

**Committed to People, Committed to the Future.**

## **Toshiba Corporation**

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Inquiry page on Toshiba website

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

The report is available on the Toshiba website

**URL** <http://www.toshiba.co.jp/env/en/>

Toshiba is conducting an online questionnaire.

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

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

Published in February 2019

**TOSHIBA**

# 2018 | Environmental Report

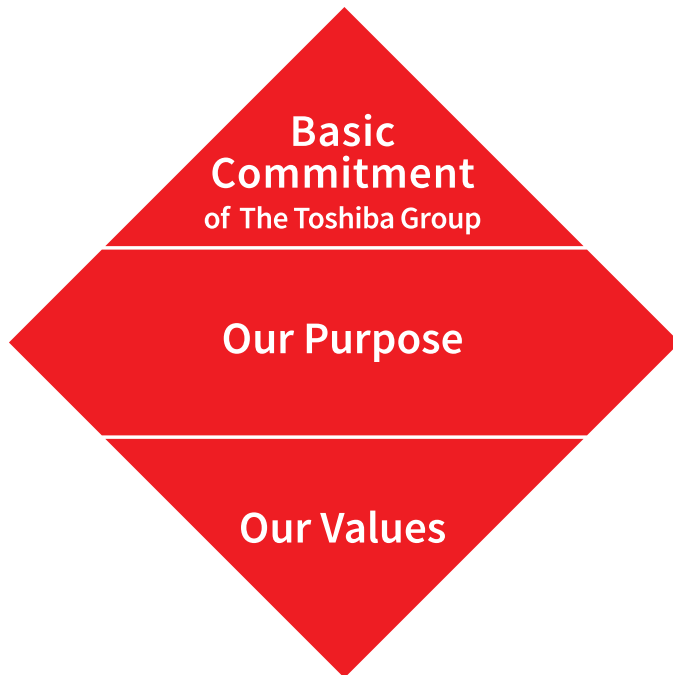


# The Essence of Toshiba

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.

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## 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.**

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## 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

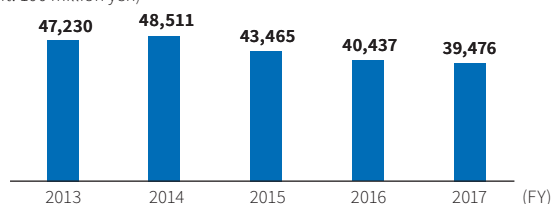
## Company Overview (as of March 31, 2018)

<b>Company name</b>	Toshiba Corporation (TOSHIBA CORPORATION)	<b>Number of shareholders</b>	300,871
<b>Headquarters address</b>	1-1, Shibaura 1 chome, Minato-ku, Tokyo	<b>Number of shares issued</b>	6,520,710,000 shares
<b>Founded</b>	July 1875	<b>Number of consolidated subsidiaries</b>	389 (144 in Japan, 245 overseas)
<b>Paid-in capital</b>	500 billion yen	<b>Number of affiliates accounted for by the equity method</b>	96
<b>Consolidated net sales</b>	3.9476 trillion yen	<b>Stock exchange listings</b>	Tokyo, Nagoya
<b>Number of employees (consolidated)</b>	141,256		

## Financial Results (Consolidated)

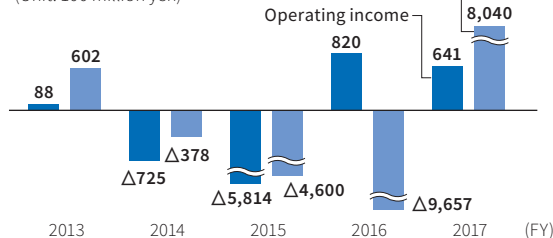
### Net sales

(Unit: 100 million yen)

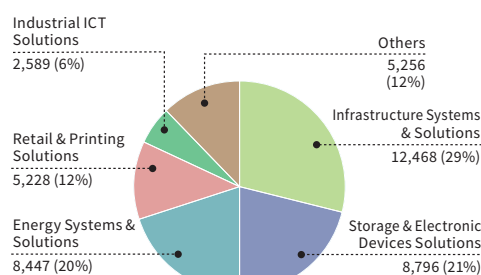


### Operating Income & Net Income

(Unit: 100 million yen)



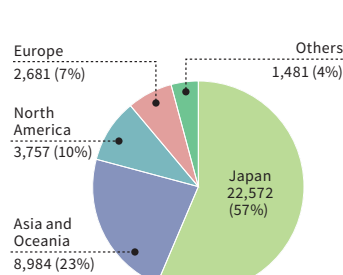
### Sales by Business Segment (FY2017)



Total: 39,476 (Unit: 100 million yen)

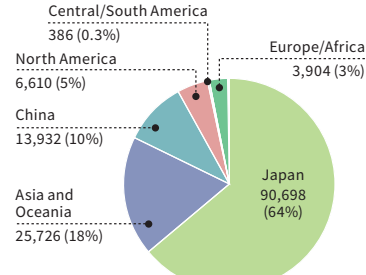
\* Eliminations of sales among segments were 330.8 billion yen.

### Sales by Region (FY2017)



Total: 39,476 (Unit: 100 million yen)

### Number of Employees by Region (FY2017)



Total: 141,256 (people)

## Main Products and Services

### Energy Systems & Solutions

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

### Infrastructure Systems & Solutions

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

### Retail & Printing Solutions

POS systems, multi-function printers, etc.

### Storage & Electronic Devices Solutions

Small signal devices, power semiconductors, optical semiconductors, mixed signal ICs, image sensors, logic LSIs, HDDs, semiconductor manufacturing systems.

### 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 2018 edition introduces Toshiba Group's initiatives for achieving SDGs and for reducing GHG emissions across the entire supply chain along with case studies. The edition also reports the status of our analysis of risks and opportunities that climate change presents to Toshiba Group, the overview of Environmental Vision 2050, our long-term vision, and the progress of Environmental Action Plan, our mid-term goal.

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**


**Annual Report**  
Providing mainly financial information, but also a non-financial information overview.



[Annual Report](#)


**Detailed non-financial information**

**CSR Report**  
Providing detailed information on CSR activities



[CSR Report](#)

**Environmental Report**  
Providing detailed information on environmental activities




### Websites

More timely information is available on these websites.

