

Committed to People, Committed to the Future.

Toshiba Corporation

1-1, Shibaura 1-Chome, Minato-ku, Tokyo, 105-8001, Japan

Contacts:

Corporate Environment Management Office

Tel: +81-3-3457-2403

Inquiry page on Toshiba website

URL <https://www.toshiba.co.jp/env/en/contact/>

Toshiba Group Environmental Report is available on Toshiba website

URL <https://www.toshiba.co.jp/env/en/index.htm>

Toshiba is conducting an online questinnarie.

Please give us your opinions or comments on the report for future reference.

URL <https://www.webcom.toshiba.co.jp/csr/env.php>

TOSHIBA

2019 | Environmental Report

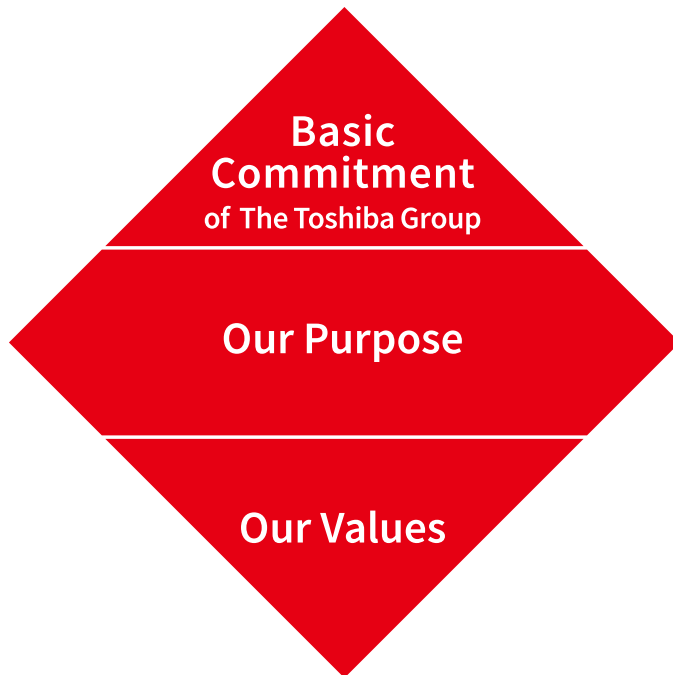


The Essence of Toshiba

The Essence of Toshiba is a statement of our unwavering credo as an organization.

It has three components.

The Basic Commitment of Toshiba Group, Our Purpose, and Our Values.



- Basic Commitment of The Toshiba Group

Our enduring credo: What we believe and promise to deliver.

- Our Purpose

Our reason for being: Inspired By the credo, the difference we make for customers and society.

- Our Values

Our Shared beliefs: A guide to action and the thorough implementation of Our Purpose.

Basic Commitment of The Toshiba Group

Committed to People, Committed to the Future.

At Toshiba, we commit to raising the quality of life for people around the world, ensuring progress that is in harmony with our planet.

Our Purpose

We are Toshiba. We have an unwavering drive to make and do things that lead to a better world.

A planet that's safer and cleaner.
A society that's both sustainable and dynamic.
A life as comfortable as it is exciting.

That's the future we believe in.
We see its possibilities, and work every day to deliver answers that will bring on a brilliant new day.

By combining the power of invention with our expertise and desire for a better world, we imagine things that have never been – and make them a reality.

That is our potential. Working together, we inspire a belief in each other and our customers that no challenge is too great, and there's no promise we can't fulfill.

We turn on the promise of a new day.

Our Values

Do the right thing	We act with integrity, honesty and openness, doing what's right—not what's easy.
Look for a better way	We continually strive to find new and better ways, embracing change as a means for progress.
Always consider the impact	We think about how what we do will change the world for the better, both today and for generations to come.
Create together	We collaborate with each other and our customers, so that we can grow together.

Toshiba Group promotes environmental management, focusing on environmental issues as one of its top management priorities. It has also formulated the Basic Policy for the Environment which lays out specific environmental strategies to be shared by all members of the group.

Toshiba Group's Basic Policy for the Environment

Toshiba Group's Basic Policy for the Environment is set forth below in accordance with The Essence of Toshiba and Environmental Vision.

We of the Toshiba Group recognize that the basic responsibility of people living today is to hand over the precious global environment to the next generation in a sound condition. Out of this recognition and in accordance with our Environmental Vision, we will strive to create affluence and ensure coexistence with the earth. We will also contribute to realizing a sustainable society by aiming at achieving a de-carbonized and recycle-oriented society that strives to coexist with nature through our environmental activities.

◆Promoting environmental management

- Toshiba considers environmental stewardship to be one of management's primary responsibilities and promotes environmental activities in harmony with economic activities.
- Toshiba assesses the impacts of its business activities, products and services on the environment, including with regard to biodiversity, and specifies objectives with respect to the reduction of environmental impacts and prevention of pollution.
- Toshiba strives to continuously improve environmental management through internal audits and reviews of activities.
- Toshiba complies with all laws and regulations, industry guidelines it has endorsed, and its own standards concerning the environment.
- Toshiba strives to enhance the awareness of all its employees with respect to the environment and requires that they make a practical contribution to the environment through their work.
- Toshiba operates globally, and accordingly, promotes environmental activities throughout Toshiba Group.

◆Providing environmentally conscious products and services and reducing their environmental impact through business activities

- Toshiba recognizes that natural resources are finite and implements vigorous environmental measures to promote their effective and practical use in terms of both products and business processes.
- Toshiba develops and provides environmentally conscious products and services which contribute to the reduction of environmental impacts throughout their life cycles.
- Toshiba strives to reduce the environmental impacts of all business processes, encompassing design, procurement, manufacturing, logistics, sale, and disposal, with a particular focus on the prevention of global warming, efficient utilization of resources and control of chemical substances.
- Toshiba considers what value and meaning it can provide to society, and strives to develop environmental technologies for the future to help realize a sustainable society.

◆Through collaboration with our customers

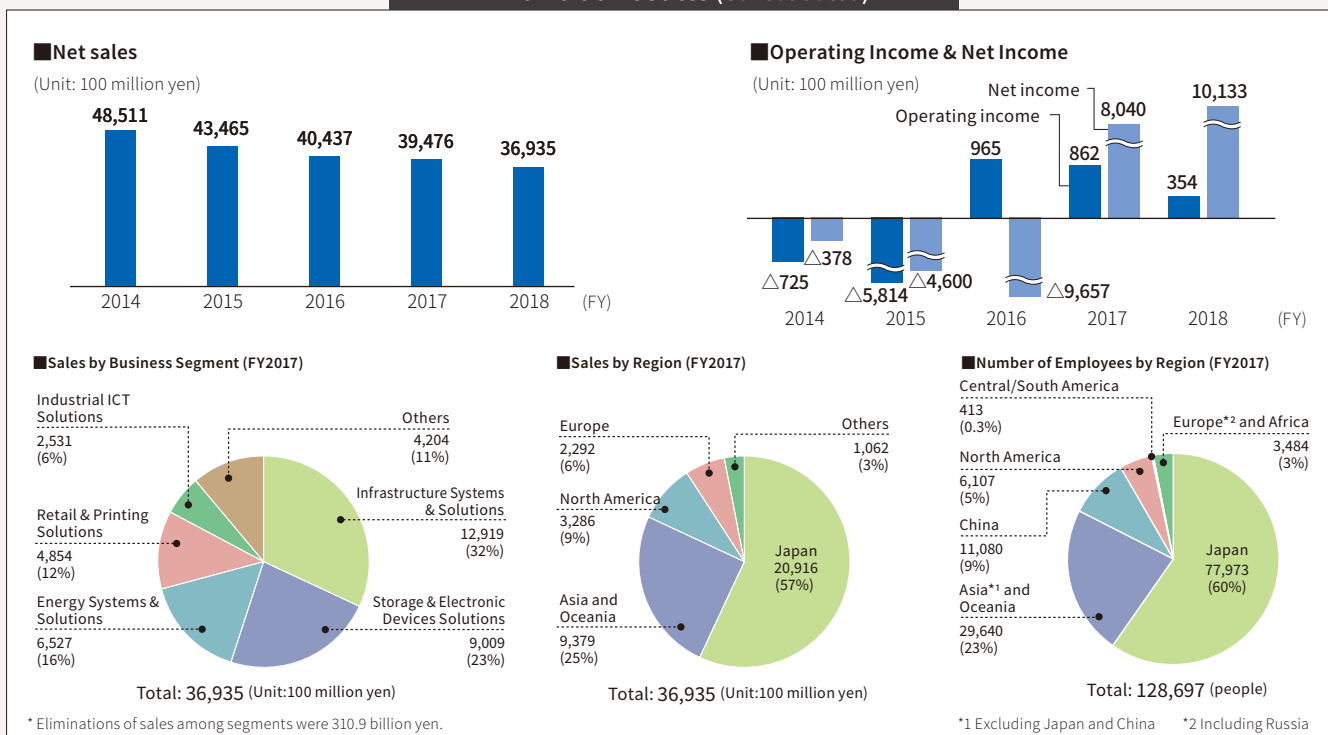
- Toshiba contributes to society through its environmental activities, which include cooperation with society at large and with local communities.
- Toshiba is committed to maximizing disclosure and transparency in communication with stakeholders and society at large in order to facilitate mutual understanding.

Toshiba Group Business Overview

Company Overview (as of March 31, 2019)

Company name	Toshiba Corporation (TOSHIBA CORPORATION)	Number of shareholders	270,570
Headquarters address	1-1, Shibaura 1 chome, Minato-ku, Tokyo	Number of shares issued	544,000,000 shares
Founded	July 1875	Number of consolidated subsidiaries	350 (128 in Japan, 222 overseas)
Paid-in capital	200.044 billion yen	Number of affiliates accounted for by the equity method	120
Consolidated net sales	3.6935 trillion yen	Stock exchange listings	Tokyo, Nagoya
Number of employees (consolidated)	128,697		

Financial Results (Consolidated)



Main Products and Services

Energy Systems & Solutions

Thermal power generation systems, nuclear power generation systems, power distribution systems, photovoltaic power generation systems, hydroelectric power generation systems, etc.

Infrastructure Systems & Solutions

Water supply and sewerage systems, broadcasting systems, radio devices, elevators, industrial light sources, compressors, industrial systems, environmental systems, road systems, station operation automation devices, general lighting, industrial air conditioners, transportation devices, battery systems, etc.

Retail & Printing Solutions

POS systems, multi-function printers, etc.

Storage & Electronic Devices Solutions

Power devices, small signal devices, optical semiconductors, mixed signal ICs, image sensors, logic LSIs, HDDs, semiconductor manufacturing systems, etc.

Industrial ICT Solutions

IT solutions and services, etc.

Others

Distribution services, etc.


Editing Policy

To provide detailed environmental information to our stakeholders, Toshiba Group has published the Environmental Report since 1998. The 2019 edition introduces Toshiba Group's initiatives for achieving SDGs along with cases, and reports the status of our analysis of risks and opportunities related to climate change and the results of calculation of GHG emissions across the entire supply chain. The edition also reports the overview of Environmental Vision 2050, our long-term vision, and the progress of the Sixth Environmental Action Plan being promoted for achieving the vision. The overview of Toshiba Group's ESG information publicly disclosed, including information other than environmental data, is shown below.

Reports


Financial information plus non-financial information

Integrated Report
Financial reports and non-financial outlines




[Integrated Report](#)

Detailed non-financial information



CSR Report
Overview of CSR activities

[CSR Report](#)




Environmental Report
Overview of environmental activities

Websites

More timely information is available on these websites.

Financial information


Investor Relations Website
Financial information and legal disclosures



[Investor Relations Website](#)


Non-financial information

CSR Website
CSR information



[CSR Website](#)

Environment Website
Environmental information



[Environment Website](#)

◆ Organizations covered

In principle, this report covers Toshiba Group (Toshiba Corporation and its 350 consolidated subsidiaries in Japan and overseas). In cases where the report covers entities other than Toshiba Group, the individual entities are indicated.
* In this report, "Toshiba" refers to Toshiba Corporation.

◆ Reporting period

This report focuses on results of activities in FY2018 (from April 1, 2018 to March 31, 2019), but includes some activities continuing from the past and some more recent activities.

◆ Publication

The current issue was published in January 2020 (Publication of the next issue is scheduled for January 2021; the previous issue was published in February 2019).

◆ Significant changes during the reporting period

- Transfer of all the shares of Toshiba Memory Corporation (currently, KIOXIA Corporation) stock
- Transfer of 80.1% of Toshiba Client Solutions Co., Ltd. (currently, Dynabook Inc.) stock to Sharp Corporation.

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◆ Reference guidelines

- GRI (Global Reporting Initiative)
Sustainability Reporting Standards 2016
Note: GRI Content Index is shown on our [CSR website](#).
- Environmental Reporting Guidelines 2018, Ministry of the Environment of Japan
- Environmental Accounting Guidelines 2005, Ministry of the Environment of Japan

◆ Ensuring universal design in terms of color vision

We made efforts to ensure the text and charts herein are easy to read for as many readers as possible irrespective of differences in color vision. For details, please visit [our website for environmental activities](#).

Disclaimer

This report includes descriptions of Toshiba Group's future plans and strategies, as well as prospects of its financial results. These descriptions and prospects are based on matters decided and opinions formed using information that is obtainable at this time.

Message from Top Management



Toshiba Corporation
Chairman and CEO

Nobuaki Kurumatani

Toshiba Corporation
President and COO

Satoshi Tsunakawa

Toward a Toshiba Group that Turns on the Promise of a New Day

Toshiba's eyes are firmly fixed on the future, and in November 2018, we introduced the Toshiba Next Plan as the blueprint for company-wide transformation that will lift the potential of the Group and maximize its corporate value.

For the past few decades, global development has centered on the IT revolution, particularly the Internet and semiconductor technology, and this has created immense value. Looking ahead, we see a future where the real world technologies (physical technologies) that Toshiba has cultivated as a manufacturer will fuse with digital and internet technologies (cyber technologies). We will enter into a new world where manufacturing and services evolve together.

As we stand at the major turning point that will take us into that era, Toshiba Group is once again reaffirming its position in industry and its direction as a Cyber-Physical Systems (CPS) technology company. With the Toshiba Next Plan, we will develop and execute measures focused on strengthening basic earnings power and concentrating investment in growth areas.

Guided by The Basic Commitment of Toshiba Group “Committed to people, committed to the Future,” we are a corporate group that is grounded in respect for people, that creates rich value, and that contributes to the lives and cultures of people around the world. As a signatory to the UN Global Compact, and with a sound management base, we are working toward the realization of a sustainable society by strengthening ESG (environment, society, governance) efforts across our business activities. We are also contributing to the achievement of the SDGs* through businesses directly connected to solving increasingly urgent social issues, such as climate change, energy and resource constraints.

For over 140 years, Toshiba Group has consistently contributed to society's evolution and progress, and brought a venture spirit to the development of a wide range of technologies. Moving forward, we will bring all our strengths to bear on the realization of the Toshiba Next Plan by continuing to combine the creativity and technology that we have cultivated, to confront increasingly serious social issues, and to turn on the promise of a new day.

* SDGs: Sustainable Development Goals. Goals adopted by the UN in 2015, to be achieved by 2030.

Message from the Corporate Environmental Officer

We aim to contribute to the resolution of social issues such as climate change to turn on the promise of a new day.

Tsutomu Kamijo
Toshiba Corporation
Corporate Vice President

T. Kamijo



●Introduction

In recent years, social issues related to the environment including climate change, depletion of energy and resources, and oceanic pollution due to plastic debris are becoming increasingly serious. Especially for climate change issues, a move toward de-carbonization is accelerating after the Paris Agreement. For companies, intent on capturing risks and opportunities that climate change presents to business, setting long-term reduction goals, working to reduce greenhouse gas (GHG) emissions throughout the supply chain and so on have become essential for growth.

Toshiba Group recognizes that making a response to social issues including climate change is one of the most important management issues. In "Toshiba Next Plan," a company-wide transformation plan formulated in November 2018, we expressed our commitment to work to resolve social issues through technology and achieve SDGs. I believe our responsibility as a member of the international society is to realize a future envisioned by SDGs by presenting resolutions for issues one after another with technological capabilities that only Toshiba Group has and business activities that only Toshiba Group can perform.

To strengthen our initiatives for climate change, Toshiba Group declared its support for the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD^{*1}) in May 2019. While analyzing risks and opportunities that climate change presents to business and appropriately disclosing information based on the recommendations, as well as continuing to grasp the status of GHG emissions including those through the supply chain, we will aim to realize a de-carbonized society. Moreover, we will also work on issues other than climate change such as the depletion of energy and resources, and contribute to the realization of a sustainable society envisioned by SDGs.

●Promotion of the Sixth Environmental Action Plan

Toshiba Group has been promoting the Sixth Environmental Action Plan (activity period: FY2017–2020) toward achieving Environmental Vision 2050, a long-term goal envisaging an ideal state of the Earth in 2050. In the plan, we aim to reduce

environmental impacts across the life cycle of the products by setting KPI^{*2} from the perspective of both manufacturing and products and services. Among achievements made in FY2018, in manufacturing we were able to limit total GHG emissions to 1.24 million tons against the target figure of 1.54 million tons. The energy-derived CO₂ emissions per unit activity were 95% (compared to the FY2013 level) thus achieving the target. We will continue to aggressively invest in energy saving equipment in an effort to make further improvements.

As for products and services, due to wide ranging development of low carbon energy technologies and improvement of energy-saving performance of products including social infrastructure products and office equipment, the reduction in CO₂ emissions achieved by products and services was 12.16 million t-CO₂^{*3}. We will bring together our technological capabilities and continue to focus on developing products and services that are highly effective in reducing emissions.

In the management field, we focused on ensuring environmental risk compliance in the first place, and also engaged in various community-based initiatives including holding the Toshiba Group Environmental Exhibition, presenting environmental educational programs for elementary school children, and conducting biodiversity conservation activities at our global sites. We will continue to promote aggressive activities toward upgrading the foundation of environmental management.

●Looking forward

The "Essence of Toshiba" newly issued in July 2018 is grounded in our long-standing statement of intent, "Committed to People, Committed to the Future," as our basic commitment, and defines our purpose as "turning on the promise of a new day" by combining the power of invention with our expertise. Under this concept, while resolving social issues and maintaining business growth, we will strive to contribute to creating a bright future. We would very much appreciate your continued support.

^{*1}: The TCFD is an organization established by the Financial Stability Board (FSB) in 2015 where financial institutions and companies discuss the climate change issue from the perspective of financial stability.

^{*2}: Key Performance Indicator

^{*3}: An accumulated value from FY2017

Toshiba Group and the SDGs

The cornerstone text of the Basic Commitment of Toshiba Group is "Committed to People, Committed to the Future." This underlines Toshiba Group's timeless commitment to contributing to the development of society through our business activities and is consistent with the United Nations Sustainable Development Goals (SDGs) that aim to realize a sustainable society.

Toshiba Group always acts with integrity and has a passion for changing the world for the better, envisioning a future for generations to come and joining with stakeholders to build a new tomorrow. Based on this ideal, we will continue as before to combine the creative power and technological expertise we have built up over the years to tackle social issues that are becoming increasingly complex and serious with the aim of launching a new future.

■ The Essence of Toshiba

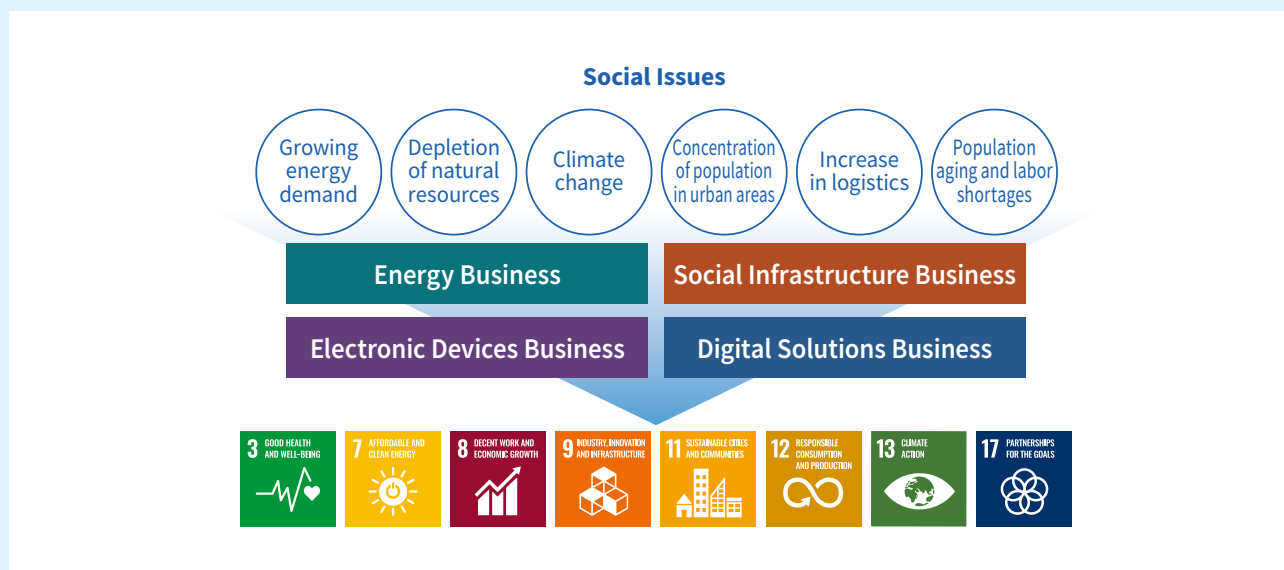


■ Sustainable Development Goals



Contributing to the SDGs through Our Corporate Activities

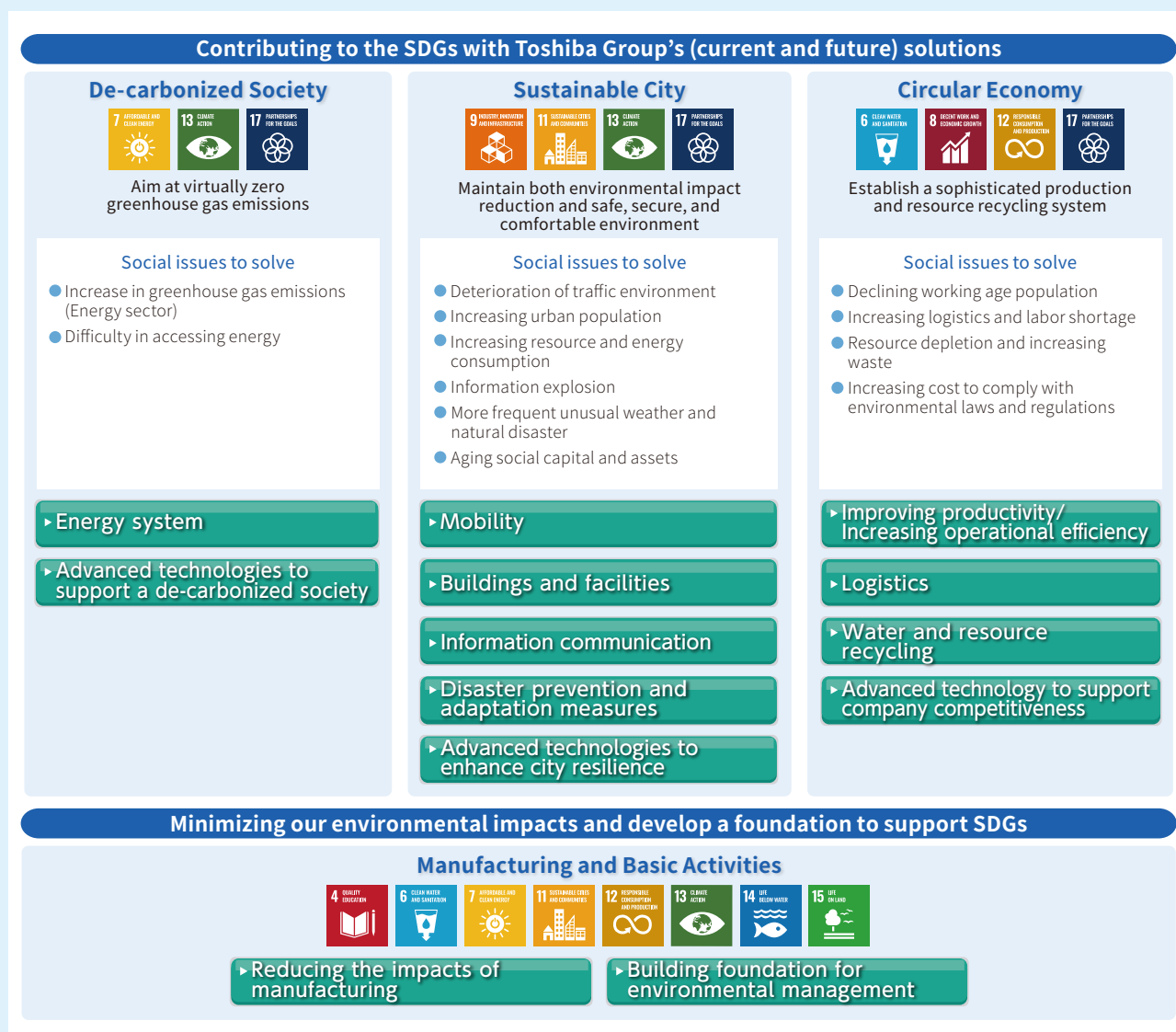
In 2018, an SDGs Promotion Team drawn from Toshiba's corporate divisions led efforts to clarify the relationship between our business and the SDGs in conjunction with key Group companies. Opinions were exchanged on the impact across the value chain on society in order to promote understanding of the SDGs and advance initiatives throughout Toshiba Group. As a result, eight goals were identified as providing the platform to contribute to the achievement of the SDGs through Toshiba Group's business, with plans to accelerate these initiatives announced in The Toshiba Next Plan (FY2019-23 Business Plan).



Development Goals (SDGs)

Contributing to the SDGs through Environmental Management

Many of the SDGs that Toshiba Group focuses on such as response to climate change, urban development, and sustainable consumption and production are closely related to environmental management.



From the viewpoint of environmental management, we group our contribution to SDGs through Toshiba Group's solutions into three categories: "De-carbonized Society," "Sustainable City," and "Circular Economy." For each category, we present related social issues, SDGs, and our product and service fields that can lead to the solution of such issues. For example, under "De-carbonized Society," toward the achievement of "Goal 7: Affordable and clean energy" and "Goal 13: Climate action," we provide solutions to make the most of renewable energy through power generation and transmission as well as energy management, and at the same time, we develop advanced technologies toward achieving virtually zero emission of greenhouse gas.

Another category of our contribution to SDGs is "Manufacturing and Basic Activities," which is an initiative to minimize our environmental impacts and foster a foundation to work on SDGs.

While developing business activities and environmental management in line with issues set out for each category in this way, we will contribute to achievement of SDGs.

Actions for the Achievement of Sustainable Development Goals (SDGs)

De-carbonized Society



► Energy system

It is essential to eliminate dependence on fossil fuel in stages while ensuring energy access across the world. We provide solutions to make the most of renewable energy through power generation and transmission as well as energy management.

- [Hydrogen solution](#) [Refer to page 11](#)
- [Energy IoT/Renewable energy](#)
- [High voltage direct current \(HVDC\) transmission technology](#)
- [Geothermal power generation system\(FY2017\)](#)

► Advanced technologies to support a de-carbonized society

Toward achievement of virtually zero greenhouse gas emission, we have been developing advanced technologies such as recycling and capturing of CO₂, new solar cells, and AI-based forecast technology to support virtual power plant (VPP).

- [Recycling of carbon dioxide using renewable energy](#) [Refer to page 11](#)
- [Perovskite film-based solar cell](#) [Refer to page 12](#)
- [AI technology for accurate forecasting of power demand and solar power output](#) [Refer to page 12](#)
- [Zero emission thermal power generation](#)

Sustainable City



► Mobility

We develop component technologies such as battery, motor, and semiconductor to support a sustainable transportation system. The system will lead to eliminating adverse effects on the traffic environment (increased energy consumption, traffic accidents, traffic jams, etc.) that arise due the increase in urban population.

- [Next generation propulsion system for railway rolling stock](#) [Refer to page 13](#)
- [Rechargeable battery SCiB™](#)
- [High efficiency on-board motor](#)
- [Automotive semiconductor components](#)
- [Locomotive and freight transportation system supporting modal shift \(FY2017\)](#)
- [Intelligent transportation system \(ITS\) \(FY2017\)](#)
- [Visconti™ image recognition processor \(FY2017\)](#)
- [Share-ride demand responsive transport system using AI technology \(FY2017\)](#)

► Disaster prevention and adaptation measures

There is concern that climate change will increase the risk of natural disasters such as from guerrilla rainstorms and tornadoes. We provide solutions that will help predict natural disasters at an early stage and communicate disaster information as one measure to adapt to disasters.

- [Disaster information system](#)
- [Multi parameter phased array weather radar \(FY2017\)](#)

► Buildings and facilities

Some 68% of the global population will likely be concentrated in urban areas by 2050. By applying component technologies to maintain both achievement of zero energy buildings (ZEBs) and creation of safe, secure, and comfortable environment, we support life in urban areas.

- [Toshiba machine-room-less elevator SPACEL-GR II](#) [Refer to page 13](#)
- [Spot and zone air-conditioning system "FLEXAIR"](#) [Refer to page 13](#)
- [LED high-bay lighting fixture \(lightweight type\)](#) [Refer to page 14](#)
- [Lazona Kawasaki Toshiba Building Smart Community Center \(FY2017\)](#)

► Information communication

We provide robust storage products featuring high capacity and high energy efficiency that serve as the foundation for dealing with the information explosion and a big data society. These products support the spread and expansion of IoT and cloud services.

- [Enterprise HDD](#)

► Advanced technologies to enhance city resilience

We have been developing a technology to detect damage inside structures and thereby improve the efficiency of infrastructure repair work. This technology will help suppress the aging of social assets and resources and increased maintenance and management costs associated with such aging.

- [Structure health monitoring using AE sensing](#) [Refer to page 14](#)

Circular Economy



► Improving productivity/Increasing operational efficiency

We provide solutions that will help improve various business processes including production, maintenance, inspection, and service, and increase operational efficiency. The solutions will lead to solving the problem of the declining working-age population as well as creating new added-value.

- [Manufacturing IoT solution "Meister Series"](#)
Refer to page 15
- [Digital O&M solutions IoT Standard Pack, Meister Digital Field Work, and Meister AR Suite](#)
Refer to page 16
- [Electronic receipt service SMART RECEIPT](#)
Refer to page 17
- Mixed reality (MR) technology for power plants
- Toshiba communication AI RECAIUS™ Field Voice Intercom Express
- [Paper reuse system Loops \(FY2017\)](#)

► Water and resource recycling

We provide underlying technology to achieve a sophisticated resource recycling system. The technology will contribute to solving problems such as increasing quantities of waste and serious water pollution.

- [Zero liquid discharge \(ZLD\) system](#)
Refer to page 18
- Plastic sorting system for home appliance recycling

► Logistics

To deal with issues such as an increase in logistics and a labor shortage, we provide solutions that visualize, automate, and increase efficiency of logistics processes with AI and IoT as well as mechatronics. These solutions support optimization and production improvement of the entire supply chain.

- [Logistics system solution](#)
Refer to page 17
- [Logistics IoT solutions: LADOCsuite and LogiTrace tracing and location management services](#)
Refer to page 18

► Advanced technology to support competitiveness of companies

We use our unique image analysis technology to support fields facing a serious shortage of skilled workers. By applying our analysis technology, we improve efficiency in complying with environmental laws and regulations that continue to increase around the world.

- [Simplified screening method for phthalates](#)
Refer to page 50
- Toshiba analytics AI SATLYS™ for combustion image analysis at waste treatment facilities

Manufacturing and Basic Activities



► Reducing environmental impacts in manufacturing

- [Certified as Top Level Facilities by the Tokyo Metropolitan Government](#)
Refer to page 36
- [Reducing abrasive used with abrasive concentration sensing](#)
Refer to page 38
- [Waste management in overseas production site](#)
Refer to page 38
- [Reducing industrial water and chemicals through optimization of water purification system operating method](#)
Refer to page 39
- [Environmental Impact Reduction Measures at Toshiba Subsidiaries in India \(FY2017\)](#)

► Building foundation for environmental management

- Environmental Communication
Refer to page 63
- Environmental Education and Human Resource Development
Refer to page 57
- Conservation of Biodiversity
Refer to page 67

Actions for the Achievement of Sustainable Development Goals (SDGs)

De-carbonized Society

Case 1

Hydrogen solution

Toshiba Energy Systems & Solutions Corporation

In response to the trend toward low-carbonization and de-carbonization that is underway around the world following the Paris Agreement, Japan has also set the goal of reducing CO₂ emissions 80% by 2050 and is working to introduce renewable energy nationwide. To solve this challenge, however, a new technology such as the hydrogen solution needs to be introduced due to issues including a decline in the operating rate of renewable energy due to increased restrictions on connection to the power grid and additional implementation of output control, increased investment in batteries by renewable power generation operators and power transmission and distribution operators, and a drop in the operating rate of thermal power plants to adjust the power supply. The hydrogen solution utilizes power storage capability to cope with unstable renewable energy, and also can convert renewable energy power into hydrogen for multiple purposes. By taking advantage of these characteristics, we provide two solutions: "off-grid power supply using hydrogen energy storage" and "hydrogen supply chain aimed at wide area use."

As an off-grid power supply, we have the H2One™ hydrogen-based autonomous energy supply system, which has been installed in local government offices, baseball parks, beer factory tour facilities, and so on. In addition, our H2Rex™ pure hydrogen fuel cell system has also been installed in factories, markets, hotels, and so on and further success in the installation of the system is expected.

As a representative case of the hydrogen power-to-gas (P2G) supply chain*, Fukushima Hydrogen Energy Research Field (FH2R) is being constructed in Namie-machi, Fukushima in Japan. This research is a project assigned to Japan's New Energy and Industrial Technology Development Organization (NEDO), and the world's largest class water electrolyzer is used to produce hydrogen. The demonstration operation and hydrogen transportation are planned to commence by July 2020 and the hydrogen produced in the FH2HR will also be used for the 2020 Tokyo Olympics and Paralympics.

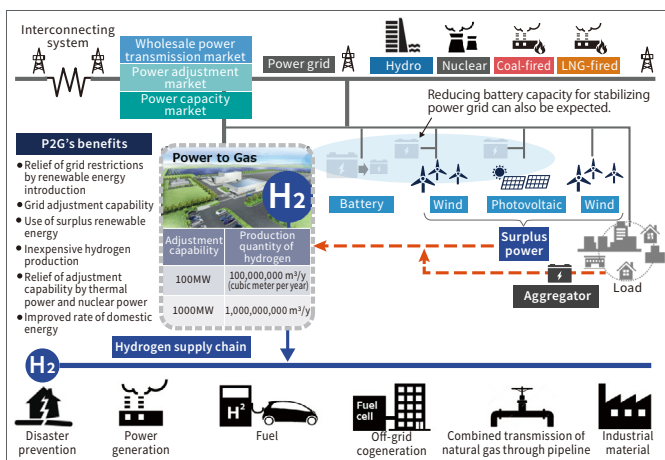
*Power to gas: A technology to store surplus power produced from renewable energy by converting it into gaseous fuel such as hydrogen.

