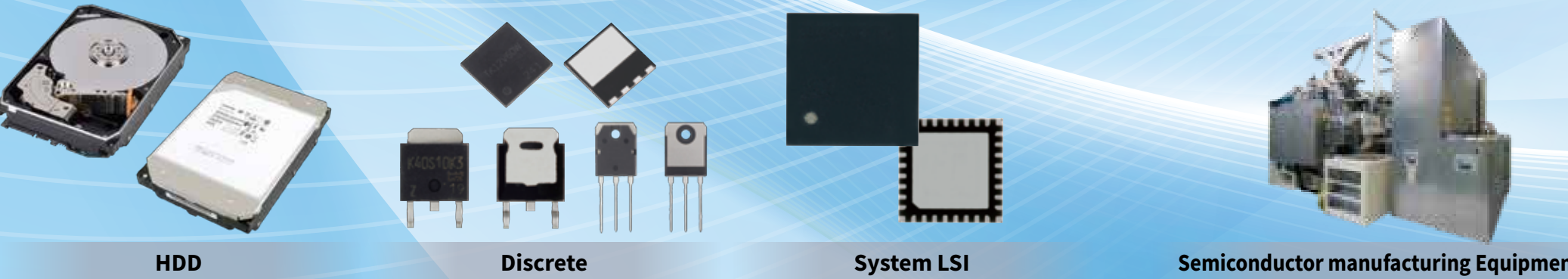
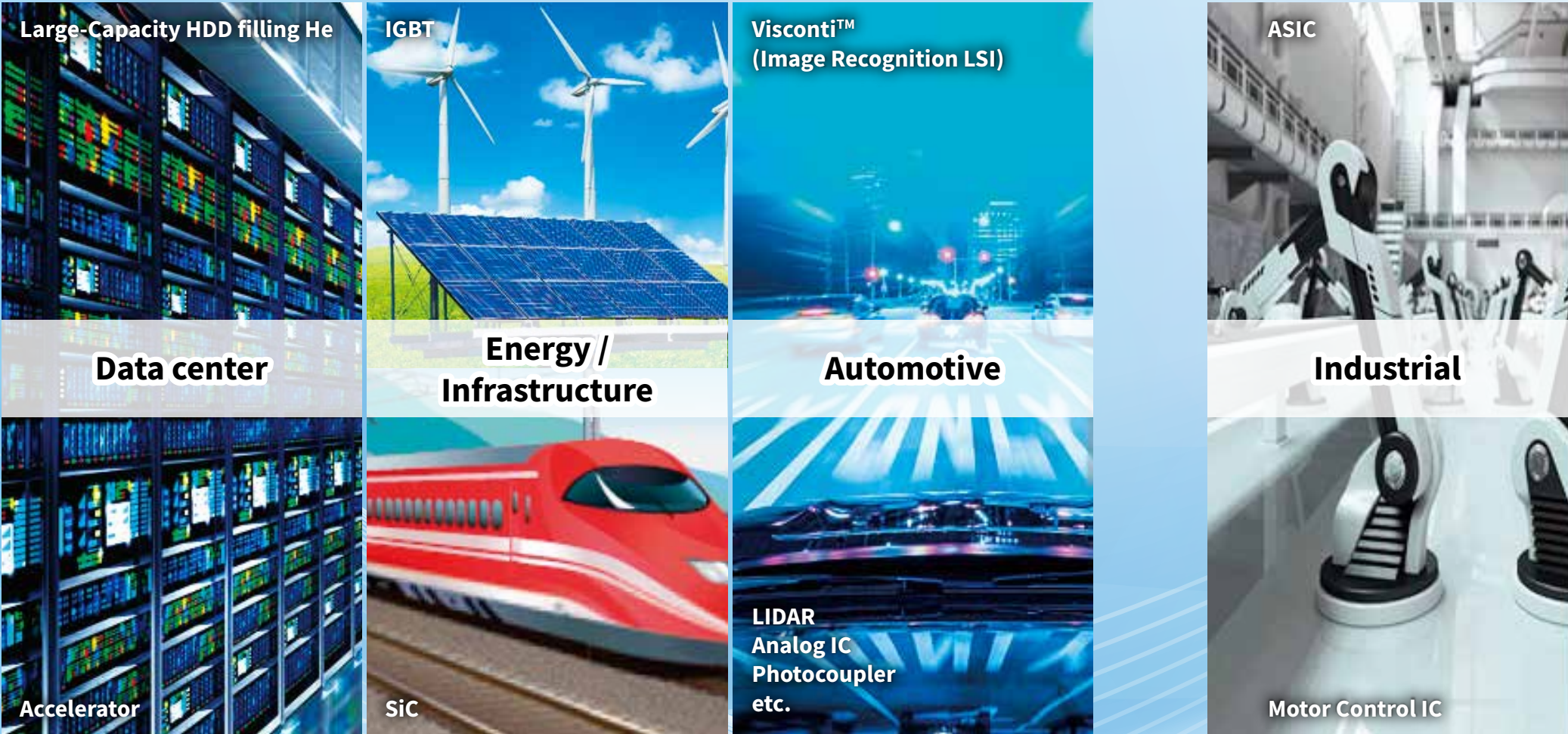
TOSHIBA

Toshiba Electronic Devices & Storage Corporation

ENVIRONMENTAL REPORT 2018



Toshiba Electronic Devices & Storage Corporation Group aim to contribute to solving issues facing society, believing that “the desire to keep up the Toshiba standard in semiconductors and storage will makes us a driving force in changing the world.”



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Top Management Commitment

Aiming towards the realization of a sustainable society, we will contribute to resolving issues in society through products and manufacturing incorporating pioneering technology and ideas.

Hiroshi Fukuchi

President,
TOSHIBA ELECTRONIC DEVICES & STORAGE CORPORATION



Our thoughts

In recent years, various issues facing society such as climate change, resource depletion, increased energy demand, population concentration in cities, expanding logistics, aging and labor shortages have become apparent and a global response is required. In September 2015, “Sustainable Development Goals (SDGs)” aimed at solving various problems facing society including climate change were adopted and, with efforts to create a sustainable society spreading globally, the “Paris Agreement” international framework for climate change prevention was adopted at the COP 21 held in December of the same year, and the decarbonization movement is continuing to accelerate.

Under such circumstances, expectations are growing for global companies, not least our own, as players capable of providing concrete solutions. In order to realize the “Environmental Vision 2050” that Toshiba Group holds as an ideal to be realized by 2050, and in which human beings can enjoy a life of abundance in harmony with the earth, the Company instigated the “Sixth Environmental Action Plan” in the fiscal year of 2017 (FY 2017), with all items in that plan being achieved for that year. Going forward, we will promote our activities in acknowledgement of the fact that the environmental impact of Toshiba Group as a whole scales with the large size of its operations, and that its responsibilities are similarly great. In addition, in July this year, we formulated the new Toshiba Electronic Devices and Storage Group Vision, placing ourselves as a driving force which, together with our customers, may provide for a better society, and safer and more comfortable lifestyles. As a comprehensive electronic device manufacturer, we aim to contribute to solving issues facing society, believing that “the desire to keep up the Toshiba standard in semiconductors and storage will makes us a driving force in changing the world.”

Contributing to achieving SDGs through our business

As a comprehensive electronic device manufacturer, the Group is committed “to contribute to resolving issues facing society through both cyber technology and physical technology” as one of the important policies in its “Toshiba Next Plan” (announced on 8th November 2018), believing it is important to promote initiatives from both the product and manufacturing perspectives. (see figure 1)

Specifically, in the field of products, we promote both energy conservation during product use, and energy saving developments made for on-board equipment, principally for discrete semiconductors, system LSIs, and storage products (HDDs), whilst asking ourselves how we might contribute to solving customer issues such as in supporting high efficiency power conversion for renewable energy, urban safety, provision of key devices for social infrastructure, etc., and working on product development with a keen eye on how our products are used, hoping, as a result, to provide products of a type contributing to society and effective in achieving the SDGs.

Meanwhile, in manufacturing, the challenge lies in the increasing environmental burden due to increased production investment which is made, in turn, in response to strong demand from customers in sectors such as automotive applications and industry. In addition to continuing our energy-saving efforts that have been made over many years, and while taking into consideration aspects such as productivity improvements and the progress and dissemination of environmental technologies from a medium-to-long-term perspective, we will solidify policies etc., incorporate new perspectives, and aim for high efficiency manufacturing that simultaneously reduces environmental burdens and costs.

Furthermore, we will contribute to high efficiency manufacturing in the semiconductor industry through the development and provision of high-precision, high-efficiency semiconductor manufacturing by equipment employing world-leading advanced technology.

Working for trusted environmental communication

As a business providing products and developing manufacturing around the globe, the Group is strongly aware of the social responsibilities it must take on, and the expectations of various stakeholders relating to its business, and it will work to maintain ongoing dialogue with these stakeholders.

In procurement, as we purchase parts from our suppliers, we will continue to hold briefing sessions to promote understanding in regard to our green procurement activities, and would be grateful for your cooperation in respect of this.