**Financial information**

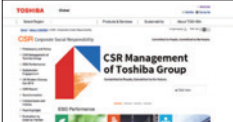
**Website for Investor Relations**  
Providing financial information and timely disclosure information.



[Investor Relations Website](#)


**Non-financial information**

**Website for CSR Activities**  
Providing information on CSR activities



[CSR Website](#)

**Website for Environmental Activities**  
Providing information on environmental activities



[Environment Website](#)

#### ◆ Organizations covered

In principle, this report covers Toshiba Group (Toshiba Corporation and its 389 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 FY2017 (from April 1, 2017 to March 31, 2018), but includes some activities continuing from the past and some more recent activities.

#### ◆ Publication

The current issue was published in February 2019 (The publication of the next issue is scheduled for January 2020; the previous issue was published in January 2018).

#### ◆ Significant changes during the reporting period

The organizations covered have changed due to the following circumstances:

- Transfer of all the shares of Landis+Gyr Group's stock
- Transfer of 95% of Toshiba Visual Solutions Corporation stock to Hisense Group Co., Ltd., a Chinese company

## Contents

Message from Top Management .....	05
Message from the Corporate Environmental Officer .....	06
<b>Special Feature 1</b>	
Actions for the Achievement of Sustainable Development Goals (SDGs) .....	07
<b>Special Feature 2</b>	
Making Supply Chain GHG Emissions Visible for All Categories .....	17
<b>Chapter 1 Vision and Strategies</b>	
Toward the Realization of Environmental Vision 2050 .....	21
Eco-Efficiency and Factor .....	23
The Sixth Environmental Action Plan .....	25
Risks and Opportunities .....	27
<b>Chapter 2 Business - Manufacturing</b>	
Contributions through Manufacturing .....	31
Mitigation of Climate Change .....	33
Efficient Use of Resources .....	34
Management of Chemicals .....	36
<b>Chapter 3 Business - Products/Services</b>	
Contributions through Products and Services .....	37
Mitigation of Climate Change .....	39
Efficient Use of Resources .....	43
Management of Chemicals .....	45
<b>Chapter 4 Management</b>	
Improvement of the Foundation of Environmental Management .....	47
Environmental Management Structure .....	49
Risks and Compliance .....	56
Environmental Communication .....	59
Conservation of Biodiversity .....	61
Third-party Verification .....	65
Evaluations .....	66

#### ◆ Note on performance data

The transfer of Toshiba Memory Corporation's stock has been completed on June 1, 2018; therefore, Toshiba Memory is excluded from all figures for benchmark years, actual results, and targeted values included in this report.

#### ◆ Reference guidelines

- GRI (Global Reporting Initiative)  
Sustainability Reporting Standards  
Note: GRI Content Index is shown on our [CSR website](#).
- Environmental Reporting Guidelines 2012 / 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**

## **Committed to people, Committed to the future. We make and do things that lead to a better world.**

In a dynamic business environment, where IoT and AI continue to drive technology advances and create new potential, we are determined to secure Toshiba's leadership in promoting new technologies and pioneering new markets, and to shape the organization we need to secure sustained development.

Toward that, we have now issued the “Essence of Toshiba”. Grounded in our long-standing statement of intent, “Committed to People, Committed to the Future”, the Essence is a restatement of the values that have guided Toshiba for over 140 years, as we have taken our business to the global level, and that still inspire us today as we work for a sustainable future.

The introduction of the Essence allows Toshiba Group employees everywhere to realign themselves with Toshiba's identity, to understand how we aim to grow as a group that promotes progress for a better world, and to continue to turn on the promise of a new day.

The future demands solutions. Mankind must address climate change, meet rising energy demand, and overcome resource depletion. Our stakeholders also have high expectations that we will contribute to a more sustainable future through sound ESG management (environment, society and governance), and by promoting initiatives to help achieve the global SDGs. Toshiba Group supports the universal principles, including human rights, labor, the environment and anti-corruption, advocated by the United Nations Global Compact, and by observing the restated Basic Commitment of the Toshiba Group, we will pursue CSR management that meets stakeholder expectations.

Our sights are set on the century to come, our goal is to be a group that continues to be needed by society and that enjoys its trust. Our core mindset has always been to create, a venturesome spirit. This has allowed us to break new grounds in many areas, and to contribute to the evolution of daily life and social development. As we put past accounting irregularities and our recent financial crisis forever behind us, we will leverage the strengths and capabilities of our employees everywhere to harness our vision and strengths in technology, manufacturing and solutions.

We will grow as a corporate group that has the trust of all stakeholders.

October 2018

\* SDGs: Sustainable Development Goals. Adopted by the UN in 2015, with achievement in 2030 as the target.

# We will contribute to resolving global social issues while capturing new trends.

The Sustainable Development Goals (SDGs) adopted by the United Nations in 2015 set 17 goals related to climate change, energy, water resources, resource recycling, etc. as important policies in order to achieve sustainable development by 2030 and have widely spread across the international community. After the Paris Agreement<sup>\*1</sup> of 2015, the response made to climate change has become a common issue worldwide and countries are further urged to make efforts to reduce greenhouse gas emissions. In addition, the final report issued in 2017 by the TCFD<sup>\*2</sup> established by the Financial Stability Board suggested that companies analyze the risks and opportunities posed by impacts from climate change. In light of the situation, as a company that develops business worldwide, we must recognize responding to social issues including climate change as one of the most important management issues and be firmly committed to it.

### ●Response to new trends

Toshiba Group has consistently been focusing on environmental management, but currently we promote contribution to SDGs, especially in response to climate change, as a key issue in order to respond to new trends. Toshiba Group will help achieve many goals of SDGs including response to climate change and energy access, through development of technology and products in the four main business domains — Social infrastructure, Energy, Electronic Devices, and Digital Solutions. In addition, we will form the foundation toward achieving SDGs by steadily conducting activities such as enhancing legal compliance, reducing environmental impacts in manufacturing, promoting environmental education and communication, and conserving biodiversity at our sites.