Related pages:

[NEDO, Toshiba, Tohoku Electric Power and Iwatani Start Construction of Fukushima Hydrogen Energy Research Field](#)

Hydrogen-based Autonomous Energy Supply System: [H2One™](#)

Pure Hydrogen Fuel Cell System: [H2Rex™](#)



hydrogen supply chain (Example)



Hydrogen-based Autonomous Energy Supply System H2One™



Pure Hydrogen Fuel Cell System H2Rex™

Case 2

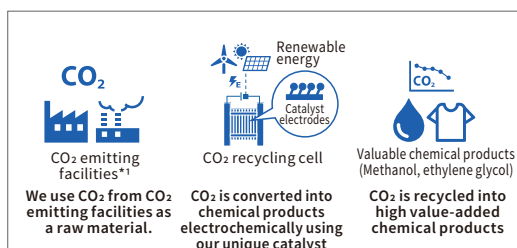
Recycling of carbon dioxide using renewable energy

Toshiba Corporation
Corporate Research & Development Center

Among the efforts for the elimination of the increasing CO₂ emissions in Japan, CO₂ reduction in the industrial sector, including factories, has also become a major issue. To deal with this situation, CO₂ is effectively used by converting it into valuable products via a technology in which chemical reactions and electricity are involved (electrochemical reactions).

We have been developing such a carbon dioxide recycling technology to produce green chemical products such as methanol from renewable energy and carbon dioxide by using our unique catalyst electrodes. Recently, we have successfully developed a CO₂ recycling cell with drastically improved CO₂ conversion rates, enabling a substantially reduced CO₂-recycling system installation area. Using this technology, we will reduce carbon dioxide emissions more economically and contribute to achieving a de-carbonized society.

We are conducting a system demonstration of this technology and will construct a model carbon recycling society via the "Carbon Dioxide Recycling Model Project using Artificial Photosynthesis Technology," a project commissioned from the Ministry of the Environment, with the aim of putting the technology into practical use in the late 2020s.



*1 Power plants, steelworks, cement plants, waste incineration plants, etc.

Case 3

Perovskite film-based solar cell

Toshiba Corporation
Corporate Research & Development Center

We have developed the world's largest film-based perovskite*¹ photovoltaic module, which are expected to help reduce costs and achieve high efficiency due to the use of the printing technology. With a newly developed process, in addition to our unique printing technology, we have achieved both the world's largest*² area of 703 cm² and high energy conversion efficiency of 11.7%, although coexistence of large area and high efficiency is difficult. Due to their flexibility and lightweight, the film-based perovskite photovoltaic modules can be installed in many installation situations, including installation in buildings with low load bearing capacity and on walls, in which hard crystal Si solar cells could not be installed previously, and these will lead to the spread of zero energy buildings.

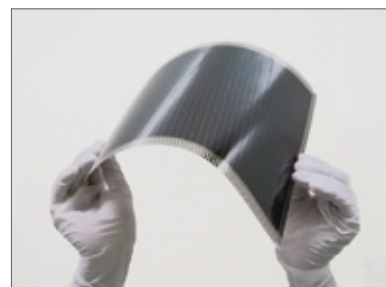
These results have been obtained by "Development of technology of power generation cost reduction for high-performance and high-reliability solar power generation," project commissioned from Japan's New Energy and Industrial Technology Development Organization (NEDO).

*1 A type of crystal structure.

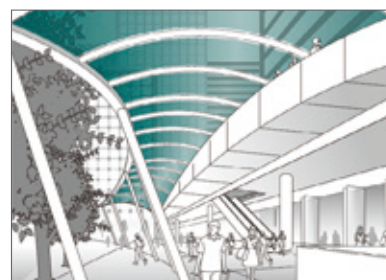
*2 Among perovskite film-based solar cell modules; According to a survey by Toshiba as of June 2018.

Related page:

[A Lightweight and Flexible Solar Panel - The Future of Solar Energy? \(Toshiba Clip\)](#)



Perovskite film-based solar cell module



Example of practical application

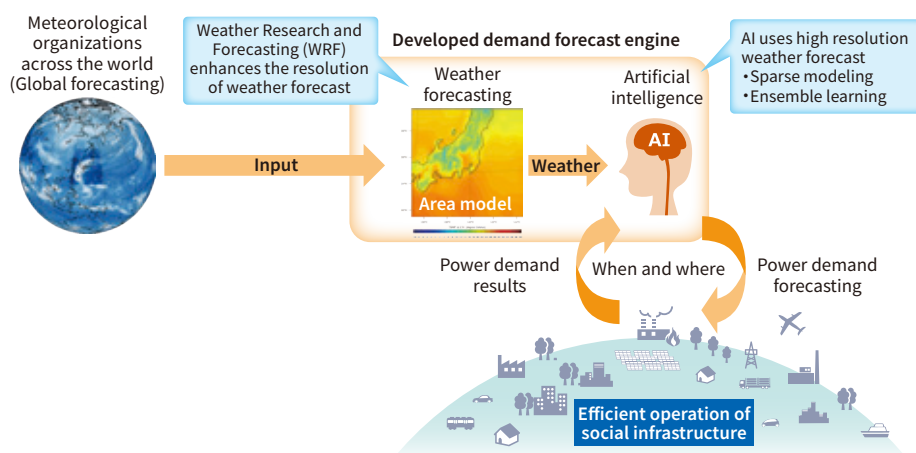
Case 4

AI technology for accurate forecasting of power demand and solar power output

Toshiba Corporation
Corporate Research & Development Center

Electric utility companies usually operate power stations while forecasting the amount of power that will be needed. Since a power shortage may cause a serious accident such as a major power outage, stand-by operation of thermal power stations is performed so as to immediately respond to power demand that exceeds the forecast. If the forecast is accurate, unnecessary stand-by operation will no longer be needed thus resulting in improved power generation efficiency and therefore a reduction in CO₂ emissions. To achieve this we will apply AI in a system to accurately forecast power demand and solar power output.

Power demand and solar power generation are largely dependent on weather conditions. Therefore, by teaching AI weather conditions such as temperature and the amount of solar radiation that affect power demand and solar power output, we improved the accuracy needed to forecast future power demand and solar power output. We participated in the "First Electricity Load Forecasting Technology Contest" hosted by Tokyo Electric Power Company Holdings (TEPCO) and the "PV in HOKKAIDO Contest on Technology for Predicting Solar Energy Production" jointly hosted by TEPCO and Hokkaido Electric Power and received both best award and grand prize. Looking forward from here, we will aim to introduce a system to support utility companies in operating efficiently in anticipation of renewable energy to serve as a major power source.



Actions for the Achievement of Sustainable Development Goals (SDGs)

Sustainable City

Case 5

Next generation propulsion system for railway rolling stock

Toshiba Infrastructure Systems & Solutions Corporation

Even in the railroad industry, further energy saving is required in response to an increasing number of users. To accomplish this we have developed the world's first propulsion system that combines: (1) VVVF^{*1} inverter using All-SiC (silicon carbide) devices^{*2} that contribute to high efficiency and smaller size; (2) totally enclosed permanent magnet synchronous motors (PMSM) that achieves even higher efficiency; (3) power supply for emergency run equipped with SCiBTM^{*3} featuring regeneration^{*4} and absorption functions as well as a power^{*5} assist function. This system which is installed on the 2000 series new train of the Tokyo Metro Marunouchi Line, reduces power consumption by 27% compared with the current 02 series train.

^{*1} Variable voltage variable frequency

^{*2} Manufactured by Toshiba Electronic Devices & Storage Corporation

^{*3} Manufactured by Toshiba Corporation

^{*4} To transform a braking force of rolling stock into electric power

^{*5} Train car accelerates after receiving electrical power



VVVF inverter using All-SiC devices



Totally enclosed PMSM



Power supply for emergency run equipped with SCiBTM



The Tokyo Metro Marunouchi Line 2000 series train
Photo provided by Tokyo Metro Co., Ltd.

Case 6

Toshiba machine-room-less elevator SPACEL-GR II

Toshiba Elevator and Building Systems Corporation

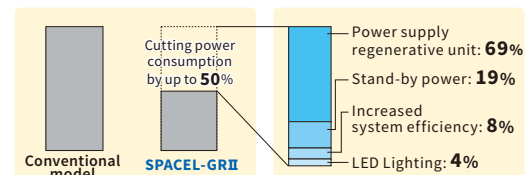
The SPACEL-GR II is an elevator developed with the aim of improving ride safety, security, and comfort. Equipped for the first time in the industry with a feature to eliminate the gap between the elevator and the building when passengers get on and off the elevator, the SPACEL-GR II prevents accidents caused for example by a cane or shoe caught in the gap or dropped items. In addition, by grasping the movement of people around the elevator using advanced image analysis technology, it efficiently opens and closes the door and prevents a passenger from becoming caught there.

In terms of environment, while reducing power consumption by up to 50%^{*} through the use of regenerative electric power and adoption of LED lighting, as well as by reducing stand-by current with a controller and improving system efficiency, it also reduces hazardous substances by use of the following: guide rails needing no lubrication through use of a roller guide shoe, by reducing the lead content, and adopting mercury-free LED lighting, and use of non-vinyl chloride decorated steel plates.

^{*} Comparison of elevator with a speed of 105 m/min for 15 passengers which uses regenerative electric power function versus the conventional model (SPACEL-EX) (A survey by Toshiba)



The no-gap threshold eliminates the gap between the elevator and the building.



Comparison of power consumption between the conventional model and the SPACEL-GR II

Case 7

Spot and zone air-conditioning system "FLEXAIR"

Toshiba Carrier Corporation

In addition to energy saving performance, air-conditioning a large space such as a warehouse, exhibition hall, and factory, requires high efficiency products to deal with issues in installation restrictions, environmental improvement effects, and others. To accomplish this, we worked to develop a product that does not require a ceiling duct, can effectively use columns and wall surfaces as the installation locations, and can create more appropriate air-conditioning environment based on high-speed airflow control for each spot and zone requiring air-conditioning while maintaining excellent energy saving performance and have completed the spot and zone air-conditioning system "FLEXAIR." This product features an annual performance factor (APF) of 4.86 and can reduce the power consumption per period by as much as 26% when compared with the floor installation, direct blowing type^{*} used in many workplaces and the like. These factors were highly rated and the product received the METI Minister's Award in the FY2018 Energy Conservation Grand Prize.

^{*} When the system is operated in a space extending 60 m x 40 m at a necessary cooling capacity of about 300 kW.

Evaluations [Refer to page 72](#)



Spot and zone air-conditioning system "FLEXAIR"

Case 8

LED high-bay lighting fixture (lightweight type)

Toshiba Lighting & Technology Corporation

Conventionally high-bay lighting fixtures had been assembled with HID lamps*¹ (hereafter, conventional fixture) and were used at large space facilities such as arenas, gymnasiums, factories, and warehouses. The conventional fixture has generally been used in between the luminous flux range of 1 kW metal halide lamp (96,000 lm total luminous flux*² at 1,050 W rated wattage) and of 250 W metal halide lamp (22,000 lm total luminous flux at 275 W rated wattage).

However, in accordance with the implementation of the planned electric outage consequent upon the Great East Japan Earthquake, conventional fixtures which have inefficient energy consumption have been rapidly replaced with high efficiency LED high-bay lighting fixtures. Also, it is required to reduce weight load on ceiling for the prevention of damages caused by the possible next severe earthquake, when the existing buildings are repaired and the aseismic capacity are improved. In the view of this situation, we have developed LEDJ-21001N-LD9 LED high-bay lighting fixture (lightweight type) featuring both high efficiency and light weight. As a result, we have achieved approximately 62% lighter weight and around 4.3 times higher efficiency compared to the conventional fixture equivalent to a 400 W metal halide lamp.

This product was awarded the Energy Conservation Center, Japan Chairman's Award in the FY2018 Energy Conservation Grand Prize.

*¹ High intensity discharge lamp

*² Amount of light per unit of time

Evaluations [Refer to page 72](#)



LED high-bay lighting fixture (lightweight type)



Case 9

Structure health monitoring using AE sensing

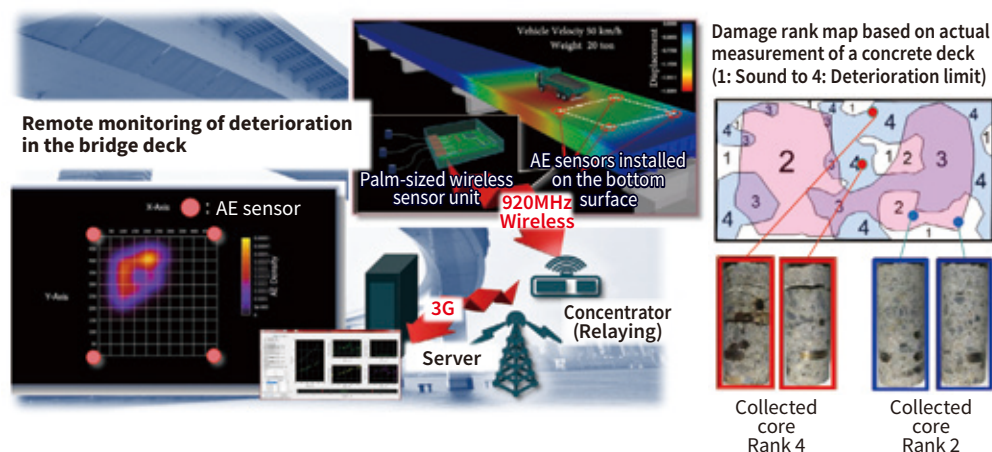
Toshiba Corporation
Corporate Research & Development Center

The market scale for infrastructure maintenance and management technology is expected to reach approximately 700 billion yen in 2030. As for 25% of the domestic bridges over 2-meter length, more than 50 years has passed since they were built by 2018, and also 68% of them by 2033. Under these circumstances, more efficient technology is newly required that takes place of conventional technique such as visual and hammering inspections. Toshiba has developed new monitoring system that is made to realize preventive maintenance by sensing the progressive damage of structures. The system detects Acoustic Emission (AE)*¹ generated from inside structural components, like micro crack, wear, and flake, enabling us to detect internal damages that may cause massive destruction.

Now we are targeting at Reinforced Concrete (RC) deck of a highway bridge. AE sensors are installed on the surface of the bottom panel, and AE waves generated from internal cracks in concrete are detected on passage of the vehicles. AE signals are sent to distant server via palm-sized wireless sensing units and accumulated. The signals are analyzed with our original signal processing technique in order to visualize the location and the scale of the cracks. Through the long-term verification test at the public highway bridge, we have good prospects of detecting the internal cracks.

*¹ Acoustic Emission refers to the generation of transient elastic waves generated by a sudden redistribution of stress or other stimulus in a material.

* This technology includes successful results from the "Systems Development Project to Address Social Issues Related to Infrastructure Maintenance, Management, and Renewal" supported by the New Energy and Industrial Technology Development Organization (NEDO).



Actions for the Achievement of Sustainable Development Goals (SDGs)

Circular Economy

Case
10

Manufacturing IoT solution "Meister Series"

Toshiba Digital Solutions Corporation

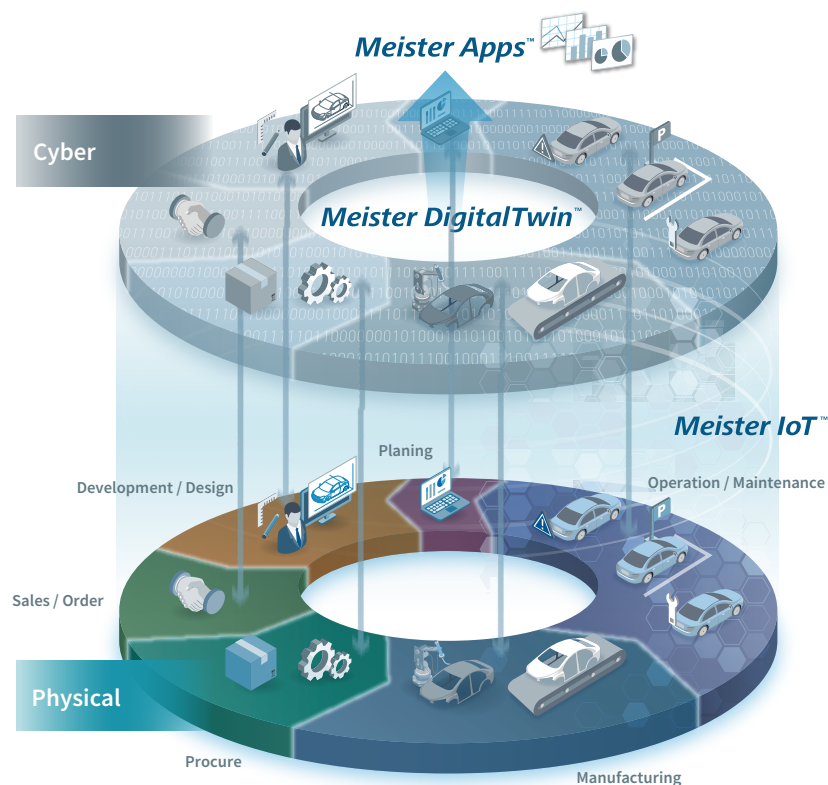
The environment surrounding manufacturing throughout the world is undergoing a drastic change and the manufacturing industry is required to not only achieve higher than ever productivity and quality through optimization of the entire value chain, but also increase the usage value by knowing how individual customers use products. Based on our knowledge and practical skill that only a manufacturing company possesses, we provide Meister Series manufacturing IoT solutions as ICT solutions that support such a change.

The solutions provide an integrated information platform that associates diverse and massive data generated from manufacturing sites and maps the past and present data related to each product on a digital space in fine detail. This allows visualization and analysis of data covering the entire product lifecycle, thus contributing to the total optimization of manufacturing including further improvement of productivity and quality as well as operation and maintenance.

* IoT: Internet of Things

Related page:

[Manufacturing IoT solutions "Meister Series"](#)



Data Usage	IoT data utilization solution for manufacturing Meister Apps™	Manufacturing IoT development kit Meister Visualizer™ Tools
Data Storage	Data Connection platform for manufacturing Meister DigitalTwin™	
Data Collection	IoT data collection solution for the manufacturing industry Meister IoT™	
Sensors Devices		
Manufacturing		

Case
11Digital O&M Solutions IoT Standard Pack,
Meister Digital Field Work, and Meister AR Suite

Toshiba Digital Solutions Corporation

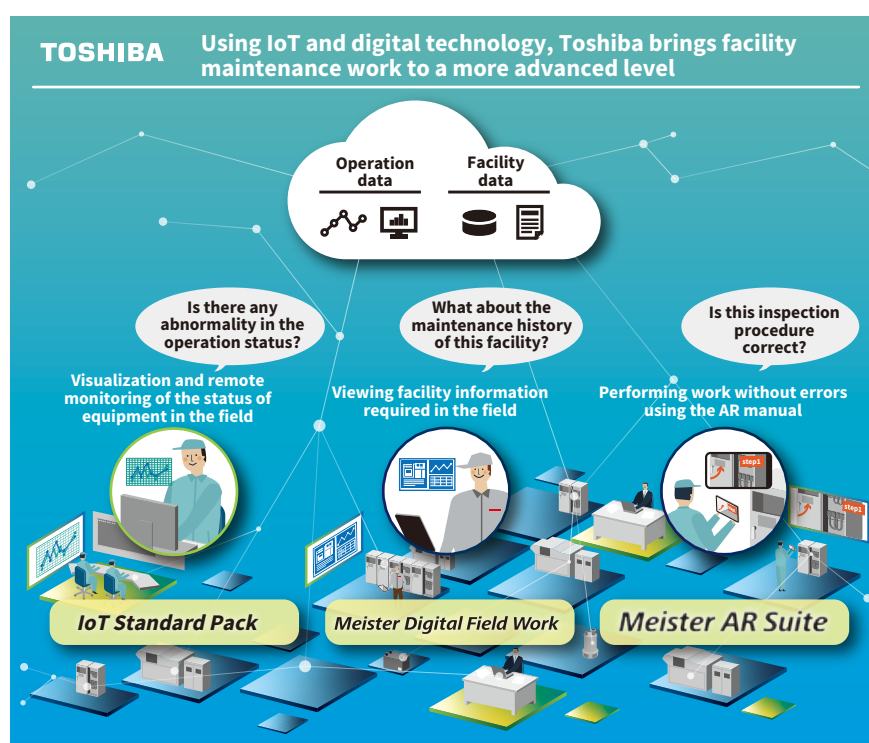
In the field of operation and maintenance (O&M^{*1}) of factories and infrastructure facilities in Japan, response to issues such as aging workers and a lack of younger successors is required. In addition, improving the O&M processes and increasing the capacity utilization ratio with digital technologies, such as IoT and AI^{*2}, and transformation to a new business model where products and the maintenance and operation services are integrated are expected.

Meanwhile, we provide solutions by combining Toshiba Group's experience in practicing O&M as a facility and industrial equipment manufacturer as well as a facility and equipment user in factories with our digital technology. By providing the "IoT Standard Pack" for remote monitoring of facilities and equipment and supporting operations and "Meister Digital Field Work" and "Meister AR^{*3} Suite" to support workers in the field through converting the knowledge and skills of experienced workers into digital information, we promote sustainable O&M for factories and infrastructure facilities.

*1 O&M: Operation & Maintenance

*2 AI: Artificial Intelligence

*3 AR: Augmented reality



Actions for the Achievement of Sustainable Development Goals (SDGs)

Case 12

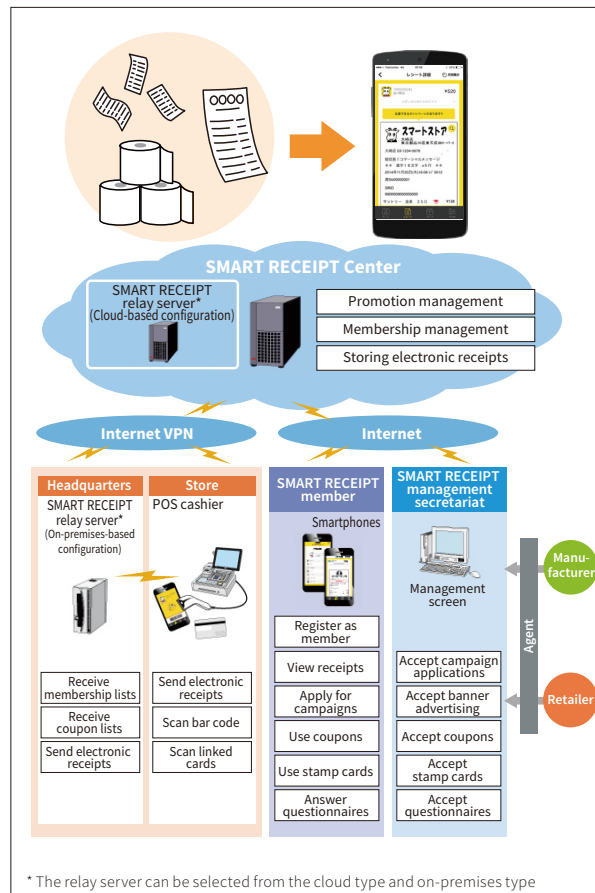
Electronic receipt service SMART RECEIPT

Toshiba Tec Corporation

SMART RECEIPT is a system that digitizes receipts that customers receive when they make purchases at a cash register and manages and provides these receipts as data from SMART RECEIPT Center. While customers can check their shopping histories anytime and anywhere via smartphones, stores can improve the efficiency of cash register tasks performed by their employees, and eliminate the cost of issuing paper-based receipts. In addition, promotion services such as paper-based receipt coupons and stamp cards can be digitized thus reducing the operational cost as in the case of receipts.

The volume of receipt paper consumed in Japan in one year amounts to approximately 5.4 tons which corresponds to as many as 13.5 billion sheets of A4 copy paper.* Reducing the amount of receipt paper through SMART RECEIPT will contribute to reducing paper resources wasted after receiving such receipts as well as lead to reducing CO₂ emissions and the amount of water used associated with manufacture of paper. Furthermore, reducing receipt paper can reduce the amount of pulp used, which will control the harvesting of forest resources, the raw material for receipt paper, and thus lead to protection of precious forest resources.

* A survey by Toshiba (The volume of paper shipped for cash registers is estimated based on the volume of thermal paper shipped within Japan)



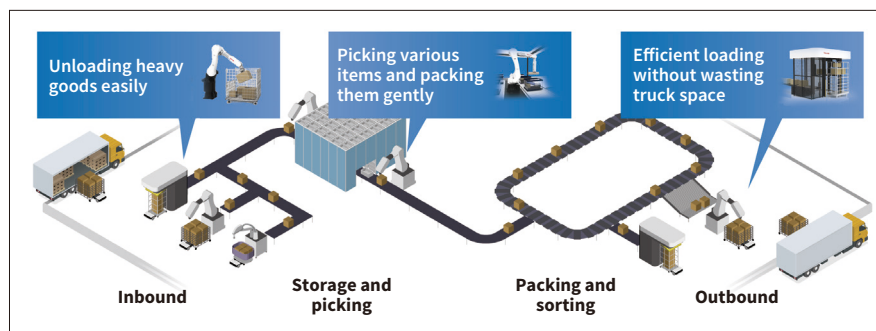
Case 13

Logistics system solution

Toshiba Infrastructure Systems & Solutions Corporation

In recent years in Japan, the demand for logistics services has sharply increased due to the growth of e-commerce, causing labor shortages in the logistics industry such as the lack of drivers.

In order to solve this problem, by utilizing our postal automation technologies, we provide various robotic solutions including unloading, picking, and loading systems in the logistics fields where there is a high demand for automation. We also propose solutions that contribute to the automation of entire warehouse, which improves operational efficiency by multi-linked robots and by connecting to automated warehouses. Eventually, using IoT and AI, we aim to realize a labor-saving automation and optimization for the entire logistics value chain.



Logistics robot system solution

Case 14

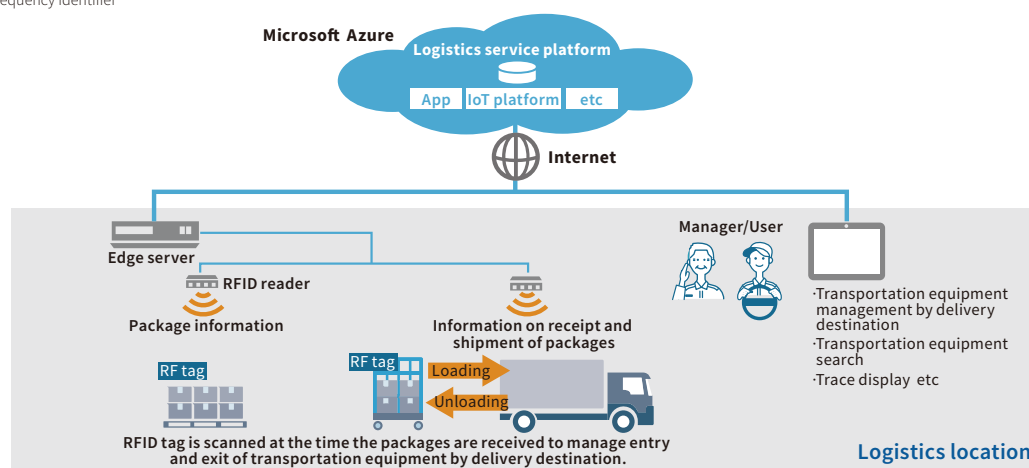
Logistics IoT solutions: LADOCsuite and LogiTrace tracing and location management services

Toshiba Digital Solutions Corporation

In the field of logistics where labor shortage continues, expectations for improved logistics processes and overall optimization through information sharing between stakeholders involved in transportation and delivery work (shipper, warehouse company, transportation company, etc.) are increasing. Reflecting the surge in transportation costs, and cutting the cost of purchasing additional transportation equipment due to lost or insufficient inventory of such equipment has become an issue.

We provide LADOCsuite and LogiTrace, transportation equipment tracing and location management services for dealing with such issues. These services automatically collect location data of transportation equipment handled in the field of logistics and visualize their movement by using RFID* to contribute to improving the efficiency of transportation and distribution work and reducing logistics costs through automating work for associating transportation equipment and delivery destinations, reducing the burden of location management for transportation equipment at delivery destinations or the shipper's own sites, appropriately managing assets by curbing loss of transportation equipment or uneven distribution of equipment between locations.

* RFID: Radio frequency identifier



Case 15

Zero Liquid Discharge (ZLD) System

Toshiba Infrastructure Systems & Solutions Corporation

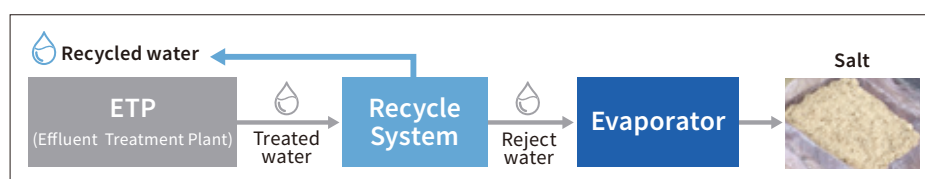
Among developing countries where population and industries are sharply concentrated in cities, water pollution due to industrial wastewater is becoming increasingly serious and the needs for improving wastewater quality and preserving the water environment are increasing. Especially in countries like India where laws and regulations are imposed, introduction of a zero liquid discharge (ZLD) system for treating and reusing discharged wastewater within the factory and reducing water to be discharged from the factory to outside to zero is getting popular.

We are promoting technology development aimed at further sophistication of the system, such as improving the recovery rate with prevention measures for membrane clogging and reducing soluble fractions with the adoption of appropriate pre-treatment process.

By increasing installation achievement of the ZLD system in developing countries, we will contribute to reducing the risk of river water pollution and to effectively using water resources.

Related page:

[Solutions for Industrial Field: ZLD with HERO™](#)



Flow of the ZLD (zero liquid discharge) system process

Material issues

Since FY2015, Toshiba Group has set three high priority responsibilities (Materiality). In reference to opinions from stakeholders as well as assessment reviews by third-party organizations and including self-evaluations conducted based on the international guidance standard ISO 26000 which concerns the social responsibilities of organizations, we evaluated these responsibilities in terms of material issues for both Toshiba Group and its stakeholders, and identified the following three high priority responsibilities. One of them is "Environmental Management," and among various environmental issues, we have chosen the following three items having both risks and opportunities with relatively high priority responsibilities: "Climate change mitigation and adaptation," "Sustainable resource use," and "Prevention of pollution."

■ Significance of Environment-related Items in Toshiba Group's High Priority Responsibilities

	Basic	Middle	High
High			<ul style="list-style-type: none"> • Climate change mitigation and adaptation • Sustainable resource use • Prevention of pollution
Middle		<ul style="list-style-type: none"> • Environmental protection, biodiversity and restoration of natural habitats 	
Basic			

Impact on Toshiba Group

For details about Toshiba Group's identifying material issues, visit our [CSR website](#)

We consider "Climate change mitigation and adaptation" to have significant impacts on business activities due to the magnitude and scale of their influence. According to IPCC*, to achieve a figure below the climate target of 2°C, the accumulated CO₂ emissions must be below 800 GtC. It was also pointed out that if the current level of emissions continues, the accumulated emissions will exceed the acceptable limit within 20 to 30 years. It is also anticipated that unusual weather will occur more frequently so there will be greater corresponding fluctuations in weather patterns. Our efforts for significantly reducing GHG emissions toward achieving a de-carbonized society involve making a drastic change in our efforts for significantly reducing GHG emissions in our social system while still feeling very uncertain of what steps to take, which also holds true for the rapid surfacing of impacts from rising temperatures and climate change. It is absolutely essential that we recognize the risks and opportunities involved in such a drastic change and incorporate them into our future corporate management.

As for "Sustainable resource use," risks, such as introduction of laws and regulations regarding resource efficiency as well as energy efficiency, resource price hikes, and pro-

curement, are expected. While reducing costs by improving resource efficiency, we will work to shift to a business model with a higher resource efficiency as well as lower our dependency on resources through reuse and recycling.

In regard to "Prevention of pollution," we will ensure that chemicals contained in products are managed with the aim of minimizing the risk from the chemical substance. Since various related laws and regulations are being fully implemented on a global basis, we will prevent the risk of business suspensions due to delays in compliance by ensuring information transmission along the supply chain. Meanwhile, we have developed a simplified screening technology for the four phthalates since we consider that compliance with laws and regulations to be introduced also represents a business opportunity.

With the aim of achieving Environmental Vision 2050, Toshiba Group's environmental management will continue to take initiatives mainly for these high priority responsibilities.

*Intergovernmental Panel on Climate Change

Climate Change Risks and Opportunities

As described above, climate change risks and opportunities are important management issues and multiple KPIs are included in the action plan for 2020 (the Sixth Environmental Action Plan) as responses to climate change. To manage greenhouse gas emissions we set KPIs in terms of both business processes and products and services by taking into account that in addition to compliance with policies such as carbon tax and energy-saving regulations, the companies' commitment to climate change will affect their environmental brands and even selection of their products and services by customers.

Greenhouse gas management by business processes is effective in reducing transition risks in the course of future enhancement of regulations (for example, future introduction or enhancement of a carbon tax system). In addition, we consider increasing our competitiveness by improving productivity while reducing transition risks, and also boosting our reputation by promoting GHG reduction activities that exceed the industry level as representing opportunities for us.

For products and services, the enhancement of energy-saving regulations poses risks. However, we have been monitoring and evaluating global trends of environmental laws and regulations by using industrial associations and external services, and also developing human resources that specialize in this area. In addition, since we have set CO₂ emission reductions from both the demand and supply sides as numerical targets so that opportunities such as expanding energy-saving markets and increasing energy

demand in regions can be optimized, we will expand the renewable energy business and increase our offerings of products and services having high energy efficiency.

Furthermore, under the Sixth Environmental Action Plan, we also included "Improvement of information disclosure" in light of risks and opportunities associated with reputation.

We will continue to work on these KPIs, whose progress is managed at meetings of the Corporate Environmental Management Committee held once semi-annually in light of external trends. In addition, the target values for the various KPIs for FY2019 onward will be reviewed in order, according to the medium-term management plan, Toshiba Next Plan, announced in November 2018.