At each manufacturing base, we consider it important to collaborate and cooperate with local communities, and together with fostering security and safety through inviting residents, administrators, as well as neighboring companies to attend plant tours, we actively provide opportunities to deepen understanding of our environmental activities by holding environmental reporting sessions and environmental exhibitions. Furthermore, biodiversity conservation activities such as protection of rare species, development of biotopes, tree planting and forest improvement activities are arranged, with outside environmental education for elementary schools in the neighborhood, and nature protection observation gatherings also held on an ongoing basis.

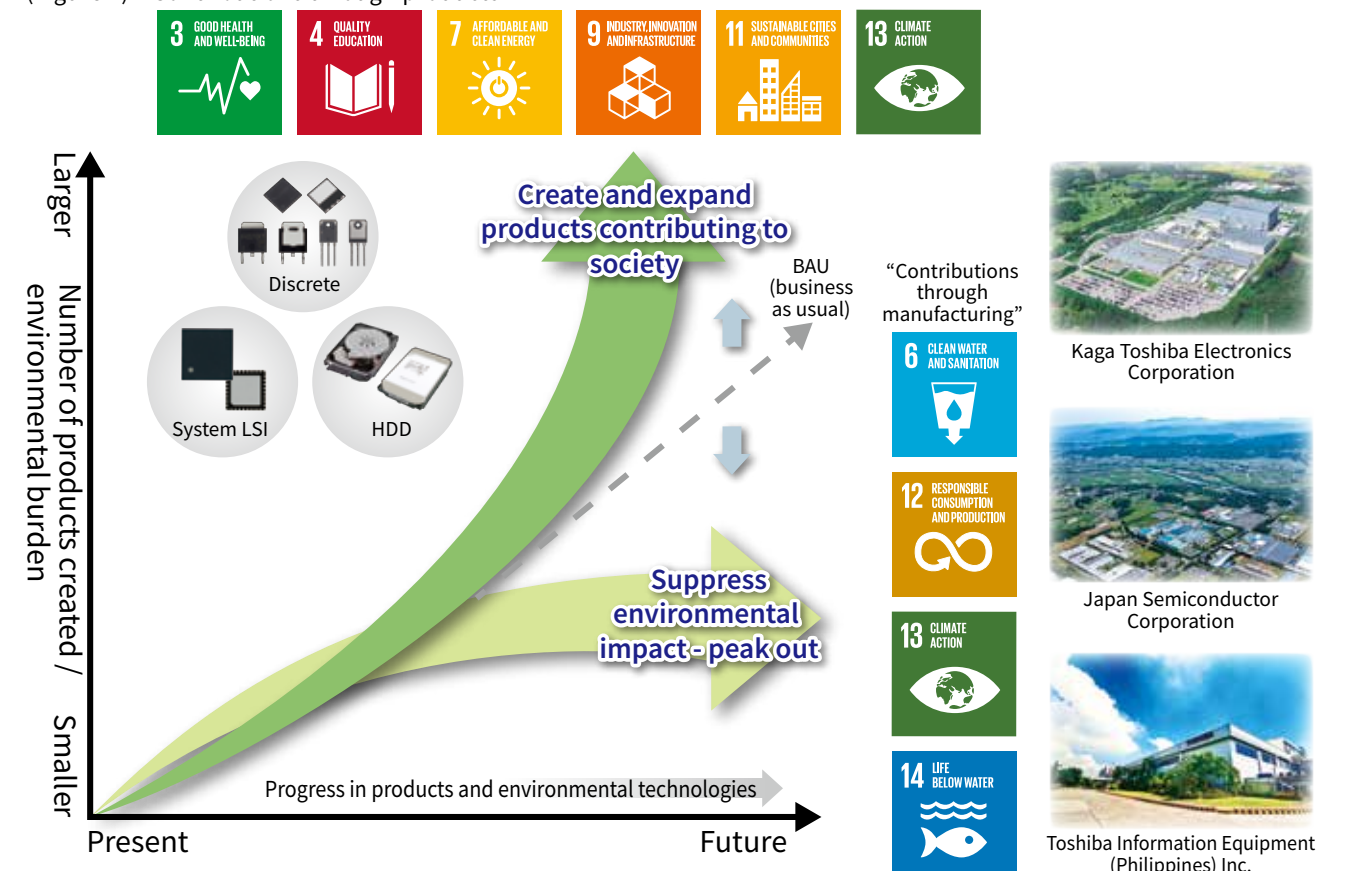
For employees, we also work to provide detailed educational support and help raise environmental awareness, including through initiatives offering a wealth of experiential learning opportunities devised with environmental education in mind, and through support for acquisition of certification.

In FY 2017, the Group's ongoing activities were evaluated, and Japan Semiconductor Corporation received the Excellence Award at the “2017 Excellent Enterprise Award for Environmental Human Resource Development” sponsored by the Ministry of the Environment and the Environmental Consortium for Leadership Development, while the Himeji Operations-Semiconductor was awarded the Encouragement Award at the same awards session, and Kaga Toshiba Electronics Corporation also received the “Ishikawa Forest Environment Distinguished Service Award”.

Going forward, we would greatly appreciate your continued understanding and support with regard to the Group's business and environmental activities.

As a comprehensive electronic device manufacturer, we will contribute to resolving issues facing society

(Figure 1) “Contributions through products”



Statement of Environmental Philosophy

We enacted the environmental policy as shown below. Regardless of organizational changes, activities concerning resolution of social issues through business activities, such as the integration of environmental management systems with business processes and activities aimed at improving environmental performances, will not change. Our environmental statement and philosophy is posted on our website and in our environmental report, available to anyone as well as to employees. We will promote our activities while addressing environmental issues as one of our most important management priorities, based on this environmental philosophy.

Statement of Environmental Philosophy of Toshiba Electronic Devices & Storage Corporation Group

Vision

Recognizing Toshiba Group's Basic Policy for the Environment that the Earth is an irreplaceable asset and it is humankind's duty to hand it on to future generations in a sound state, Toshiba Electronic Devices & Storage Corporation Group is pursuing creation of new values and symbiosis with the Earth. Also Toshiba Electronic Devices & Storage Corporation Group contributes to the development of a sustainable society by promoting environmental activities designed to contribute to the realization of a world that is low-carbon, recycling-based and nature-harmonious.

Policy

Toshiba Electronic Devices & Storage Corporation Group considers environmental stewardship to be one of management's primary responsibilities, and promotes environmental activities proactively to reduce the environmental impact in the manufacturing process for semiconductor and hard disk drive (HDD) products from the design stage in harmony with economic activities. Toshiba Electronic Devices & Storage Corporation Group strives to take the environment into consideration in its business activities such as development, manufacturing, sales, services, and disposal from life cycle perspective, and aims to contribute to society by supplying products that consider environmental impact, and by realizing energy saving and reduction of resource usage in equipment in which semiconductor and hard disk drive (HDD) products are installed.

1. Compliance and sustainability
1. Toshiba Electronic Devices & Storage Corporation Group complies with all applicable laws and regulations, industry guidelines it has endorsed, and its own standards concerning the environment.
2. Toshiba Electronic Devices & Storage Corporation Group strives to continuously improve and effectively apply its environmental management system through internal audits and reviews in order to enhance environmental activities level and environmental performances.
2. Execution
- Toshiba Electronic Devices & Storage Corporation Group strives to assess the environmental impact of its business activities including with regard to biodiversity which comprehend development, procurement, manufacturing and sales, set objectives and targets with respect to the reduction of environmental impact, pollution prevention and development of energy saving technologies, and execute proactive environmental measures including the following:
1. Striving to create and supply semiconductor and hard disk drive (HDD) products that consider environmental impact through the development of energy-saving and resource-saving designs, and by the restriction of the amounts and types of chemical substances contained in products;
2. Promoting reduction of our contribution to global warming by implementing productivity improvements, reducing our emission of greenhouse gases, developing and implementing energy-saving technologies for power systems and manufacturing equipment, along with establishing guidelines to track our progress in these issues;
3. Contributing to a recycling-based society through efforts to promote 3R (reduce, reuse, recycle) measures proactively along with improving productivity, developing technologies to reduce, reuse or recycle resources used during our manufacturing processes, and establishing guidelines related to our waste and recycling, while also promoting efficient utilization of natural resources by implementing measures aiming to reduce waste generation and water intake;
4. Promoting risk reduction on environmental issues by appropriately restricting and using chemical substances, developing technologies to effectively reduce the use of certain chemical substances, and establishing guidelines for our chemical usage, along with making efforts to reduce the total amount of chemical substances released into the environment and the amount of chemical substances treated;
5. In order to preserve biodiversity, Toshiba Electronic Devices & Storage Corporation Group strives to assess and mitigate the environmental impact of its business activities on biodiversity and seeks to make a better contribution to society;
6. Facilitating mutual understanding with stakeholders by disclosing information through public relations, exhibitions, and mass-media regarding semiconductor and hard disk drive (HDD) products from the energy-saving viewpoint, and collaborating with local communities and society at large;
7. Striving to enhance the awareness of employees with respect to environmental management, and considering the environment in business activities and processes throughout the Toshiba Electronic Devices & Storage Corporation Group.