As for climate change, we are working to reduce GHG emissions across the entire supply chain including upstream and downstream, in addition to reducing GHG emissions in our own manufacturing. According to our calculation results for Scope 3<sup>\*3</sup>, GHG emissions during use of sold products account for many of Toshiba Group's GHG emissions. Therefore, we will continue to develop highly energy efficient products and services to reduce GHG emissions during use and thereby help to reduce GHG emissions of society as a whole. Also, since it is highly likely that the social system related to climate change will significantly change, Toshiba Group assesses mid- to long-term risks and opportunities for each business domain in the Corporate Environmental Management Committee which is a decision-making organization regarding environmental management, and shares those results within the Group. We believe that in the process of understanding legal regulations, policy risks, and physical risks, and leveraging them for business management, and at the same time transitioning to a decarbonized society, implementing our low-carbon and decarbonized infrastructure systems in society as quickly as possible will bring about great business opportunities and so we will take action accordingly.



### ●Promotion of the Sixth Environmental Action Plan

As a specific KPI<sup>\*4</sup> in environmental management, we launched the Sixth Environmental Action Plan in FY2017 toward achieving Environmental Vision 2050, a long-term goal envisaging an ideal state of the Earth in 2050.

The "Business" category which takes environmental considerations across the life cycle of the products into account contains not only the reduction of GHG emissions, but also resource recycling and management of chemical substances. Under this "Business" category we will promote initiatives for comprehensive reduction of environmental impacts. In regard to manufacturing in particular, as a result of accumulating reduction effects through high efficiency manufacturing and energy-saving measures at production sites, Toshiba Group was able to reduce the amount of total GHG emissions to 1.27 million tons for a target of 1.46 million. The energy-derived CO<sub>2</sub> emissions per unit activity were 97.8% for a target of 98% compared to the FY2013 level, exceeding the initial target. In addition, we achieved all targets for waste, water, and chemical substances thus steadily reducing environmental impacts in manufacturing. In FY2018 and onwards, we will actively invest in energy-saving facilities with the aim of achieving the goals by 2020.

As for products and services, although some items fell short of the targets mainly because of fluctuations in demand, due to wide ranging development of low carbon energy technologies and improved energy-saving performance of many products including air conditioners, lighting, and semiconductors, the reduction of CO<sub>2</sub> emissions achieved by products and services was 10.86 million t-CO<sub>2</sub>. Toward reducing CO<sub>2</sub> emissions in both power supply and consumption, we will bring together our technological capabilities and continue to focus on developing products and services that are highly effective in reducing emissions while appropriately reducing product resource usage and managing chemicals contained in products.

As for the "Management" category, we focus on ensuring environmental risk compliance to steadily comply with global environmental laws and regulations and develop human resources who support such activities as part of our upgrading of basic environmental management activities.

Looking forward, Toshiba Group will remain firmly committed to resolving global social issues including climate change with the goal of achieving a sustainable society. While ensuring sound management, we aim to become a company that is truly needed by society. We would very much appreciate your continued support.

<sup>\*1</sup> : An international agreement adopted by the 2015 United Nations Climate Change Conference (COP21). It is a framework for a participatory process where all COP members from 196 countries and regions cooperate with each other to deal with climate change issues.

<sup>\*2</sup> : Task Force on Climate-related Financial Disclosures. It was established by the Financial Stability Board in 2015, and its member financial institutions and companies discuss climate change issues from the viewpoint of financial stability.

<sup>\*3</sup> : The amount of GHG emissions in the entire supply chain which includes indirect emissions outside the range of the company's business activities -material procurement, distribution, use and disposal of products sold (Scope 3) - in addition to the company's direct emissions (Scope 1) and energy-derived indirect emissions (Scope 2).

<sup>\*4</sup> : Key Performance Indicator



The 2030 Agenda for Sustainable Development, which was adopted at the U.N. Headquarters in New York in September 2015, defines 17 Sustainable Development Goals (SDGs) as important goals for the international community in order to realize sustainable development towards 2030 by resolving issues such as poverty, famine, energy, and climate change. These SDGs are the foundations of society for 2030 and have been widely spreading as a common term throughout the world. At Toshiba Group, we can contribute to many of SDGs through promoting environmental management because many of these goals, such as mitigation and adaptation to climate change and promotion of sustainable consumption and production are closely related to our environmental management.

Toshiba Group has been focusing efforts on four business domains—namely, social infrastructure, energy, electronic devices, and digital solutions—and among SDGs, we contribute to the achievement of the following goals through our business: "Goal 3: Good health and well-being," "Goal 6: Clean water and sanitation," "Goal 7: Affordable and clean energy," "Goal 8: Decent work and economic growth," "Goal 9: Industry, innovation and infrastructure," "Goal 11: Sustainable cities and communities," "Goal 12: Responsible consumption and production," "Goal 13: Climate action," "Goal 15: Life on land," etc.

The social infrastructure business and the energy business are domains where we can satisfy community needs from multiple different aspects. Energy and public infrastructure are directly and indirectly related to achievement of SDGs in those countries and regions where such infrastructure are installed, and our business will contribute to the realization of a sustainable energy system, sustainable city, sustainable value chain, and climate change adaptation, etc.

The electronic device business is involved in various SDGs throughout the lifecycle. For example, the business is involved in the following: communication of information in the upstream

process, reducing environmental impacts in manufacturing, communication with communities surrounding the production sites, and improving performance and reducing environmental impacts of final products. We consider the business as the basis for supporting the future society to be realized by SDGs.

The digital solution business is the domain which is expected to contribute through innovation as indicated by "Society 5.0" proposed by the Japanese government. By improving the added value of the social infrastructure business and the energy business, we believe we can accelerate the speed of achieving SDGs. In addition, these have the potential to create a future vision of society through new solutions.

Meanwhile, basic activities in environmental management are also closely related to the achievement of SDGs. At our production sites, in addition to steady compliance with environmental laws, we have continued to make efforts to reduce energy consumption, resource consumption, water consumption, and chemicals discharged, etc. Not only do laws to be observed differ depending on the country and region where our business and production site is located, but the priority regarding environmental impacts changes according to the policy for SDGs of each country. In spite of this, we must move ahead with activities to allow achievement of "Goal 6: Clean water and sanitation," "Goal 11: Sustainable cities," "Goal 12: Responsible consumption and production," "Goal 13: Climate action," etc. Biodiversity conservation activities promoted at Toshiba Group's approximately 70 sites worldwide, such as building ecosystem networks and protecting rare plant and animal species, are in line with the achievement of "Goal 14: Life below water" and "Goal 15: Life on land." Furthermore, developing the environmental awareness of employees through environmental education and global environmental action will also lead to the achievement of "Goal 4: Quality education." Our environmental management at the business and production sites will comprehensively incorporate these efforts and form the basis for realizing SDGs.