Toshiba Group has also been comprehensively assessing risks and opportunities on a mid- to long-term basis in line with recommendations made by the Task Force on Climate-related Financial Disclosures (TCFD). Toshiba Group has four business domains, namely energy, electronic devices, digital solutions, and social infrastructure as the core, so each business has different risk drivers. For this reason, Toshiba Group companies individually identify risks and opportunities in light of their business situations. We assess the following items according to the risk items defined by the TCFD: introduction or enhancement of a carbon tax system (policy and regulation risks), replacement of technologies (technology risk), lawsuits on climate change (legal risk), further emphasis on energy-saving performance (market risk), damage to environment brands (reputation risk), and business suspensions due to flooding, etc. and an increase in fuel and lighting expenses (physical risk). We assess the probability of each of these risk items on a 10-point scale, further assess the extent of their impacts on a 5-point scale, and list the risk measures as well. As for opportunities, Toshiba Group companies evaluate their own businesses from the viewpoint of both areas that are driven as a result of transition to a de-carbonized society and further market expansion, and we will update these opportunities as necessary while reflecting the latest external trends in them.

The coal fired power generation business is now amidst business circumstances where the financial impacts will increase due to the climate change risk. However, it is also true that this is a risk largely dependent on the policy trends in the country or the entire region and transcends the management decisions of a single business entity. Under the Toshiba Next Plan, based on the recognition of such risk and in view of international trends such as the increasing adoption of renewable energy, shifting from new construction of a coal fired power plant to a service business, and building up the renewable energy business are ranked as priority measures.

The reputation risk must now be taken more seriously. It is important to enhance information disclosure related to climate change and maintain communication with various stakeholders. Toshiba Group supports the TCFD recommendations and participates in the "TCFD Consortium" established with the aim of promoting the implementation of initiatives among supporting institutions in Japan in a unified manner. Through this consortium, we will discuss initiatives for effectively evaluating and disclosing climate related financial information as well as for enabling financial institutions, etc. to make appropriate investment decisions based on disclosed information and in this way enhance the disclosure of ESG information.

Although there are no physical risks that have yet surfaced at the moment, we recognize that the impacts from unusual weather on production and logistics are on a gradually increasing trend from hereon into the future. In the event of a large-scale disaster such as flooding and typhoons at the production and sales sites of Toshiba Group, the operation of such production sites may be suspended due to damage to production facilities, suspension of procurement of raw materials and parts, and paralyzed distribution and sales functions. We formulate a business continuity plan (BCP) for each business and production site and work with multiple suppliers to deal with such risks.

On the other hand, since our core operation is a social infrastructure business, we believe it is our mission to implement low carbon and de-carbonized systems in our society as quickly as possible and to accelerate the transition to a de-carbonized society. We believe that pursuing that mission will lead to great business opportunities. Under the Toshiba Next Plan, we regard de-carbonization in the mobility field as a growth market and aim to increase sales of e-Mobility equipped with our unique rechargeable battery SCiB™. By taking advantage of SCiB™ features such as its fast charging, long life, and safety, we have already achieved various applications for this battery, including in electric vehicles (EV) and EV buses.

In addition, de-carbonization of buildings and other facilities is also an area where our strength can be utilized and long-term growth can be expected. Since FY2019, our elevator, lighting, and air conditioner businesses have been integrated into one business as a result of establishment of the Group Relations Division and in this way shifted to a system where cooperation between the three business domains will be strengthened even further.

On the other hand, needs for adaptation to climate change are expected to further increase and so we believe that expansion of disaster prevention solutions including weather radars and rainwater drainage systems in preparation for urban floods, and global development of air conditioner sales for heat stroke prevention will help expand our business.

Making Supply Chain GHG Emissions Visible for All Categories

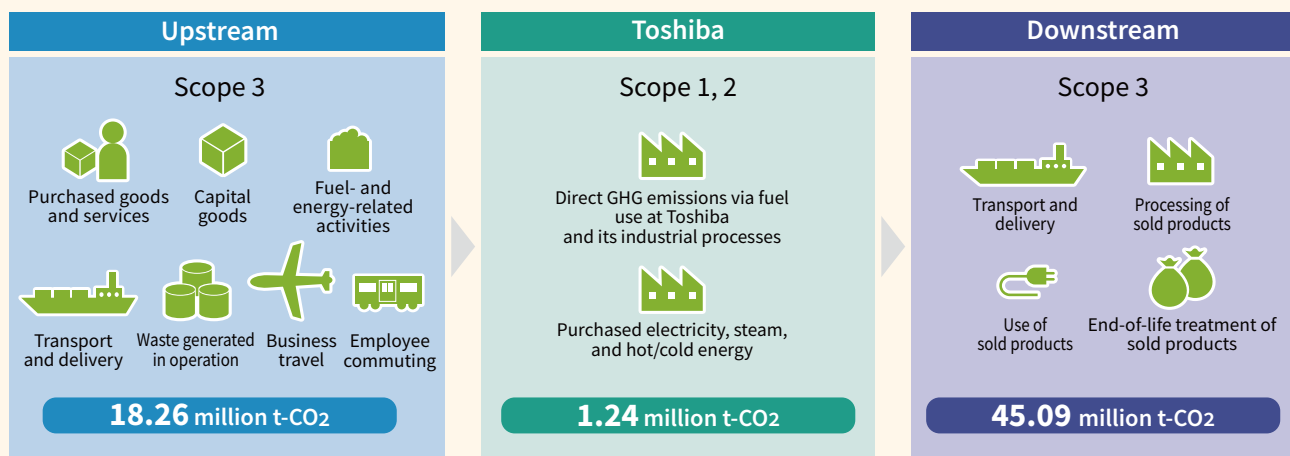
As climate change becomes an increasingly serious issue, companies must manage not only their own greenhouse gas (GHG)*¹ emissions but also emissions generated throughout their entire supply chain. Based on the GHG Protocol*², which provides international standards for calculating GHG emission, and the Ministry of the Environment's Basic Guidelines for Calculating GHG Emissions throughout the Supply Chain, Toshiba Group calculates indirect GHG emissions generated outside the scope of its own business activities (Scope 3) in addition to its own emissions (Scopes 1 and 2).

Toshiba Group will continue working effectively throughout product lifecycles by quantitatively analyzing emissions per category as described above. GHG emissions especially during use of sold products account for many of GHG emissions from across the entire value chain. We will therefore continue to improve energy-saving performance of products and take other measures as needed.

*1 CO₂, CH₄, N₂O, HFCs, PFCs, SF₆, NF₃

*2 The Greenhouse Gas Protocol (GHG Protocol): Guidelines for calculating and reporting GHG emissions formulated by companies, NGOs, and government organizations under the leadership of the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD)

(FY2018)



Category	Categories covered by calculations		FY2017 calculation results (10,000 t-CO ₂)	FY2018 calculation results (10,000 t-CO ₂)	Considerations
Upstream	1	Purchased goods and services	2,499	1,753	
	2	Capital goods	21	43	
	3	Fuel- and energy-related activities (not in Scope 1 or 2)	6	6	
	4	Upstream transportation and distribution	20	19	
	5	Waste generated in operation	1	2	
	6	Business travel	5	3	
	7	Employee commuting	—	—	GHG emissions for this category were estimated at 0.1% of the total or less
	8	Upstream leased assets	—	—	This category is not relevant, due to the fact that the type of industry category of Toshiba is manufacturing
Toshiba	9	Direct GHG emissions (Scope 1)	33	34	
	10	Indirect emissions associated with energy-derived emissions (Scope 2)	94	90	
Downstream	11	Downstream transportation and distribution	7	6	
	12	Processing of sold products	—	—	We mainly deal with finished products and parts that do not require processing
	13	Use of sold products	4,263	4,501	
	14	End-of-life treatment of sold products	3	2	
	15	Leased assets (Downstream)	—	—	This category is not relevant, due to the fact that the type of industry category of Toshiba is manufacturing
	16	Franchises	—	—	This category is not relevant, due to the fact that the type of industry category of Toshiba is manufacturing
	17	Investments	—	—	This category is not relevant, due to the fact that the type of industry category of Toshiba is manufacturing
Total			6,952	6,459	

Toward the Realization of Environmental Vision 2050

Toshiba Group will resolve global environmental issues and create new value through innovation to ensure that all people can lead affluent lifestyles in harmony with the Earth.

Environmental Vision 2050

Toshiba Group tackles various social issues head-on and provides countermeasures based on technology through its business activities. “Toshiba Next Plan,” our medium-to longterm management plan announced in November 2018 states that Toshiba Group will focus investment in AI, rechargeable batteries, renewable energy, and other new growth businesses and develop as an outstanding company with the power to earn and grow by building a firm position as a cyber-physical systems (CPS) technology company. Under the Toshiba Next Plan, we will maximize our corporate value by bringing together our technological capabilities and developing businesses that will lead to the resolution of deepening social issues as well as contribute to the achievement of SDGs and realization of a sustainable society.

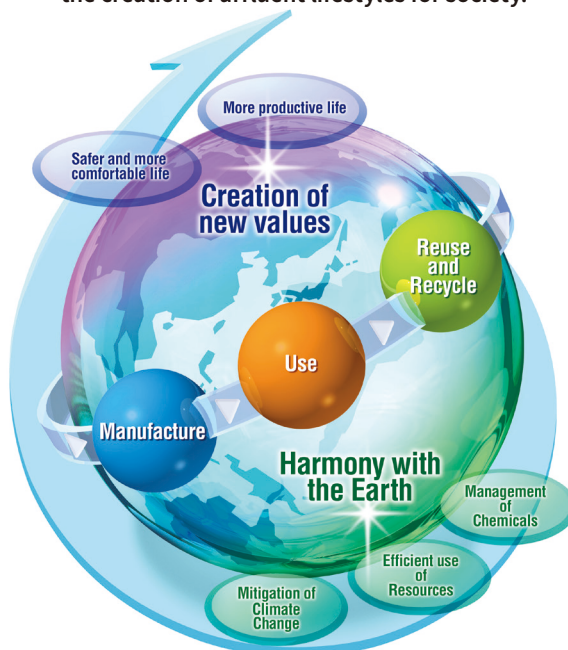
The world population topped 7.7 billion in 2019, and rapid population growth and the urbanization of populations are expected to continue to occur mainly in the emerging countries of Africa, Asia, etc., and the population is considered to reach nearly 10 billion in 2050. As a result, there are food, water, and energy shortages and the non-renewable resources that support today's society including fossil fuels, metals, and minerals, are decreasing. In addition, the temperature is rising due to the effects from global warming, causing serious problems worldwide including floods, droughts, and enormous typhoons. These various problems have complex interrelationships, and their effects spread by the year. Against this backdrop, the U.N. Sustainable Development Goals (SDGs) came into effect in January 2016 alongside the Paris Agreement which was put into effect in November of the same year to provide a new international framework to prevent global warming. Thus, guidelines and rules shared worldwide aiming to resolve global issues have been developed one after another in recent years. Companies en-

gaged in global business activities must therefore do more than before to resolve such issues.

Toshiba Group has developed Environmental Vision 2050, a corporate vision that envisages affluent lifestyles in harmony with the Earth as an ideal situation for mankind in 2050, and will work to realize this vision. Throughout the life cycle of products from manufacture and use to recycling and reuse, Toshiba Group will strive to provide safer and more comfortable lifestyles and create enriched value for customers. Toshiba Group will also strive for harmony with the Earth by working to mitigate climate change, using resources efficiently, and managing chemicals properly in order to reduce environmental impacts.

Environmental Vision 2050

Toshiba Group practices environmental management that promotes harmony with the Earth, contributing to the creation of affluent lifestyles for society.

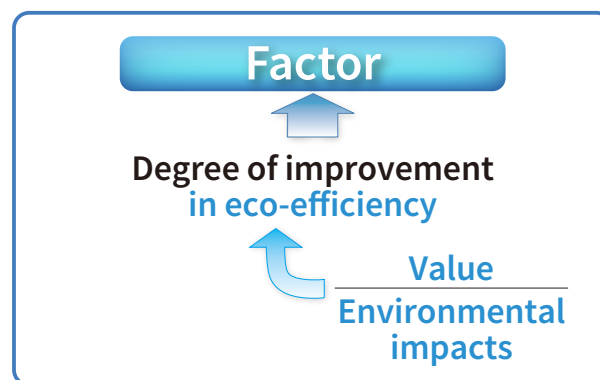


Performance indicators for our Vision

Based on the concept of eco-efficiency, we have set goals to ensure that all people can lead affluent lifestyles in harmony with the Earth as envisaged in Environmental Vision 2050.

Eco-efficiency can be expressed as a fraction, with the creation of new value as the numerator and environmental impacts as the denominator. The more enriched value created - or the more environmental impacts are reduced and progress made toward coexisting with the Earth - the more eco-efficiency improves. We call the degree of improvement in eco-efficiency the "Factor," and increasing the Factor leads to affluent lifestyles in harmony with the Earth.

Based on several predictions about the future shapes society may take, we examined how much we need to raise the Factor by 2050. It is assumed that the gross domestic product (GDP) of a country reflects value that its people can enjoy. According to the Organization for Economic Co-operation and Development (OECD), the world's average GDP per capita is expected to grow 3.4 times by 2050. It is also expected that the world population will increase by 1.5 times compared to 2000 by 2050. And at the Conference of Parties to the U.N. Framework Convention on Climate Change, participants emphasized that it is necessary to reduce greenhouse gas emissions by half by 2050.



If the three points cited previously are taken into account, the required degree of improvement in eco-efficiency (Factor) in the world in 2050 is 10.2 ($3.4 \times 1.5 \times 2$). In light of this, Toshiba Group has made it a goal to achieve Factor 10 by 2050.

Factor 10 cannot be achieved merely by conducting business as usual. This very ambitious goal can only be accomplished by developing multiple major innovations over an extended period. Nevertheless, we will strive to the utmost to achieve our goal. Also, if there are major changes in society or international rules before 2050, we will flexibly reexamine this goal as needed.

In addition to developing businesses through the promotion of the Toshiba Next Plan, we will aim to realize an ideal sustainable society of 2050 by working to create value and reduce environmental impacts toward the achievement of Factor 10.

Achieving Factor 10 in 2050 Ideal situation in 2050 (affluent lifestyles in harmony with the Earth)

Issues to address to realize the vision

Accelerated economic development
(esp. in developing countries)

Increase value creation by **3.4 times**

Increasing population growth

Reduce environmental impacts due to
overpopulation to **1/1.5**

Target: Cut CO₂ emissions 50% to
mitigate climate change

Reduce global environmental impacts
by **1/2**

<Environmental Vision 2050> Factor 10 ($3.4 \times 1.5 \times 2$)

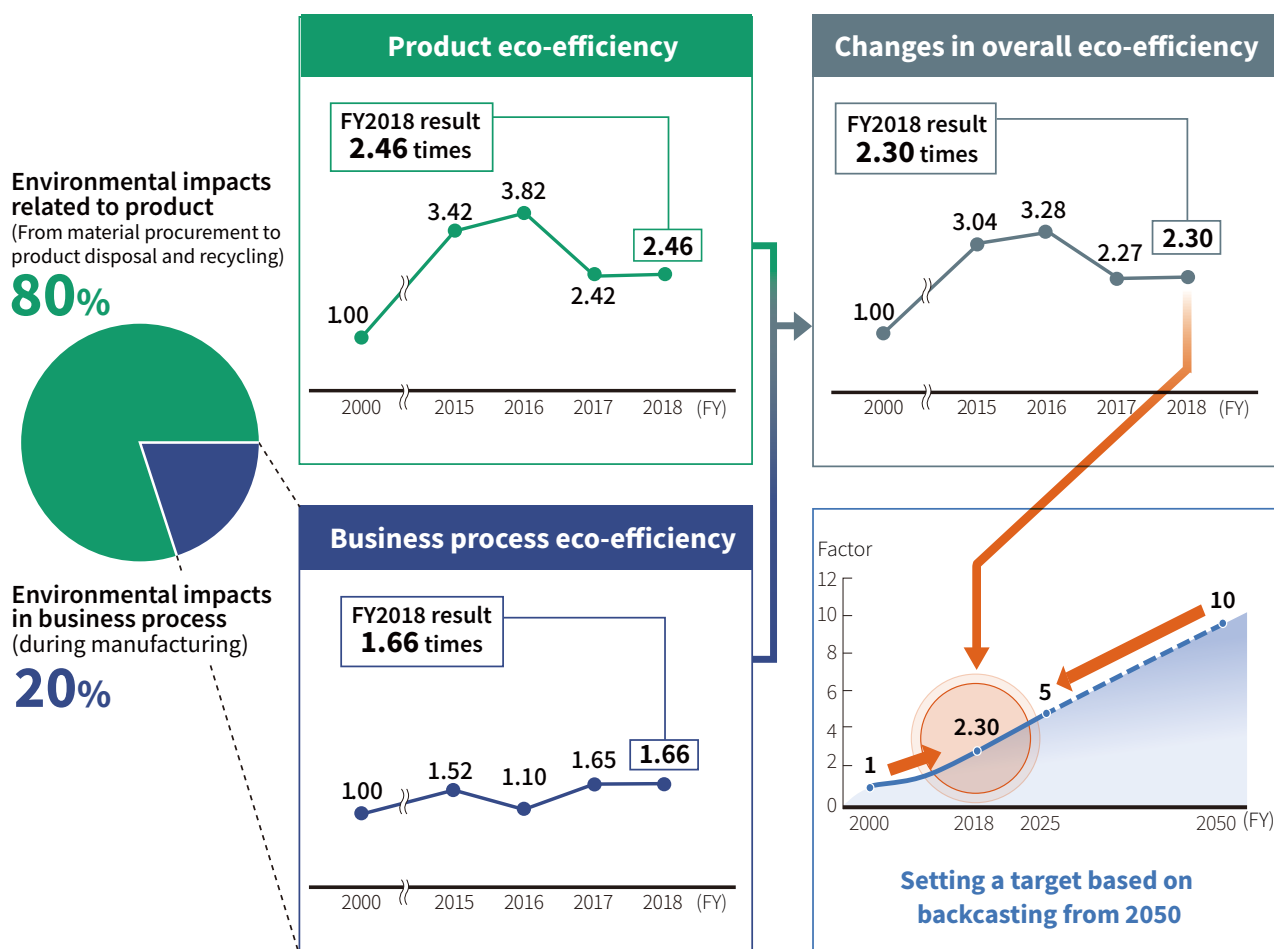
Eco-Efficiency and Factor

Overall eco-efficiency

Environmental Vision 2050 requires Toshiba Group to increase the degree of improvement in overall eco-efficiency ten times (Factor 10) by FY2050 compared to the FY2000 level.

Toshiba Group's overall eco-efficiency is calculated by combining product eco-efficiency and business process eco-efficiency. The overall eco-efficiency in FY2018 was 2.30 times the FY2000 level (Factor 2.30). Although our overall eco-efficiency decreased temporarily in FY2017 due to impacts from a significant change in the business structure, the situation turned around in FY2018 in both products and business process eco-efficiency under "Toshiba Next Plan," our newly formulated medium-to long-term management plan. In FY2019, we will continue to achieve further improvement through creation of high eco-efficiency products and services and improving our business process efficiency.

Changes in overall eco-efficiency



Product eco-efficiency (Factor T)

Toshiba Group originally developed a method for calculating eco-efficiency to introduce an indicator that allows overall assessment of products' environmental consciousness. Comprehensive activities for creating ECPs*¹ that are aimed at increasing the Factor are part of the Factor T initiative, which was named using the first letter from Toshiba's name.

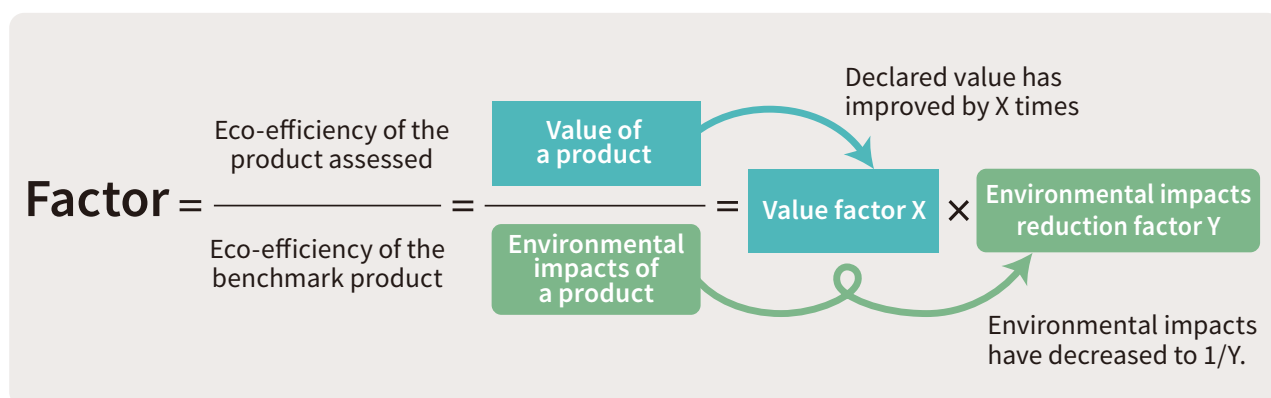
Factor T is expressed by multiplying a value factor, which represents a product's degree of improvement in value, with an environmental impacts reduction factor, which represents the degree of environmental impacts. The value factor quantifies the value of a product or service using QFD*², while the environmental impacts reduction factor assesses environmental impacts using LIME*³.

*1 ECP : Environmentally Conscious Products

*2 QFD : Quality Function Deployment is a standard tool used in product design.

*3 LIME : Life-cycle Impact assessment Method based on Endpoint modeling developed by the Research Center for Life Cycle Assessment, the National Institute of Advanced Industrial Science and Technology (AIST) as a method integrating various environmental impacts.

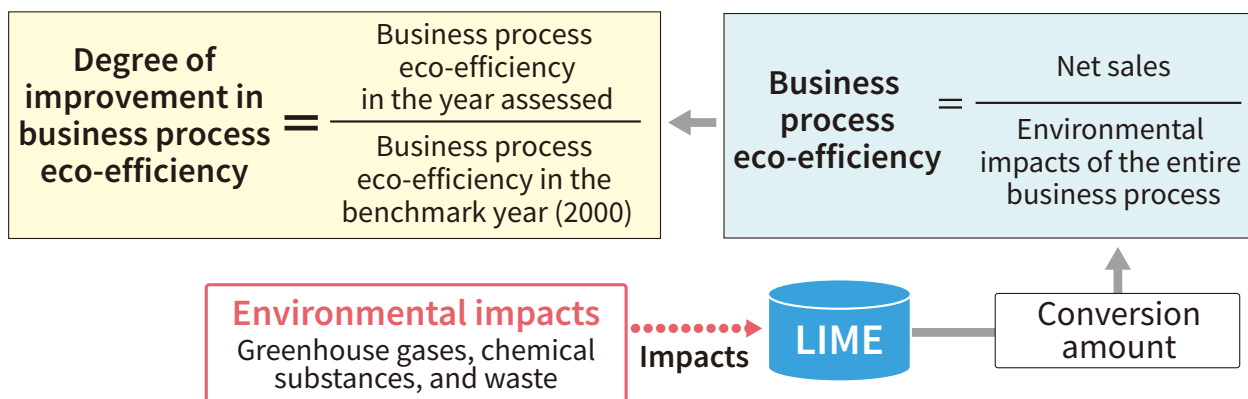
Calculation of product eco-efficiency (Factor T)



Business process eco-efficiency

Toshiba Group is striving to reduce environmental impacts by assessing the effect of environmental impacts on business activities and ranking the degree of improvement from the benchmark year as business process eco-efficiency.

Calculation of business process eco-efficiency



The Sixth Environmental Action Plan

Setting medium-term goals based on Environmental Vision 2050

In order to realize an ideal state of the Earth in 2050 envisaged by Environmental Vision 2050, Toshiba Group formulates Environmental Action Plan and manages specific environmental activities and their targets. Since Toshiba Group formulated its first Environmental Action Plan in FY1993, we have reviewed the scope of environmental activities and governance once every several years. Under the ongoing Sixth Environmental Action Plan for the period from FY2017 to FY2020, we set goals for 15 items in two areas: or namely activities to reduce environmental impacts in the lifecycles of products and services (Business), and basic activities to support such activities (Management). While further developing our activities along with these goals toward realizing Environmental Vision 2050, we will help resolve various social issues including climate change.

Progress of the Sixth Environmental Action Plan

The achievements made in FY2018 are summarized as follows. We achieved 14 targets among 15 targets and our activities made progress in all areas.

Business —Reducing environmental impacts in manufacturing—

We pursue high-efficiency manufacturing designed to simultaneously reduce environmental impacts and costs by properly managing greenhouse gases, waste, water, and chemicals emitted from production sites. In FY2018, we proactively promoted energy-saving measures and improved production efficiency, increasing the amount of waste converted into valuables, and reused water at our sites worldwide. As a result, we were able to achieve our targets for all items.

Business —Improving environmental performance of products and services—

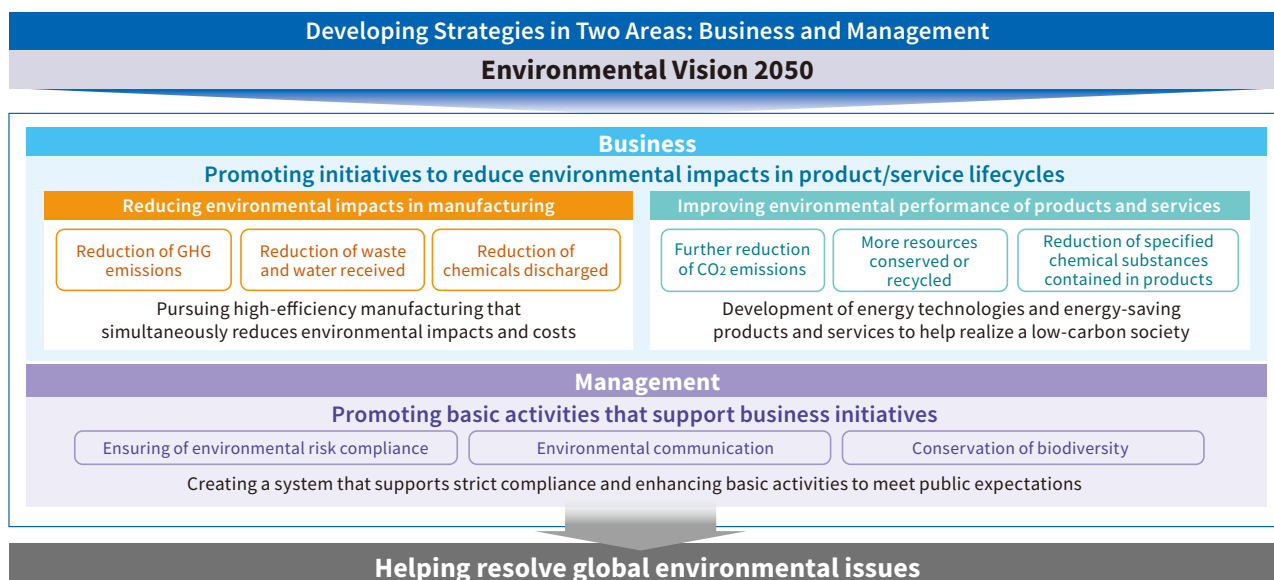
We are working to improve the environmental performance of products and services by reducing CO₂ emissions in terms of both power consumption and supply, by reducing product resource usage, and by managing the chemicals contained in products. In FY2018, although we fell short of our target for the item of increased reduction of CO₂ emissions (power supply)*, due to demand fluctuations, etc., we succeeded in steadily improving the energy-saving performance of products and services and reduced the usage of product resources in various businesses.

* Reductions in emissions from products and services associated with power supply such as power plants

Management

As basic activities that support business initiatives, we are ensuring environmental risk compliance, promoting environmental communication, and conserving biodiversity. In FY2018, in addition to strengthening compliance with global laws and regulations by holding study sessions for environment responsible persons in China where we have many production sites, we enhanced communication with various stakeholders by improving information disclosure in our Environmental Report and website, holding Toshiba Group Environmental Exhibition and educational programs for elementary school children, and conducting Global Environmental Action at our global sites. In terms of biodiversity conservation, we have conducted activities at our sites worldwide to achieve "Aichi Targets" which are global goals.

After sorting issues concerning the items for FY2018 that we could not achieve, we will further intensify our activities toward achieving FY2019 targets.



Toshiba Group's Sixth Environmental Action Plan

Business

Activity area	Activity content		FY2018			FY2019	FY2020
			Target	Result	Evaluation	Target	Goal
Reducing environmental impacts in manufacturing	Reduction of total greenhouse gas emissions*1		1.54 million t-CO2	1.24 million t-CO2	Achieved	1.61 million t-CO2	1.66 million t-CO2
			We further reduced greenhouse gas emissions by actively promoting energy-saving measures and by improving production efficiency at each site.				
	Improvement of total energy-derived CO2 emissions per unit activity (Compared to FY2013 level)		96%	95%	Achieved	94%	92%
			We further improved total energy-derived CO2 emissions per unit activity by actively promoting energy-saving measures and by improving production efficiency at each site.				
	Reduction of waste volumes*2		48,000 t	40,000 t	Achieved	51,000 t	52,000 t
			We further turned more waste into valuables and minimized waste volume through efforts to mprove production processes and sort waste more carefully.				
	Improvement of the total volume of waste generated per unit production (Compared to FY2013 level)		98%	91%	Achieved	97%	96%
			We further improved the total volume of waste generated per unit production by working to improve production processes.				
Improvement of the amount of water received per unit production (Compared to FY2013 level)		98%	92%	Achieved	97%	96%	
		We further improved the amount of water received per unit production by using recycled waste water and rainwater.					
Reduction of the total amount of chemicals discharged per unit production (Compared to FY2013 level)		98%	76%	Achieved	97%	96%	
		We further reduced the amount of chemicals discharged by taking such measures as to deal with solvents which ranked high among our emissions and to use alternative substances.					
Improving environmental performance of products and services	Increased reduction of CO2 emissions (cumulative total)	Power supply*3	12.9 million t-CO2	8.38 million t-CO2	Not achieved	16.1 million t-CO2	16.3 million t-CO2
		Although we worked to develop and spread wide ranging energy technologies, we failed to achieve a target due partly to demand fluctuations.					
	Power consumption*4	3.4 million t-CO2	3.78 million t-CO2	Achieved	4.9 million t-CO2	6.3 million t-CO2	
		We promoted the development of products with the highest energy-saving performance and highly energy efficient products.					
	Increased amount of resources saved (cumulative total)		180,000 t	200,000 t	Achieved	270,000 t	380,000 t
			We significantly reduced resource consumption for products in each area.				
	Increased amount of recycled resources (recycled plastics) used (cumulative total)		1,500 t	1,685 t	Achieved	2,280 t	3,000 t
We continue to increase their usage in products including MFPS and industrial air conditioners.							
Reduction of specified chemical substances contained in products							
Using alternative materials for four phthalates*5 or identifying alternates for all products by July 2019		—	We completed the replacement with alternatives for electronic devices and water heaters shipped to Europe	Achieved	Activities will be continued.		

Management

Activity area	Activity content		FY2018		FY2019	FY2020
			Result	Evaluation	Target	Goal
Ensuring of environmental risk compliance	Enhancement of compliance with global environmental regulations and human resource development		<ul style="list-style-type: none"> •We strengthened our internal response through collection and evaluation of impacts of legal information, information sharing through meeting bodies, and implementing human resource development measures •We held study sessions for environment responsible persons in China, which led to strengthening of legal compliance at our production sites. 	Achieved	Activities will be continued.	
Environmental communication	Improvement of information disclosure		<ul style="list-style-type: none"> •Toshiba Group Environmental Report 2018, Annual Report 2018, and CSR Report 2018 received an award of merit in the Ministry of the Environment's Environmental Communication Awards in Japan. 	Achieved	Activities will be continued.	
	Development of networks with stakeholders		<ul style="list-style-type: none"> •We held 27th Toshiba Group Environmental Exhibition, which received nearly 2,600 visitors. •We held educational programs for elementary school children at Toshiba Science Museum and elementary schools about 30 times. •We implemented more than 650 Global Environmental Action programs around the world. 	Achieved	Activities will be continued.	
Conservation of biodiversity	Contributions to Aichi Targets		<ul style="list-style-type: none"> •We conducted activities toward achieving Aichi Targets at 66 sites worldwide. 	Achieved	Activities will be continued.	

Note: Values related to the energy consumption required for manufacturing (nominal production amounts, number of products manufactured, number of persons, total floor area, etc.) are used for basic-unit goals for greenhouse gas emissions. For waste, water, and chemical substances, volume-based nominal outputs are used as an indicator for basic-unit goals that allows appropriate assessment.

*1 The CO₂ emission coefficient for electricity in Japan is 5.31 t-CO₂/10,000 kWh. Electricity outside of Japan is based on GHG Protocol data.

*2 Obtained by deducting the volume of objects with value from the total volume of waste generated (excluding the sites engaged in waste treatment and power generation)

*3 Reductions in emissions from products and services associated with power supply such as power plants. The calculation method is as follows:

For thermal power, compare with average CO₂ emissions per unit of electricity for the same fuel type; for renewable energy, compare with CO₂ emissions per unit of electricity for average thermal power of all types. Acquired the cumulative total amount of CO₂ emission reductions through power generation in FY2017 onward due to newly installed or upgraded facilities.