Toshiba Electronic Devices & Storage Corporation Group discloses this Statement of Environmental Philosophy to the public, promotes awareness of this Statement of Environmental Philosophy throughout Toshiba Electronic Devices & Storage Corporation Group, and promotes its business activities according to this Statement.

Revised on 1st Apr, 2018

Hiroshi Fukuchi

President, Toshiba Electronic Devices & Storage Corporation

Group Initiatives for the Sixth Environmental Action Plan

The Toshiba Group has formulated their medium-term goals on the environment as the “Sixth Environmental Action Plan” (Activity Period: FY 2017 to FY 2020), and is currently implementing its activities. In formulating this, various factors were taken into consideration, including external factors such as the adoption of the Paris Agreement at COP 21, adoption of SDGs at the UN summit, and the start of operation of ESG investment, as well as internal factors such as changes in the Company's business structure, and the successes and points for reflection from the Fifth Environmental Action Plan (Activity Period: FY 2012 to FY 2016). Regarding the contents, we set a total of 15 items with goals over the two areas of “Business (products / services and manufacturing)” and “Management”.

Business (Improvement of environmental performance for products and services)

We will develop energy-saving products for realizing a low-carbon society through suppression of CO2 emissions, both at the time of manufacturing of products, and during their use, through resource savings, such as in the miniaturization of products, and through reductions in specified chemical substances contained within the products. Regarding our established and ongoing activities for the creation of Environmentally Conscious Products (ECP), we will review activities for the creation of products contributing to society according to the current form of our business.

Business (Reduction of environmental impact in manufacturing)

We will seek to achieve highly efficient manufacturing that curbs greenhouse gas emissions, chemical substances emissions, waste production, and water usage at each manufacturing base and simultaneously reduces environmental burdens and costs. At the same time, we will make efforts to conserve energy and resources across all manufacturing bases, such as by introducing energy-saving equipment, improving facilities and operating facilities efficiently.

Management

In response to situations in which multiple violations of laws and regulations occurred within Toshiba Group, we established “Thoroughness in environmental risk and compliance” as a new item. We will strive to strengthen compliance with global environmental laws and regulations, foster environmental human resource development, and aim to create a system that can constantly monitor risks. In order to respond to the growing needs for disclosure of ESG information, we added “Enhancement of information disclosure” to the “Environmental communications” item. Furthermore, in “Conservation of biodiversity” we will develop measures to contribute to the global goals of the “Aichi Targets”.

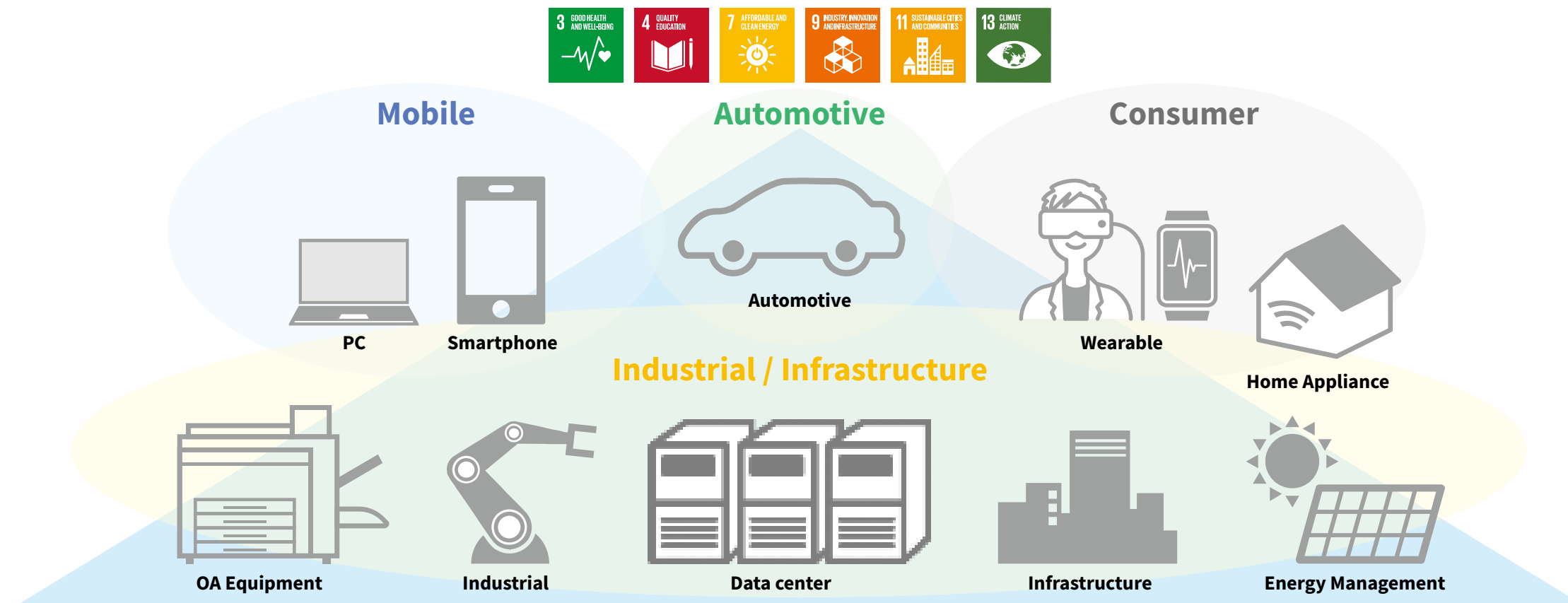
Toshiba Electronic Devices and Storage Corporation Group Results for FY 2017 and Plans for FY 2018

The table below shows targets and actual results for environmental performance from FY 2017 to FY 2018 based on Toshiba Group's Sixth Environmental Action Plan. We anticipate the increase of environmental loads as a result of expanding our production capabilities. But at the same time, we will conduct enhanced efficient raw material use, and chemical substances to promote resource conservation and waste recycling all in efforts to reduce environmental loads.

Item	FY 2017		FY 2018
	Target	Actual result	Target
Expanding creation of products of types contributing to society *1	(Managed by different index)	(Managed by different index)	3 products
Total CO2 emissions from energy sources*2	664 thousand tons CO2 or less	641 thousand tons CO2	660 thousand tons CO2 or less
Total emissions of greenhouse gases (GHGs other than energy source CO2)*3	163 thousand tons CO2 or less	138 thousand tons CO2	165 thousand tons CO2 or less
Total chemical substance environmental emissions	241 tons or less	222 tons	239 tons or less
Amount of waste*4	11.4 thousand tons or less	10.3 thousand tons	13.1 thousand tons or less
Total amount of waste produced	18.7 thousand tons or less	16.6 thousand tons	19.9 thousand tons or less
Water usage	15.8 million m³ or less	14.0 million m³	15.3 million m³ or less
Biodiversity conservation activities *5	Implemented at 7 bases	Implemented at 7 bases	9 bases

(note)
*1 Index: Number of created products of types contributing to society
*2 Electrical CO2 emissions coefficient are used to calculate energy-originated CO2 emissions (in Japan, 5.31 t-CO2/10,000 kWh). Overseas electricity is based on the GHG Protocol.
*3 The subject substances: based on Global Warming Countermeasures Act, Emission quantity calculation methods: based on 2006 IPCC guidelines, Global Warming Potential (GWP) coefficient: Based on IPCC 4th evaluation report.
*4 The waste amount is remaining after valuable materials are subtracted from the total amount of waste generated.
*5 Index: Number of targeted manufacturing bases (Conservation of indexed species (protection / breeding etc.))

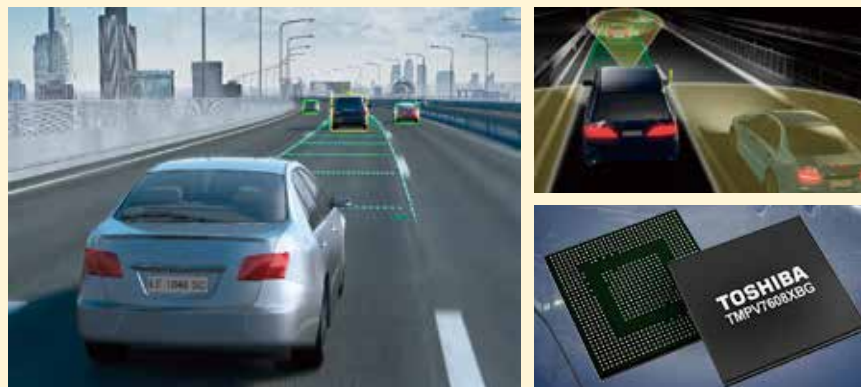
SDGs - 17 goals set by the UN to be achieved by 2030. We will contribute to achieving the SDGs with our semiconductor and storage products.



Visconti™ Series Image Recognition Processors



The Visconti™ series image recognition processors act in place of the human eye by processing input images from a camera, assisting drivers, reducing accidents caused by human error, and contributing to the development of safe and pleasant towns, realized for the ongoing benefit of residents, from children to the elderly. In order to improve image recognition performance, it is necessary to perform large amounts of signal processing, and there is a tendency towards increased power consumption. Visconti 4 simultaneously achieves high performance and low power consumption by employing various measures, including switching to multicore architecture, adopting original image processing circuitry, supporting low power consumption memory, etc.