## ■ Toshiba Group's policy for SDGs



### Problem resolutions through businesses

- Power generation
- Power distribution
- Public infrastructure
- Railroads and industrial systems
- Buildings and facilities
- Retail and printing
- Electronic devices
- Digital solutions



### Contribution through environmental management

#### The Sixth Environmental Action Plan < Business > < Management >

- Reduction of environmental impacts in manufacturing
- Improvement of environmental performance of products and services
- Environmental communication
- Environmental education
- Conservation of biodiversity
- Global Environmental Action

# Sustainable Development Goals (SDGs)

<b>3</b> GOOD HEALTH AND WELL-BEING	<b>Goal 3:</b> Ensure healthy lives and promote well-being for all at all ages	<b>4</b> QUALITY EDUCATION	<b>Goal 4:</b> Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	<b>6</b> CLEAN WATER AND SANITATION	<b>Goal 6:</b> Ensure availability and sustainable management of water and sanitation for all
<b>7</b> AFFORDABLE AND CLEAN ENERGY	<b>Goal 7:</b> Ensure access to affordable, reliable, sustainable and modern energy for all	<b>8</b> DECENT WORK AND ECONOMIC GROWTH	<b>Goal 8:</b> Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE	<b>Goal 9:</b> Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
<b>11</b> SUSTAINABLE CITIES AND COMMUNITIES	<b>Goal 11:</b> Make cities inclusive, safe, resilient and sustainable	<b>12</b> RESPONSIBLE CONSUMPTION AND PRODUCTION	<b>Goal 12:</b> Ensure sustainable consumption and production patterns	<b>13</b> CLIMATE ACTION	<b>Goal 13:</b> Take urgent action to combat climate change and its impacts
<b>14</b> LIFE BELOW WATER	<b>Goal 14:</b> Conserve and sustainably use the oceans, seas and marine resources	<b>15</b> LIFE ON LAND	<b>Goal 15:</b> Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	<b>17</b> PARTNERSHIPS FOR THE GOALS	<b>Goal 17:</b> Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Source: United Nations "The Sustainable Development Goals Report 2017"

## Energy

### Case 1 Geothermal power generation system (Africa)

Toshiba Energy Systems & Solutions Corporation

#### Background

The percentage of people living without electricity throughout all of Africa is approximately 65%, which amounts to some 630 million people there<sup>\*1</sup>. In such a region, ensuring a stable supply of energy and improving energy access as well as low carbonization are required.

<sup>\*1</sup> Excluding North Africa (Egypt, Libya, Tunisia, Algeria, Morocco, and Western Sahara). Source: JICA

#### Business overview

Geothermal power generation is a type of renewable energy in which electric power is generated by rotating a turbine with natural steam from the heat of magma inside the Earth. Africa is a focus area of Toshiba Group's geothermal power generation business, and we have delivered steam turbines and power generation equipment to Units 1 and 4 of Olkaria Geothermal Power Plant which are the largest geothermal power plants in Kenya<sup>\*2</sup>, in 2013. In addition to Africa, Toshiba Group has delivered 57 units of 3,687 MW (as of May 2018) power generation facilities worldwide, accounting for the top share<sup>\*3</sup> in the geothermal power generation equipment market of 23%. In recent years, we have expanded the business to other regions, including Indonesia and Turkey, contributing to resolving the issues around the world.

<sup>\*2</sup> Reference: JICA's detailed planning survey for the project for capacity strengthening for geothermal development in Kenya (2013)

<sup>\*3</sup> Source: Bloomberg News Energy Finance (Dec. 2017), based on installed capacity as of the end of December 2017



Olkaria Unit 4 Geothermal Power Plant in Kenya

#### Contribution to SDGs



**Goal 7:**  
Energy



**Goal 13:**  
Reduction of CO<sub>2</sub> emissions

A geothermal power generation system is a renewable energy system that can stably supply power without being affected by weather, etc., generates power at low cost, and emits less CO<sub>2</sub> since operation is independent of fossil fuel.



**Goal 9:**  
Economic and employment effect



**Goal 4:**  
Education

In addition to creation of guidelines needed for the development, supply, operation, and management of equipment, we have been supporting human resource development in terms of acceptance of trainees, etc.



**Goal 17:**  
Partnership

Up until now, we have worked on business development projects by concluding a memorandum on cooperation in geothermal power generation projects in Ethiopia, Tanzania, Djibouti, and Uganda with the counterpart governments and affiliated companies.

## Smart mobility

By applying the sensing and communication technology, battery technology, semiconductor technology, etc., we aim to achieve optimum operation of various traffic and energy for mobility infrastructure and energy.

Case  
2

### Locomotive and freight transportation system supporting modal shift (global)

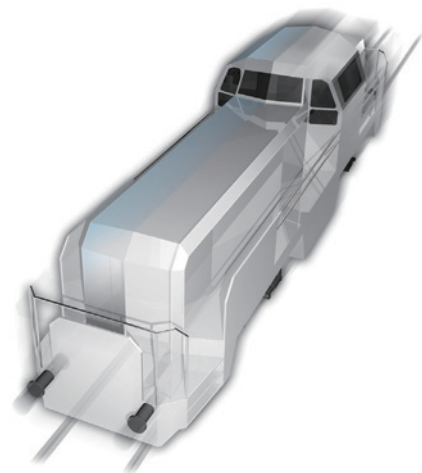
Toshiba Infrastructure Systems &amp; Solutions Corporation

#### Background

Railway freight transportation plays an important role in physical distribution which supports our daily life. Modal shift is attracting attention as an effective measure for reducing environmental impacts like global warming by converting transportation means such as trucks over to trains and railways. And even for this type of railway freight, environmental needs such as further energy-saving in the entire system are increasing in Europe and other countries around the world.

#### Overview

Railway freight is pulled by electric locomotive and hybrid locomotive. After manufacturing electric locomotive for the first time in 1923 (during the era of our predecessor, Shibaura Engineering Works Co., Ltd.), Toshiba Group has been delivering electric locomotives to Japan and to various other countries, including China, India, Turkey, New Zealand, and South Africa. In recent years, interest in hybrid locomotive that uses a diesel engine, power generation equipment, and storage battery as the power source is growing even overseas where power and a high operating rate were once most in demand. By combining our knowledge about hybrid locomotives that we gained through experience in Japan with our technologies such as a high efficiency permanent magnet synchronous motors (PMSM) and lithium-ion rechargeable battery SCiB™. Toshiba Group has been deploying energy-saving solutions to overseas markets.