*4 Reductions in emissions from products and services associated with power consumption such as social infrastructure products. The calculation method is as follows:

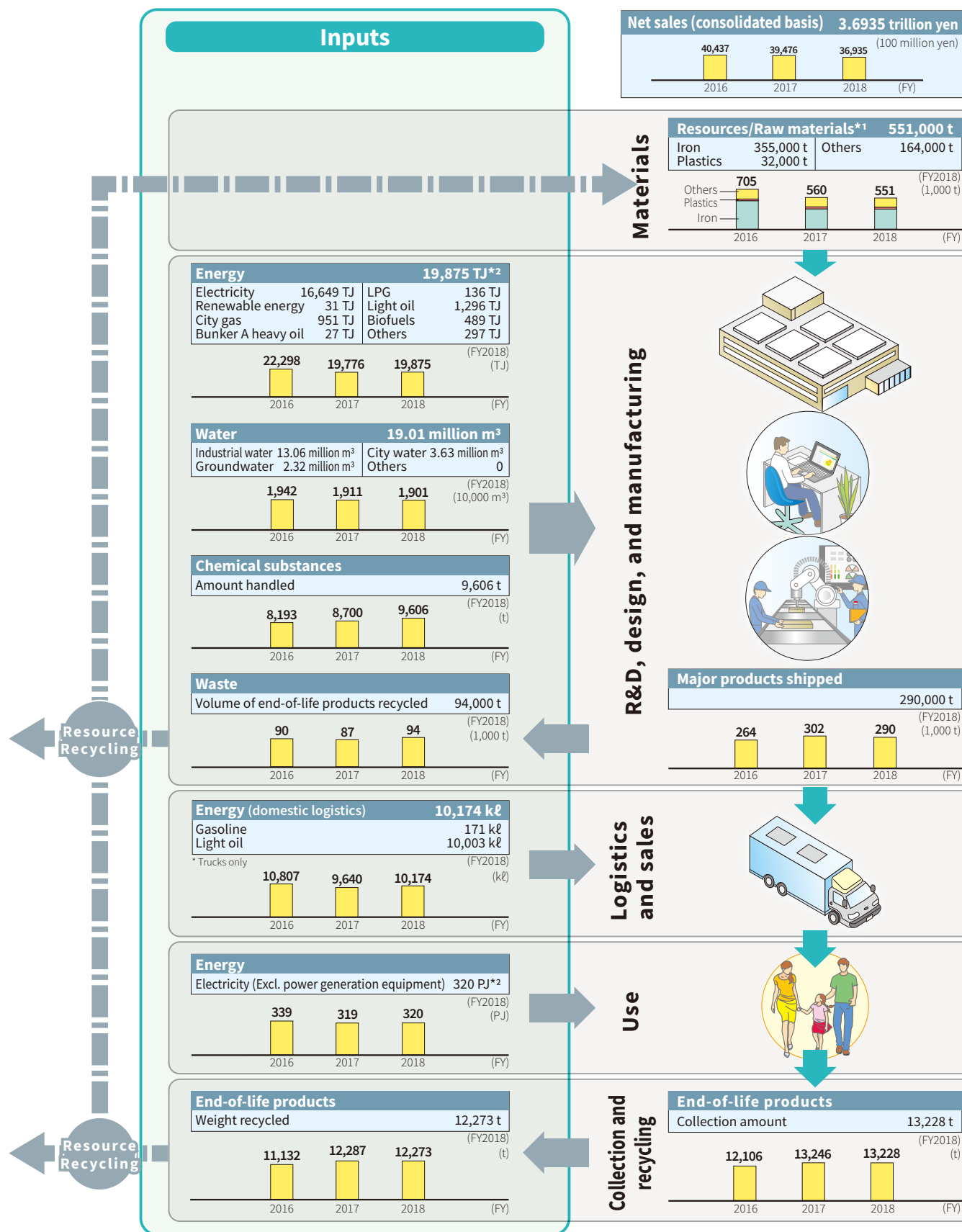
[CO₂ emissions of assumed substitute products – CO₂ emissions of shipped products] (Compares emissions per year during the usage stage and cumulates emissions for half the expected number of years of use)

*5 Bis (2-ethylhexyl) phthalate, butyl benzyl phthalate, di-n-butyl phthalate, and diisobutyl phthalate. These substances are used mainly as plasticizers for plastics (e.g., cable coatings) and there is some concern about their effects on the human body.

Overview of Environmental Impacts

Toshiba Group is proceeding to quantify the environmental impacts at each stage of the product life cycle — from materials procurement, manufacturing, transportation to customer use, collection and recycling. This data on actual results for FY2018 was collected from 350 Toshiba Group companies.

We add up input resources/energy and emission of greenhouse gas and waste etc. throughout the entire business activities and integrate them into environmental impacts. We used our own foreground data as well as standard background data such as an

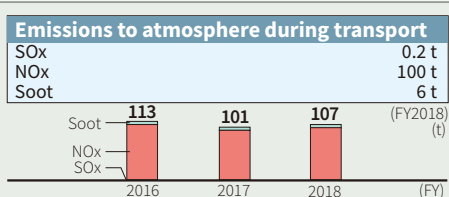
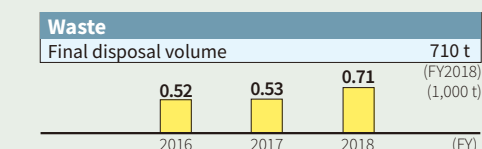
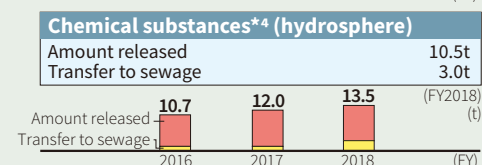
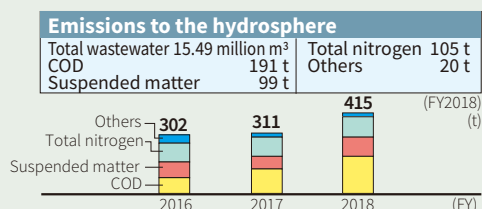
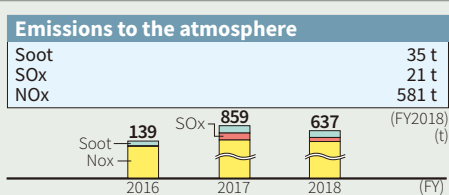
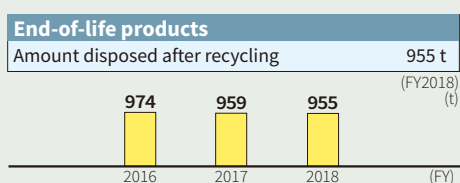
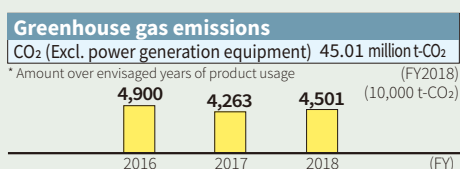
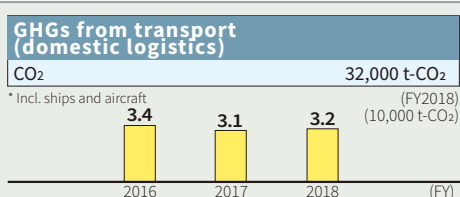
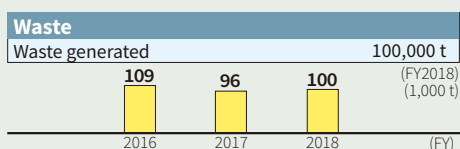
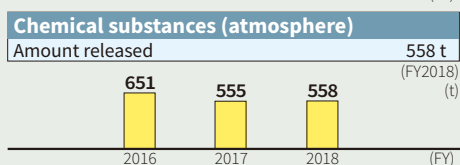
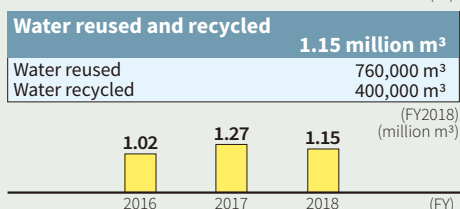
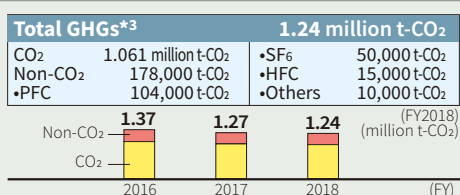


*1 Material inputs are calculated based on the Estimation Method for Material Inputs Using Input-Output Table (EMIOT), a method independently developed by Toshiba Group ("EMIOT": Estimation method for Material-inputs using Input-Output Table). EMIOT uses ratios of resources used per unit production, which are prepared based on the Input-Output Table, to calculate total material inputs. One distinctive feature of the method is that input-output analysis is applied only to the flow of resources from upstream to downstream. Another is that the volume of such resources by industrial sector is stored in a database. Using this method, it is possible to calculate weights of input resources by resource type from the data on procurement (monetary value) by resource category, which are gathered by materials procurement divisions. Therefore, data can be gathered not only on direct materials, but also indirect materials. Previously, it was difficult to totalize as resources the imported inputs that accompany the procurement of complex materials and service businesses. However, by using this method, it has become possible to grasp the amount of imported inputs by material category for such procured materials as well.

LCI database IDEA for environmental impacts, and LIME3, the latest Life cycle Impact assessment Method based on Endpoint modeling (LIME), for the integration.

LIME is a widely used representative method developed in Japan to integrate multiple environmental impacts. LIME3 is an environmental assessment method based on the latest scientific knowledge and has features that allow it to assess impacts by region, and assess environmental impacts in terms of economic value, and so on.

Emissions



*² TJ = 10¹² J; PJ = 10¹⁵ J. J (Joule) is a unit of energy measuring mechanical work, heat, and electricity. One joule equals about 0.239 calories.

*³ In this table, the CO₂ emission coefficient for electricity in Japan is 5.31 t CO₂/10,000 kWh.

*⁴ The volume of hydrogen fluoride and its water-soluble salt emitted into hydrosphere since FY2009 is calculated to be zero because hydrogen fluoride used becomes non-water-soluble salt through post-use treatment.

Overview of Environmental Impacts

Environmental impacts (Overall evaluation)

The following charts show comparisons of environmental impacts along Toshiba Group's entire supply chain between FY2017 and FY2018. In FY2018, the environmental impacts of the material procurement stage were substantially reduced. This is owing to reduced product resource consumption, increased recycled material use, resource recycling, and promotion of green procurement and you can see that mainly the impact of mineral resources was reduced. Under the Sixth Environmental Action Plan, we set an "Increased amount of resources saved," "Increased amount of recycled resources (recycled plastics) used," and "Reduction of specified chemical substances contained in products" as KPIs and implement initiatives based on them.

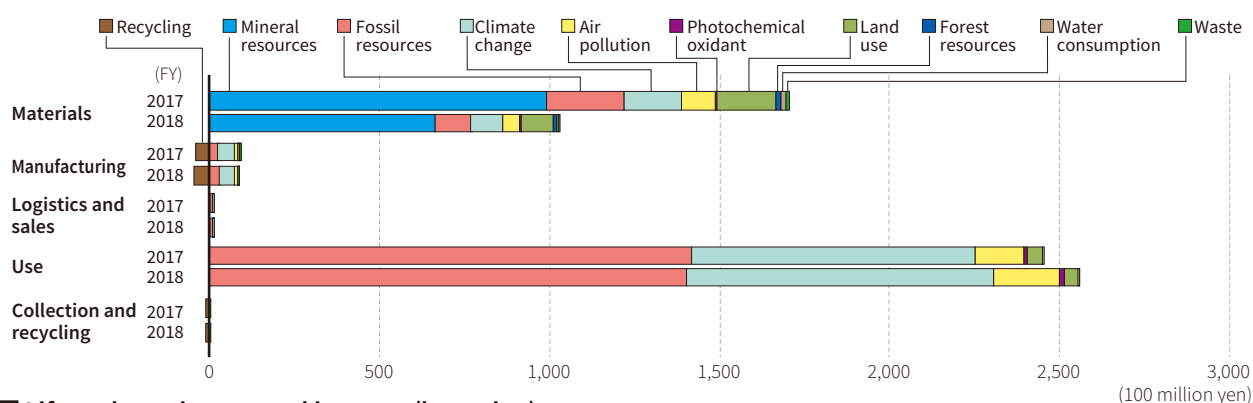
Although the environmental impacts of the manufacturing stage account for only a small portion in the entire supply chain, in addition to legal compliance, continued process improvement is required so that the overall environmental impacts can be reduced. We set "Reduction of total greenhouse gas emissions," "Improvement of total energy-derived CO₂ emissions per unit activity," "Reduction of waste volumes," "Improvement of the total volume of waste generated per unit production," "Improvement of the amount of water received per unit production," and "Reduction of the total amount of chemicals discharged per unit production" as KPIs under the Sixth Environmental Action Plan with the aim of reducing total environmental impacts.

In terms of the breakdown of environmental impacts, "climate change" and consumption of "fossil resources" account for a relatively large part. We will ensure the steady progress of ongoing initiatives under the Sixth Environmental Action Plan and will continue striving to use more renewable energy to achieve de-carbonization during the manufacturing stage. In FY2018, Toshiba Group used about 31 TJ's worth of renewable energy. This amount corresponds to a reduction of 1,635 t-CO₂.

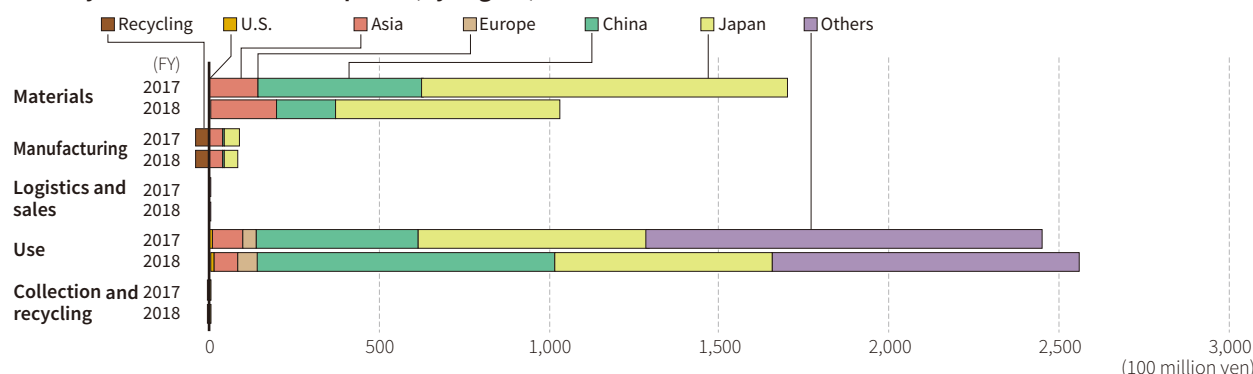
In the transportation and sales stage, in addition to taking various energy and CO₂ reduction measures including improving load factors, applying modal shifts to a wider range of products, and shortening the transport distance by restructuring distribution centers, we will continuously employ the 3R initiatives for packaging materials.

We realized that environmental impacts are most significant during the use of products and services in the supply chain. Although environmental impacts vary depending on the destination, "climate change" and consumption of "fossil resources" account for a large part overall, indicating that in addition to energy saving, an energy system for de-carbonization is important in each country. Under the Sixth Environmental Action Plan, we set "Reductions in CO₂ emissions by low carbon energy" "Reductions in CO₂ emissions by eco-products" as a KPI and are making efforts

Life cycle environmental impacts (by impact category)



Life cycle environmental impacts (by region)



* "Other" includes product groups with no specified destinations

to increase products and services that can reduce their environmental impacts on society as a whole. Since we can contribute to help achieve a low-carbon and de-carbonized society from both the energy supply side and the energy consumption side, we will continue to promote contributions to the environment through products and services.

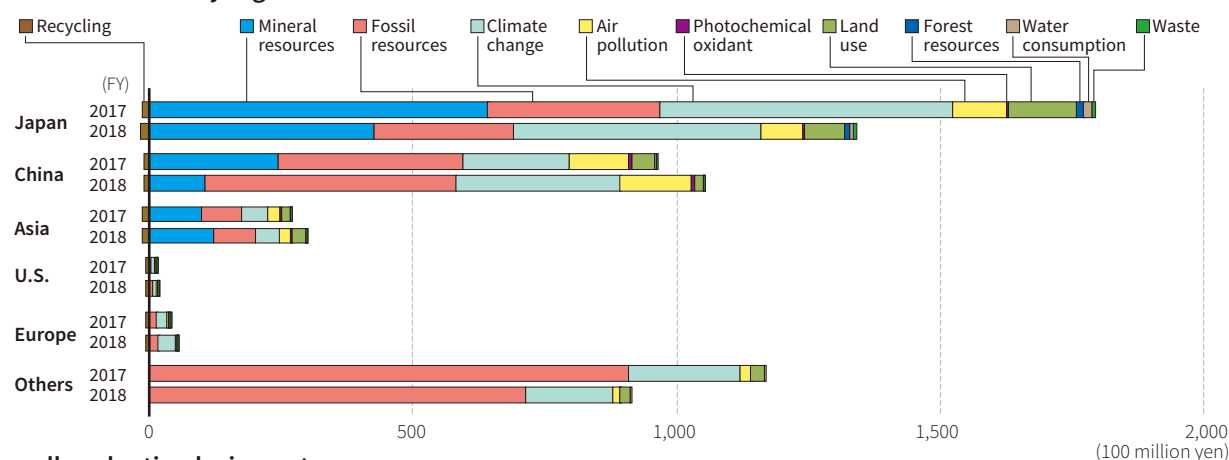
In the collection and recycling of products stage, we will work to collect and recycle end-of-life products such as industrial air conditioners, MFPs, and POS on a global basis.

In terms of environmental impacts by region, the environmental impacts as a result of business activities in Japan and China are significant. By environmental impacts, we can see that "fossil resources," "climate change," followed by "mineral resources" are strongly related in Toshiba Group as a whole. The data also indicates that "air pollution" and "land use" are also related to business activities and therefore that responding to local environmental issues is important, and biodiversity conservation is also an important viewpoint and so on. The breakdown by region and impact area suggests environmental impacts to which business activities are related as well as required measures.

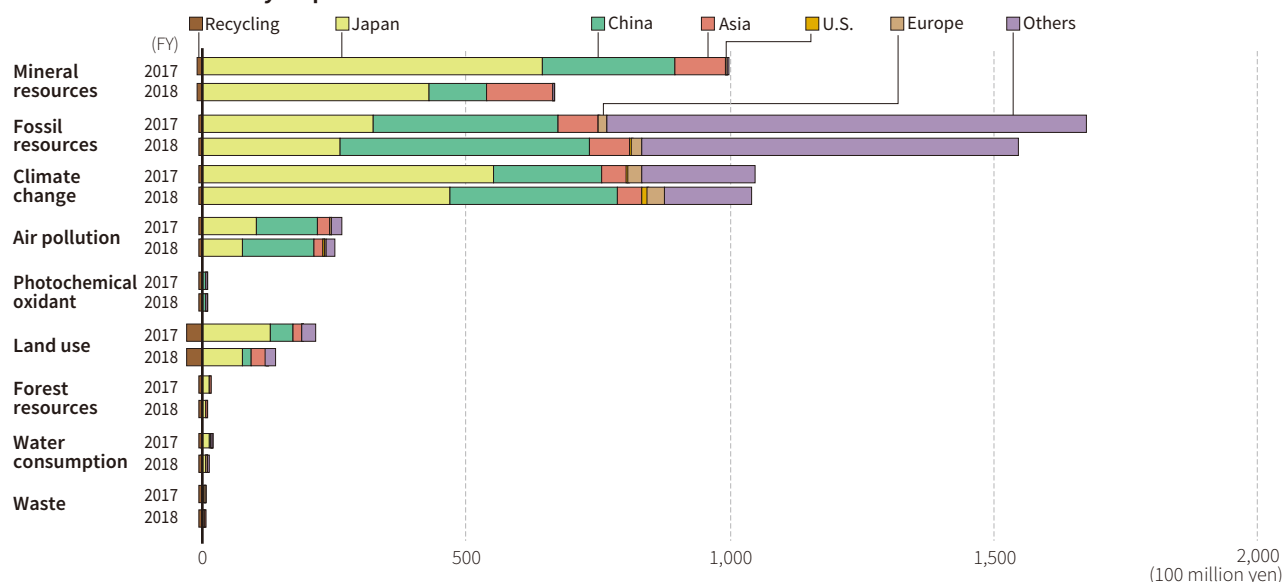
Indexing by region and impact area is useful also in terms of visualizing contribution to the SDGs. Many of the SDGs are closely related to environmental issues. For example, "climate change" and "fossil resources" are connected to Goal 7 (energy access) and Goal 13 (response to climate change), and "air pollution" and "waste" to Goal 11 (urban development), "water consumption" to Goal 6 (water access), "mineral resources" to Goal 12 (sustainable consumption and production), and "forest resources" and "land use" to Goal 15 (protection of terrestrial ecosystem).

Understanding an overview of environmental impacts, especially the process of integrating them in this way is essential for understanding the current situation and thereby developing targets and measures. In addition, impact assessment is not a temporary process, but rather an iterative process to enhance accuracy by reviewing data every year. We also set "Improvement of information disclosure" as an item for which to promote activity under the Sixth Environmental Action Plan, with a goal of better reporting. We will continue to enhance the quantification of environmental impacts by expanding the target items for data collection and striving to improve the accuracy of the data.

Overall evaluation by region



Overall evaluation by impact area



Pursuing high-efficiency manufacturing that simultaneously reduces environmental impacts and costs.

Major Results for FY2018

Mitigation of Climate Change • Total GHG emissions : **1.24** million t-CO₂

Efficient Use of Resources

- Waste volume : **40,000** tons
- Amount of water received per unit production (Compared to FY2013 level) : **92%**

Management of Chemicals

- Total amount of chemicals discharged per unit production (Compared to FY2013 level) : **76%**

Basic strategies

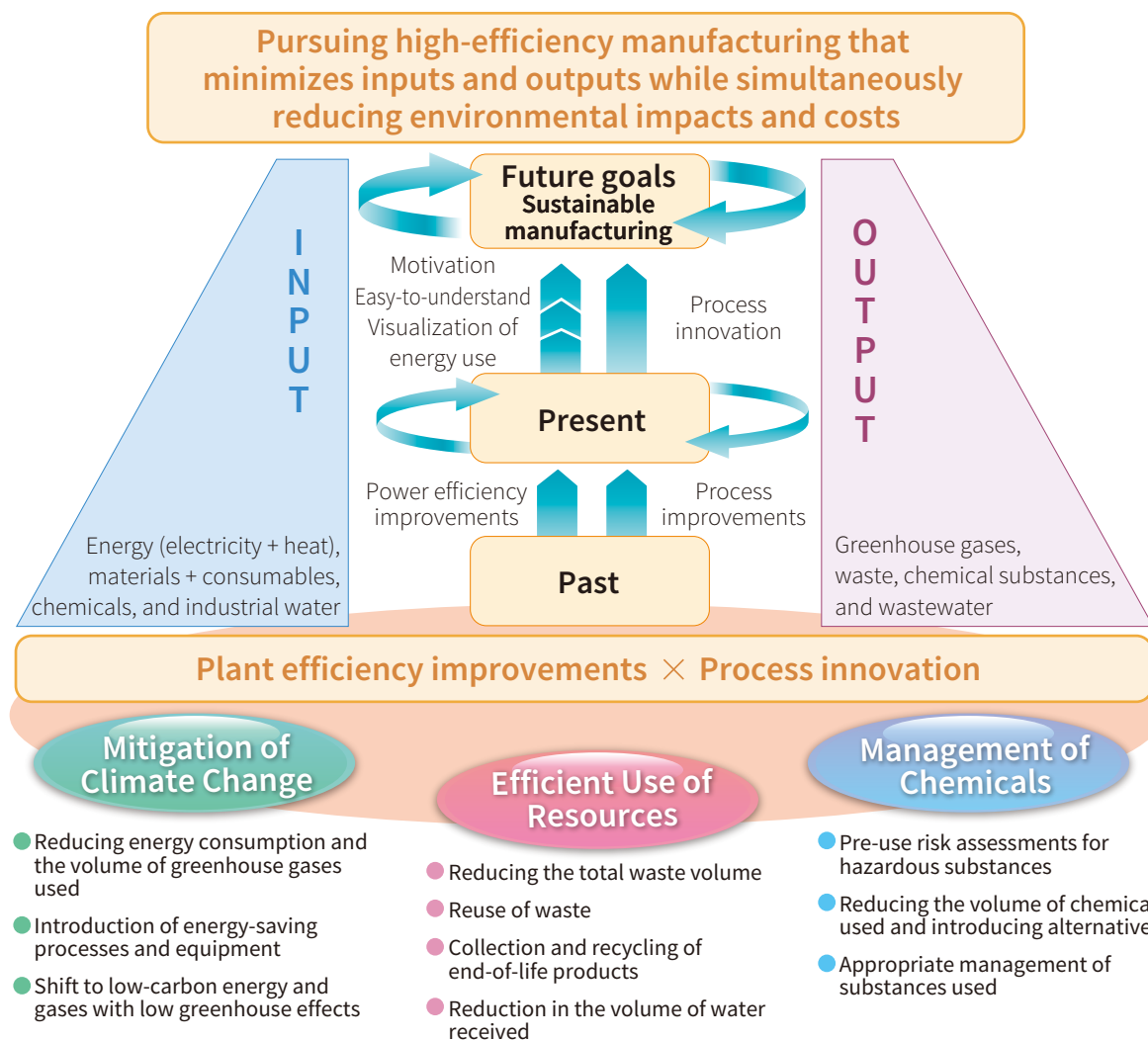
Toshiba Group is pursuing high-efficiency manufacturing that minimizes resource inputs in production processes in Japan and abroad, eliminates unnecessary tasks in manufacturing processes, and reduces to minimum emissions into the atmosphere and waters, thus simultaneously reducing environmental impacts and costs.

We aim to contribute to resolving climate change and other environmental issues by promoting the following two initiatives: "improvement of plant efficiency," which refers to efforts to grasp energy consumption appropriately in order to ensure effective improvement of equipment operation

and introduce high-efficiency equipment, and "process innovation," which aims to achieve sustainable manufacturing in collaboration with all involved divisions.

In terms of mitigation of climate change, Toshiba Group is actively taking energy-saving measures on a company-wide scale to reduce emissions of greenhouse gases, including CO₂ and perfluorocarbons (PFCs). In terms of efficient use of resources, we will continue our efforts to reduce the total volume of waste generated through 3R activities as well as strive to use water resources efficiently by reusing and recycling. As for management of chemicals, we make efforts to reduce environmental impacts mainly through the introduction of alternative substances and process improvements.

High-efficiency manufacturing



Special Feature

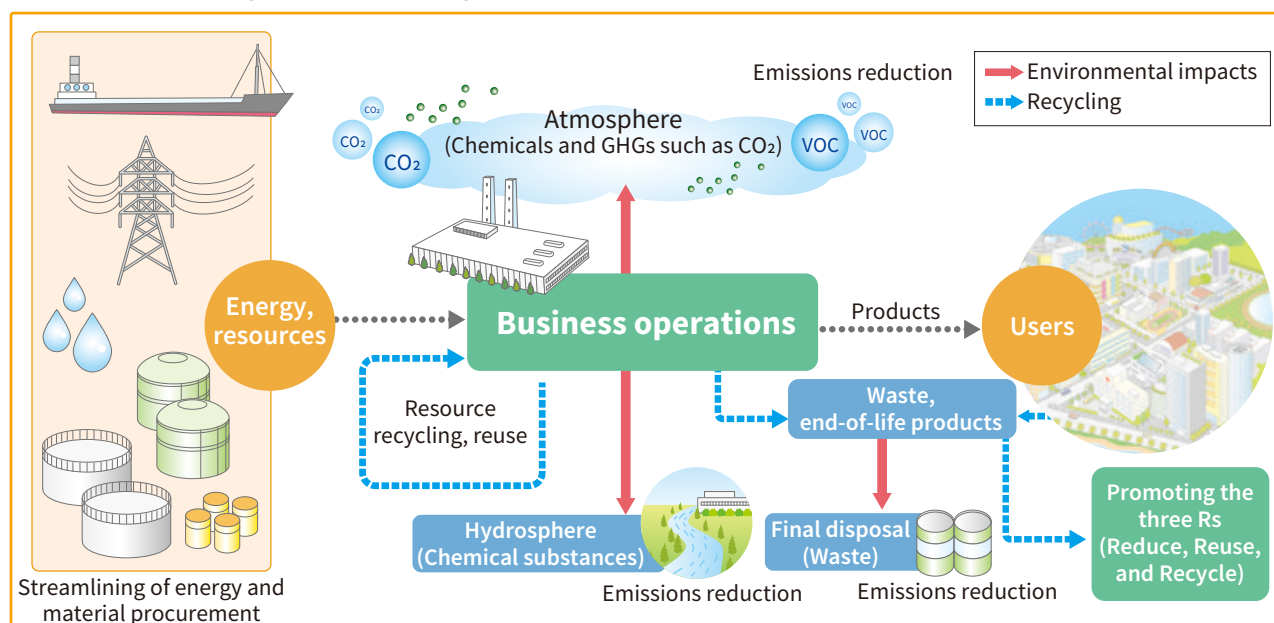
Vision and Strategies

Business - Manufacturing

Business - Products / Services

Management

Environmental impacts of business operations



Mitigation of Climate Change

Reducing total GHG emissions

Toshiba Group proactively installed systems to collect and/or remove sulfur. Toshiba Group proactively installed systems to collect and/or remove sulfur hexafluoride (SF₆), which is used to insulate heavy electric machinery, and perfluorocarbons (PFCs), which are used to produce semiconductors. By means of this effort in FY2010, the Group succeeded in reducing the total amount of GHG emissions* by nearly 40% compared to the FY1990 level, and in subsequent years GHG emissions continued to decrease as the Group steadily took measures to improve its production processes. To reduce energy-derived CO₂ emissions resulting from use of electricity, we continuously make efforts to proactively adopt energy-saving measures at our production sites, including those overseas, to improve production efficiency, as well as to introduce renewable energy.

* Carbon dioxide (CO₂), methane (CH₄), dinitrogen oxide (N₂O) (= nitrous oxide), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆), and nitrogen trifluoride (NF₃)

Results of FY2018

Toshiba Group is working to reduce GHG emissions other than energy-derived CO₂ emissions mainly by installing PFC removal equipment and due to this effort emissions have remained almost constant since FY2010. Meanwhile, energy-derived CO₂ emissions were affected by deterioration in the CO₂ emission coefficient for electricity due to the effects of the Great East Japan Earthquake, but the Group reduced energy consumption compared to the FY2010 level by taking proactive conservation measures, including making capital investments.

Future initiatives

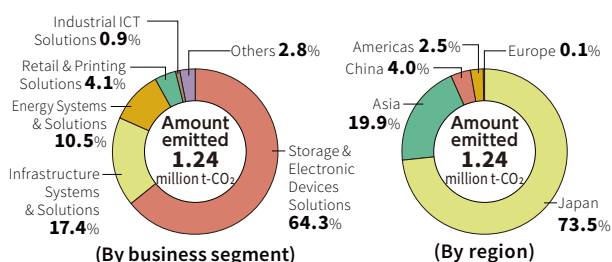
The CO₂ emission coefficient for electricity will continue trending higher in the future, but Toshiba Group will continue to make steady efforts to reduce total GHG emissions by investing proactively in high-efficiency equipment. The Group goal is to reduce total GHG emissions to 1.66 million t-CO₂ or less by FY2020.

Total GHG emissions

FY2017 result	FY2018 target	FY2018 result	FY2019 target	FY2020 (Final fiscal year) goal
1.27 million t-CO ₂	1.54 million t-CO ₂	1.24 million t-CO₂	1.61 million t-CO ₂	1.66 million t-CO ₂

Note: The power receiving end coefficient (in Japan: 5.31 t-CO₂/10,000kWh) is used as the CO₂ emission coefficient for electricity in calculation of CO₂ emissions. Overseas electricity is based on the GHG Protocol data.

Breakdown of total GHG emissions (FY2018)



Reducing energy-derived CO₂ emissions

Results of FY2018

In FY2018, energy-derived CO₂ emissions amounted to 1.06 million t-CO₂. As a result of initiatives to reduce power consumption mainly through energy-saving investments and production adjustments, Toshiba Group was able to reduce energy-related CO₂ emissions per unit activity to 95.0% of the FY2013 level, exceeding the initial target by 1.0 percentage points.

Future initiatives

In order to meet growing market demand, Toshiba Group plans to introduce more facilities. Therefore, energy-derived CO₂ emissions are likely to increase in the near future. The Group will continue its efforts to reduce CO₂ emissions per unit activity by 8% compared to the FY2013 level in FY2020 by adopting a variety of energy-saving measures, including investing in energy-saving facilities.

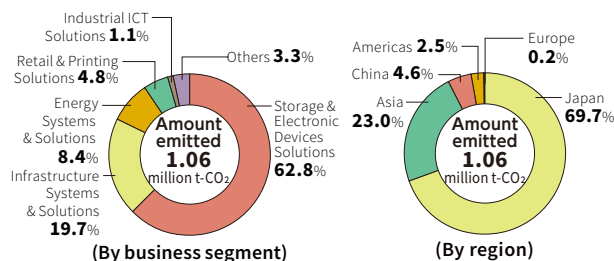
Energy-derived CO₂ emissions and those per unit activity

	FY2013 (Benchmark year) result	FY2017 result	FY2018 target	FY2018 result	FY2019 target	FY2020 (Final fiscal year) goal
Amount emitted	1.18 million t-CO ₂	1.09 million t-CO ₂	—	1.06 million t-CO₂	—	—
Per unit activity*	100%	97.8%	96%	95%	94%	92%

Note: The power receiving end coefficient (in Japan: 5.31 t-CO₂/10,000kWh) is used as the CO₂ emission coefficient for electricity in calculation of CO₂ emissions. Overseas electricity is based on GHG Protocol data.

* Values related to the energy consumption required for manufacturing (nominal production amounts, number of products manufactured, number of persons, total floor area, etc.) are used.

Breakdown of energy-derived CO₂ emissions (FY2018)



Case

Certified as Top Level Facilities by the Tokyo Metropolitan Government

Toshiba Infrastructure Systems & Solutions Corporation Fuchu Complex

Our Fuchu Complex was certified as a Top-Level Facility by the Tokyo Metropolitan Government for outstanding global warming countermeasure efforts. The certification reflects the recognition of its long history with the completion of the building in 1940, a large-scale facility in the manufacturing industry with solar power generation and high efficiency production facilities, control of peak power and power usage by using the power monitoring system, "Demand EYE," participated by all employees, and so on.

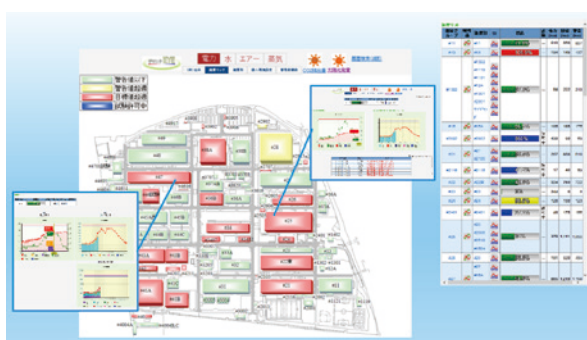
In addition to these efforts, Fuchu Complex has been working on other various global warming countermeasures toward the

achievement of "Zero Emission Tokyo" promoted by the Tokyo Metropolitan Government, which includes: weeding by goats and sheep; promotion of demonstration experiments at a hydrogen utilization facility; and the zero emission building (ZEB) concept for buildings and offices under Fuchu Complex Next Plan*.

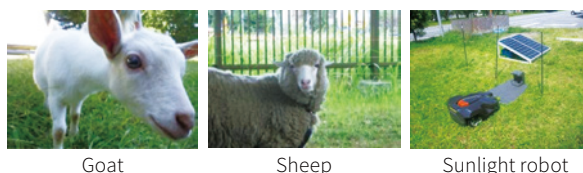
Looking forward, Fuchu Complex will continue to aim at reducing environmental impacts and improving production efficiency through highly environmentally conscious facility management as Toshiba Group's leading production site.