U-MOSIX Series Power Semiconductors



Power semiconductors are active all around us, raising and lowering voltages, spinning motors, etc. Although power semiconductors can be compared to switches, they have a slight resistance (referred to as an ON-resistance), resulting in corresponding losses through heating. The U-MOSIX series reduces such losses by keeping the ON-resistance low, thereby contributing to energy conservation.



MG08 Series HDDs for Enterprise



The amount of data produced and accumulated worldwide increases at accelerating pace, and data centers are required to store larger amounts of information. The MG08 Series HDDs for enterprise are internally filled with helium and incorporate 9 platters, with the CMR^{(*)1} model realizing the industry's largest storage capacity of 16 TB^{(*)2}/^{(*)3}, supporting the information infrastructure for the IoT society.



(*)1 Conventional Magnetic Recording

(*)2 Source: Toshiba Electronic Devices & Storage Corporation, as of January 8, 2019.

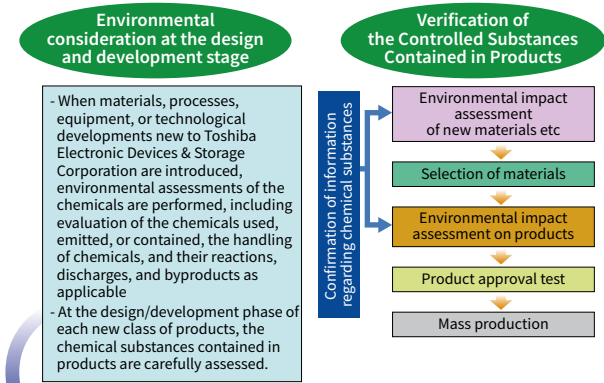
(*)3 Definition of capacity: Toshiba defines a megabyte (MB) as 1,000,000 bytes, a gigabyte (GB) as 1,000,000,000 bytes and a terabyte (TB) as 1,000,000,000,000 bytes. A computer operating system, however, reports storage capacity using powers of 2 for the definition of 1GB = 2³⁰ = 1,073,741,824 bytes and therefore shows less storage capacity. Available storage capacity (including examples of various media files) will vary based on file size, formatting, settings, software and operating system, such as Microsoft Operating System and/or pre-installed software applications, or media content. Actual formatted capacity may vary.

Creating products that contribute to resolving issues facing society, including by energy conservation and control of chemical substances in products

While environment-related laws and regulations have been enacted in countries around the world, and there is demand for more energy savings in electronic devices, a corresponding response for semiconductor and storage products is also required. The Group is working on energy savings, and the control of chemical substances in products, through the design and development stages, and through the material procurement stages, creating products that are environmentally friendly.

Environmental consideration at the stages of product design and engineering

The Group conducts environmental assessments for products at the design and development stages and confirms compliance with laws and various regulations relating to those products. Specifically, we check the content of chemical substances included in raw materials and parts used in the products. In addition, we also give consideration to the environment, such as through designing more compact, lightweight and lower power products, and through the reduction of the number of processes used during manufacturing.

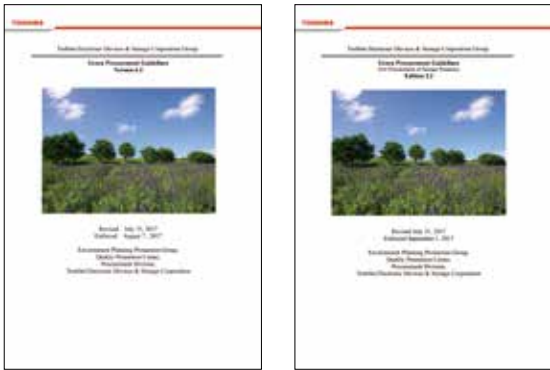


In performing its impact assessments, Toshiba Electronic Devices & Storage Corporation Group aims to promote:

- The selection of materials that do not contain prohibited substances, and
- Process technology development, design, and development of semiconductor and storage products with less environmental impact, as measured by Toshiba's LCA calculations and controlled substances guidelines, than existing Toshiba semiconductor and storage products.

Environmental considerations for products containing substances coming from procured materials

The Group has established green procurement guidelines and is developing green procurement activities. Specifically, in addition to explaining the contents of said guidelines to all suppliers, we collect information on chemical substances contained in products from the suppliers, including the content of "Procurement-Prohibited Substances" and "Procurement-Controlled Substances" as specified by the Company, and check the compliance status according to said guidelines. In addition, when we revise these guidelines, activities such as holding explanatory meetings for the suppliers will be implemented.



Compliance with domestic and overseas environmental laws and regulations

Regulations for chemical substances related to products are enforced or scheduled to be enacted in all countries around the world. In addition to the main regulations related to the Company including the EU RoHS Directive, ELV Directive, Packaging and Packaging Waste Directive, and EU REACH Regulation, laws similar to the EU RoHS Directive in China, South Korea, other Asian countries, Gulf countries, etc. are either already enforced or are scheduled to be enacted.

Amongst recent developments relating to substances subject to the EU RoHS Directive, in addition to the six substances currently regulated (Pb, Hg, Cd, Cr6+, PBB, PBDE), four phthalate esters (DEHP, BBP, DBP, DIBP) will be added (from July 2019).

[Toshiba Electronic Devices and Storage Corporation Group regulations relating to environmental management etc.]

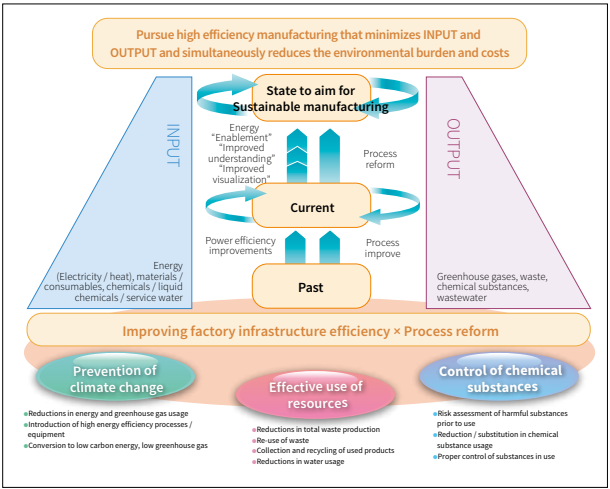
- Domestic regulations, etc.: Ozone Layer Protection Law, Chemical Substances Control Law, Industrial Safety and Health Law, Chemical Weapons Prohibition Law, PRTR Law, Water Pollution Control Law, Waste Disposal Law, etc.
- Overseas regulations, etc.: RoHS related regulations for each country, WEEE Directive, European ELV Directive, REACH Regulation, ErP Directive, etc.
- Others : Customer requests, etc.

Environmental burden reductions through high-efficiency manufacturing and expansion of advanced technology



The Group is aiming for "high-efficiency manufacturing", that simultaneously reduces the environmental burden, and the manufacturing costs generated in the production process. In step with progress towards an information-oriented society, we plan to expand and strengthen production capacity for our semiconductor and HDD products in order to meet vigorous demand in the market, and it appears likely that the environmental burden will increase in the immediate future. However, by promoting various measures throughout the organization, such as introducing highly energy-efficient facilities, making process improvements, and reviewing the design of product parts, we will work to suppress any environmental burden imposed by the Company, while contributing to the SDGs. In addition, we will contribute globally to high-efficiency manufacturing in the semiconductor industry through the development and provision of highly accurate and highly efficient semiconductor manufacturing equipment using world-leading advanced technology. In this chapter, we will introduce the Group initiatives, while also including specific measures at manufacturing bases.

Basic philosophy



Toshiba Group will pursue high efficiency manufacturing, simultaneously reducing environmental burden and costs, by minimizing input resources in domestic and overseas production processes, by eliminating waste at the manufacturing stage, and by minimizing emissions into the atmosphere and bodies of water.

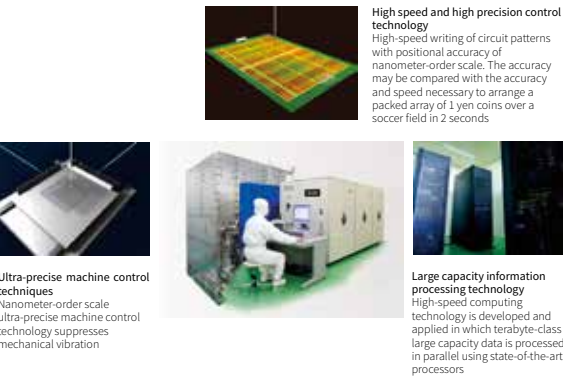
We aim to contribute to solving environmental issues such as climate change by promoting the two initiatives of "Improving factory infrastructure efficiency", which aims to properly grasp the status of energy usage, to make effective equipment operation improvements and to introduce high efficiency equipment, along with "process reform", which aims to achieve sustainable manufacturing through collaboration between all departments involved in manufacturing.