Hybrid locomotive

#### Contribution to SDGs



##### Goal 11: Sustainable cities

We have realized a safe, environmentally conscious, and sustainable transportation system.



##### Goal 13: Reduction of CO<sub>2</sub> emissions



##### Goal 7: Energy

Using a high performance lithium-ion rechargeable battery SCiB™ as the main power source, this system has been contributing to reducing fuel consumption by effectively using regenerative energy as well as reducing emissions of NO<sub>x</sub> and other air pollutants. By applying a high efficiency permanent magnet synchronous motor (PMSM) that can significantly reduce energy consumption, this system realizes even further energy saving.



##### Goal 12: Sustainable resource usage

The PMSM has a totally-enclosed structure, which requires no internal cleaning and significantly reduces the maintenance cost. The system improves ease of maintenance by incorporating the modular concept adapted for the structure.

Case  
3**Intelligent transportation system (ITS) (Vietnam)**

Toshiba Infrastructure Systems &amp; Solutions Corporation

**Background**

As the economy progresses in the southern region of Vietnam including Ho Chi Minh City, the means of transportation has shifted from motorcycles to automobiles. The section between Ho Chi Minh City and Dau Giay City has become a highway for nearly 30 million vehicles since its partial opening in January 2014. However, the highway network was already at the saturation point due to the rapid spread of automobiles.

**Overview**

The intelligent transportation system (ITS) is a system that handles pedestrians and vehicles in an integrated manner with the most advanced information processing technology, and thereby resolves issues faced by road traffic such as congestion and accidents. ITS consists of a traffic control system, toll system, and other various systems, and in this project, we have delivered ITS equipment required for the newly built 55 km section, from the central unit to the roadside unit, all in one shipment. The equipment installation work and the on-site trial operation have been completed and formal operation started in March 2017.

**Contribution to SDGs**

**Goal 11:**  
**Smart cities**

In addition to a charge collection system including ETC, we have installed a vehicle detection system and introduced monitoring cameras, sensors for tracking weather conditions, as well as dedicated wireless communication equipment for road administrators. The system can support traffic demand that is expected to continue to increase in the future, which will lead to an increase in distribution efficiency and elimination of traffic jams.



**Goal 13:**  
**Reduction of CO<sub>2</sub> emissions**

Traffic jam reductions will contribute to the reduction of air pollutants as well as CO<sub>2</sub> emissions.



**Goal 9:**  
**Innovation**

The ITS will contribute to economic development in developing countries as an important road traffic infrastructure.



**Goal 17:**  
**Partnership**

The ITS package, which was developed by a consortium of Japanese companies including Toshiba Group for an overseas customer for the first time as Japanese companies, is a large project order received from the Vietnam Expressway Corporation.



Case  
4

## Visconti™ image recognition processor (Japan)

Toshiba Electronic Devices &amp; Storage Corporation

## Background

The number of people that die from traffic accidents around the world is approximately 1.25 million every year. More than 90% of traffic accidents are said to be attributable to human error\*. Autonomous driving is expected to contribute to reducing the number of people dying from traffic accidents through safe driving. It is also expected to reduce environmental impacts, reduce the burden on drivers, support safe driving by elderly people, and serve as a fundamental solution for social issues such as community revitalization. The key to this realization is a technology that supports driving by humans with respect to safety aspects, such as collision avoidance, parking assistance, and autonomous traveling, and a high accuracy image recognition processor for processing images from cameras, is essential.

\* A survey by WHO

## Business overview

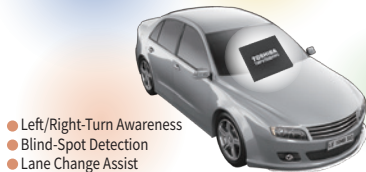
Toshiba Group has developed the Visconti™ series image recognition processor. We will provide a cutting-edge semiconductor technology that comprehensively supports human vision and driving sensations from a futuristic point of view.

## ▼ Driving Assistance Applications

- Lane Change Assist
- Backward Collision Warning
- Backover Prevention (BOP)



- Driver Authentication
- Driver Monitoring
- Passenger Monitoring



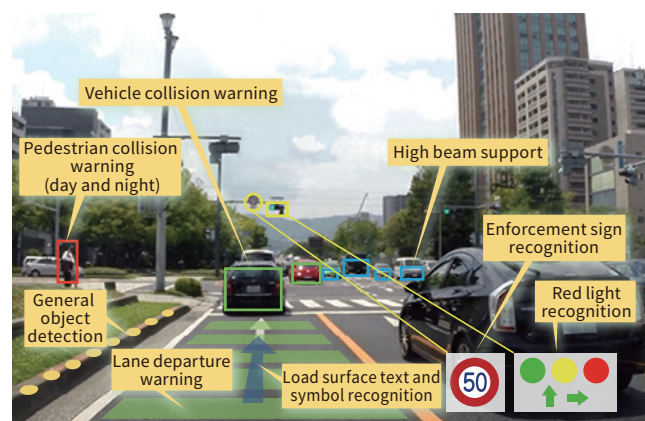
- Left/Right-Turn Awareness
- Blind-Spot Detection
- Lane Change Assist



- Top-View Parking Assist
- Obstacle and Pedestrian Detection



- Lane Departure Warning
- Forward Collision Warning
- Traffic Sign Recognition
- Traffic Signal Recognition
- Night Vision
- Forward Pedestrian Collision Warning
- Forward Pedestrian Detection and Collision Warning



## Contribution to SDGs



**Goal 11:**  
Smart cities



**Goal 9:**  
Innovation



**Goal 3:**  
Traffic accident reduction

The processor is capable of tracking road conditions in real-time and detects obstacles for taking evasive action. Safe driving support and autonomous driving of a vehicle require accurate recognition of pedestrians and other vehicles around the vehicle as images to ensure safety. Visconti™4 improves the nighttime pedestrian detection function and also enables detection of obstacles such as fallen objects on the road that have no standard shape or appearance by acquiring 3D information from time series images captured by monocular cameras. By reducing accidents attributable to driver human error with these functions, we will contribute to creating safe and smooth street traffic, and thereby realize neighborhoods where people from children to elderly persons can continue to live in safety.