* Fuchu Complex's medium-term strategy plan

Visualization of electric power (Demand EYE)



Unique weeding measures



Goat

Sheep

Sunlight robot

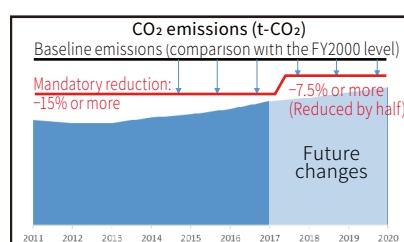
Utilization and demonstration of renewable energy

Photovoltaic power
generation
(Self-consumption)Hydrogen utilization
facility
(Demonstration
facility)Wind power
generation
(Self-consumption)

Planned facility upgrade toward growth strategy



Increasing efficiency and reducing loss based on a forecast for increasing energy demand



ZEB concept for buildings and offices under Fuchu Complex Next Plan



As the first step of demonstration, the interrelation between the office environment and productivity is being evaluated (since October 2019)

Participation in "Zero Emission Tokyo"

Participation in the world's first urban cap-and-trade program covering office buildings promoted by the Tokyo Metropolitan Government



In regard to reduced CO₂ emissions as an effect of being certified as a top-level facility, we donated 50,000 tons of CO₂ credits to the Tokyo Metropolitan Government.

Efficient Use of Resources

Reducing Waste Volumes

Toshiba Group is working to reduce waste generation by minimizing the volume of waste generated per unit production, which indicates business process efficiency improvement, as well as by reducing the total volume of waste to a level below the Earth's environmental capacity.

●Results of FY2018

The volume of waste (excluding that of objects with value) totaled 40,000 tons, which is 8,000 tons lower than the initial target. The total volume of waste generated per unit production was 91% compared to that of FY2013, achieving the initial target.

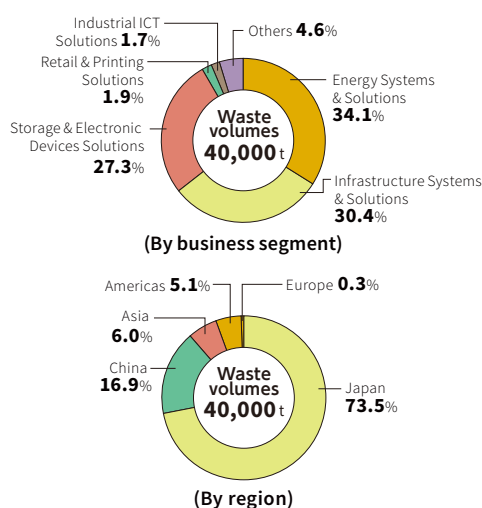
●Future initiatives

We will work to reduce the amount of generated waste and increase sales of objects with value from waste, with the goal of reducing waste volume by 52,000 tons and improving the total volume of waste generated per unit production for FY2020 by 4% compared to the FY2013 level.

■ Waste volume and total volume of waste generated

	FY2013 (Benchmark year) result	FY2017 result	FY2018 target	FY2018 result	FY2019 target	FY2020 (Final fiscal year) goal
Waste volume	—	37,000 tons	48,000 tons	40,000 tons	51,000 tons	52,000 tons
Total waste volume	108,000 tons	96,000 tons	—	100,000 tons	—	—
Total waste volume per unit production	100%	84%	98%	91%	97%	96%

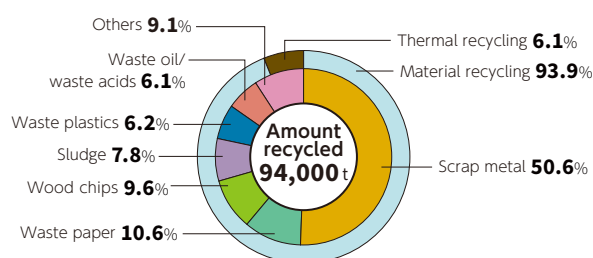
■ Breakdown of the waste volume (FY2018)



Promoting recycling

In FY2018, Toshiba Group recycled 94,000 tons of resources. 94% of the total volume of waste generated was reused effectively as various resources. The recycled resources consisted mainly of scrap metal, waste paper, and wood chips, and 93.9% of them were used effectively for material recycling (recycled into materials for products), and the remaining 6.1% for thermal recycling (heat recovery). In the future, Toshiba Group will continue to increase the total volume of resources recycled and at the same time will strive for higher quality recycling chiefly by increasing the percentage of resources recycled into materials.

■ Breakdown of the volume recycled (FY2018)



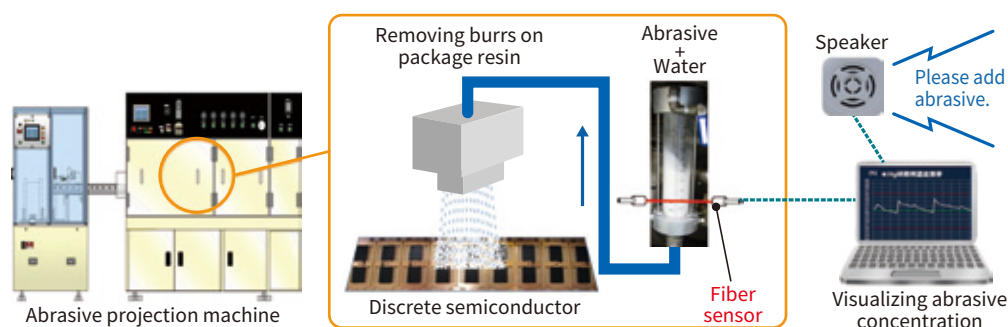
Case

Reducing abrasive used with abrasive concentration sensing

Toshiba Electronic Devices & Storage Corporation
Himeji Operations-Semiconductor

Himeji Operations-Semiconductor manufactures discrete semiconductor. Discrete semiconductor is packaged with a mold resin to protect semiconductor chips. However, burrs* form on the mold resin during manufacturing and abrasive is applied to remove burrs. Since the abrasive is used by dissolving it in water, its concentration must be managed. Before making the improvement, the worker regularly stopped the abrasive projection machine, let the abrasive precipitate, and then added abrasive according to the amount of precipitation. In this improvement, we have installed a fiber sensor which indicates the abrasive concentration in real time, allowing us to optimize the interval and amount to add abrasive. Through this optimization, we have been able to reduce the amount of abrasive used by 600 kg in a year.

* Unnecessary projection



Case

Waste management in overseas production site

Toshiba Information Equipment (Philippines), Inc.

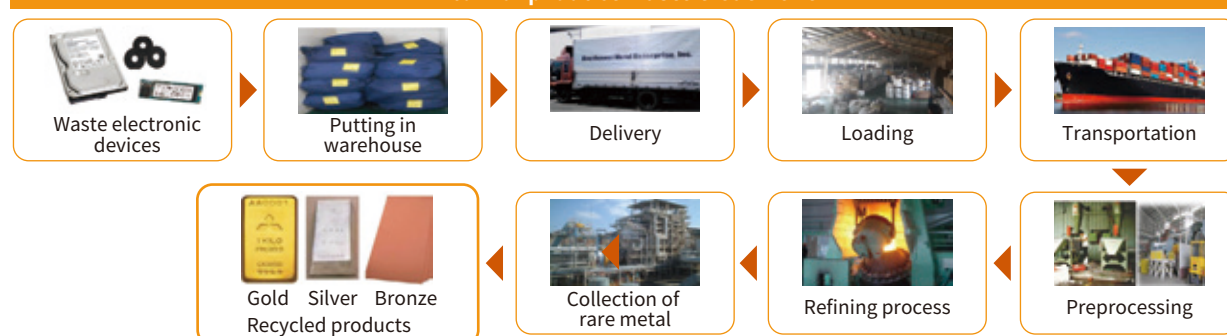
● Recycling rare metal from waste

Some waste from defective products that are produced in the process for manufacturing HDD contain rare metal. We sell them to companies which have treatment facilities outside Philippines, let them extract the rare metal, and in this way recycle resources. By establishing this process, the amount of product waste recycled by Toshiba Information Equipment (Philippines) in FY2018 was 207 tons.

● Reducing landfill waste by utilizing waste heat treatment facility

Previously, some of our waste was disposed of as landfill. By using a heat treatment facility that has recently been put into service, the amount of waste disposed as landfill by the entire Toshiba Information Equipment (Philippines) has been substantially reduced from 0.17% in FY2016 to 0.025% in FY2017 and further to 0.019% in FY2018.

Flow of product waste treatment



Flow of disposal as landfill



Efficient Use of Resources

Reducing the Amount of Water Received

In response to a global increase in concerns regarding water problems, Toshiba Group is promoting sustainable water resource management. Each of our production sites has incorporated reducing the amount of water received into its annual plan in order to develop specific strategies and conduct follow-up surveys on an ongoing basis. We are promoting wide-ranging initiatives including recycling the wastewater generated in sites and introducing systems for using rainwater.

Results of FY2018

The total amount of water received in FY2018 was 19.0 million m³ and the amount of water received per unit production was 92% of the total for FY2013, exceeding the initial target by 6 percentage points.

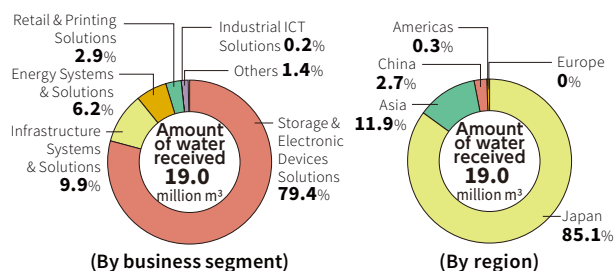
Future initiatives

We will promote recycling wastewater and using rainwater and aim to improve the amount of water received per unit production by 4% of the FY2013 level in FY2020.

Amount of water received per unit production

	FY2013 (Benchmark year) result	FY2017 result	FY2018 target	FY2018 result	FY2019 target	FY2020 (Final fiscal year) goal
Amount of water received	20.4 million m ³	19.4 million m ³	—	19.0 million m ³	—	—
Per unit production	100%	92%	98%	92%	97%	96%

Breakdown of the amount of water received (FY2018)



Case

Reducing industrial water and chemicals through optimization of water purification system operating method

Kaga Toshiba Electronics Corporation

In the semiconductor manufacturing process, a large amount of pure water*¹ is used for cleaning and efforts for reducing the amount of water used are important. By applying this measure, we optimized the amount of water fed from pure-water production systems according to the flow rate used in the manufacturing process as well as optimized the operating method for pure-water production systems by reducing the frequency for recycling*² water purification filters while maintaining water purification capacity, resulting in a reduction of industrial water by 7,500 m³ per year, chemicals by 4 tons per year, and energy by 12.8 t-CO₂ per year.

*¹ Water from which ions among other contaminants in the water have been removed by ion exchange, etc.

*² Cleaning a water purification filter (ion exchange resin) to make it reusable. Captured contaminant ions are emitted by chemicals so that the original functionality is restored.

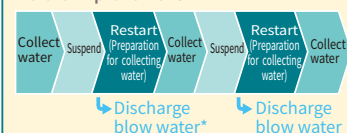
Measure 1 Changing the amount of water fed (70→65 m³/h)

The system suspension frequency was reduced by optimizing the flow rate of the follow-up unit for water supply according to the flow rate used.

Reduction in water and energy needed when restarting the system

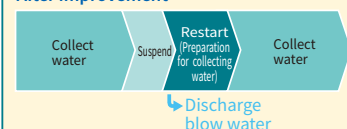
Water feeding process in pure-water production system

Before improvement



*A pure-water production system is always blown after it is suspended to maintain the water purity when it is restarted.

After improvement



•Industrial water
Reduction by 7,200 m³ per year

•Energy
Reduction by 1.9 t-CO₂ per year

Preparation for collecting water

Blow water

Wastewater

Collection and reuse of discharged water to be considered in the future

Raw water

Water storage tank

Pure-water production system

Follow-up unit*³ (Up to three units)

Base unit*⁴ Amount of water fed: 100 m³ (Fixed)

Pure-water tank

To CR

Reduction effect

Industrial water
Reduction by 7,500 m³ per year

Chemicals
Reduction by 4 tons per year

Energy
Reduction by 12.8 t-CO₂ per year

CO₂ conversion factor:
3.68 t-CO₂/10,000 kWh

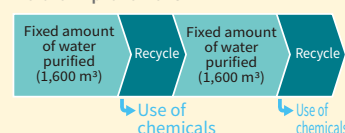
Measure 2 Changing the fixed amount of water purified** (1,600→1,800 m³)

The frequency for recycling water purification filters was reduced by optimizing the fixed amount of water purified according to the water purification capacity of the follow-up unit.

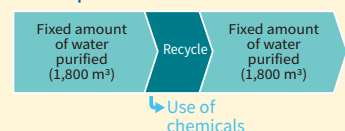
Reduction in the chemicals, energy, and water needed for recycling

Water feeding process for pure-water production system

Before improvement



After improvement



•Industrial water
Reductions by 300 m³ per year

•Chemicals
Reduction by 4 tons per year

•Energy
Reductions by 10.9 t-CO₂ per year

*³ Unit that starts and stops repeatedly according to fluctuations in the amount of water used;

*⁴ Unit that is regularly in service regardless of fluctuations in the amount of water used;

*⁵ The amount of raw water purified until the purification filter is recycled next time

The diagram is an image.

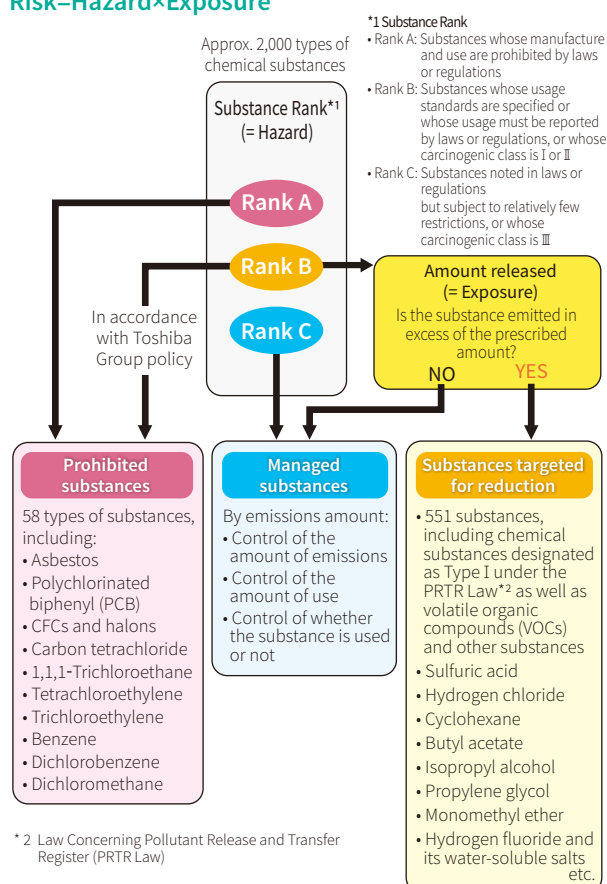
Management of Chemicals

Managing Chemical Substances by Ranking

Toshiba Group classifies standards for the handling of chemical substances into the three categories of prohibition, reduction, and control, and manages chemical substances according to the regulations for each category. The relationship between substance ranking and management classifications, which shows the concept underlying this initiative, is indicated in the figure below. Approximately 2,000 types of chemical substances are classified into three ranks (hazard level A, B, and C) based on the regulatory levels set by environmental legislation, data on carcinogenic chemicals, and other factors. The classifications of prohibition, reduction, and control are determined by judging risks for each chemical substance using the ranking of the substance equivalent to hazard levels and emissions equivalent to exposure to the substance.

Substance ranking and management classifications

Risk=Hazard×Exposure



Reducing Emissions of Chemical Substances

Toshiba Group strives to reduce the consumption of chemical substances by designating substances that have large direct impacts on the environment as those targeted for reduction. By business segment, Storage & Electronic Devices Solutions and Infrastructure Systems & Solutions account for more than 80% of the total emissions of such substances, and by region, approximately 80% of such emissions originate from Japan.

Results of FY2018

In FY2018, Toshiba Group took measures for solvents used in cleaning and resin processing, which ranked high among such emissions, and promoted initiatives such as using alternative substances and improving manufacturing processes in order to reduce the use of raw materials as well as reducing the amount of VOC evaporation by enhancing chemical management. As a result, the Group reduced emissions of substances targeted for reduction by 187 tons (25%) compared to the 2013 level. The amount of chemical substance emissions per unit production was 76% of the FY2013 level and we therefore achieved our target.

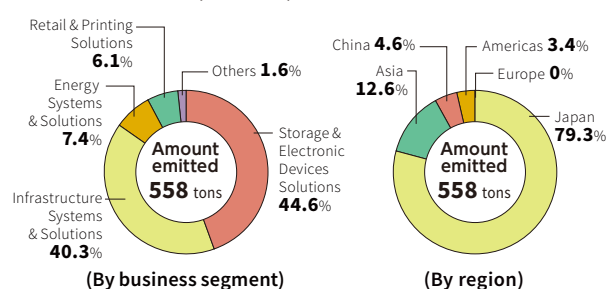
Future initiatives

In the Sixth Environmental Action Plan, Toshiba Group aims to reduce emissions of chemical substances per unit production in FY2020 to less than the FY2013 level. It plans to use alternative substances and increase material efficiency by improving processes as an incoming countermeasure and to expand usage of emission removal and collection equipment as an outgoing countermeasure.

Emissions of substances targeted for reduction and those per unit production

	FY2013 (Benchmark year) result	FY2017 result	FY2018 target	FY2018 result	FY2019 target	FY2020 (Final fiscal year) goal
Amount emitted	725 tons	555 tons	–	558 tons	–	–
Per unit production	100%	76%	98%	76%	97%	96%

Breakdown of emissions of substances targeted for reduction (FY2018)



We develop energy technologies and energy-saving products/services required to realize a low-carbon society.

Major Results for FY2018

Mitigation of Climate Change

- Reduction of CO₂ emissions through products and services associated with power supply : **8.38 million t-CO₂***
- Reduction of CO₂ emissions through products and services associated with power consumption : **3.78 million t-CO₂***

Efficient Use of Resources

- Amount of resources saved for products : **200,000 tons***
- Amount of recycled plastics used for products : **1,685 tons***

Management of Chemicals

- Completed the replacement of four phthalates used in **electronic devices, and water heaters shipped to Europe** with alternatives

*Accumulated value from FY2017

Basic approach

Toshiba Group aims to contribute to resolving climate change and other environmental issues by continuing to improve the environmental performance of all products and services that we develop.

First, we identify the level of environmental performance required to resolve issues facing society and customers during use of products and services, set “eco-targets” to achieve the required level of performance, and incorporate such targets into product specifications.

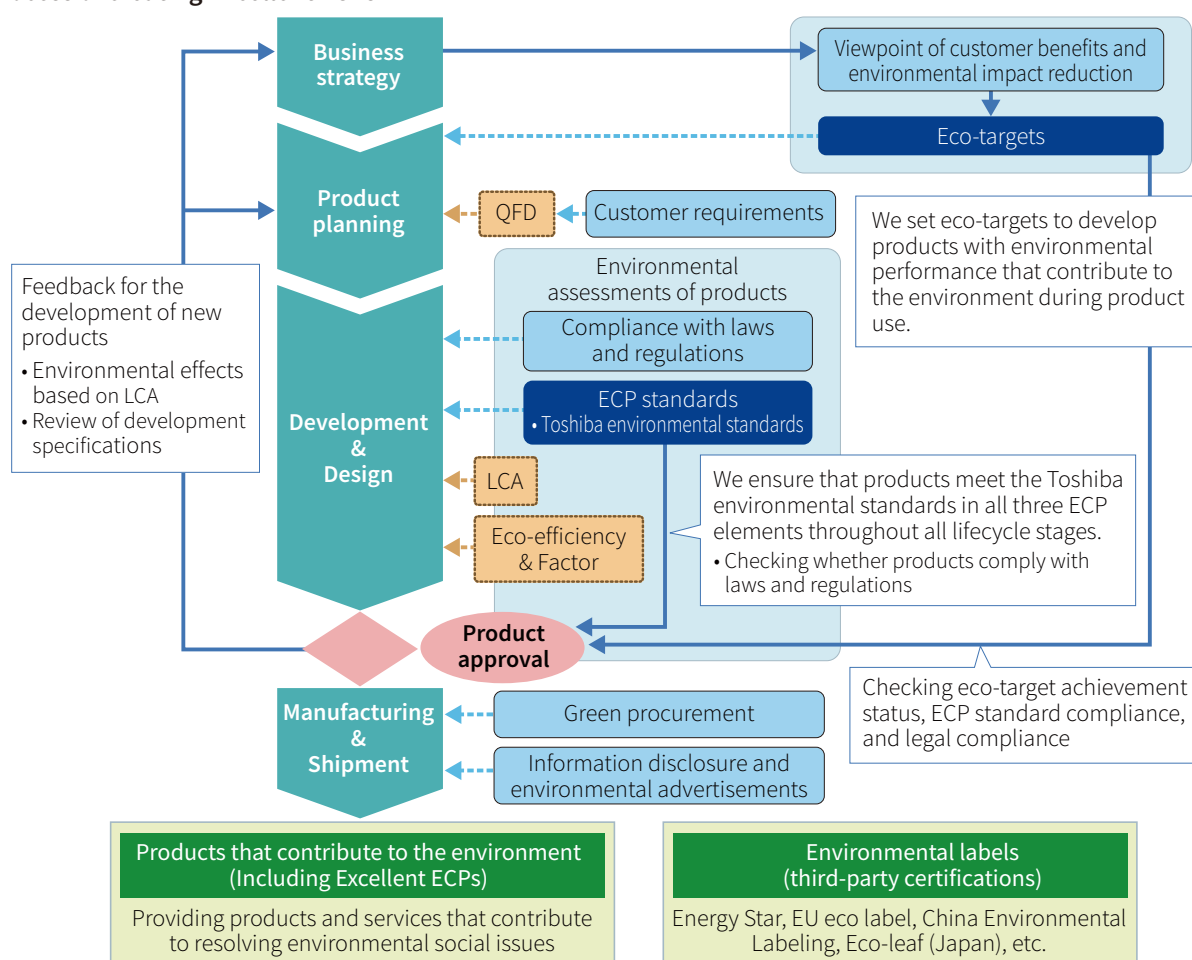
Then, we confirm that our products and services comply with all relevant laws and regulations. Meanwhile, based on the three elements of ECPs* (Toshiba environmental standards), we define and manage ECP standards for the environmental performance to achieve at each stage of the lifecycle of products and services in order to ensure their quality with respect to the environment.

* Environmentally Conscious Products

From among such products and services, we choose those with the highest levels of environmental performance at the time of product release and certify them as Excellent ECPs within Toshiba Group.

[The three elements of ECPs* \(Toshiba environmental standards\)](#)

■ Process of creating Excellent ECPs



■ Products certified as Excellent ECPs in FY2018

Energy Systems & Solutions

- Small Horizontal Axis Hydraulic Turbine Generator
- Integrated Control and Protection System for Hydroelectric Power Plants

Infrastructure Systems & Solutions

- Radio source visualizing system [Refer to page 48](#)
- Elevator controller renovation: Time-saving renovation [Refer to page 47](#)
- LED Spotlight
 - AL-LED-FSP-L-2 (Fresnel spotlight for stages and studios)
 - AL-LED-FSP-L-T-2 (Fresnel spotlight for stages)
 - AL-NRL-FSPLT2 (Remote-control Fresnel spotlight for stages)
 - Equipped with AL-LED-FSP-L-T-2
 - AL-NRL-ASPL2 (Remote-control plano-convex spotlight for stages)
 - Equipped with AL-LED-ASP-L-2
- Air conditioner for store and office [Refer to page 46](#)
 - R32 "Super Power Eco Gold" RP3 Series
 - P50, P56, P63, P80, P160 model
- Air conditioner for store and office
 - R32 "Super Digital Inverter" Series 1

Retail & Printing Solutions

- Color MFP e-STUDIO5015AC [Refer to page 46](#)
- Color MFP e-STUDIO7516AC
- Monochrome MFP e-STUDIO4518A
- Monochrome MFP e-STUDIO5518A/6518A/7518A/8518A

Mitigation of Climate Change

Contributing to mitigating climate change by improving power supply and power consumption efficiency

(1) Eco-products (Power supply):

Contributions by products and services associated with power supply

We contribute to reducing CO₂ emissions by improving the efficiency of power infrastructure facilities including power plants with low-carbon energy technologies.

(2) Eco-products (Power consumption):

Contributions by products and services associated with power consumption

We contribute to reducing CO₂ emissions by improving the energy-saving performance of products and services associated with power consumption including social infrastructure products and services such as elevators, railway systems, air conditioners, and lighting systems as well as office equipment.

●Results of FY2018

We reduced emissions by an accumulated total of 12.16 million t-CO₂ during FY2017 and FY2018 in terms of combined "Power supply" and "Power consumption."

(1) Results achieved by eco-products (Power supply)

We failed to reach the target due to a delay in starting the scheduled operation of facilities but reduced emissions by 8.36 million t-CO₂.

(2) Results achieved by eco-products (Power consumption)

We developed products by setting eco-targets for preventing global warming and provided products and services with improved energy saving performance worldwide, thereby reducing CO₂ emissions by 3.78 million t-CO₂.

●Future initiatives

Regarding products and services associated with power supply, we will spread the use of high-efficiency thermal power and renewable energy by providing combined cycle power generation systems and power generation systems for geothermal power plants. Also, to promote large-scale introduction of renewable energy, we will continue to develop and provide storage battery solutions and hydrogen power storage systems designed to ensure a stable power supply.

Regarding products and services associated with power consumption, we aim to spread the use of products that have large energy-saving effects, such as industrial air conditioners and LED lighting. Furthermore, we will expand our business in the global market for system products mainly in the social infrastructure domain, particularly in emerging countries that have rapidly increasing demand for products that can achieve significant reductions in CO₂ emissions.

Under the Sixth Environmental Action Plan, we aim to reduce emissions by a total of 22.6 million t-CO₂ by 2020 in terms of "Power consumption" and "Power supply" combined.

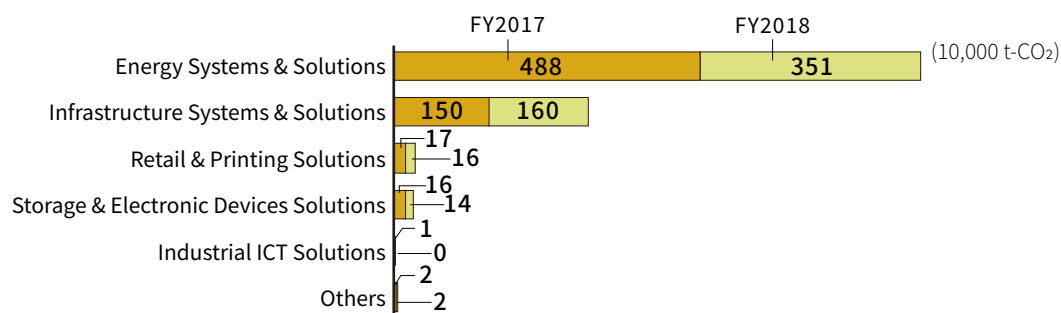
■ Reductions in CO₂ emission by eco-products (Power supply) (cumulative total)

FY2017 result	FY2018 target	FY2018 result	FY2019 target	FY2020 (Final fiscal year) goal
4.88 million t-CO ₂	12.9 million t-CO ₂	8.38 million t-CO₂	16.1 million t-CO ₂	16.3 million t-CO ₂

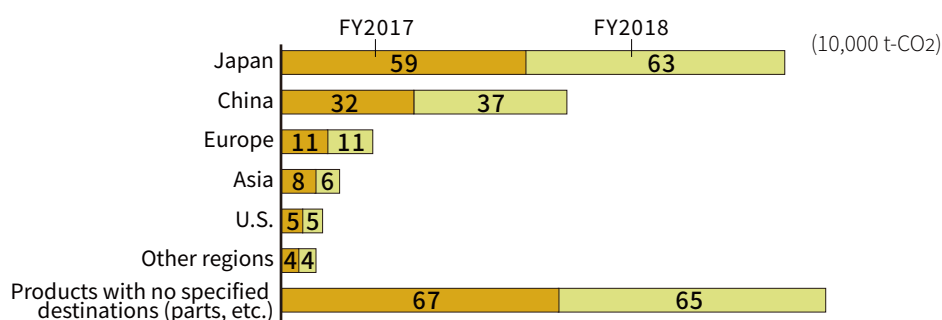
■ Reductions in CO₂ emission by eco-products (Power consumption) (cumulative total)

FY2017 result	FY2018 target	FY2018 result	FY2019 target	FY2020 (Final fiscal year) goal
1.86 million t-CO ₂	3.4 million t-CO ₂	3.78 million t-CO₂	4.9 million t-CO ₂	6.3 million t-CO ₂

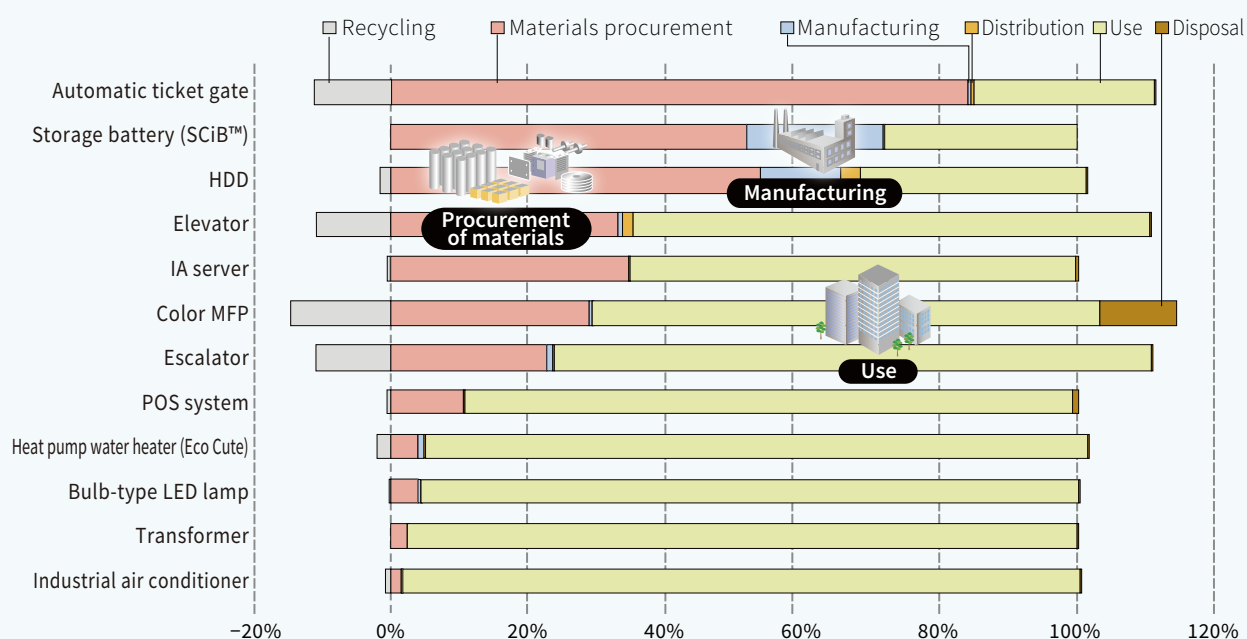
Breakdown of reductions in CO2 emissions by business segment (FY2017 and FY2018)



Breakdown of reductions in CO2 emissions by eco-products (Power consumption) by region (FY2017 and FY2018)

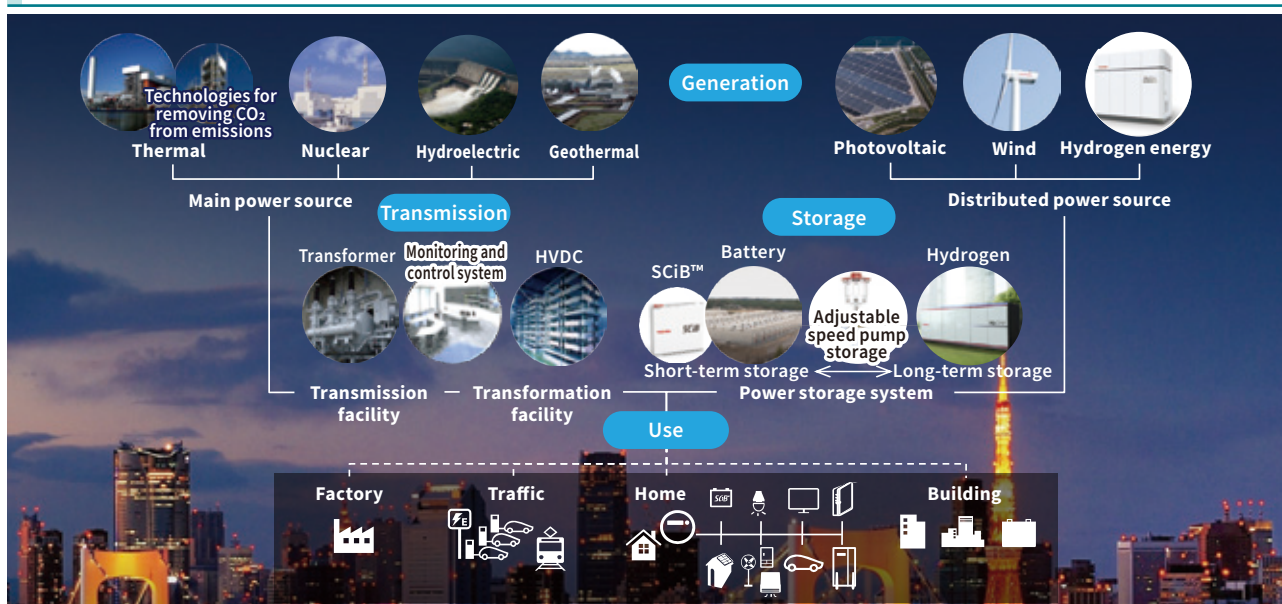


Percentages of CO2 emissions from the lifecycle stages of Toshiba Group's products



Mitigation of Climate Change

Contributions by products and services associated with power supply



●Generating power

— Contributing to climate change mitigation with power generation technologies —

Electric power supply is one of an important lifeline that supports economic activities and our lives in contemporary society. Toshiba Group promotes various initiatives to ensure a stable power supply as well as to mitigate climate change.

■ Main power source

Currently, approximately 60% of the world's power is produced by thermal power generation from fossil fuels. Toshiba Group aims to achieve its goal of ensuring both environmental consciousness and a stable power supply by using a variety of thermal power technologies, including high efficiency thermal power generation; technologies for separating and collecting CO₂ from emissions caused by thermal power generation; and super critical CO₂ cycle power generation which can collect CO₂ without the loss of energy while generating power.

We are also striving to restart nuclear power plants in Japan. To this end, we are implementing measures to enhance nuclear reactor cooling systems and control the release of radioactive materials with the aim of preventing serious accidents and mitigating the effects of radiation. In addition to developing a reactor core material that can reduce the amount of hydrogen in the event of a major accident as well as to protecting against cyber-attacks, we will continue ongoing efforts to further improve the safety of nuclear power plants.

With regard to hydroelectric power generation, Toshiba Group has developed a technology that improves water runner efficiency by applying Computational Fluid Dynamics (CFD^{*1}) and also successfully increased output by renovating aged turbine facilities. Furthermore, we are also working to promote the introduction of renewable energy devices by

using adjustable speed pumped storage power generation systems that are effective for power system stabilization.