This Group's environmental burden as a proportion of that of the Toshiba Group as a whole tends to be high, constituting 60% of total greenhouse gas emissions, 70% of water usage, 40% of chemical substance emissions and 30% of waste, and with regard to reducing the environmental burden, we will continue to proactively advance initiatives with the Group as a whole.

Column NuFlare Technology Inc. high-performance semiconductor manufacturing equipment supporting the IoT society

NuFlare Technology Inc. manufactures electron beam mask writing equipment which is used to produce masks serving as original plates for semiconductor circuits with both high speed and precision. It can be said that the electron beam mask writing equipment is a compound technology which combines various state-of-the-art technologies straddling physics, electrical and electronic engineering, mechanical engineering, control engineering, information processing engineering, instrumentation technology, chemistry, etc. The newly developed EBM-9500 electron beam mask device has, through its innovative technology, greatly miniaturized circuit line widths, realizing improvements in semiconductor processing capacity and reductions in power consumption. From miniaturization technology represented by "nano (1 billionth)", we reach vast data processing technology extending to "terra (1 trillion)". State-of-the-art technology provided by NuFlare Technology Inc. supports the development of the semiconductor industry and the IoT society.

"Three key technologies to realize miniaturization"

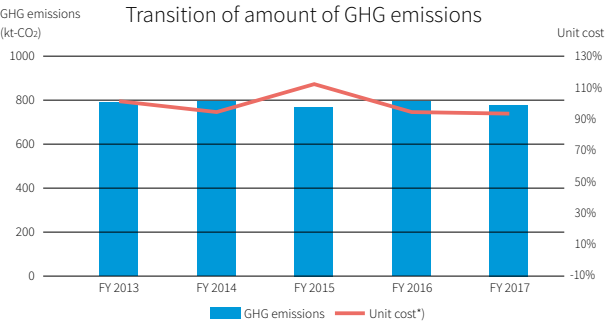


Environmental activity achievements in production processes

As one of the important obligations within its business activities, the Group actively promotes environmental burden reduction initiatives, such as energy-saving, resource-saving, etc., as organizational activities employing multi-divisional cooperation. The Toshiba Group has established a long-term environmental action plan for the global environment as it should be in 2050, and each manufacturing base manages its performance by establishing specific environmental activities and the management of target values.

Prevention of climate change; reduction in greenhouse gas (GHG) emission CO₂ and discontinued PFC

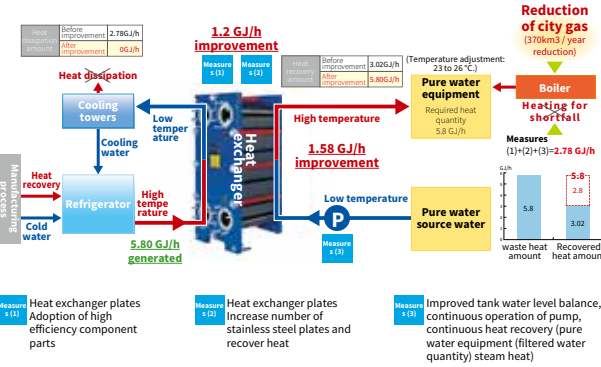
During production processes for semiconductor products and HDDs, large amounts of energy are used for clean room air conditioning and product testing. For this reason, the Group launched an organization-wide project in 2004 to work on reductions in greenhouse gases. For FY 2017, emissions of greenhouse gases were reduced by about 15,000 tons compared to FY 2016, through the advancement of efficient waste heat recovery, optimization of room pressure in clean rooms, etc.



* Power CO₂ emission coefficient used for output of CO₂ emissions is the coefficient at point of receiving power (5.31 t-CO₂ / 10 thousand kWh in Japan). Data on overseas power is GHG protocol data
*) GHG emissions necessary in producing a certain amount of product

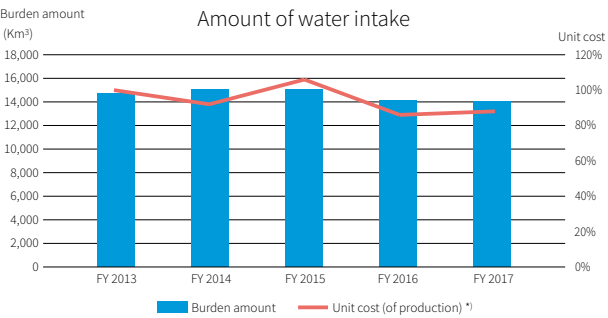
Example case: Reduction of city gas volume by efficient waste heat recovery

Japan Semiconductor Corporation Oita Operations uses large amounts of city gas when heating the pure water used in manufacturing processes. In this case, in order to reduce the consumption of city gas, waste heat efficiently recovered from refrigeration equipment was used for heating pure water, the balance of water tank levels was also improved by optimizing the amounts of pure water and filtered water, and further improvements were realized in waste heat recovery by continuous pump operation.



Effective use of resources: Reduction of water usage

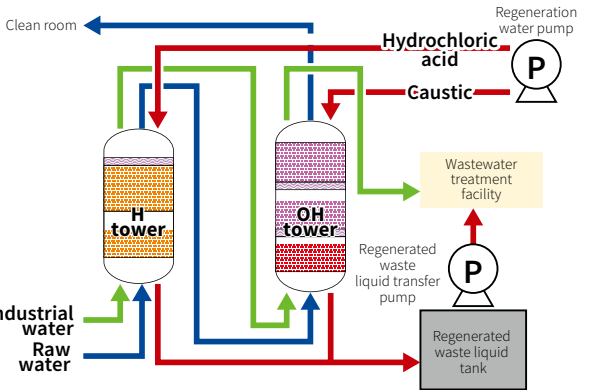
In semiconductor production processes, ultra-pure water, having had its impurities removed to the highest limit, is used in large quantities as washing water and for diluting chemicals. The Company recognizes the scarcity of water resources to be an issue facing society, and is working on measures to prevent water pollution, and to reduce usage amounts. In FY 2017, the amount of water received was approximately 14,000 Km³, which was approximately 120 Km³ less than in FY 2016. We will continue to work to make effective use of limited resources.



*) Water usage required to produce a certain amount of product

Example case: Water reductions through extension of the regeneration period of ion exchange resin

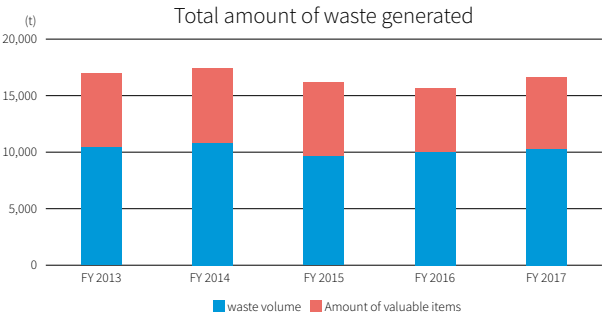
In the pure water production process, ion exchange resin is used to remove metals and ions in water. Because the removal rate of ion exchange resin decreases with its period of use, periodic regeneration treatment is necessary. The Toshiba Devices and Storage Corporation Himeji Operations-Semiconductor realized a reduction in water use for the regeneration process by extending the regeneration period of the ion exchange resin. By implementing this measure, a reduction of 329 m³ of water per month was achieved.



Environmental activity achievements in production

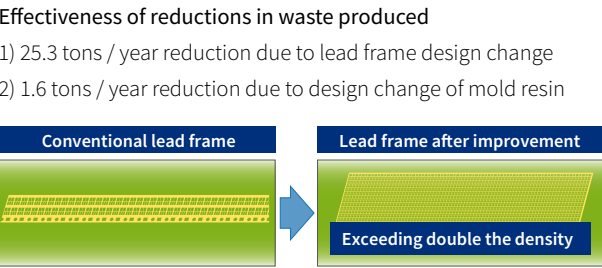
Effective use of resources; reductions in waste production

In order to build a recycling-oriented society, the Group is working to reduce the amount of waste generated by its business activities and to recycle its resources. Excluding any valuable sold products, the total amount of waste generated in FY 2017 was 5,639 t, which was unchanged from FY 2016. In addition, we are promoting efficiency, and the unit cost of production, which shows the efficiency of our business processes, is 91% compared with FY 2013. We will continue to promote initiatives to make effective use of resources both through reductions in waste production and through resource recycling.



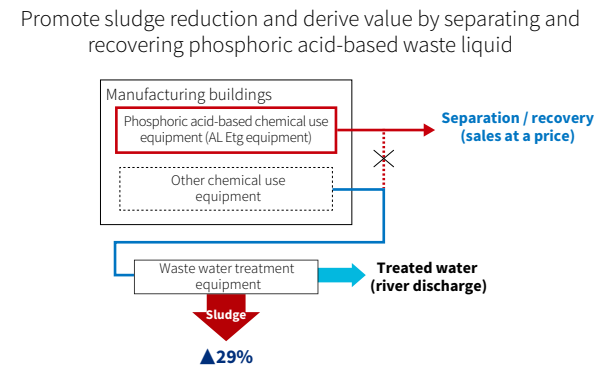
Example case: Waste reduction through improving production processes

Toshiba Semiconductor (Thailand) Co., Ltd. changed the design of the lead frame and mold resin used for products in order to curb metal waste produced in the production process. Following the design change, the density compared with conventional lead frame designs was more than doubled, which succeeded in reducing the amount of waste produced by 25.3 tons per year. In addition, by reducing the amounts of rare and expensive metal-based materials used, production costs have also been kept down.