**Goal 13:**  
Reduction of CO<sub>2</sub> emissions

Improving image recognition requires a lot of signal processing and tends to increase power consumption. Visconti™4 achieves both high performance and low power consumption through various measures such as use of a multi-core processor, adaption of a unique image processing circuits, and support for low-power consumption memory.

Case  
5

## Share-ride demand responsive transport system using AI technology (Japan)

Toshiba Digital Solutions Corporation

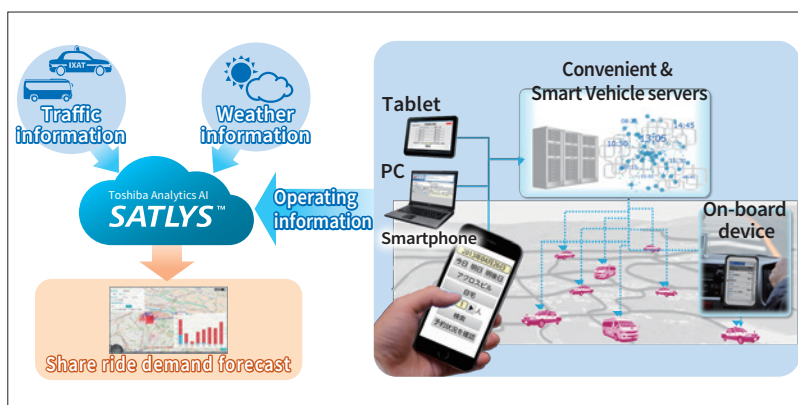
## Background

The discontinuation of fixed routed bus services due to decreasing population and the increasing number of people who voluntarily return their driving licenses have led to an increasing number of people who have difficulty traveling, mainly among the elderly in Japan. In addition, under circumstances where regional revitalization is anticipated such as by inviting tourists and promoting exchanges among local residents, an affordable and convenient means of transportation is essential. JUNPUZI Co., Ltd. has developed a share-ride demand responsive transport system, Convenient & Smart Vehicle, jointly with the University of Tokyo and has been operating the system since 2009. Currently, 65,000 persons use the system every month at 42 locations nationwide.

## Business overview

Share-ride demand responsive transport (taxi, bus, etc.) is public transport that operates only when a reservation is made. An operation plan (route, schedule, the number of persons boarding/exiting, etc.) is automatically set according to random requests from users regarding boarding and exiting points and the time.

In 2018, Toshiba Group and JUNPUZI Co., Ltd. launched a verification test of the share-ride demand responsive transport that uses AI technology. During this verification testing we aim to set up an efficient operation plan based on demand forecast. Based on big data consisting of data collected through the previous operation of the transport by JUNPUZI to which weather information, traffic information, and other external environment data is integrated, Toshiba Analytics AI SATLYS™ is used to forecast boarding/exiting places, time, and the number of people for up to several weeks ahead and visualize the results on a map, which is used for advance adjustment on the number of vehicles to be arranged, etc. We will also conduct verification of community revitalization activities such as events with expected demand.



## Contribution to SDGs



**Goal 8:**  
Job satisfaction, economic growth



**Goal 11:**  
Smart cities



**Goal 3:**  
Traffic accident reduction

This system contributes to increasing employment opportunities for people who have difficulty commuting and creating jobs for drivers and operators.

Increasing opportunities for people who have difficulty commuting will lead to the revitalization of community. This system also contributes to reducing the burden on local governments, creating community circles, increasing opportunities to use facilities, shops, and culture schools, and creating safe and comfortable neighborhoods through fewer traffic accidents.



**Goal 9:**  
Innovation



**Goal 13:**  
Reduction of CO2 emissions

This system realizes a mobility system that is best suited for changing communities through continued data analysis. By realizing smooth integration with other public transport, this system also contributes to CO2 reduction, through dealing with a lack of parking lots, reducing opportunities for on-street parking, and reducing fuel usage as a result of the providing the best routes.



**Goal 17:**  
Partnership

While deploying the Regional Economy Advancement Project Plan in Chiba Prefecture to urban areas nationwide as well as the 42 locations throughout the country where the system is under operation as a pilot plan, Toshiba Group plans to work together with JUNPUZI to spread the system to various freight companies and transport operators which will lead each local economy in the future.

## Buildings and facilities

Case  
6

### Lazona Kawasaki Toshiba Building Smart Community Center (Japan)

Toshiba Infrastructure Systems &amp; Solutions Corporation

#### Background

In Japan, 22% of GHG emissions comes from "business and other" sector (commerce, service, offices, etc.)\*1, and a significant reduction in emissions in this sector is needed to achieve the GHG emission reduction goals for 2030. The Ministry of Economy, Trade and Industry aims to achieve net zero energy by 2030, by requiring that all new buildings be zero energy buildings (ZEB) or namely to achieve more than 50% energy savings while maintaining the quality of the indoor environment and then introducing renewable energy such as photovoltaic power generation.

To realize ZEB, continued promotion of energy saving will be necessary in addition to incorporating comprehensive measures, including architectural expertise, better equipment efficiency, energy management, and renewable energy.

\*1 A survey by the Ministry of the Environment

#### Overview

Lazona Kawasaki Toshiba Building Smart Community Center is the next generation of environmentally- and disaster-prevention-conscious office buildings, which meets "ZEB Ready," the energy-saving standard for building that can reduce CO<sub>2</sub> emissions by 50% compared to other general office buildings. The building can reduce CO<sub>2</sub> emissions by 35.8% through improved efficiency of the building and equipment and by 14.2% through smart BEMS. It has obtained CASBEE Kawasaki S rank and also received the Energy Conservation Grand Prize and Chairman of the Energy Conservation Center Japan's Prize (FY2016).



Lazona Kawasaki Toshiba Building Smart Community Center

#### Contribution to SDGs



**Goal 11:**  
Smart cities



**Goal 9:**  
Innovation

With smart BEMS, the building can realize coordinated control of air conditioning and lighting according to the number of persons present by detecting the presence or absence of persons, enabling to achieve both energy-saving and comfort. The building can also visualize power consumption by floor or per person, which will lead to raising the energy-saving awareness of employees.