As for geothermal power generation, we have a proprietary technology that offers high-corrosion-resistance and erosion-resistance called "super rotor." By applying this technology to steam turbines, we ensure plant longevity, high operational reliability, and high operating rates.

■ Renewable energy (Photovoltaic)

In the area of industrial photovoltaic power generation systems, Toshiba Group has delivered large-scale photovoltaic power plants with capacities of more than 10 MW to many locations in Japan. In addition, in 2018, we began selling a 360-W photovoltaic module with a conversion efficiency of 22.1% for residential photovoltaic power generation systems, thereby helping reduce CO₂ emissions.

^{*1} CFD: Computational Fluid Dynamics

●Storing power

— Contributing to climate change mitigation with power storage technologies —

The amount of power generated by some renewable energy technologies varies with the weather, so generating power with renewable energy is an unstable method for generating power. Expanding the use of this method requires controlling sharp output fluctuations and achieving load leveling through peak shifts by charging batteries when there is a grid power surplus and discharging electricity during the day when there is a grid power shortage. To handle such requirements, Toshiba Group provides products such as adjustable speed pump storage power generation systems and a stationary storage battery system that uses Toshiba's high-performance lithium battery, SCiB™ as modules.

Furthermore, in 2015, we commercialized H2One™, a hydrogen-based autonomous energy supply system, by combining a hydrogen power storage technology employing water electrolysis with fuel cell power generation technology.

●Distributing power

— Contributing to climate change mitigation with power transmission and transformation technologies —

In order to provide an economical and stable power supply, we deliver various systems, including high-voltage, large-capacity power transmission/transformation devices, medium- and low-voltage power distribution devices, system protection relay devices that incorporate digital technologies, and monitoring and control equipment systems that remotely control these devices. Toshiba Group has also developed a DC power transmission technology that can reduce transmission losses compared to AC power transmission. Using this technology, we are participating in every DC power transmission system project that promotes linkage between systems in Japan that differ in frequency. Overseas, we are also participating in a project for DC transmission between Italy and Montenegro as well as manufacturing major devices including suspended thyristor valves and converter transformers for the project. Furthermore, thanks to our proprietary circuit composition technology, Toshiba Group can miniaturize devices. Using this technology, we can reduce installation footprints.

●Comprehensive energy coordination

—Power demand forecasting technology, etc.—

As renewable energies increase, whose power generation significantly varies depending on the weather and meteorological conditions, a technology to fill the gap between power supply and demand that fluctuates every second has become more and more important. We have been developing virtual power plant (VPP) technology to optimally control multiple batteries (Store) using IoT, a technology to accurately forecast power demand (Use) and power generation (Generate) from renewable energy, and other technologies as technologies that achieve a stable and economical supply of power through comprehensive efforts to generate, transmit, and store energy.

Both our high accuracy weather forecasting technology based on a numerical weather model and high accuracy forecasting technology for power demand and solar power generation that combines a technology to use weather big data for AI have received goods results*2 in the "Electricity Load Forecasting Technology Contest (June–October 2017)*3" and the "Contest on Technology for Predicting Solar Energy Production (February–June 2019)*4" hosted by major power companies.

*2 Best award in the "First Electricity Load Forecasting Technology Contest," and Grand prize in the "PV in HOKKAIDO Contest on Technology for Predicting Solar Energy Production"

*3 A contest hosted by TEPCO Power Grid that competes for accuracy in methods for forecasting power demand in the service area operated by the company.

*4 A contest hosted by TEPCO and Hokkaido Electric Power that competes for accuracy in forecasting power demand at a solar power plant specified in advance as well as the practical use and potential of the method.

Contributions by products and services associated with power consumption

With regard to product groups such as air conditioners and LED lights for which CO2 emissions during use account for the largest percentage of emissions generated throughout product lifecycles, improving energy-saving performance leads to significant reductions in CO2 emissions. Toshiba Group helps reduce CO2 emissions by developing and providing advanced energy-saving technologies.

Case

Store and office air conditioner "Super Power Eco Gold"

Toshiba Carrier Corporation

In recent years, unusual weather such as an extreme heat wave and harsh winter or a cold wave is often being observed in many parts of the world. In this circumstance, depending on the installation condition of an air conditioner outdoor unit, we can anticipate a risk that the cooling capacity may drop during peak hours in an extremely hot day or other risks.

As such, we have developed this product that achieves high efficiency with a newly developed DC twin rotary compressor featuring high output and increased shaft rigidity owing to optimized design for a four-axis motor and others, enabling operations in the widest outdoor unit temperature range in the industry*1. While ensuring toughness to withstand the extreme heat wave and harsh winter, this product has not only cleared the 2015 standard of Japan's Energy Saving Act, but achieved a high annual performance factor (APF) and thus the industry's top level high energy saving performance. As a result, this product was certified as an excellent ECP*2 for FY2018.

Furthermore, the product reduces the burden of transportation and installation work in the field by making the outdoor unit smaller and lighter with a compact compressor, light heat exchanger, and single fan. Moreover, the product uses the new refrigerant R32 featuring approximately one third smaller the Global Warming Potential (GWP) than conventional refrigerants and is environmentally conscious in many aspects.



Store and office air conditioner "Super Power Eco Gold"

*1 The lower limit minus 27°C to the upper limit 50°C; in store and office air conditions; a survey by Toshiba Carrier Corporation.

*2 Toshiba product or service that has achieved No. 1 environmental performance at the time of market launch.

Case

Medium-speed color multifunction printer (MFP) e-STUDIO5015AC series

Toshiba Tec Corporation

Amid rising interest in various environmental requirements worldwide, Toshiba Tec Corporation has been working on energy saving, saving resources, and reduction of chemical substance used in MFPs.

A fixing device is the component that plays an important role in increasing energy saving performance in MFPs. In an MFP, a toner stuck on paper is warmed, melted, and fixed with a fixing roller. Here, the important point in improving energy efficiency is how efficiently the fixing roller can be warmed. Our e-STUDIO5015AC series color MFP achieves energy-saving by improving the heat conductivity of the fixing component and using a low temperature fixing toner. As a result, the e-STUDIO5015AC achieved the top-level typical electricity consumption (TEC) value, which is an energy saving standard for MFPs used by the International ENERGY STAR® Program and was certified as an excellent ECP for FY2018. From the viewpoint of resource saving, it also achieves 8.5% in the usage rate of recycled plastic materials by utilizing high post-consumer recycled materials.

Related page:

[e-STUDIO5015AC series](#)



Efficient Use of Resources

Toshiba Group's 3R Initiatives for Products

In order to achieve a sound material-cycle society, there is a need to reduce the amount of resources extracted and discharged as waste throughout product lifecycles. Toshiba Group is promoting 3R* initiatives for products aimed at reducing waste, increasing incoming recycling, and improving outgoing recycling. We are also taking measures to promote design for 3Rs of products and recycling systems and are implementing activities to reduce environmental impacts of our products throughout their lifecycles.

* Reduce, reuse, and recycle

●Waste reduction

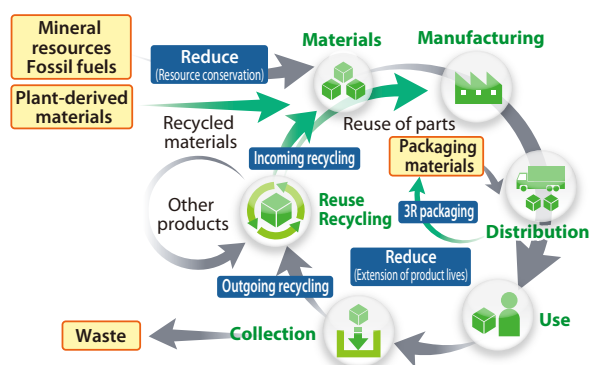
We achieve waste reduction through various means, including reducing the amount of resources used to manufacture products (reducing weight and size) and extending product lives (including upgrades and maintenance).

●Incoming recycling

Incoming recycling refers to the application of recycled materials in products. We will work to improve our incoming recycling rate by increasing our use of recycled materials, plant-derived materials, and reusable parts.

●Outgoing recycling

Outgoing recycling refers to the collection and recycling of end-of-life products. By promoting designs for reusing and recycling materials, we improve outgoing recycling while simultaneously improving the system design for recycling end-of-life products further.



●3R initiatives for packaging materials

We will streamline the use of packaging as well as product materials to reduce environmental impacts throughout their entire lifecycles.

We will work to reduce the use of packaging materials by taking into account the characteristics of each business area and product group through various measures such as reducing packaging volume, enlarging the size of returnable (reusable) cases, and using materials having low environmental impacts.

Increasing the Amount of Resources Saved

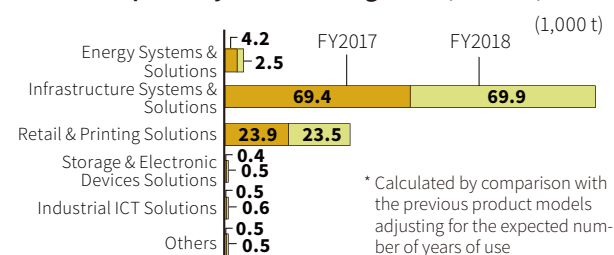
●Results of FY2018

Under the Sixth Environmental Action Plan, we aim to reduce resource consumption by a cumulative total of 380,000 tons by FY2020. In FY2018, the total amount of resources used in Toshiba Group's major products, estimated by multiplying the amount used for products and packaging materials by the number of shipments, was approximately 290,000 tons. Based on comparisons with previous product models and adjusting for the expected number of years of use, we also estimated to what extent resource consumption has been reduced for different products. Our comparisons show that we have reduced the use of resources by 98,000 tons compared to previous product models and by 200,000 tons in total from FY2017 and achieved the planned amount of 180,000 tons for FY2018.

■ Amount of resources saved (cumulative total)

FY2017 result	FY2018 target	FY2018 result	FY2019 target	FY2020 (Final fiscal year) goal
99,000 t	180,000 t	200,000 t	270,000 t	380,000 t

■ Amount of resources used and reductions in resource consumption by business segment (FY2018)



●Future initiatives

We will continue to promote resource-saving designs for all products with the aim of further reducing resource consumption.

Case Elevator controller renovation: Time-saving renovation

We have made it possible for customers to continue to use elevators by replacing only the main devices (controller, motor, etc.) of their elevators which have exceeded their service life and for which the end of components supply* is close at hand. This service improves the convenience of customers in various respects such as: (1) being less expensive than conventional products; (2) short construction period with complete suspension for two days (previously, five to seven days); and (3) improved safety (use of double braking system). From an environmental aspect, by increasing the rate of reusing existing components to 88% and thus reducing the resources used, this service was certified as an excellent ECP for FY2018. Moreover, it achieves energy saving by using LED lighting and a state of the art controller.

* For some elevators whose production has ended, the production of some of their components has also ended and therefore maintenance components may not be available.

Case

Radio source visualizing system

Toshiba Infrastructure Systems & Solutions Corporation

As the use of radio waves for mobile phones increases, the effects from radio interference and disturbance due to illegal radio waves transmitted from unlicensed radio stations has recently become serious.

With the aim of identifying the locations of unlicensed radio stations, we have developed

a radio source visualizing system that can identify the locations of radio emission sources (antennas, mobile objects) in two dimensions by superimposing an imaging processed electric field distribution and an image photographed with a camera.

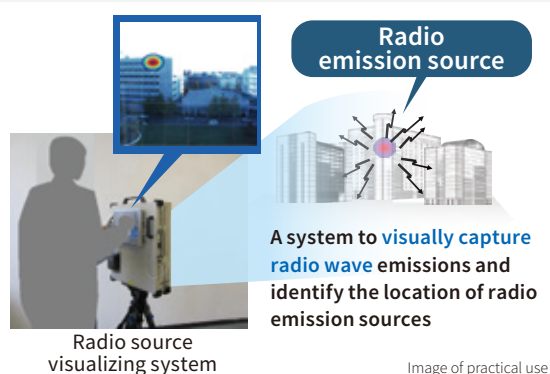
By integrating the signal processing section and antenna section which were previously separate components, into one unit, the new system (TW4347B) that we have developed achieves resource saving of approximately 56%* by a weight comparison. The system is also designed to meet the needs of customers by expanding the frequency range and achieving approximately 70% of energy saving in a comparison of power consumption for long-hour operation.

Looking forward from here, we will propose a wide range of applications such as measurement of the radio wave (emission) environment and checking for mobile phone usage and thereby contributing to resolving various social issues.

* Comparison with a conventional model (TW4347A)



Various antennas of the radio source visualizing system TW4347B (From left: 300–700 MHz, 700–2,700 MHz, 2,700–6,000 MHz)



Increasing the Use of Recycled Plastics

Toshiba Group is promoting initiatives to recycle plastic waste generated by end-of-life products.

●Results of FY2018

Use of recycled plastics by Toshiba Group is increasing mainly in multi-function printers, hard disk drives, batteries, industrial air conditioners, and ceiling lighting equipment. In FY2017 and FY2018, the cumulative total amount of recycled plastics used was 1,685 tons, exceeding the initial target (1,500 tons).

●Future initiatives

To increase use of recycled plastics, we will ensure the supply of waste plastics as well as develop new uses for recycled plastics. Under the Sixth Environmental Action Plan, we aim to increase the cumulative total of recycled plastics to 3,000 tons by 2020.

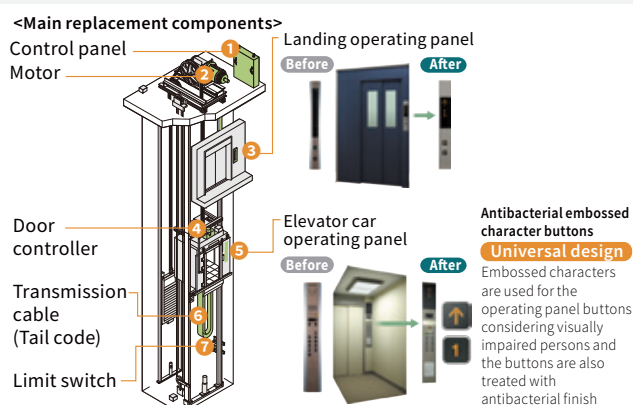
■ Amount of recycled plastics used (cumulative total)

FY2017 result	FY2018 target	FY2018 result	FY2019 target	FY2020 (Final fiscal year) goal
851 t	1,500 t	1,685 t	2,280 t	3,000 t

Recycling of End-of-Life Products

In order to ensure efficient use of resources and appropriate treatment of hazardous substances, in accordance with recycling regulations in each country and region of the world, Toshiba Group is promoting the collection and recycling of products that customers have discontinued use of. We promote collection and recycling of end-of-life products while striving to minimize collection and recycling costs as it complies with each country's recycling scheme. In Japan, in addition to products covered by the Act on Recycling of Specified Kinds of Home Appliances and the Act on the Promotion of Effective Utilization of Resources, we have established a unique scheme to collect elevators, MFP/POS systems, and other office equipment. Toshiba Group also responds appropriately to the Directive on Waste Electrical and Electronic Equipment (WEEE) in Europe and state laws in the United States. Furthermore, it is preparing to respond appropriately to recycling-related laws enacted in China, India, and Australia and those expected to be enacted in the future by governments in other countries in Asia and Central/South America.

Toshiba Elevator and Building Systems Corporation



Management of Chemicals

Initiatives for management of chemicals contained in Toshiba Group products

Toshiba Group manufactures and sells a wide range of products, from electronic devices (e.g., semiconductors and hard disks) to building-and facility-related equipment (e.g., air conditioners, elevators, and lighting devices), industrial systems (e.g., motors and railroad systems), and energy and social infrastructure products (e.g., power generation, transmission, and distribution systems). Various chemicals are used to manufacture these products. To properly manage these chemicals and to achieve our goal of minimizing the risks involved in the use of chemicals in accordance with the precautionary principles which were proposed and adopted at the World Summit on Sustainable Development (WSSD^{*1}) and other conferences, Toshiba Group has been promoting initiatives to specify the chemicals to be managed, to eliminate the use of specified chemicals (including the use of substitute materials), and to reduce the amount of chemicals contained in our products. In addition, we also promote communication and informa-

tion sharing on such identified chemicals in each process of our production activities from product design to shipping inspection, in order to minimize risks to human health and the global environment throughout product lifecycles.

Also, to respond to the globalization of business, Toshiba Group is developing global measures to manage chemicals contained in products. To this end, we gather and assess the impact of policies and regulations of countries around the world to enhance Toshiba Group's management of chemicals.

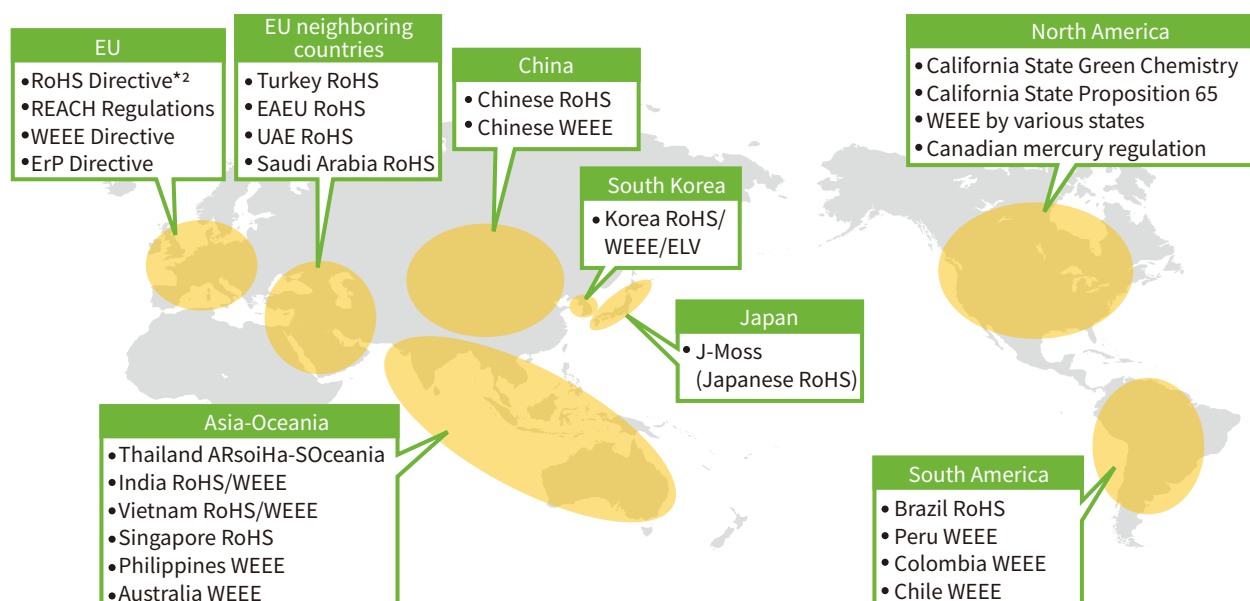
Furthermore, to promote the Green Procurement initiative, Toshiba Group has specified "prohibited substances," whose presence is prohibited in procurement items, including product materials and parts, and "managed substances," whose environmental impacts should be reduced, based on their actual usage, via reduction of use and substitution. Our aim is to procure products, parts, and materials in cooperation with our business partners and suppliers to minimize the environmental impacts.

Toshiba Group Environment-related Substance List

Category	Definition
Rank A (Prohibited Substances)	Substances whose presence is prohibited in procurement items (including packaging) in Toshiba Group. Substances whose use in products (including packaging) is prohibited or restricted by domestic or foreign laws and regulations.
Rank B (Managed Substances)	Substances whose environmental impact should be reduced, based on actual usage, via reduction of use and substitution, or recovery and detoxification in a closed system.

Due to sector-specific conditions and other circumstances, details of the management of chemicals (substances managed, management levels, threshold values, etc.) may differ among Toshiba Group companies.

Examples of regulations on chemicals contained in products in different countries



^{*1} WSSD : World Summit on Sustainable Development

^{*2} RoHS Directive : Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment

Promoting use of alternatives to the four phthalates*¹

Under the Sixth Environmental Action Plan, Toshiba Group promotes use of alternatives to the four phthalates as part of our initiative for the management of chemicals contained in products.

Phthalates are used as a plasticizer for PVC and other plastics. They are widely used in electrical and electronic equipment as plasticizers for plastics that must be pliable, such as cords and internal wire cable coatings, as well as for various types of packing. However, concerns have been raised over the reproductive toxicity of phthalates revealed in toxicity assessment. Therefore, in Europe and the United States, they are prohibited from use in toys or product parts that contact the skin for a long time.

Also, the Commission Delegated Directive (EU) 2015/863 was issued in the EU in June, 2015 to amend Annex II of the RoHS Directive for electrical and electronic equipment, and the four phthalates were added as new controlled substances. Based on this amendment, use of the four phthalates has been regulated for electrical and electronic equipment sold in EU countries' markets after July 22, 2019. Due to their regulation in the EU, use of the four phthalates will also be subject to regulation in various countries including the UAE starting in 2020.

Against this backdrop, Toshiba Group reviewed the Toshiba Group Green Procurement Guidelines in 2015 to prohibit procurement of materials containing the four phthalates at

an appropriate time. Meanwhile, we requested the cooperation of our business partners and suppliers and conducted a full-scale review of alternative materials. Under the Sixth Environmental Action Plan, we identify the parts of products (product groups) where business divisions are using materials containing phthalates to replace them with alternatives.

To promote use of alternatives while maintaining product quality, it is important to evaluate alternative materials' reliability and to easily assess whether materials purchased contain phthalates. Toshiba Group has reviewed how to assess cables' bending strength and how to simply test whether polymeric materials contain phthalates. Based on the knowledge we have acquired through past reviews as well as information that we have obtained with our customers' cooperation, we will promote replacement with alternatives for all products (product groups)*².

●Results of FY2018

We have completed replacement of electronic devices and water heaters for Europe.

●Future initiatives

We will continue to conduct thorough ongoing management of products subject to EU RoHS Directive, and then from FY2019 onward we will further replace or take other actions for energy and social infrastructure products as well.

*1 Bis (2-ethylhexyl) phthalate, butyl benzyl phthalate, di-n-butyl phthalate, and diisobutyl phthalate. Used mainly as plasticizers for plastics (cable coatings etc.) and other materials; there is concern about its effects on the human body.

*2 We aim to complete identification of alternative materials for some products (product groups) for which RoHS regulation starts in 2021 as well as for products not regulated by the RoHS Directive.

Case

Promotion of international standardization of a simplified screening method for phthalates

Toshiba Corporation
Corporate Research & Development Center

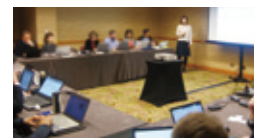
Focusing on the four phthalates in products added by the RoHS Directive in EU in July 2019, we have developed the thin-layer chromatography (TLC) method as one of the screening methods for acceptance tests on procured items and quality control of production processes, and we have been applying that method within Toshiba Group.

Since the specifications required for the screening of the phthalates vary depending on the user, it is important to choose the method according to the purpose. Among some screening methods with distinctive characteristics, the TLC method has the advantages of low cost and simplicity. In response to the needs of the electric and electronic industry inside and outside of Japan to reduce the management cost of the phthalates, we are promoting the international standardization of the TLC method as a screening method option.

At IEC*¹ TC111*² WG3, the IEC62321 series international standards for testing certain substances in products have been developed. Currently, the group is also working to standardize screening methods for the phthalates. We proposed adding the TLC method to the standards, and as a result, they accepted to consider standardizing the TLC method along with other methods. We continue to work on making the TLC method a part of the IEC standards.

*1 The International Electrotechnical Commission

*2 The committee of expert engineers to formulate environmental standards for electrical and electronic devices



International conference of IEC TC111 WG3 in Korea and the US

We aim to become an excellent company that lives up to the public's expectations by strengthening our environmental management

Major Results for FY2018

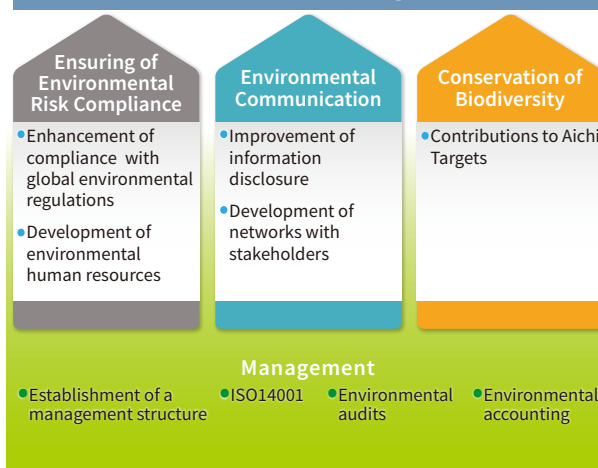
Environmental Management Structure	<ul style="list-style-type: none"> Number of Toshiba Group environmental audits conducted (cumulative) : over 5,000
Environmental Risks and Compliance	<ul style="list-style-type: none"> Enhancement of compliance with global environmental regulations, environmental human resource development at production sites
Environmental Communication	<ul style="list-style-type: none"> Toshiba Group Environmental Report 2018 won the award of merit in the Environmental Communication Awards held by the Ministry of the Environment of Japan The 27th Toshiba Group Environmental Exhibition was held with 2,600 visitors Educational programs for elementary school children was conducted approximately 30 times Over 650 environmental actions, such as environmental events and education, were implemented at our sites worldwide
Conservation of Biodiversity	<ul style="list-style-type: none"> Activities to achieve Aichi Targets were carried out at approximately 66 sites worldwide

Basic policy

In an effort to support "Business" activities for manufacturing and products and services, Toshiba Group is also promoting "Management" initiatives to enhance the basis for environmental management.

In our Management initiatives, we place the highest priority on ensuring compliance to raise the level of our environmental activities by maintaining a check system based on our original environmental audits as well as through environmental education for employees and human resource development programs. In addition, we also focus on improving information disclosure, developing networks with stakeholders, and conserving biodiversity.

Strengthening the foundation of environmental management



● Results of FY2018 and future initiatives

Under the Sixth Environmental Action Plan that has started in FY2017, we promote activities to achieve three goals: ensuring environmental risk compliance, promoting environmental communication, and conserving biodiversity.

To achieve the first goal of ensuring environmental risk compliance, to enhance compliance with global environmental laws and regulations regarding products and services, we collected and evaluated the impacts of legal information worldwide, shared information through meetings in a timely manner, and implemented human resource development measures such as education. In addition, we actively worked to strengthen human resources at production sites by holding study sessions on legal compliance and environmental management targeting persons responsible for environmental matters at our sites in China.

To achieve the second goal of promoting environmental communication, we worked to enhance appropriate information disclosure. As a result of these efforts, Toshiba Group Environmental Report 2018, Annual Report 2018, and CSR Report 2018 won the award of merit in the Environmental Communication Awards held by the Ministry of the Environment of Japan. We also promoted the development of networks with stakeholders in various ways. We conducted educational programs for elementary school children at Toshiba Science Museum and peripheral elementary schools at approximately 30 locations, and held Toshiba Group Environmental Exhibition with the theme of SDGs in February with nearly 2,600 visitors. At our sites worldwide, we conducted a wide range of activities as part of a Global Environmental Action program including environmental

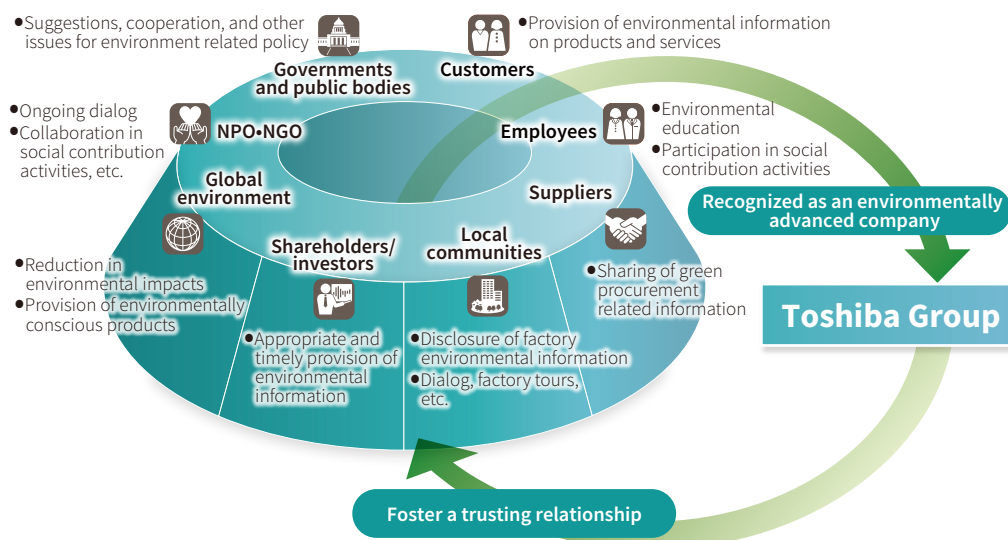
events, education, and cleaning activities in Japan, Asia, China, Americas, and Europe with the theme of water.

To achieve the third goal of conserving biodiversity, we set 10 of the 20 Aichi Targets, which are global targets, as goals for Toshiba Group and implemented activities according to the characteristics of each region such as "Promoting environmental education inside and outside the company (Aichi Target 1)," "Invasive alien species countermeasures by weed control (Aichi Target 9)," and "Protecting endangered animals and plants (Aichi Target 11)" at our approximately 66 global sites.

■ Main activities with stakeholders

Measures to take	Main activities
Improvement of information disclosure	<ul style="list-style-type: none"> • Issue of Environmental Report • Disclosure of Environment Website • Introduction of environmental activities at exhibitions • Development of environmental advertisements • Environmental labeling on products • Issue of Integrated Report and CSR Report
Network building	<ul style="list-style-type: none"> • Holding educational programs for elementary school children • Implementing Global Environmental Action • Holding investor briefing and dialog • Holding stakeholder dialogs • Employee education / enlightenment activities • Cooperation with other communities in environmental activities • Participation in external bodies / suggestion toward industry standardization • Holding briefing sessions for green procurement

■ Toshiba Group's stakeholders



Environmental Management Structure

Environmental Management Structure

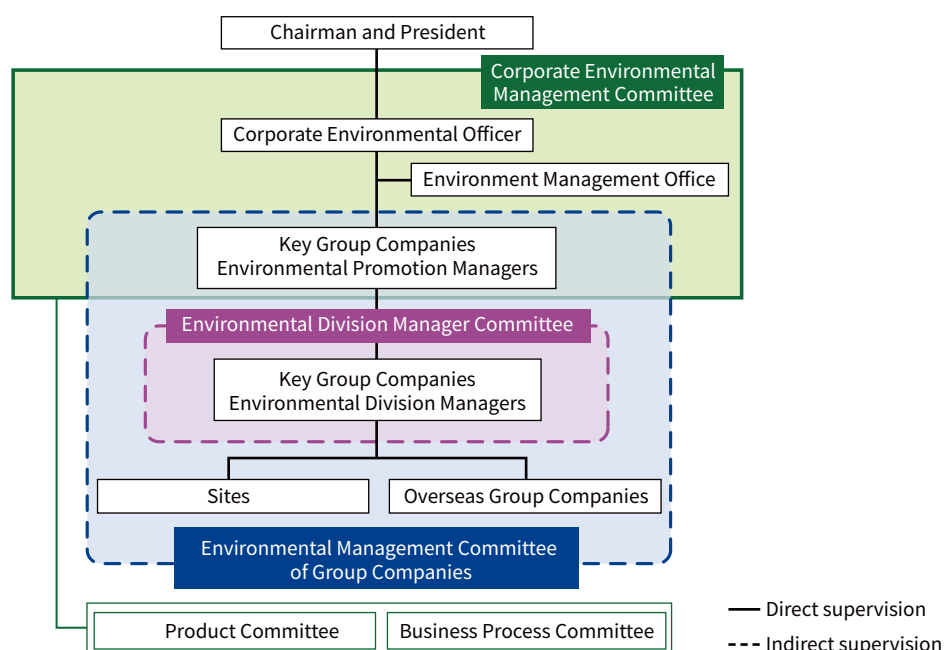
Toshiba Group is promoting environmental management worldwide as a group. There are four pillars upholding our environmental management: (1) strengthening of the management structure, (2) provision of environmentally conscious products and services, (3) development of environmentally conscious manufacturing, sales, and processes, and (4) promotion of environmental communication. We take active measures to promote initiatives focused on these objectives.

Corporate Environment Management Office develops and implements important corporate-level policies, strategies, and measures with the approval of senior managers and makes them fully known to all personnel of the company. Specifically, Toshiba semiannually convenes the Corporate Environmental Management Committee, a group-wide decision-making organization regarding environmental management chaired by the Corporate Environmental Officer, which consists of environmental promotion managers of key group companies and corporate staff division managers. Meetings of the Committee make proposals for environmental measures related to management, technological development, production, and sales; confirm and follow up on the progress of the Environmental Action Plan to achieve Environmental Vision; discuss and decide

the overall policy and plans for environmental management; and make the company-wide policy fully known to all managers and employees. Key environmental related measures and policies discussed in the Corporate Environmental Management Committee are explained to Directors in a meeting of the Audit Committee Hearing held every year and to the Chairman and President in a management meeting or a regular meeting of executive officers.

The following committees are organized as subgroups of the Corporate Environmental Management Committee: The Product Committee, which manages the development of environmentally conscious products and technologies, and the Business Process Committee, which promotes efforts to reduce the environmental impacts in business activities. These committees formulate detailed plans, identify potential problems, review measures implemented to solve problems, and promote the sharing of information among all company members. Various working groups specializing in particular themes are engaged in activities in a wide range of areas under the supervision of these committees.

■ Toshiba Group environmental management structure



● Global environmental management structure

Toshiba Group has established a corporate regional headquarters in China, where we have an especially large number of production sites, to ensure local environmental management. In addition, in Europe, the U.S., and Asia-Oceania, we work together with the relevant regional headquarters to collect and share information on environmental policies and regulations in each region and to collaborate and provide support for group companies in these regions to develop effective environmental strategies.

We also have an auditing system through which we provide training for local auditors who conduct the environmental audits of overseas sites.

● ISO 14001

In recognition of the importance of activities at our sites in promoting environmental management, we obtained ISO 14001 certification for all of Toshiba Corporation's sites in Japan by 1997. Currently, Toshiba Group's 65 sites have obtained the certification.

Key group companies such as Toshiba Energy Systems & Solutions Corporation, Toshiba Infrastructure Systems & Solutions Corporation, Toshiba Electronic Devices & Storage Corporation, and Toshiba Digital Solutions Corporation are striving to obtain integrated certification for their headquarters, sales offices, production sites, and their group companies in order to develop environmental management systems for entire group companies.