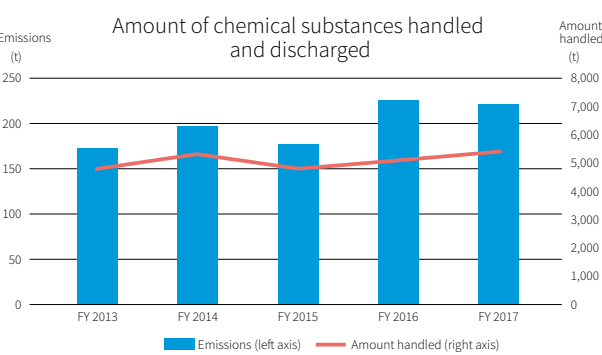
Example case: Sludge reduction by waste liquid separation and recovery

At semiconductor manufacturing bases, reduction of sludge generated during wastewater treatment is a challenge. At Kaga Toshiba Electronics Corporation, the amount of sludge generated was reduced by separating and recovering the phosphoric acid normally contained within sludge during the wastewater treatment process. With this measure, a sludge reduction of about 29% over the year has been realized compared to FY 2016. Additionally, we are promoting resource recycling through sale of the separated and recovered phosphoric acid waste liquid.



Reducing environmental risks: Reducing emissions of chemical substances

The Group is working to achieve reductions in the amounts of chemical substances used by optimizing input quantities of those chemical substances, improving processes, and ongoing implementation of re-use measures. Also, by additionally recovering as much as possible, eliminating harm by wastewater treatment, and conducting extraction by condensation sedimentation during the discharge stage, we are working to reduce emissions of chemical substances, both in terms of "reductions in use" and "reductions at discharge". In FY 2017, the amounts of chemical substances handled increased with the increase in production, but the emissions were unchanged compared to FY 2016 as a result of implementation of the various measures.



Through proactive environmental communication activities, including biodiversity conservation work at our domestic and overseas bases, we are working to spread environmental information in society, and to improve the environmental awareness of employees

The Group is proactively promoting information disclosure and dialogue with all stakeholders, including all residents in the vicinity of our manufacturing bases. Here, we introduce the environmental communication activities and the activities contributing to society in which the Group is engaged.



Environmental briefing sessions starting with the community



Community First Environmental Report Meeting

Explanation of environmental activities at the plant

Citizens, neighboring companies, university teachers, students and administrative staff have been invited to the Japan Semiconductor Corporation Headquarters / Iwate Operations since 2004, and in order to create a sense of security and safety, while also disclosing information on environmental management activities, the “Environmental briefing sessions starting with the community” is held. At this meeting, advice is received regarding activities in order to assist with these activities in the future. At the June 2018 meeting, in addition to hearing about Company profile, it was possible to see the sorting of waste discharged from the production sites, the LNG plant necessary for the steam supply, the biodiversity activity area on the premises, etc. We will continue to promote community integration activities including those improving our environmental brand image.

Outside environmental education for elementary school students



An employee acts as lecturer to deliver environmental education

Toshiba Electronic Devices and Storage Corporation Himeji Operations-Semiconductor carries out outside environmental education every year at neighboring elementary schools. In classes, subjects include the theme of climate change, which has become a global issue in recent years and, in January 2019, three classes using semiconductors are planned at two schools entitled “Mysterious Materials for Controlling Electricity”. We hope to continue to explain the importance of environmental activities and the contributions that products manufactured by the Group make in solving the problems facing society.

Environmental awards results

The following is a list of major awards Toshiba Electronic Devices & Storage Corporation Group won in FY2017. We received high evaluations on our environmental activities in Japan and abroad.

Award Titles	Evaluated Points	Evaluated Entity
2017 Excellent Enterprise Award for Environmental Human Resource Development- “Excellence Award”	Businesses fostering employees who undertake environmental activities upon their own initiative	Japan Semiconductor Corporation
2017 Excellent Enterprise Award for Environmental Human Resource Development- “Encouragement Award”	Businesses fostering employees who undertake environmental activities upon their own initiative	Toshiba Electronic Devices and Storage Corporation Himeji Operations-Semiconductor
Ishikawa Forest Environment Distinguished Service Award	Organizations with outstanding contributions to conservation of forest environments	Kaga Toshiba Electronics Corporation
Kennan (Iwate Prefecture) Regional Promotion Bureau Grand Prize for the Environment	Plants actively engaged in environmental conservation activities in the areas covered by Kennan (Iwate Prefecture) Regional Promotion Bureau	JAPAN SEMICONDUCTOR CORPORATION Iwate Operations and Oita Operations
Award for ECO Action What Can Be Possible	For companies, etc. that, in addition to conducting outstanding activities to prevent climate change, have achieved remarkable results in environmental activities.	JAPAN SEMICONDUCTOR CORPORATION Iwate Operations and Oita Operations
The Prime Minister's Industry Award 2017 (Environmental Quality Conservation Category)	Environment conservation activities (activities raising awareness in employees, construction of check dams, reductions in vinyl use, biodiversity activities, collaboration with schools, etc.)	Toshiba Semiconductor (Thailand) Co., Ltd.

Commendation case example (1) “2017 Excellent Enterprise Award for Environmental Human Resource Development”

Toshiba Electronic Devices and Storage Corporation Himeji Operations-Semiconductor and Japan Semiconductor Corporation received the Excellence Award and Encouragement Award at the “2017 Excellent Enterprise Award for Environmental Human Resource Development”, organized by the Ministry of the Environment, and the Environmental Consortium for Leadership Development. The “Excellent Enterprise Award for Environmental Human Resource Development” commends companies making outstanding efforts to nurture environmental human resources (human resources driving environmental conservation and green socioeconomic change to realize corporate management in harmony with the global environment), and Japan Semiconductor Corporation received their Encouragement Award for the second consecutive year. We will continue to promote environmental activities rooted in the local communities while working to nurture human resources capable of engaging in environmental activities upon their own initiative.

Japan Semiconductor Corporation - Excellence Award

Initiatives to contribute to the community, such as the “5R Challenge Rally” with the theme of promoting the 5Rs, employee experience type education, rare plant protection activities, and environmental classes targeted at elementary schools, were all highly appreciated.



Planting flowers inside and outside premises at the “Flowering Paths Gathering Project”

Fun environmental experiments for elementary school students

Toshiba Electronic Devices and Storage Corporation Himeji Operations-Semiconductor - Encouragement Award



Nature-watching activities by the “Toshiba Forest Science Exploration Team”

Protection of the golden venus chub (an A-ranked fish in the Hyogo Prefecture Edition of the Red Data Book) at a pond within the premises

The Encouragement Award was given in honor of the building of a system whereby the entire target audience is able to attend environmental education according to their occupational ability, and also of the aim to raise awareness of both climate change prevention and conservation of biodiversity, through outside environmental education at neighboring elementary schools.

Commendation case example (2) - Receipt of the “Ishikawa Forest Environment Distinguished Service Award”



Presentation ceremony for certificates of commendation at the Prefectural Forest Park (29th April)
Governor Tanimoto (left) and President Kamebuchi (right)

Since 2013, Kaga Toshiba Electronics Corporation has given the name of “Kaga Toshiba Forest” to the neighboring Tatsunokuchikyuryo Park and, as an activity linking its rich natural assets with the future, continues to maintain reforestation in close cooperation with the community. With five years having passed since the start of the activities, and through the participation of more than 1000 volunteers, the numbers of the scarce plant, the sasa-yuri (lilium japonicum), have increased, and the rare species, the Gifu butterfly (luehdorfia japonica), has also begun to arrive. As a result, the “Ishikawa Forest Environment Distinguished Service Award” was awarded at the “34th Prefectural Green Festival” on April 29, 2018. We will continue our activities working closely with local communities.

26th Toshiba Group Environmental Exhibition

The “26th Toshiba Group Environmental Exhibition” was held at the Smart Community Center in Kawasaki City on February 1st and 2nd, 2018, with around 3,000 visitors attending. The theme of this exhibition was “Contributing to a Low-carbon Society”, and environmentally conscious products and services, as well as examples of highly productive manufacturing, were introduced in the four focus areas of business: “Social Infrastructure”, “Energy”, “Electronic Devices” and “Digital Solutions”. In the area of “Electronic devices”, the Group introduced five topics including Visconti, a high-performance low-power image recognition processor and the state-of-the-art semiconductor manufacturing equipment and in the manufacturing zone, the exhibits focused on energy-saving measures from each of the manufacturing bases. We will actively provide opportunities to let everyone know how semiconductor and HDD products manufactured by the Group contribute to a low-carbon society.