The building ensures BCP\*2 by using a base-isolated structure and introducing a continuous operation system for elevator power failure that uses a private power generator for emergency and SCiB™, a power supply and demand control unit for disasters, etc. It has two 1,500 kVA emergency generators and a high capacity water tank for tap water and water for miscellaneous use, enabling supply of electricity and water for at least 72 hours.

\*2 Business continuity planning for disaster and accident scenarios



**Goal 13:**  
Reduction of CO<sub>2</sub> emissions



**Goal 7:**  
Energy

The building has high efficiency equipment, including air conditioning equipment, LED lighting, and elevators. By reducing the exterior area with cubic architecture called EcoCube, the building ensures insulation.



**Goal 17:**  
Partnership

By working with Nomura Real Estate Development Co., Ltd., Nikken Sekkei, Ltd., Obayashi Corporation, and NREG Toshiba Building Co., Ltd. under a project structure where architectural planning, facility planning, construction, and operation are combined, the building succeeded in realizing the status of next generation of energy saving office building.



## Disaster prevention

Case  
8

### Multi parameter phased array weather radar (Japan)

Toshiba Infrastructure Systems &amp; Solutions Corporation

#### Background

It is difficult to predict natural disasters, and what constitutes a disaster is changing with the times. In recent years, great damage especially by localized heavy rain (so called guerrilla rainstorms) or tornadoes due to climate change have become a major problem, and the frequency and scale of such disasters are predicted to increase. In response to this situation, in Japan, the Climate Change Adaptation Act was enacted in June 2018 and the national government, local governments, and companies are strongly encouraged to actively take adaptation measures to prepare for climate change risk.

#### Overview

As a measure for the Enhancement of Societal Resiliency against Natural Disasters promoted by the Cabinet Office of Japan, we installed the world first practical multi parameter phased array weather radar (MP-PAWR) developed by a study group including Toshiba Group at Saitama University on November 21, 2017.

The MP-PAWR uses the latest phased array antenna instead of the conventional reflecting mirror type. This antenna can capture rain clouds in a space about 15 km above the ground in 30 seconds within a 60 km radius or in 60 seconds within 80 km radius in a 3D image just by rotating it once. In addition, as a result of supporting a high accuracy precipitation measurement function, the MP-PAWR is capable of measuring the signs and rainfall of a guerrilla rainstorm faster and at higher accuracy than conventional weather radars. It can predict localized heavy rain and tornado hazards 20 to 30 minutes in advance at high accuracy by observing rapidly developing cumulonimbus clouds.



Radar antenna system



The MP-PAWR radome installed at Saitama University

#### Contribution to SDGs



##### Goal 13:

##### Adaptation to climate change

This radar provides adaptation measures for natural disasters such as localized heavy rains and tornadoes that occur due to the effect of climate change, and in this way reduces the risk of disasters.



##### Goal 11:

##### Resilient cities

By using this radar to provide information on guerrilla rainstorms, floods, and heavy wind predictions, local governments can grasp those locations with a high flood risk in advance, allowing them to carry out flood control activities and give residents evacuation instructions well in advance.



##### Goal 17:

##### Partnership

The radar was developed jointly by a study group consisting of National Institute of Information and Communications Technology (NICT), Tokyo Metropolitan University, Nagoya University, and Saitama University.



## Production site management at an overseas subsidiary

Case  
9

### Environmental Impact Reduction Measures at Toshiba Subsidiaries in India (India)

Toshiba Energy Systems &amp; Solutions Corporation

#### Background

Due to a rapid increase in population and economic development, the problem of water shortage is becoming serious in India. It is said that 600 million people out of approximately 1.3 billion people in India are facing water shortage, and lack of safe water claims the lives of roughly 0.2 million people every year\*<sup>1</sup>. River water and groundwater contamination is also a large problem there and the regulations on water discharge are becoming stricter, mainly in urban areas.

In addition, due to its geographical characteristics, India is one of the world's natural disaster-prone countries, with a risk of river flooding due to a cyclone or flood. Furthermore, India is currently the world's third country in the amount of CO<sub>2</sub> emissions as a result of a rapid increase in the amount due to economic development, and how CO<sub>2</sub> emissions in plants can be reduced is an important issue.

Under these circumstances, our manufacturing sites in India are strongly required to take actions for water risks, such as reducing water usage and managing water discharge, natural disaster measures, and other measures for reducing CO<sub>2</sub> emissions.

\*<sup>1</sup> Source: National Institution for Transforming India Committee

#### Measures Overview

Toshiba JSW Power Systems Private Limited has been working on saving water by reusing rainwater and treated water as a response to water risks. Specifically, the company waters plants in the premises by using rainwater stored in a pond and treats and reuses wastewater as cooling water and flushing water and thereby reducing wastewater discharged to outside the premises to zero. On the assumption that there may be a risk of its plants to be under water following a river flooding due to a natural disaster, the company also takes measures such as building a dike around the main equipment and installing control panels and private power generators on raised floors.

Toshiba Transmission & Distribution Systems (India) Private Limited has been using biomass boilers to reduce CO<sub>2</sub> generated from its plants. The company burns 2,236 tons of biomass fuel using cotton waste in boilers installed in the premises, and uses the generated heat source for thermostatic ovens used in the manufacturing process. In addition, the company has been implementing comprehensive environment management activities, including the monitoring of flora and fauna in the premises and awareness raising activities for its employees as part of biodiversity conservation activities and composting leftover food of approximately 5,000 persons to green the plants as part of waste reduction efforts.



Reuse of rainwater and treated water



Use of a biomass boiler



Raising the floor of equipment in preparation for disasters

#### Contribution to SDGs



**Goal 6:**  
**Effective use of water resources**

By promoting the reuse of rainwater and treated water, we will achieve zero wastewater.



**Goal 7:**  
**Energy**

Use of a biomass boiler, which is carbon-neutral, allows us to reduce the amount of fossil fuel used and thereby significantly reducing CO<sub>2</sub> emissions.



**Goal 13:**  
**Adaptation to climate change**

On the assumption that there may be a risk of plants being flooded by a natural disaster, we have taken actions, such as building dikes and raising the floor level for equipment.



**Goal 15:**  
**Biodiversity conservation**

We work on protecting the ecosystem by monitoring flora and fauna in the premises and encouraging animals to migrate to the premises. By posting pictures of flora and fauna taken through the process of monitoring, we also promote awareness raising among employees.