■ Number of ISO 14001-certified sites

Business domains	Number of certified sites
Corporate	8
Energy Systems & Solutions	9 (including integrated certification)
Infrastructure Systems & Solutions	26 (including integrated certification)
Retail & Printing Solutions	14
Storage & Electronic Devices Solutions	5 (including integrated certification)
Industrial ICT Solutions	3 (including integrated certification)
Total	65

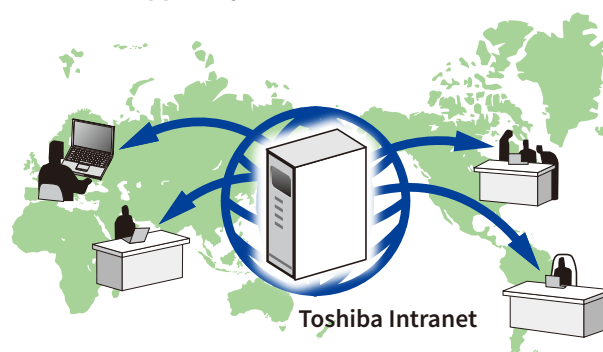
Note : As of August 30, 2019

Environmental Management Information System

We have developed an Environmental Management Information System in order to collect and manage environmental data required to promote environmental management.

The Environmental Management Information System makes it possible to centrally manage and register not only performance data, such as energy consumption required for business activities and the amount of waste generated from these activities, but also environmental accounting information and the results of site environment audits. It covers all consolidated subsidiaries within the scope of management of Toshiba Group (350 companies in FY2018) and is accessible from countries around the world.

■ Global support system



Environmental Management Structure

Environmental Audits

● Toshiba Group's environmental audit system

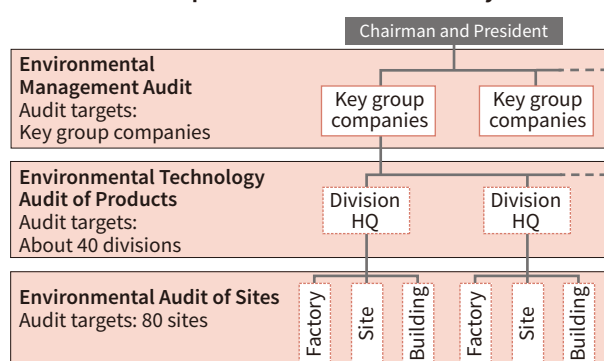
After conducting environmental audits for the first time in 1989, Toshiba Group developed a comprehensive environmental audit system and has been using the system since FY1993 to conduct audits based on standards established by the group. The audit system initially developed was composed of four categories: (1) management system audits (environmental promotion systems, etc.), (2) on-site audits (levels of compliance with rules regarding environmental facilities, etc.), (3) VPE audits (levels of achievement of goals set in the voluntary plan), and (4) technology audits (product environment management system, environmental performance, etc.). Audits were conducted over two days to check these items. The most unique of these categories was on-site audits, reflecting the shop-floor approach. This approach is incorporated into the environmental audits of sites conducted today.

Environmental technology audits of products became an independent category in FY1995. Environmental management audits were started in FY2004 to evaluate the level of environmental management in key group companies.

Since FY2006, these multiple audits have been systematized so that they can be conducted as one of three types: (1) environmental management audits covering key group companies, (2) environmental technology audits of products covering various divisions, and (3) environmental audits of sites covering production sites and non-production sites that consume large amounts of power. Group companies conduct self-audits (self-inspections) within their companies based on the same standards in order to check their sites with relatively low levels of environmental impacts that are not covered by site environmental audits.

Audit items for these three audits are reviewed annually to improve the evaluation level. During FY2012 to FY2016, we evaluated the level of environmental management based on audit items linked to the goals of the Fifth Environmental Action Plan. To further enhance environmental management, starting in FY2017, we have been evaluating the level of environmental management based on audit items linked to the goals of the Sixth Environmental Action Plan and confirm the details of specific initiatives.

■ Toshiba Group's environmental audit system



Toshiba Group's environmental audit results (FY2018)

■ Environmental management audit

Audit targets: six key group companies

No.	Items to be confirmed (Number)	Number of non-conforming or recommendation items	Number of good examples
1	Environmental policies and systems (14)	15	9
2	Legal compliance and risk management (9)	9	4
3	Business processes (11)	9	2
4	Products and services (15)	4	8
5	Information disclosure and communication (7)	1	13
6	Supply chain management (2)	4	0

Main non-conforming or recommendation item examples

- Incomplete information sharing on cases of potentially dangerous minor incidents
- Deterioration of the improvement rate for CO₂ emissions per unit activity due to the management of energy-derived CO₂ per unit activity with low correlation

Main good examples

- The analysis results from questionnaires answered by those who received environmental education are used for the education in the following year
- The results of site environmental audits are comprehensively analyzed to examine common issues and improvement measures

■ Environmental technology audit of products

Environmental technology audits of products are intended to improve environmental quality of products and increase contribution to the environment by confirming the level of conformance with ECP* standards set for each product (group) to ensure the environmental quality of products and the relevant legal requirements and also the status of activities to create Environmentally Conscious Products (ECPs), which aim to create products that contribute to reducing environmental impacts while they are introduced and used by customers.

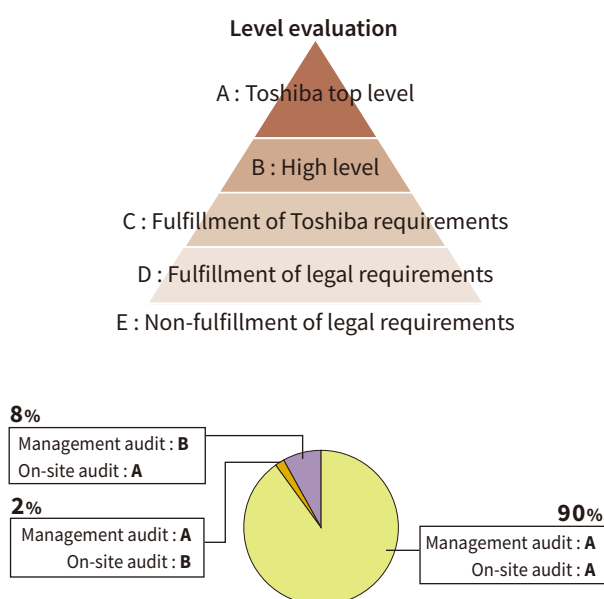
*Environmentally conscious products

Product area	Main comment
Energy Systems & Solutions	Product development plans that contribute to reducing environmental impacts are being clarified and the challenging of 3R initiatives for products is also being promoted. Firm compliance with environmental regulations.
Infrastructure Systems & Solutions	Industry-specific ECP promotion activities are being clarified and business opportunities through contribution to the environment are being created.
Retail & Printing Solutions	The performance of the Environmental Action Plan exceeded that of last year in MFPs and each business division is steadily implementing the new evaluation item "ECP creation system and policy."
Storage & Electronic Devices Solutions	Product development plans that contribute to environmentally conscious design are being clarified and a mechanism to secure compliance with legal regulations through to product shipment has been created.
Industrial ICT Solutions	The contribution of products and services is visualized (CO ₂ reduction at customers, etc.) by using a customer check sheet and is incorporated into ECP activities.

Environmental audit of sites

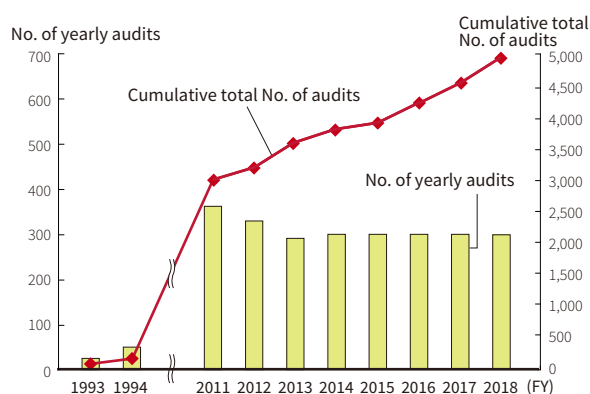
Environmental audits of sites are intended to improve the environmental management of sites by confirming the environmental management of sites, site management, and level of compliance.

Evaluation levels of environmental audit of sites in FY2018



Toshiba Group's environmental audit records

We conduct over 300 audits, including self-audits, annually, and the total number of audits conducted since FY1993 exceeds 5,000. We also provide in-house training for auditors who conduct audits.

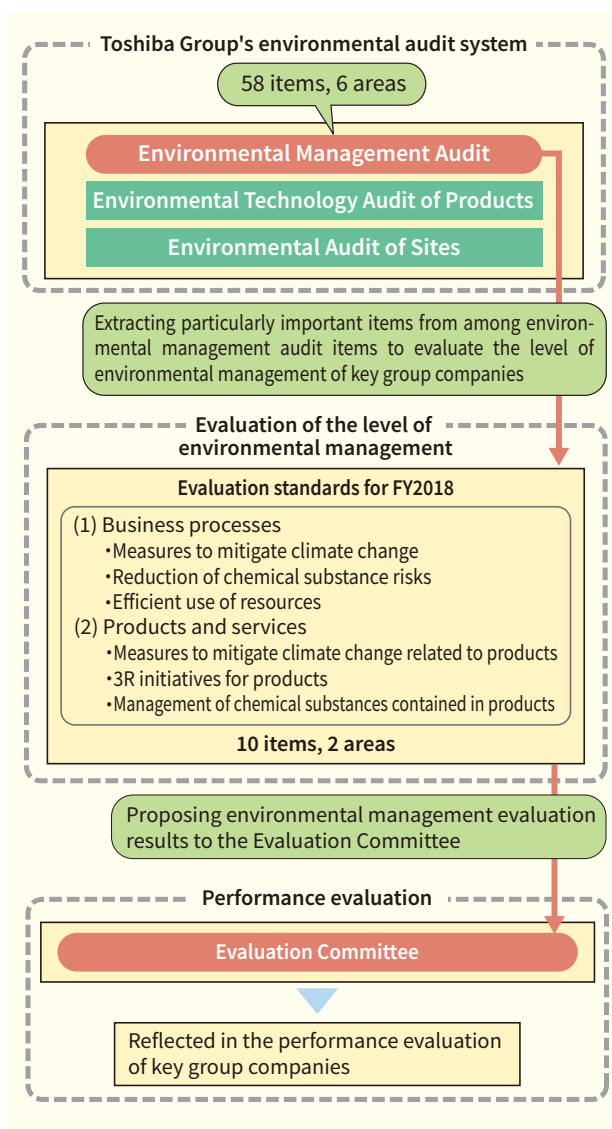


Performance Evaluation System

Reflecting the level of environmental management in performance evaluation

We evaluate the environmental management of key group companies based on Toshiba Group's comprehensive environmental audit system. Out of 58 items in the 6 areas of environmental management audits, we extract high priority items in the Sixth Environmental Action Plan as evaluation items to evaluate environmental management. In FY2018, we extracted 10 items in the following 2 areas to perform quantitative evaluation: (1) Business processes and (2) Products and services. Also, we submit evaluation results to the Evaluation Committee to reflect the results in each company's performance evaluation.

Performance evaluation system



Environmental Management Structure

Environmental Education and Human Resource Development

●Environmental education and human resource development

In order to raise the level of environmental activities, we provide environmental education programs for all employees. These education programs are composed of (1) management education courses, (2) general education courses, (3) ISO 14001 education courses, and (4) specialized education courses, offering curricula designed to meet the needs of different posts, occupational roles, and specialties. All curricula for these courses are reviewed annually in order to help employees share the latest information.

■ Environmental education system

Management education	Education for management
General education	e-learning (for all Toshiba Group members)
	Education for new employees
	Education for managers
ISO 14001 education	Education for employees
	Education for managers
	Education for special employees
	Training courses for internal auditors
Specialized education	Education for certification of site environmental auditors
	Education for certification of product environmental technology auditors
	Education on introduction to environmentally conscious design

●Environmental e-learning

We provide an environmental e-learning program once a year to all employees worldwide. This program helps employees deepen their understanding of global environmental issues and Toshiba Group's environmental initiatives.



E-learning text for FY2018

●Education for new employees

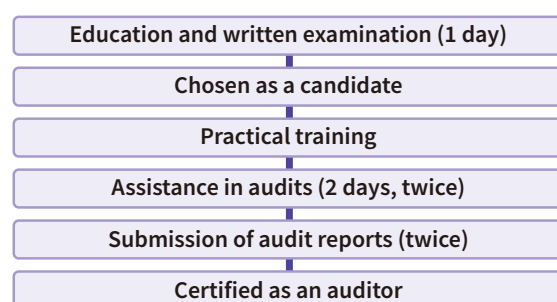
We provide interactive environmental education to new employees in April every year to encourage them to become business persons and members of society with high environmental awareness.



●Training for auditors

We provide training for auditors for our in-house environmental audits, which were put into practice in 1993. In the training program for site environmental auditors, candidates are screened through group education, on-site training, and a written examination. After the screening, candidates participate in actual audits as assistants and submit reports in order to be certified as auditors. Product environmental technology auditors are certified through group education and a written examination. In FY2018, 26 employees were certified as site environmental auditors, 6 as product environmental technology auditors, and 8 as overseas local auditors. The current number of certified auditors is 324 in total.

■ Process for certification of site environmental auditors



● Knowledge required

- Global environmental issues
- Environmental laws and regulations
- ISO environmental management system
- Environmental science and technology
- Toshiba's environmental promotion rules and structural design guidelines, etc.

● Requirements for auditors

- Employment in a position equivalent to or higher than section chief

● Requirements for assistant auditors

- Those who are approved by the supervisor depending on their experience and skills

● Others

- Education sessions are held once a year

Environmental Accounting

● As a tool for environmental management

With a view to promoting environmental management, Toshiba Group is working to introduce an environmental accounting approach aimed at collecting accurate data on investments and costs required for its environmental conservation initiatives and analyzing the collected data in order to reflect investment effects and cost benefits in managerial decision making.

Environmental costs are calculated in accordance with the Ministry of the Environment's Environmental Accounting Guidelines 2005. To assess benefits, we show reductions in environmental impacts in physical amounts and also calculate benefits on a monetary basis.

● Environmental costs and benefits

Total environmental costs increased by 23% from FY2017 to 23 billion yen. The breakdown of environmental costs by business segment shows that the social infrastructure business incurred the largest costs, followed by the electronic device business and then by the energy business.

Total investments decreased by 7% from FY2017 to 3.5 billion yen.

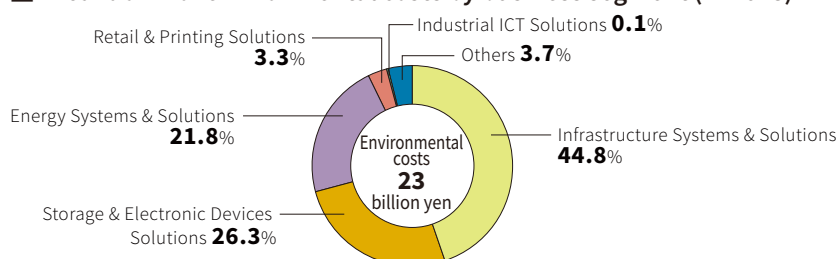
The total amount of environmental benefits was 6.7 billion yen. The breakdown of the total is as follows: actual economic benefits were 2.8 billion yen and assumed economic benefits were 3.9 billion yen.

Unit: million yen

■ Environmental costs (FY2018)

Category	Description	Investments	Costs
Business area costs	Reduction in environmental impacts	2,395	6,306
Upstream/downstream costs	Green procurement, recycling, etc.	355	636
Administration costs	Environmental education, EMS maintenance, tree planting on factory grounds, etc.	133	2,626
R&D costs	Development of environmentally conscious products, etc.	637	13,279
Public relations costs	Support for local environmental activities, donations, etc.	9	20
Environmental damage restoration costs	Restoration of polluted soil, etc.	20	151
Total		3,549	23,018

■ Breakdown of environmental costs by business segment (FY2018)



■ Environmental benefits (FY2018)

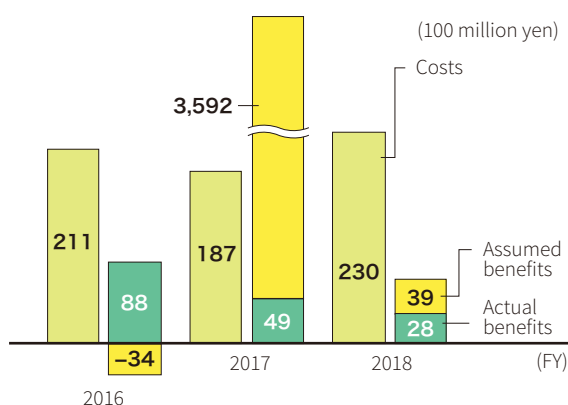
Category	Description	Reductions in environmental impacts	Benefits measured as a monetary value (million yen)	Calculation method
(A) Actual benefits	Costs that can be measured directly as a monetary value, such as electricity and water charges	Energy	-423,568(GJ)	Reductions in electricity charges and waste processing costs compared to the previous year, plus sales of valuables.
		Waste	41,139(t)	
		Water	597,015(m ³)	
		Total monetary benefits	2,796	
(B) Assumed benefits	Reductions in environmental impacts measured as a monetary value	Reductions in the amount of chemicals discharged	154(t)	3,915
Total monetary benefits			6,711	To obtain monetary values, we assessed the impact of different substances by using the equivalent amount of cadmium for each substance, which we calculated based on environmental standards and on threshold limit values for chemical substances specified by the American Conference of Governmental Industrial Hygienists (ACGIH-TLV), and then multiplying such amounts by the damage compensation for cadmium contamination. In order to compare different environmental impacts by the same standard, reductions in environmental impacts on the atmosphere, hydrosphere, and soil compared to the previous year are shown alongside monetary amounts that represent the values of such reductions.

Reductions in environmental impacts for actual and assumed benefits indicate differences between FY2017 and FY2018.

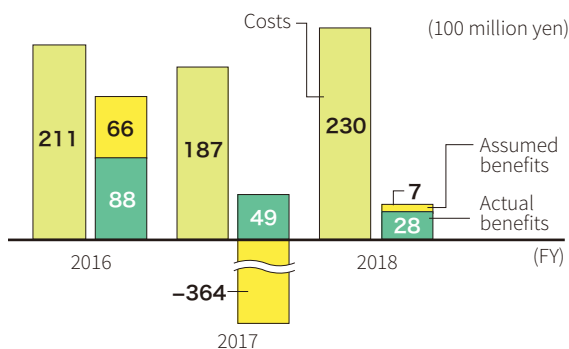
Negative benefits indicate that the increase in environmental impacts exceeded reductions due to increases in production and other factors.

With respect to assumed economic benefits, in light of the major impact of Sigma Power Ariake Co., Ltd., which engages in the thermal power generation business, we also present data on changes in environmental benefits for Toshiba Group after excluding Sigma Power Ariake. We will continue to appropriately analyze environmental costs and develop environmental management measures to further increase environmental benefits.

■ Environmental costs and benefits (including the effects of Sigma Power Ariake)



■ Environmental costs and benefits (excluding the effects of Sigma Power Ariake)



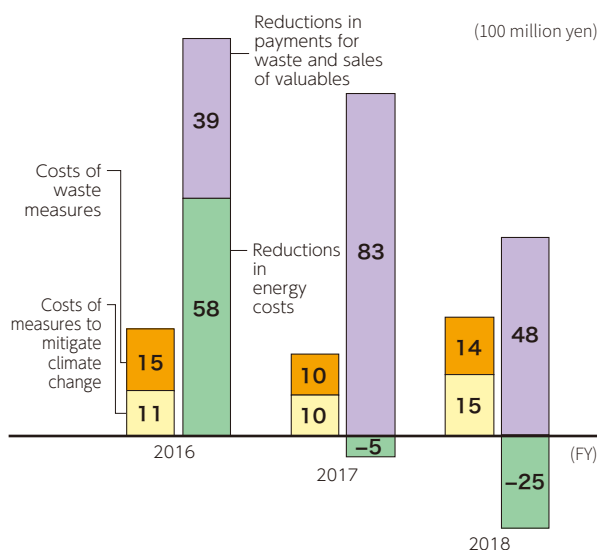
● Cost benefits of environmental management measures

The figure shows the changes in cost benefits of measures for climate change mitigation and waste disposal over the past three years. We compared the costs incurred in taking measures related to climate change and waste disposal against the total amount of reductions in payments related to energy consumption and waste disposal compared to the previous year as well as sales of valuables during the current year. In the table above, costs are expressed as business area costs and benefits as actual benefits.

In FY2018, the amount of reduction in energy costs was below the cost of climate change mitigation. Meanwhile, waste measures brought larger benefits than the costs for implementing them.

The major issue to be addressed going forward is how to overcome two conflicting problems: an increase in emissions of environmental pollutants as a result of business expansion and the need for cost reductions. Toshiba Group will also analyze the cost benefits and other financial aspects of environmental management measures in more detail.

■ Cost benefits of measures for climate change mitigation and waste disposal



Risks and Compliance

Ensuring Environmental Risk Compliance

● Compliance with environmental laws and regulations

At Toshiba Group, we ensure compliance with environment related regulations and requirements for products and services by managing processes from the design stage through to delivery to customers along with the cooperation of suppliers. We also set self-regulation standards that are even stricter than legal standards regarding atmospheric emissions and discharges into the hydrosphere in the process of manufacturing, and all its production sites comply with the standards.

While identifying potential risks in business activities during in-house environmental audits to prevent any environmental accidents or violation of laws and regulations, we also develop comprehensive initiatives by sharing information, such as results of internal audits of individual sites and divisions, the latest legal trends, and past examples of accidents in our group companies through company-wide environmental education and environmental auditor certification training as well as Corporate Environmental Management Committee meetings, etc.

Unfortunately, three legal violations occurred in FY2018. After dealing with the problems promptly and appropriately, we will work to prevent future recurrence and ensure compliance management to a greater extent.

Toshiba Elevator (China) Co., Ltd. (January 2019)

- Violation of the air pollution control law for outside paint spraying work

PG Toshiba (Langfang) Arrester Co., Ltd. (December 2018)

- Violation of the water pollution control law for directly draining water used to clean electronic parts to outside the premises
- Violation of the water pollution control law for exceeding the Chemical Oxygen Demand (COD) and phosphorus standard value in industrial wastewater
- Violation of the environmental contamination prevention law regarding solid waste for storing waste sludge outside the designated area

Toshiba Infrastructure Systems & Solutions Corporation (January 2019)

- Violation of the commission criteria under the waste management law with regard to industrial waste processing of switchboards

Under the Sixth Environmental Action Plan, we promote specific measures to prevent risks from the aspect of both products/services and manufacturing to achieve the goal of ensuring environmental risk compliance as the top priority in the "Management" category.

In the area of products and services, in order to enhance compliance with global environmental laws and regulations, we collect and assess the impacts of legal information around the world while sharing regulatory trends and response policies in a timely manner through meetings for spreading such information across the group. We also develop environmental human resources by regularly providing education on environmentally conscious products, legal compliance, etc. and certifying product environmental technology auditors, and so on.

In the area of manufacturing, in order to develop environmental human resources at production sites, we prepare materials for site management and legal compliance and hold study sessions intended for persons responsible for the environment in China where we have many production sites. Through discussions in study sessions we will improve environmental awareness and skills of local personnel and in this way ensure environmental risk compliance at production sites.

● Responses to environmental risks

The Risk Compliance Committee examines how to cope with diversified risks under the direct supervision of the Chairman and President and also takes measures to prevent environmental risks.

If any environmental risk should materialize, Corporate Environment Management Office works in collaboration with environmental promotion managers and related persons of key group companies and the sites under the direction of the Corporate Environmental Officer to implement appropriate measures, including sharing information, checking relevant business and production sites, and preventing recurrence.

Risks and Compliance

Soil and Groundwater Purification

Toshiba Group is working to purify contaminated soil and groundwater by ascertaining the present condition of soil and groundwater at its production sites. The Group is also taking safety measures for environment-related equipment to prevent contamination with chemicals and reduce environmental risks. A survey of all production sites confirmed contamination at 12 sites, where soil and groundwater contamination with volatile organic compounds (VOCs) have been purified, and the results are being monitored. VOCs in groundwater are collected and eliminated mainly using the water pumping method.

Toshiba Group uses the water pumping method to purify soil and groundwater mainly in areas with high concentrations of VOCs, but if the VOC concentration in such areas is lowered due to progress in purification, the Group takes such mea-

sures as stepping up water pumping efforts in other areas with relatively high VOC concentrations. In FY2018, the Group collected 312 kg of VOCs. The amount collected was about 6% less compared to FY2016, but this is chiefly because the amount of VOCs collected per liter of water pumped is gradually decreasing due to the progress made in purification through drastic measures that make the most of the opportunity presented by land modifications, methodological changes (from water pumping to in-situ purification), and declines in relative concentrations of VOCs as a result of purification.

While continuing to purify contaminated soil and groundwater through appropriate methods based on laws and regulations as well as progress and trends in purification technology of the times, Toshiba Group will strive to ensure full communication with local governments and residents in neighboring areas through tours of purification facilities and other public relations activities.

■ Purification of soil and groundwater contaminated with volatile organic compounds

Production sites	Location	Progress in purification	Purification method*1	Amount collected*2 (kg)
Former site of Asia Electronics Inc.'s Yokohama Operation Center	Yokohama, Kanagawa Prefecture	Being monitored*3	A,E,G	–
Toshiba Corporation Komukai Complex	Kawasaki, Kanagawa Prefecture	Purification in progress	A,G	45.2
Toshiba Electronic Devices & Storage Corporation Himeji Operations-Semiconductor	Taishi Town, Ibo County, Hyogo Prefecture	Being monitored (North district)	D,F,G	–
		Purification in progress (South district)	A,F	118.8
Japan Semiconductor Corporation Oita Operations	Oita, Oita Prefecture	Being monitored	G	–
Toshiba Carrier Corporation Fuji Factory & Engineering Center	Fuji, Shizuoka Prefecture	Purification in progress	A,B	75.2
Toshiba Carrier Corporation Tsuyama Factory	Tsuyama, Okayama Prefecture	Purification in progress	A,B	0.17
Kawamata Seiki Corporation	Kawamata Town, Date County, Fukushima Prefecture	Purification in progress	A	Less than 0.01
Former site of Toshiba Shomei Precision Corporation's Kawasaki Works	Kawasaki, Kanagawa Prefecture	Being monitored	A,B,F	–
Former site of Toshiba Lighting & Technology Corporation's Iwase Works	Sakuragawa, Ibaraki Prefecture	Purification in progress	A	0.06
Lighting Device & Fixture Corporation Ibaraki Plant	Joso, Ibaraki Prefecture	Being monitored	A,B	–
Former site of former Toshiba Components Co., Ltd. Kimitsu Operation Center	Kimitsu, Chiba Prefecture	Purification in progress	A,B,F	72.3

*1 Purification method: (A) groundwater pumping, (B) soil gas suction, (C) reduction decomposition, (D) oxidation decomposition, (E) interception containment, (F) removal by excavating soil, and (G) bio-activation.

*2 Amount collected: Amount collected from April 2018 to March 2019

*3 Monitoring: Monitoring to confirm how things develop after work that will allow measures to be taken or purification is completed.

Management of Ozone-depleting Substances

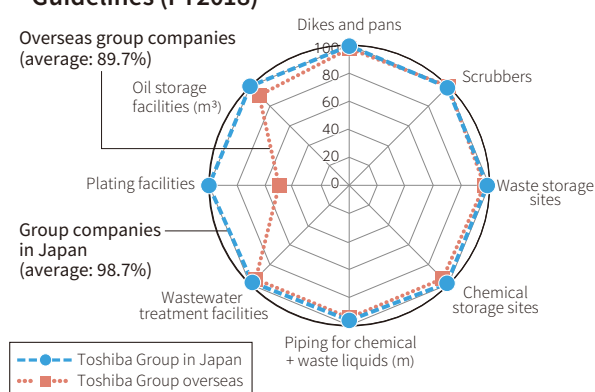
Toshiba Group possesses specified chlorofluorocarbons (CFCs), which deplete the ozone layer, as coolant for air conditioners installed in sites; we appropriately dispose of such CFCs in compliance with the law. In FY2018, due to measures such as facility upgrades, we reduced the amount of specified CFCs to 5.24 tons, a reduction of about 17% compared to the previous year. Our CFC leaks stipulated in the Fluorocarbons Emissions Control Act were 2,297 t-CO₂. We will continue to further enhance our management of chemicals through routine and periodic inspections as well as environmental audits.

Preventing Contamination and Reducing Contamination Risks

In order to prevent contamination with chemical substances and reduce contamination risks, Toshiba Group independently established the Structural Design Guidelines to prevent leaks of chemicals at its eight types of environment-related facilities (including wastewater treatment plants), and its overseas sites are also promoting continuous improvements in this area. In FY2018, Toshiba Group achieved a compliance rate of 98.7% in Japan and 89.7% overseas.

In its overseas operations, at the time of establishing a new business or relocating a business, Toshiba Group also assesses contamination risks by investigating land use and contamination histories. Assessments are made in accordance with laws and regulations in each country, and Toshiba Group's own rigorous standards are applied in countries without relevant legislation.

■ Rate of compliance with the Structural Design Guidelines (FY2018)



In order to ensure effective prevention of groundwater contamination, an act revising part of the Water Pollution Control Act in Japan was promulgated on June 22, 2011 and came into force on June 1, 2012. To prevent groundwater from becoming contaminated with hazardous substances*, new provisions have been added that require those who install facilities where hazardous substances are used, stored, or otherwise handled to comply with structural, equipment, and usage standards to block hazardous substances from entering the ground and to record and maintain records of periodic inspection results.

As early as FY1990, Toshiba Group established the Structural Design Guidelines, an initiative that anticipated the purpose of these revisions to the Act, and has since been working to improve compliance with these guidelines by developing measures to prevent underground infiltration and by conducting periodic facility inspections to facilitate on-site improvements.

Through such measures, we aim to further reduce environmental risks.

* As stipulated in Article 2 of the Order for Enforcement of the Water Pollution Control Act in Japan, the 28 hazardous substances subject to regulation include cadmium, lead, and trichloroethylene (as of April 2019).

Storage and Management of PCB

Since 1972, when the manufacture of products using polychlorinated biphenyl (PCB) was discontinued in Japan, Toshiba Group has kept PCB and PCB-containing products under strict surveillance, controlled them, and reported their storage to the relevant authorities in accordance with the Waste Management and Public Cleansing Act and the Act on Special Measures concerning Promotion of Proper Treatment of PCB Wastes in Japan. In addition to meeting the prescribed storage standards, the Group makes doubly sure through the installation of dikes and double containers and other measures that they are stored appropriately.

To manage high-concentration PCB waste, Toshiba Group has registered some 2,500 transformers and condensers with Japan Environmental Storage & Safety Corporation (JESCO), which provides wide-area PCB treatment services, and is gradually disposing of these devices according to JESCO's plan.

Meanwhile, we are also working to dispose of low-concentration PCB waste at government-certified detoxification facilities and prefectural governor-authorized facilities.

Transformers and condensers for which the possibility of containing PCB cannot be ruled out are in use at a number of production sites.

When checking transformers for maintenance, we analyze the oil, and if we discover PCB contained in such oil, we suspend use of the transformers, upgrade them, or draft a disposal plan. Condensers are fully sealed and become useless if their oil is analyzed, regardless of whether or not they contain PCB. Therefore, we are drafting plans to gradually update condensers while taking care not to impair our business activities. These measures are incorporated into Toshiba Group's disposal policies.

We will continue our efforts to dispose of devices that contain PCB properly by the legal processing deadline.



PCB-containing equipment being transported to JESCO

■ Disposal policies

	PCB waste (Pollution-confirmed materials for storage)	PCB devices in use
High density	Proceed with disposal according to JESCO's disposal plan.	Formulate plans to upgrade or dispose of devices.
Low density	Proceed with disposal at government-certified facilities.	Transformers: Analyze oil during maintenance. Formulate plans to upgrade or dispose of devices containing PCB. Condensers: Formulate plans to gradually upgrade fully sealed devices while taking care not to impair business activities. Formulate plans to dispose of devices containing PCB.

● Identifying environmental liabilities

Enforcement of the Act on Special Measures concerning Promotion of Proper Treatment of PCB Wastes, obliges PCB waste storage business operators to dispose of PCB wastes properly by March 2027. As of March 31, 2018 and 2019, Toshiba Group recorded environmental liabilities of approximately 11.7 billion yen and 11.0 billion yen respectively as PCB detoxification outsourcing expenses. These expenses were incurred in relation to the disposal of products containing PCB that were stored and managed in business and productions sites nationwide and their facilities. We will continue to grasp and disclose such information properly.

Environmental Communication

Educational programs for elementary school children to learn about the environment

As part of our environmental communication initiative, we are working together with the Association of Corporation and Education, an NPO that specializes in developing classes together with companies, to start an educational program for elementary school children at the Toshiba Science Museum and elementary schools in the Tokyo metropolitan area for learning about the environment.

This program is designed to raise children's awareness about global warming, resource depletion, and other environmental issues that seriously affect people's lives. Meanwhile, we are introducing various scientific technologies that contribute to resolving such issues, thereby enabling elementary school children to think deeply about environmental issues and how to give back as members of society by taking action on their own. These activities are aligned with "Education for Sustainable Development (ESD)*," a concept advocated by the United Nations.

* Education for fostering children who will support a sustainable society. This education is thought to require the following two perspectives: (1) Developing personality and fostering humanity, including self-discipline, judgment, and a sense of responsibility; (2) Fostering individuals who are aware of relationships with others, society, and natural environment and can respect a "relation" and "connection" (The Ministry of Education, Culture, Sports, Science and Technology's Japanese website).

This program's content is also in line with elementary school curriculum guidelines and can be taught in classes for science studies, social studies, and general studies. The program places high priority on experiments, team activities, and active dialog with teachers and provides opportunities for children to enjoyably learn about various initiatives and technologies developed to resolve environmental issues.

In FY2018, we held two programs titled: "What's on the other side of the power outlet?" (theme: energy) and "The mysterious material which controls electricity!?" —How to use energy learned from the discovery and use of the semiconductors— (theme: semiconductors) at about 30 locations including Toshiba Science Museum and in elementary schools mainly in the Tokyo metropolitan area. In the semiconductor program, we use educational material as part of community communication activities by way of our production site (visiting lectures at local elementary schools) as the first attempt after the launch of the program. Toshiba Group plans to continue this series of programs to provide children who will support a sustainable society in the future with opportunities to think about what they can do at present and 10 and 20 years from now.

Educational programs

"What's on the Other Side of the Power Outlet?" (Theme: Energy)

Participants in the program learned through experiments about the features of various methods for generating electricity including wind power generation, geothermal generation, photovoltaic power generation, and thermal power generation which are indispensable for our life. They also developed an interest in considering how energy should be consumed in the future including global warming-related issues and combined use of multiple energy sources.



The Mysterious Material Which Controls Electricity!?