Introducing applications to support driving using the “Visconti” image recognition processor

Efforts to biodiversity

The Group is making comprehensive efforts towards the realization of a “low carbon society”, a “recycling-oriented society” and a “society in harmony with nature”, which together make up the three conditions for a “sustainable society”. Among them, the realization of a “society in harmony with nature” requires that biodiversity is properly maintained, that human beings live in harmony with nature on earth, and that it remains possible for us to enjoy the blessings of our ecosystem. Within the Group’s business activities, in addition to climate change prevention, effective utilization of resources and management of chemical substances, we would like to contribute to the recovery and maintenance of the ecosystem through activities aimed at conserving biodiversity.

Cultivation of Hyogo prefecture flowers - chrysanthemum japonense and aristolochia debilis (dutchman's pipe vine)



“Flower beds brimming with aristolochia debilis in full bloom”



Employees maintain and cultivate flower beds

From 2013, while receiving the advice of experts, Himeji Toshiba E. P. Corporation began cultivation of the chrysanthemum japonense (a near-threatened species - Red Data Book C rank) with activities such as the preparing of flower beds. In addition, we distribute chrysanthemum japonense seeds to persons who request them, working to encourage an interest in protecting the natural environment, and in conducting biodiversity conservation activities, even in the home.

In FY 2016, in order to attract the Chinese windmill butterfly, also now established as the nutterfly of Himeji city, we began cultivating aristolochia debilis, which is consumed by their larvae, and we are working towards a planned increase in the number of aristolochia debilis on the premises.

In the future, employees themselves will actively conduct activities such as regular weeding and watering, and by cultivating chrysanthemum japonense and aristolochia debilis, they will maintain their habitat, while working on protecting the natural environment and propagation activities.

Using firefly light for community-building in a region connected through its greenery and water

Japan Semiconductor Corporation Oita Operations carries out activities with local residents to bring back fireflies to the Kitahana River, where it had become impossible to confirm their presence. While fireflies are not released directly to the river, kawanina freshwater snails, which make up their food, are released to improve the firefly habitat, and the ongoing presence of fireflies by the river has been confirmed in the vicinity of the plant since 2015.



Cleanup activities by employees around the Kitahana River

~ Tackling biodiversity conservation for the long term through improvement of habitats ~
The Matsuoka district, where the Oita Plant is located, is surrounded by the Ono, Kitahana and Ototsu class A rivers, and these rivers are closely linked to local life. Although wastewater from the workplace is rendered harmless for discharge to the Kitahana river, in order to deepen understanding of the plant’s environmental activities amongst local people, we maintain community-linked biodiversity conservation activities having the theme of “community-building through water and greenery”. In conducting these activities, we have listened to the opinions of experts and, from the viewpoint of biodiversity, do not release fireflies directly into the river, but are working to collect kawanina freshwater snails, which make up the fireflies’ food, from upstream and release them downstream to improve the habitat for the fireflies.

Fireflies could not be seen for several years following the beginning of these activities, but their presence was finally confirmed in 2015, in the project’s fifth year. Fireflies now appear from May to June every year, and fixed point observation is carried out with the cooperation of the local people.

At the third firefly appreciation meeting in 2018, about 30 individuals, including local people, and family members of employees, participated. Participants would say “We didn’t think we’d be able to find fireflies in places within sight of the plant. We’d like you to publicize this widely,” so to conduct PR and spread knowledge of these activities, we are holding outside classes for neighboring elementary schools, and

also neighborhood council exchange meetings, etc. While learning from nature again that long-term efforts are needed to preserve biodiversity, we will continue with environmental activities that are deeply rooted within the community.



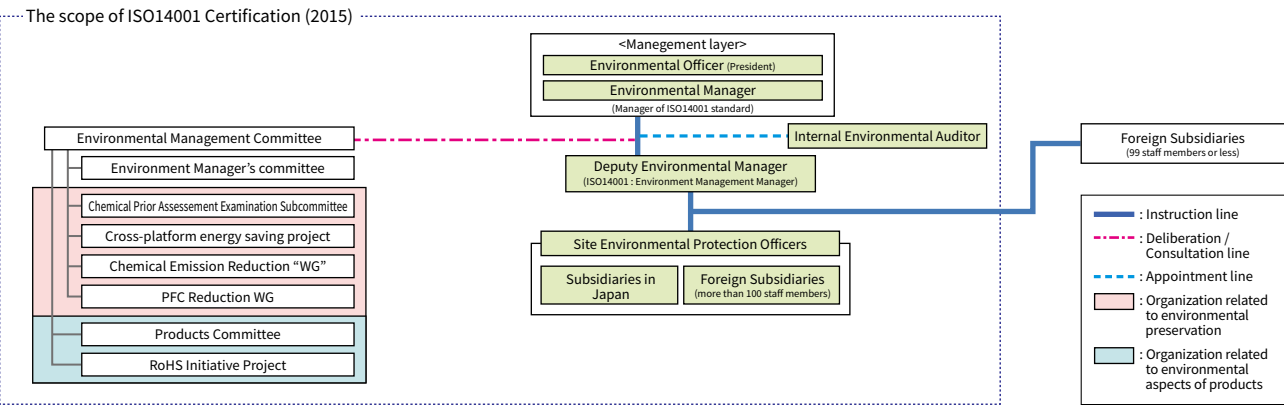
Children enjoying fireflies



Huge aluminum can artwork made as PR using aluminum cans gathered from employees

Environmental Management System

Our environmental management, as is true with the Toshiba Group, consists of five pillars: (1) reducing the environmental burden of manufacturing, (2) improving the total environmental performance of products and services through management, (3) ensuring thorough environmental risk compliance, (4) promoting environmental brand improvement measures, and (5) conserving biodiversity that develop proactive activities based on the following environmental management system.



Activities supporting environmental management

Environmental Management Committee

With the Environmental Management Officer as chairperson, a global environment conference is held twice a year with executives as the committee members and, in addition to deciding environmental management guidelines, priority measures such as legal compliance, reports on the status of base activities, and other individual environmental issues are discussed. Regarding matters of decisions, employees will be fully notified through base directors or presidents of the affiliated companies.

Compliance with Laws and Risk Management

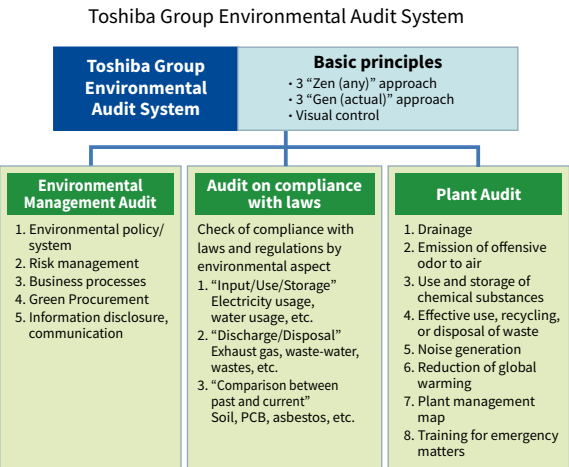
We set voluntary control values stricter than legal regulations in respect of the environmental burden of emissions to the atmosphere, or to bodies of water, and comply with these at each site. In addition, with in-house environmental audits, we aim to identify any potential environmental risks, prevent environmental accidents, and reduce the environmental risks. During FY2017, no group member was in breach of any environmental law nor subject to any fine or other penalty related to the environment.

Environmental Training

In order to raise awareness of environmental management, the Group conducts environmental education through e-learning for all employees. In addition, based on the Toshiba Group’s internal auditor training program, we are conducting Toshiba Comprehensive Environmental Audit System Auditor Training, which consists of written exams and on-site training on environmental laws, ISO14001, internal guidelines, regulations, etc.

Implementation of Environmental Audit at Toshiba group

The Group conducts environmental audits (Toshiba Comprehensive Environmental Audits) based on some typical Japanese business practices with associated mnemonics. *These translate roughly as: 3 ALLs for management of ALL facilities, in ALL areas, by ALL members; 3 ACTUALs for ACTUAL sites, ACTUAL things, ACTUAL situations; 3 SEEs of visual management for SEEing, being able to SEE, letting others SEE*. Particularly for site audits, in addition to the 19 facilities subject to the law, effectiveness-audits for response training in hypothetical emergencies are also implemented. We will also thoroughly review compliance with laws and regulations, measurement management, organization and orderliness, cleaning and cleanliness, and employee education. With regard to items for improvement extracted during the audit, we will implement measures within half a year, and will link these to further optimization of on-site management and ongoing improvements.



Site audits at domestic (Japanese) manufacturing bases



Acquisition of ISO14001 Certification

Toshiba Electronic Devices & Storage Corporation Group is proceeding with the acquisition of integrated certification for all its global business processes, and has maintained the certification (at 11 company sites within Japan and 7 sites outside Japan (*1)) on September 26, 2018. We will continue our contributions to resolve social issues by the creation and offering of energy and resource conservation and products that are consistent with the business policy based on our global comprehensive environmental management system. We will also strive to minimize impact on the environment by our organization, conduct community outreach according to regional characteristics, and conduct biodiversity preservation activities along with effective environmental management activities. For the business locations and subsidiaries that have acquired certifications and certification numbers, etc., refer to the following table..

Name of the organization	Certified body	Registration date	Approval certificate No.	Certificate Expiry
Toshiba Electronic Devices & Storage Co., Ltd. Head Office (Head Office Bldg. and Sales Office Sites)	JACO(*2)	1996/2/2	EC98J2014	2019/8/7
Toshiba Electronic Devices & Storage Co., Ltd. Himeji Operations-Semiconductor				
Toshiba Electronic Devices & Storage Co., Ltd. Head Office Branch (Komukai Branch · Semiconductor System Engineering Center Branch · Ofuna Branch)				
Kaga Toshiba Electronics Corporation				
Himeji Toshiba E.P. Corporation				
Buzen Toshiba Electronics Corporation				
Japan Semiconductor Corporation Headquateras & Iwate operations				
Japan Semiconductor Corporation Oita Operations				
NuFlare Technology, Inc.				
Toshiba Device Corporation				
Toshiba Discrete Semiconductor Technology Corporation				
Toshiba Microelectronics Corporation				
Toshiba Semiconductor (Thailand) Co., Ltd.				
Toshiba Electronics Europe GmbH.				
Toshiba Electronics Asia, Ltd.				
Toshiba Electronics (China) Co., Ltd.				
Toshiba Electronics Asia (Singapore) Pte. Ltd.				
Toshiba Electronic Components Taiwan Corporation				
Toshiba Electronics Korea Corporation				
Toshiba America Electronic Components, Inc.	DNV(*2)	2010/6/29	80416-2010-AE-USA-ANAB	2019/6/24
Toshiba Information Equipment (Philippines), Inc.	TÜV Rheinland	2018/11/20	01 104 023260	2021/11/16

Note:
(*1) The subjects are the main company and all consolidated companies (manufacturing and non-manufacturing) and overseas consolidated companies (manufacturing and non-manufacturing) with over 100 employees.
(*2) JACO: Japan Audit and Certification Organization for Environment and Quality
DNV: DET NORSKE VERITAS AS Group

Cooperation for third-party evaluation

Third party assessment of environmental performance data

We are cooperating with third-party verifications of greenhouse gas emissions for the purpose of improving the reliability of Toshiba Group Environmental Performance Data as set out by Toshiba Corporation. In FY 2017, Himeji Operations-Semiconductor underwent verification from the Company base in respect of global data, which concerned data collection, aggregation, internal verification processes, etc.



Third party assessment in Himeji Operations-Semiconductor



Editorial policy

The Environmental Report 2018 of Toshiba Electronic Devices & Storage Corporation Group presents the results of Toshiba Electronic Devices & Storage Corporation Group’s environmental management activities in fiscal 2017. The object of this report is to present our statement of environmental philosophy, system, achievements and plan of action, environment-friendliness of products, manufacturing activities and environmental communication activities. This report has been compiled by referring to *The Guidelines for Environmental Report (fiscal 2012 version) of the Ministry of Environment, Japan and The Guidelines for Environmental accounting (fiscal 2005 version) of the Ministry of Environment, Japan.*

[Scope of the report]

Reporting period: Fiscal 2017 (from April 1, 2017 to March 31, 2018)

Although the report focuses on the results of activities in fiscal 2017, it also includes those ongoing activities prior to and after fiscal 2017.

Organizations covered: Toshiba Electronic Devices & Storage Corporation Group *

* “Toshiba Electronic Devices & Storage Corporation Group” where mentioned, is a separate company of Toshiba Corporation, and refers to Toshiba Electronic Devices & Storage Corporation and its consolidated subsidiaries in Japan and overseas.

[Publication]

Previous issue: February 2018

Current issue: March 2019

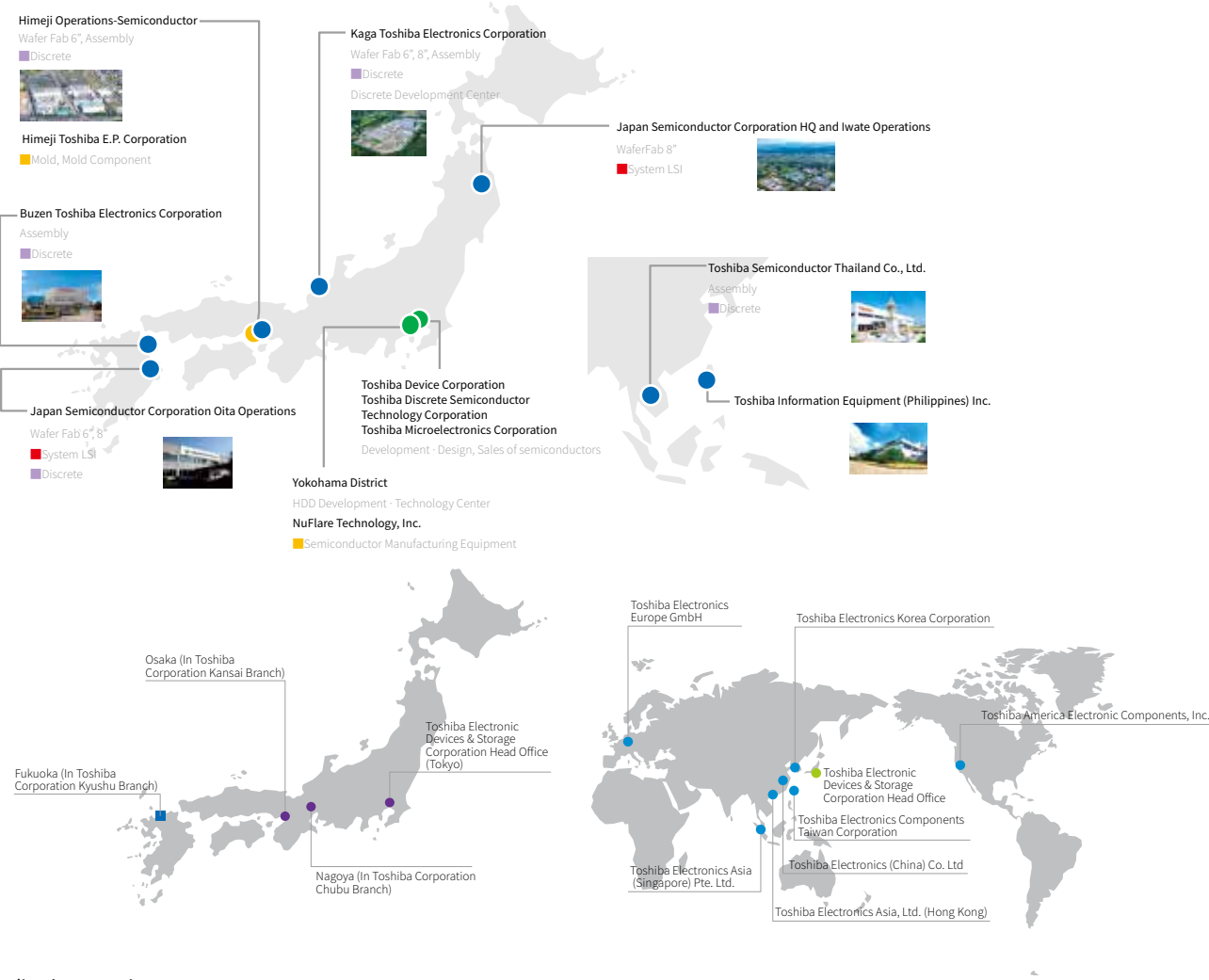
Toshiba Electronic Devices & Storage Corporation Overview (as of 1st July, 2018)

Company name: Toshiba Electronic Devices & Storage Corporation

Address: 1-1-1, Shibaura, Minato-Ku, Tokyo 105-8001, Japan

Number of employees: 4,300 (Non-Consolidated), 22,300 (Consolidated)

Consolidated sales: 879,600 million yen (Actual in FY2017)



Editor's postscript

Thank you for reading the Environmental Report 2017.

This time, in addition to the results report for our environmental activities, we will introduce the environmental activities the Company will develop in the future, such as the contributions to the SDGs and the Sixth Action Plan, so we have made efforts that may help readers envisage, at least to a certain degree, a future image of the Company's environmental activities.

We will transmit information of our environmental activities through environmental reports and other means to our stakeholders. If you have any questions about our activities or the content of this report, kindly contact us through the following URL.

<https://toshiba.semicon-storage.com/ap-en/corporate/environmental-activities.html>

Productivity Planning Div. Environment Planning Promotion Group, Toshiba Electronic Devices & Storage Corporation

- If you have any inquiries, please contact us at the following website.
<https://toshiba.semicon-storage.com/ap-en/company.html>
- The original texts of laws and regulations, including but not limited to the EU RoHS Directive should be consulted for a full understanding of legal requirements. Environmental laws and regulations may be revised at any time, so users should take care to remain informed. The information contained herein is intended to be informative but carries no legal authority and does not constitute legal advice.
- Toshiba Electronic Devices & Storage Corporation Group reserves the right to revise the content of this Environmental Report without notice.
- The information contained herein is subject to change without notice.

Toshiba Electronic Devices & Storage Corporation