—How to use energy learned from the discovery and use of semiconductors— (Theme: Semiconductors)

Participants looked at how semiconductors, which are indispensable for use of electricity, actually work, along with examples of advances made in familiar electrical products such as laundry machines and air conditioners. They learned that semiconductors not only contribute to energy-saving in products, but also are manufactured in consideration of decreasing adverse impacts on the environment, and got a deeper understanding of the roles of semiconductors in society. We believe this program will also contribute to smooth introduction of programming education to be made compulsory in elementary schools starting from FY2020.



Association of Corporation and Education
Executive Director
Shota Wada

<Energy program>

Although there are various energy education programs, there are few lessons that discuss a combination of power generation methods. The program was intended to ensure that children understand the characteristics of power generation methods and think about how they should supplement each other.

<Semiconductor program>

The mechanism and roles of semiconductors are closely connected with the study of subjects such as science and social studies. We tried not only to have the students actually realize how everyday study is connected to familiar products and technologies, but also to create a program that will lead to constructive study that can be applied to solutions to environmental issues.

27th Toshiba Group Environmental Exhibition

On February 7 and 8, 2019, the 27th Toshiba Group Environmental Exhibition was held at Smart Community Center in Kawasaki City. Approximately 2,600 guests visited the exhibition.

This year's exhibition showed how Toshiba Group is contributing to the achievement of the Sustainable Development Goals (SDGs) through environmentally conscious products and services as well as high efficiency manufacturing technologies. With the title, "Contributing to achieving the SDGs through environmental management," we exhibited a total of 40 products and services that contribute to solving various social issues including environmental issues, as well as case studies on manufacturing and basic activity, under the themes of: De-carbonized Society, Sustainable City, Circular Economy, and Manufacturing and Basic Activity. Customers from a wide range of sectors, ranging from government and municipal offices to companies through to students and media, visited the exhibition and asked questions regarding technologies, performance, and business scale and left many messages to our Group. As side events, we held a special tour of Toshiba Science Museum located on the second floor of Smart Community Center with the environment as the theme and introduced Toshiba Group's environmental management and what you should see at the exhibition to the press.



Messages from visitors

- The exhibition was useful because disaster prevention is an extremely important issue at our city. (Customer from a municipal office)
- The explainers were thoughtful and kind. I was able to understand the exhibition content very well. Since it has both high technical strength and many unique products, I felt future growth can be expected from this company. (Student)
- Due partly to the covered theme being close to my research theme, I was able to really sense the high level of the company's technology. (Student)
- I would like to express my respect for the company's efforts to continually hold the environmental exhibition a total of 27 times. (University professor)
- I was again able to recognize the company's attitude that contributes to our society. (Business person)
- I found out that the company is working in various business fields. Maybe it would be better to clarify differences versus other companies. (Business person)



Environmental advertisements

We introduced our energy-saving railway rolling stock system that combines VVVF* inverters using All-SiC (silicon carbide) devices, totally enclosed permanent magnet synchronous motors (PMSM), and power supply system for emergency run equipped with SCiB™ over a total of four pages.

* Variable Voltage Variable Frequency



Nikkei ESG, February 2019 issue (Nikkei BP)

Environmental Communication

Toshiba Group's Global Environmental Action

Toshiba Group is promoting "Global Environmental Action," which is an employee-supported environmental action program. In the Sixth Environmental Action Plan, which started in FY2017, we have set a theme for each fiscal year and carry out activities worldwide in accordance with that theme. The theme for FY2018 is water, and each of our sites has organized activities such as events and education to think about the importance of water resources, as well as water saving and cleanup activities. The total number of activities reached over 650* across the Group. We aim to foster a sense of togetherness within Toshiba Group by developing activities based on a common theme and to raise employees' awareness about a wide range of environmental issues by changing the theme annually. In addition, we conduct activities in collaboration with local communities to enhance communication with local residents, NPOs, and NGOs.

In 2019 and beyond, we plan to set themes related to issues that stimulate public interest such as resources, and chemicals, thereby promoting environmental activities at our sites around the globe. By sharing information on activities of the sites inside Toshiba Group, each site can further develop its activity going forward.

* Including activities based on themes other than water

Participation in initiatives

●Support to the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD)

The TCFD is a task force established by the Financial Stability Board in 2015 under the leadership of the private sectors with the aim of enhancing disclosure of climate-related information from companies. In support of the recommendations in the final report released by the TCFD in 2017, Toshiba Group has been working on information disclosure with regard to financial impacts of climate change. We also participate in the TCFD Consortium aimed at making joint efforts among supporting institutions in Japan for enhancing ESG information disclosure.



●Participation in the Environmental Reporting Platform Development Pilot Project

Toshiba Group has been participating in the Environmental Reporting Platform Development Pilot Project, a demonstration project promoted by the Ministry of the Environment of Japan for full-scale operation of the ESG dialog platform for six consecutive years since its launch in 2013. This will allow understanding information that is genuinely required based on information registered in the project and through dialog with investors to enhance disclosure of our ESG information.

●Participation in other external CSR related initiatives

[Participation in External CSR Organizations](#)



TEL-C-BATON2019

Toshiba Elevator and Building Systems Corporation (Japan and China)

All employees of Toshiba Elevator and Building Systems Group sites in Japan and China (261 sites) conducted various regionally-oriented environmental activities.



Environmental education on the theme of water

Toshiba Dalian Co., Ltd. (China)

The company provided education about water at nearby elementary schools and the company premises. Here, a total of about 730 people including elementary school children, local residents, and families of employees learned the importance of water resources and how to save water. The company also distributed a card describing its environmental policy and other information on water resource protection to participants to raise their awareness of this issue.



Seashore cleaning activity

Toshiba TEC Europe Imaging Systems S. A. (France)

The company conducts cleaning activities at the neighboring seashore which also help maintain the surrounding ecosystems every year.



Reducing the amount of water by raising awareness and installing equipment

Toshiba JSW Power Systems Private Limited (India)

The company put up posters calling for water saving on the premises to raise the awareness of employees. It also installed valves to control the water flow rate and meters to find the water consumption and in this way reduced the amount of water consumed by 47% compared to the previous year.



Tideland observation meeting**Toshiba Infrastructure Systems & Solutions Corporation (Japan)**

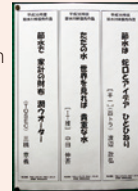
A total of 22 employees and their family members participated in the observation of tideland at the Tamagawa River. They collected a variety of creatures including crabs, corbicula clam, and shrimps, and learned about their living conditions.

**Environmental event for elementary school students****Toshiba Carrier Corporation (Fuji Factory & Engineering Center) (Japan)**

The site invited neighboring elementary school students to have them observe how water is used and waste water is treated in the factory. Based on that experience, the students created Environment Sugoroku (sugoroku: a traditional board game in which pieces are advanced by throwing dice).

**Water-saving senryu****Toshiba Electronic Devices & Storage Corporation (HIMEJI Operations-Semiconductor) (Japan)**

The site invited employees to create senryu with the theme of water saving and posted excellent work chosen from among 1,286 pieces of work on the premises.

**Environmental events****Toshiba Digital Solutions Corporation (Japan)**

The company holds the Environmental Forum every year inviting neighboring residents. In FY2018, the company invited Mr. Yoshihide Ito, Curator at The Museum of Tokai University, School of Marine Science and Technology to give a lecture and consider the importance of marine nature with approximately 150 participants.

**Cleaning activity around the lake****Toshiba America Business Solutions, Inc. (USA)**

The company cleaned the neighboring lake and its walking path, which resulted in conserving the environment and increasing the awareness of employees.



U.S.

**Mangrove planting****Toshiba Lighting Components (Thailand) Ltd. (Thailand)**

The company's approximately 200 employees participated in an event held at a national park and planted 100 pieces of mangrove.

**Reusing rainwater****P. T. TEC Indonesia (Indonesia)**

Taking advantage of the regional characteristic of ample rainfall, the company installed special rainwater tanks on the premises and reused the stored rainwater for cleaning and watering flowers.



France

China

Japan

India

Thailand

Philippines

Indonesia

**Energy saving and water saving contest****Toshiba Information Equipment (Philippines), Inc. (Philippines)**

The company held a contest in which its employees competed in terms of results from energy saving and water saving activities at home. Approximately 70 employees participated in the contest and those who substantially reduced the amount of electricity and water consumed were given awards.



Conservation of Biodiversity

Importance of initiatives for the conservation of biodiversity

In the contemporary world, the conservation of biodiversity and its sustainable use is becoming increasingly important and recognized worldwide. The year 2010 marked the adoption of Aichi Targets as the global goal at the tenth Conference of the Parties to the Convention on Biological Diversity (COP10) held in Japan. In 2015, the 2030 Agenda for Sustainable Development was adopted by the United Nations General Assembly and the Sustainable Development Goals (SDGs) were announced, which included goals for biodiversity. In 2019, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services* (IPBES) released their first global assessment which highlighted the adverse effects of human activities on the ecosystems. The assessment reported that around one million animal and plant species are now threatened with extinction and that the health

of ecosystems on which we and all other species depend is deteriorating more rapidly than ever. Initiatives for the conservation of biodiversity are becoming an inseparable issue when companies try to promote sustainable management.

Toshiba Group assesses each environmental process related to manufacturing as well as products and services, such as those aimed at preventing global warming, efficiently using resources and managing chemical substances, to see their impact on the environment including that on biodiversity, and specifies activity objectives with respect to the reduction of that impact. At the same time, we are contributing to creating a society in harmony with nature through the promotion of conservation activities that directly affect nature. It takes many years to restore and improve biodiversity and ecosystems. We will promote biodiversity conservation activities from a long term view and an ongoing effort based on an analysis of possible risks and opportunities to our group.

Risks for Toshiba Group from not working on biodiversity conservation and the opportunities gained from working on it

Risks:

- Unstable procurement and increased cost of resources including water and mineral
- Negative reputation and damage to brand image

Opportunities:

- Prevention of risks of unstable procurement and increased cost of resources
- Increased corporate value
- Increased employees' motivation

* An intergovernmental platform covering biodiversity and ecosystem services. The so-called biodiversity version of the Intergovernmental Panel on Climate Change (IPCC). It has four functions, namely "assessments," "policy tools and methodologies," "capacity-building," and "knowledge generation" as the core of its activities. It assesses the relationship between humans and nature with experts in diverse fields of study, generates new knowledge, requests capabilities, and reflects them in the policy. IPBES has released a Summary for Policymakers (SPM) in the Global Assessment Report on Biodiversity and Ecosystem Services in May 2019.

Contributions to the 10 Individual Aichi Targets

The Strategic Plan for Biodiversity 2011-2020 was adopted at the tenth Conference of the Parties to the Convention on Biological Diversity (COP10) held in Nagoya City in 2010. The plan sets a medium-to long-term vision for achieving "a society in harmony with nature" by 2050 and aims to achieve a mission and specific action targets, Aichi Targets, by 2020. Aichi Targets include five strategic goals and 20 individual targets.

■ Aichi Targets



Reference: Ministry of the Environment
"Biodiversity"

Toshiba Group considers biodiversity conservation activities an important element of environmental management and manages them as one of the Sixth Environmental Action Plan items. We have set a goal by 2020 to contribute to 10 of the 20 individual Aichi Targets that closely relate to our business activities (targets, 1, 2, 4, 5, 8, 9, 11, 12, 14, and 19). With the aim of contributing to the achievement of these 10 targets, we now promote biodiversity conservation activities according to the characteristics of each region at 66 (42 in Japan, 24 overseas) sites worldwide.

■ The Sixth Environmental Action Plan (2017–2020) —Biodiversity conservation activities—

Category of Aichi Targets		Aichi Targets	Toshiba Group's Activity Targets	
			Theme	Description
Strategic Goal A	Address the underlying causes of biodiversity loss by mainstreaming biodiversity	Target 1	Raising awareness	Environmental education, information disclosure, and collaboration with outside organizations
		Target 2	Incorporating targets into strategies and plans	Incorporation of targets into environmental policies, Environmental Action Plans, and ISO 14001 goals and targets
		Target 4	Sustainable production	Mitigation of climate change and efficient use of resources
Strategic Goal B	Reduce the direct pressures on biodiversity and promote sustainable use	Target 5	Reducing habitat loss	Building ecosystem networks that connect natural habitats with Toshiba Group sites, planting trees
		Target 8	Reducing chemical pollution	Management of chemicals
		Target 9	Eliminating alien species	Elimination of alien species at company sites
Strategic Goal C	Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity	Target 11	Conserving protected areas	Activities that contribute to preserving protected areas outside Toshiba Group sites
		Target 12	Conserving endangered species	Protecting rare plant and animal species, ex-situ conservation
Strategic Goal D	Enhance the benefits to all from biodiversity and ecosystem services	Target 14	Maintaining and managing ecosystem services	Maintenance and improvement of cultural services
Strategic Goal E	Boost implementation through participatory planning, knowledge management and capacity building	Target 19	Improving and spreading knowledge and technology	Accumulating and disclosing ecosystem survey data (including habitat maps) and creating biodiversity conservation technologies

Implementing biodiversity conservation activities at 66 sites worldwide

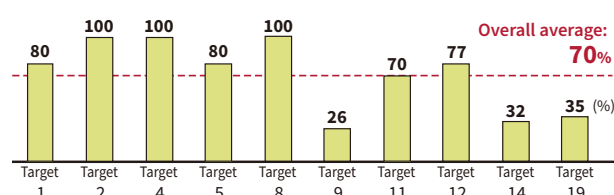
In FY2018, the rate of implementation of activities corresponding to the 10 Aichi Targets at all sites (overall average) was 70%. The extent of efforts for targets 1, 2, 4, 5, 8, 11, and 12 was higher, while the extent of efforts for targets 9, 14, and 19 was lower. By target, the rate of implementation of target 2 (Incorporating targets into strategies and plans) was 100% as a result of complying with ISO 14001: 2015^{*1}. The rate of implementation of target 4 (Sustainable production) and target 8 (Reducing chemical pollution) was also 100% as a result of promoting the ongoing business activities such as reducing GHG emissions, providing energy-saving products and services, effectively using resources, and managing chemical substances in manufacturing. The rate of implementation of target 1 (Raising awareness) reached 80% as a result of promoting education, nature observation meetings, workshops for employees and conveying information for stakeholders. As for target 5 (Reducing habitat loss) and target 12 (Conserving endangered species), many business and production sites continued to conduct activities under the Fifth Environmental Action Plan for 2012 to 2016, such as building ecosystem networks and protecting rare animal and plant species, and as a result of these activities, the rates for implementing target 5 and target 12 were respectively 80% and 77%. The rate of implementation of target 11 (Conserving protected areas) reached 70%^{*2} as a result of promoting activities to not only preserve protected areas outside Toshiba Group sites but also investigate and preserve rare species in Toshiba Group sites.

For target 9 (Eliminating alien species), target 14 (Maintaining and managing ecosystem services), and target 19 (Improving and spreading knowledge and technology) that have low implementation rates, we will identify issues and consider countermeasures toward the final year of Aichi Targets.

^{*1} "Protection of biodiversity and ecosystems," as well as "sustainable resource use" and "climate change mitigation and adaptation" were added to the scope of environmental conservation activities.

^{*2} Though activities to preserve rare species in Toshiba Group sites were not covered by target 11 in Toshiba Group Environmental Report 2018, they have been covered by the target since the report for FY2019.

■ Implementation results for FY2018 by target (covering All 66 sites)^{*4}



^{*4} The percentage of total number of targets achieved by each site for the number of targets covering all sites (66 sites x 10 targets)

■ Toshiba Group Biodiversity Conservation Activity Database

Data on activities at individual sites is stored in a database for disclosure on our website. The corresponding Aichi Targets are also shown.



[Toshiba Group Biodiversity Conservation Activity Database](#)

Conservation of Biodiversity

Case
1

[Aichi Target 1*]

Promoting environmental education in and outside the company

TOSHIBA CARRIER (THAILAND) CO., LTD.

As education outside the company, we visit neighboring elementary schools and give lectures on the environment. In terms of in-house education, employee awareness education not only through lectures but also experiences is given. This education includes encouraging tree-planting at their homes by distributing wooden seedlings and development of supply points for minerals (salt lick) for elephants and deer in Khao Yai national park.

Supply point for minerals (salt lick): Area where essential minerals for wild animals are artificially mixed in the ground



Tree Distributing



Mineral Supply Point Development

Case
3

[Aichi Target 9]

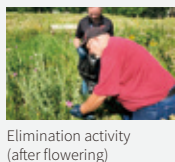
Invasive alien species countermeasures by weed control

TOSHIBA AMERICA BUSINESS SOLUTIONS, INC.
TONER PRODUCTS DIVISION

We regularly investigate any noxious weed on our property, in the Pollinator Plot, and on the Lake Mitchell Walking Path. We found Canada thistle as a result of our investigative activities. It is considered a noxious plant and we constantly monitor and eliminate it.



Monitoring and eliminating alien species on the lake walking path



Elimination activity (after flowering)



Elimination activity (before flowering)



Canada thistle

Case
5

[Aichi Target 12]

Protection and observation of rare animals and plants inhabiting the premises

TOSHIBA JSW POWER SYSTEMS PRIVATE LIMITED

We conducted a survey regarding animals and plants that inhabit the premises and confirmed many plants including those of the families Combretaceae and Apocynaceae which are designated as rare plants. We share information with employees by posting the appearance of these plants and also work on their protection through regular observation.



Recording the population of animals and plants



Posting photos of plants found in the premises

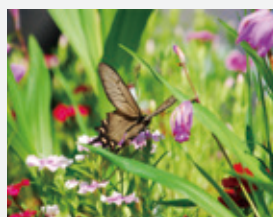
Case
2

[Aichi Target 5]

Contributing to creating a city where Chinese windmills which are the 'city-butterfly' of Himeji City can be seen here and there throughout the area

NISHISHIBA ELECTRIC CO., LTD.

Himeji City sets Chinese windmills as its city-butterfly and endeavors to increase their number. We have established a biotope in our premises to conserve birthworts, which are the feed for Chinese windmills and their larvae, contributing to the building of an ecosystem network across the city. In FY2018, we have seen adult-eclosion (or moulting) of more than 250 butterflies.



Chinese windmills



Larva of Chinese windmills on a birthwort

Case
4

[Aichi Target 11]

Conservation activities at a habitat of *Linaria japonica* (endangered species)

TOSHIBA LIGHTING & TECHNOLOGY CORPORATION
(IMABARI COMPLEX)

We created a vegetation map of Odagahama beach in Ehime Prefecture where *Linaria japonica*, which is listed as Endangered Class IA by the Ministry of the Environment, is growing naturally. We made this map in a cooperative effort with fourth grade students at a local elementary school, Ehime Prefecture, an NPO, and the residents' association and donated the map we created to the school. We also promote protection and development activities for *Linaria japonica*, *Marsilea quadrifolia*, which is listed as Endangered Class II on the Red List of the Ministry, and frogbit, which is listed as Near Threatened (NT) by constructing a biotope on the premises of Imabari Complex.



Creating a vegetation map with local elementary school students



Donating the vegetation map to the elementary school

Case
6

[Aichi Target 14]

Forest preservation through the construction of a check dam (erosion control dam) and reforestation

TOSHIBA SEMICONDUCTOR (THAILAND) CO., LTD.

As one of nature conservation activities of the employees, we promote activities to build a check dam (erosion control dam) in the forest and reforestation. A check dam prevents landslides and sediment disaster in forests and helps secure not only forest conservation but also agricultural water. In FY2018, we planted a total of 200 young trees. We also distributed small young trees such as Chili trees at an environmental exhibition held on our premises to improve awareness of employees on the environment.



Constructing a check dam over the stream in the forest



Distributing small trees such as Chili trees at an in-house exhibition

* Each target shown for each case study is a representative Aichi Targets to which each activity corresponds, and it may also correspond to other targets.

Professor **Ryo Kohsaka**

**Environmental Policies, Department of Social and Human Environment,
Graduate School of Environmental Studies
Nagoya University**

The year 2020 is the target year for the Aichi Targets agreed upon in 2010 whose objectives are the conservation of biodiversity and its sustainable use. In a sense, it is the year when governments and regions are given a report card on their performance and in which initiatives of business operators are naturally important elements. Unfortunately, as also seen in the IPBES report mentioned at the beginning of Toshiba's report, situations are actually taking a turn for the worse in many aspects, rather than for the better, in a gradually accelerating speed.

In this sense, this report, though taken from the standpoint of initiatives of one business operator, is internationally important in terms of its disclosure timing indicating the progress of the mainstreaming of biodiversity within the private sectors.

This report has an easy to read format showing the progress of initiatives and case studies inside and outside Japan with respect to the ten goals of Aichi Targets. Especially, Toshiba's joint effort with Dai Nippon Printing Group to

protect rare life, conduct biological research, and hold nature watching events is worthy of note in the sense that it exceeds the boundaries of companies and affiliates. I hope the company will make further efforts to enact multi-layered collaboration in conservation activities inside and outside Japan with the government administration and society as a whole.

Traditionally, Toshiba characteristically takes a bottom-up approach in its initiatives by giving each site as well as its head office the freedom to think about what conservation and initiatives they can implement on their own. I can see from the report that this approach is spreading throughout the company's overseas sites. I welcome this trend since developing activities for conservation of the environment and its sustainable use overseas including that of biodiversity, within the framework of Aichi Targets and sustainable development goals (SDGs) that are linked to the targets, is urgently needed today due to the rapid development of overseas businesses.

This report clarifies risks and opportunities as Toshiba's overall activity format. While many companies have hard time making decisions when it comes to biodiversity, the report well organizes the risks and opportunities into the categories of supply chain, reputational risk, motivation and so on. I hope the company will make even further efforts to set out numerical targets regarding the conservation and sustainable use of biodiversity and make contributions as a member of the community and society through its business activities as a company that has direct contact with consumers and investors.

Promoting collaboration with industry associations and other companies

Through collaboration with electrical and electronic industry associations as well as other companies, Toshiba Group is working to strengthen awareness and information disclosure regarding biodiversity protection.

●Participating in biodiversity working group of the 4 Electrical and Electronic Industry Associations

For the purpose of raising awareness and promoting biodiversity conservation activities in the industry, we have been continuing to develop measures for mainstreaming biodiversity and to conduct research and discussion regarding international issues on biodiversity, including the SDGs, plastic marine debris issue, and "post-Aichi Targets," along with other member companies. "Let's Try Biodiversity—The first step in biodiversity conservation for companies—," a collection of activity examples issued by the biodiversity working group of four electric and electronic industry associations in FY2017 won the award of excellence in the Biodiversity Action Award 2018 (Communication category) hosted by Japan Committee for UNDB (UNDB-J) for its expectations for ripple effects among all companies throughout Japan. As for the Guidelines for Action by the E&E Industries concerning Biodiversity Conservation issued in FY2015, the second edition with an additional description on relevance with SDGs has been issued. Moreover, in the fourteenth meeting of the Conference of the Parties to the Convention on Biological Diversity (COP14) held in Egypt in November 2018, the working group members presented the outcome of the group's activities to the world in two side events (UNDB-DAY and Business Forum 2018).



Let's Try Biodiversity—The first step in biodiversity conservation for companies—



"Guidelines for Action by the E&E Industries concerning Biodiversity Conservation (Second Edition)"



Working group members giving a presentation at a COP14 side event (two persons in the center)

●Collaboration with Dai Nippon Printing Group

Toshiba Group and Dai Nippon Printing Group have been promoting biodiversity conservation activities by using 15 sites of both groups in 6 regions in Japan. While building ecosystem networks that connect the sites of the two companies, protecting rare animal and plant species, conducting joint biological research, holding joint nature observation meetings, and carrying out joint voluntary cleaning activities, we are also aiming to increase employee awareness at both companies.

Collaboration (1) Kitakami, Iwate Prefecture

Japan Semiconductor Corporation Headquarters & Iwate Operations / Kitakami Plant, D.T.Fine Electronics Co., Ltd.

Collaboration (2) Kawasaki, Kanagawa Prefecture

Toshiba Corporation Komukai Complex / Kawasaki Plant, D.T.Fine Electronics Co., Ltd.



Cutting away underbrush in the flower bed for rare species (Collaboration 1)



Biological research at Daishigawara tidal flat (Collaboration 2)

Third-party Verification

In order to improve the reliability of the environmental performance data presented in this report, Toshiba Group requested Japan Audit and Certification Organization for Environment and Quality to provide third-party verification. The details are as follows.

Scope of the verification

●GHG emissions caused by business processes:

GHG emissions generated by Toshiba Corporation and its group companies in Japan and overseas (Scopes 1 and 2^{*1})

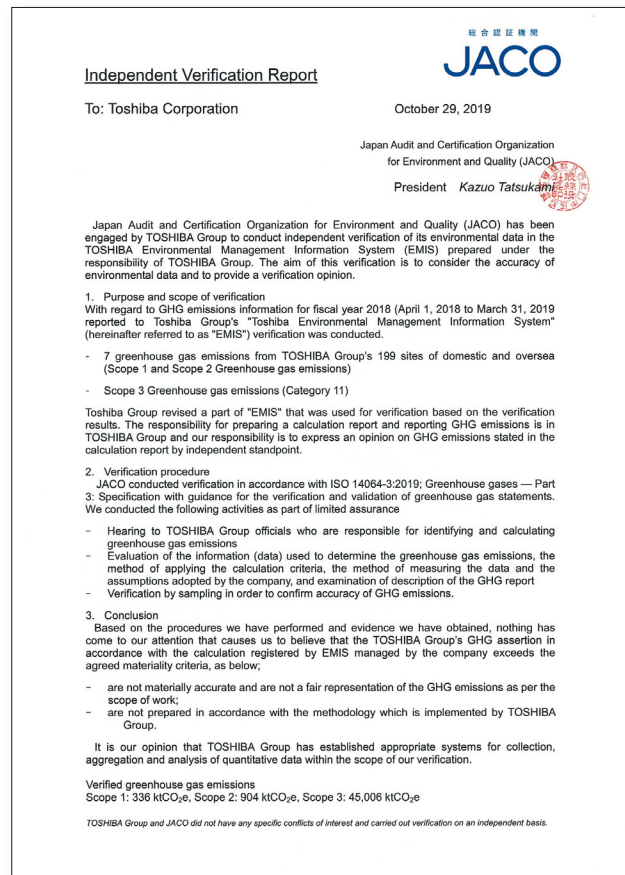
We selected and visited two production sites (Smart Community Center and Japan Semiconductor Corporation Iwate Operations).

●GHG emissions caused by use of products sold:

GHG emissions caused by use of products sold by Toshiba Corporation and its group companies in Japan and overseas (Scope 3 Category 11^{*2})

^{*1} Scopes 1 and 2: GHG emissions generated by Toshiba through use of fuels and electricity as well as by manufacturing process (Scope 1: direct emissions; Scope 2: indirect emissions)

^{*2} Scope 3 Category 11: GHG emissions caused by use of products and services produced and sold during the year covered by the report.



Result

Based on research conducted in accordance with Toshiba Group's policies and standards as well as with ISO14064-3^{*3}, it was concluded that there are no significant items that have not been disclosed or covered by the report.

^{*3} ISO14064-3: Specification with guidance for the verification and validation of greenhouse gas statements

Methods of calculation

- CO₂ emissions caused by use of fuels: Calculated by the method set by Toshiba Group based on the Ministry of the Environment's Manual for Calculating and Reporting GHG Emissions (Version 4.4).
- CO₂ emissions coefficient for electricity purchasing: 5.31 t-CO₂/10,000 kWh is used as the CO₂ emissions coefficient in Japan. GHG Protocol data is used overseas.
- Greenhouse gases other than CO₂: Calculated by the method set by Toshiba Group using the Global Warming Potential (GWP) in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).
- CO₂ emissions caused by use of products sold: Calculated by aggregating the emissions estimated to be generated during use of products in the future for the year the products were sold.

Evaluations (FY2018)

■ Evaluation of products and services

Award title		Award-winning item(s)	Winner
FY2018 Energy Conservation Grand Prize	METI Minister's Award Product and Business Model Category	Spot and Zone Air Conditioning System "FLEXAIR"	Toshiba Carrier Corporation
	The Energy Conservation Center, Japan Chairman's Award Product and Business Model Category	LED high-bay lighting fixture	Toshiba Lighting & Technology Corporation
	The Energy Conservation Center, Japan Chairman's Award Product and Business Model Category	New Environmentally Conscious Transformer for Power Distribution ULTrans	Kitashiba Electric Co., Ltd. *Shared award with Tohoku Electric Power Co., Inc.
FY2018 Minister of the Environment's Award for Activities to Mitigate Global Warming	Technology Development and Productization Category	Stage Direction Lighting Space, DC Light Bulb Type LED Lamp Dimmer Control System	Toshiba Lighting & Technology Corporation
1st EcoPro Awards	Excellence Award	Hybrid MFP e-STUDIO5008LP Series	Toshiba Tec Corporation
Eco Mark Award 2018	Excellence Prize	Hybrid MFP e-STUDIO5008LP Series	Toshiba Tec Corporation
15th LCA Japan Forum	LCA Japan Forum Chairman's Award	IT equipment pilot test of EU Environmental Footprint	Technical Secretariat for the IT equipment pilot test of EU Environmental Footprint*1
	LCA Japan Forum Incentive Award	Life cycle assessment of elevators and its use	Toshiba Elevator and Building Systems Corporation
Jules Verne Award		Hydrogen energy-related achievements	Toshiba Energy Systems & Solutions Corporation
Cogeneration Award 2018	Special Prize (Technology Development Category)	Toward Realization of a Hydrogen Society with Pure Hydrogen Fuel Cell —Development of the Pure Hydrogen Fuel Cell—	Toshiba Energy Systems & Solutions Corporation / Toshiba Fuel Cell Power Systems Corporation
City of Kawasaki's Low CO2 Kawasaki Brand 2018		• Instrument Landing System (TW4520) • Currency Sorter (IBS-1000)	Toshiba Infrastructure Systems & Solutions Corporation Komukai Complex
		Universal Smart X EDGE Series	Toshiba Carrier Corporation
FY2018 Kawasaki Mechanism Certification System		• Instrument Landing System (TW4520) • Currency Sorter (IBS-1000)	Toshiba Infrastructure Systems & Solutions Corporation Komukai Complex
Registered as Essential Historical Materials for Science and Technology		Rotary Compressor B Series	Toshiba Carrier Corporation
JECA Fair 2018 57th Products Award	Environment Minister's Award	LED high-bay lighting fixture	Toshiba Lighting & Technology Corporation
	Minister of Economy, Trade and Industry Award	UPS System Equipped with Lithium-ion Storage Battery	Toshiba Infrastructure Systems & Solutions Corporation
67th Electrical Manufacturers' Technology Award	Encouragement Award	Development of capacity expansion of the high voltage shaft generating system	Nishishiba Electric Co., Ltd.

*1 A consortium consisting of four companies from electrical and electronic industry (Hitachi, Fujitsu Limited, NEC Corporation, and Toshiba Corporation), Japan Environmental Management Association for Industry, The Japan Electrical Manufacturers' Association, and Mizuho Information & Research Institute, Inc. The Technical Secretariat aims to formulate evaluation rules for an environmental footprint (EF) of IT equipment through pilot testing.

■ Evaluation of business activities

Award title		Award-winning item(s)	Winner
FY2018 Energy Conservation Grand Prize	The Energy Conservation Center, Japan Chairman's Award Example in the Energy Conservation Category	Energy saving activities through optimization of cleanroom environment at Oita Operations	Japan Semiconductor Corporation Oita Operations
Certified as Yokohama City's "Excellent 3R Activity Facility"		Initiatives to reduce and recycle waste	TOSHIBA MATERIALS CO., LTD.
FY2017 Fukushima Agreement for Global Warming Prevention Business	(Advanced) Award of Excellence	Energy saving activities at offices	Kitashiba Electric Co., Ltd.
FY2018 Yokohama Global Warming Countermeasures Award		Awarded for collaborative initiatives among business operators	Toshiba Corporation *Joint award with The Nisshin OilIO Group, Ltd.
7th Kawasaki City Smart Life Style Awards	Award of Excellence	Reduction of GHG through promotion of measures to reduce contract demand at Komukai complex	Toshiba Infrastructure Systems & Solutions Corporation Komukai Complex
26th Yokohama environmental activity prize	Practice Award Enterprise Category	Environmental Conservation Activities of Toshiba Environmental Solutions Corporation	Toshiba Environmental Solutions Corporation
FY2018 Public Benefit Contribution Award for Environmental Protection	Award for Contribution to Environmental Protection Public Welfare	Outstanding Enterprises in Environmental Protection	Toshiba Dalian Co., Ltd.
CSR-DIW Continuous Awards FY2018 (4th year)		CSR Activities including Environmental Activities in General	Toshiba Semiconductor (Thailand) Co., Ltd.
Green Industry Award	Level4:Green Culture	Environmentally conscious industry	Toshiba Carrier (Thailand) Co., Ltd.

■ Evaluation of communication and human resources development programs

Award title		Award-winning item(s)	Winner
2018 Excellent Enterprise Award for Environmental Human Resource Development	Environmental Minister's Award (Large Enterprise Category)	Awareness enlightenment activities for employees and cooperation and collaboration with community, etc.	Japan Semiconductor Corporation
	Encouragement Award (Large Enterprise Category)	Overall environmental education for employees (education to executives and general employees, education on ISO14001 and specialized fields)	Toshiba Corporation
		Overall environmental education for employees and visiting classes for local residents, etc.	Toshiba Electronic Devices & Storage Corporation Himeji Operations-Semiconductor
22nd Environmental Communication Awards	Award of merit in the Environmental Report Category	Toshiba Group Environmental Report 2018 Toshiba Group Annual Report 2018 Toshiba Group CSR Report 2018	Toshiba Corporation
		Toshiba Infrastructure Systems & Solutions Corporation Komukai Complex Environmental Report 2018	Toshiba Infrastructure Systems & Solutions Corporation Komukai Complex
		Toshiba Carrier Group Social and Environmental Report 2018	Toshiba Carrier Corporation

■ Evaluation of biodiversity

Award title		Award-winning item(s)	Winner
Biodiversity Action Award 2018	Awarded	Biodiversity activities for the conservation of daylily to Linaria japonica, etc.	Toshiba Lighting & Technology Corporation
Certified by Japan Committee for UNDB as an approved business		Biodiversity CSR activities (Protection of rare animals and plants)	Toshiba Lighting & Technology Corporation Imabari
FY2018 Ishikawa Forest Environment Outstanding Contributors Award		Long-term conservation activities for Kaga Toshiba Forest satoyama woodland in cooperation with local NPOs	Kaga Toshiba Electronics Corporation
15th Ehime Miuratomotsu Environment Award	Grand Prize	Linaria japonica transplantation activities in cooperation with Ehime Prefectural Government, NPOs, experts, neighborhood associations, and local elementary school children; creation of animal and plant map of Odagahama with elementary school children	Toshiba Lighting & Technology Corporation Imabari

We appreciate your opinions and comments about this report. [Questionnaire for Environmental Report 2019](#)