As climate change becomes an increasingly serious issue, companies must manage not only their own greenhouse gas (GHG)\*<sup>1</sup> emissions but also emissions generated throughout their entire supply chain. Based on the GHG Protocol\*<sup>2</sup>, which provides international standards for calculating GHG emission, and the Ministry of the Environment's Basic Guidelines for Calculating GHG Emissions throughout the Supply

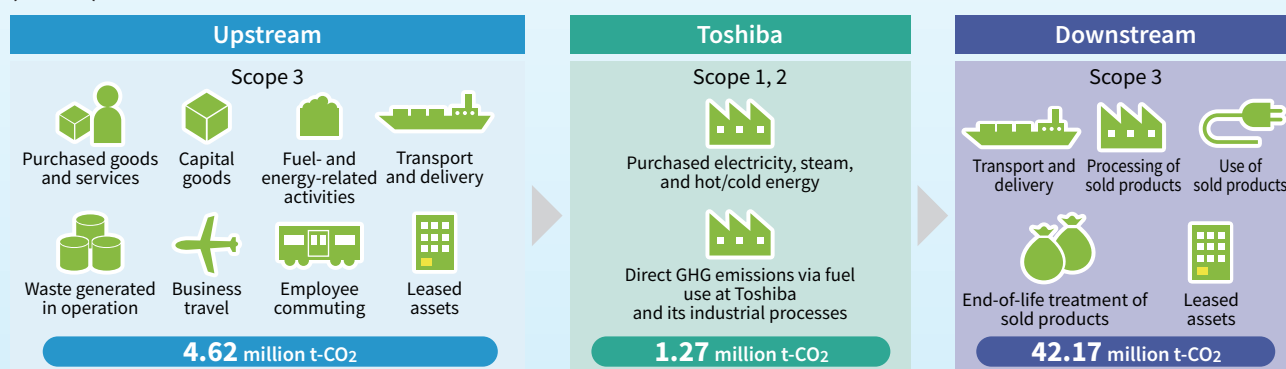
Chain, Toshiba Group calculates indirect GHG emissions generated outside the scope of its own business activities (Scope 3) in addition to its own emissions (Scopes 1 and 2).

Toshiba Group will continue working effectively throughout product lifecycles by quantitatively analyzing emissions per category as described above.

\*1 CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub>, NF<sub>3</sub>

\*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)

(FY2017)



Category	Categories covered by calculations		FY2016 calculation results (10,000 t-CO <sub>2</sub> )	FY2017 calculation results (10,000 t-CO <sub>2</sub> )	Amount released emissions	Considerations
Upstream	1	Purchased goods and services	441	400	-9%	
	2	Capital goods	51	21	-59%	
	3	Fuel- and energy-related activities (not in Scope 1 or 2)	7	6	-14%	
	4	Upstream transportation and distribution	30	29	-3%	
	5	Waste generated in operation	1	1	0%	
	6	Business travel	5	5	0%	
	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)	53	33	-38%	
	10	Indirect emissions associated with energy-derived emissions (Scope 2)	98	94	-4%	
Downstream	11	Downstream transportation and distribution	9	8	-11%	
	12	Processing of sold products	—	—	—	We mainly deal with finished products and parts that do not require processing
	13	Use of sold products	4,903	4,265	-13%	
	14	End-of-life treatment of sold products	-53	-56	6%	
	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			5,545	4,806	-13%	

\* Toshiba Memory Corporation and Toshiba Visual Solutions Corporation are excluded from calculations for both FY2016 and FY2017.

# Visible for All Categories

## ■ Cases on GHG Emissions Reductions throughout the Supply Chain

Toshiba Group promotes various initiatives toward reduction of GHG emissions at each stage of upstream, Toshiba Group's own business activities, and downstream throughout the supply chain.

### Upstream

To achieve reduction of GHG emissions in upstream operations, we are working to create highly resource-efficient and energy-efficient products and services throughout the product and service life cycles.

#### Case 1 Contribution to reduction of GHG emissions in the lifecycle with the SCiB™ rechargeable battery

Toshiba Infrastructure Systems & Solutions Corporation

Toshiba's SCiB™ rechargeable battery has the excellent characteristics including safety, long life, low-temperature performance, rapid charging, high input/output power and large effective capacity. SCiB™ has been widely used for vehicle, industrial and infrastructure applications, including automobiles, buses, railways, elevators and power plants.

With these excellent characteristics, SCiB™ can improve resource and energy efficiency throughout product lifecycles, contributing to reducing GHG emissions in the product lifecycles.

#### (1) Improvement EV value by the "rapid charging", and resource saving by the "large effective capacity"

SCiB™ can be charged with very short period such as "Super Quick Charge" in 6 minutes\*<sup>1</sup>, enabling it to be used in electric automobiles, electric buses and other vehicles that require quick charging similar to refilling a gasoline car. That makes it possible to reduce the nominal battery capacity or amount of batteries necessary for a vehicle. By conducting research and development of high technologies such as the wireless charging technology\*<sup>2</sup>, while applying SCiB™ to diverse transportation infrastructure, we will contribute to both reducing environmental impacts and improving the convenience of urban transportation.

\*1: Measured by Toshiba under specific conditions

\*2: Technology that allows electricity to be transmitted from a power supply device on the ground to a storage battery installed in the vehicle without wires

#### (2) Reduced environmental impacts during product use by the "long life" feature

With SCiB™, only a small degree of capacity degradation occurs even after more than 20,000 Cycles\*<sup>3</sup> of 60A charging and discharging. SCiB™ also requires low maintenance even when it is used in applications that perform frequent charging/discharging such as large-scale storage battery systems, hence being environmentally conscious.

\*3: Measured by Toshiba under specific conditions

#### (3) Improved energy efficiency by the "high input/output power" feature

SCiB™ can be charged and discharged at high current rate. SCiB™ can accept a large amount of regenerative energy in a short time as produced by a train or an automobile when the brake is being applied, and is later used for motor assist during acceleration. This leads to increased energy efficiency and fuel economy, thus contributing to a high environmental performance.





**Toshiba Group's own business activities**

To achieve reduction of GHG emissions in Toshiba Group, we are taking energy-saving initiatives at our production sites.

**Case  
2****Energy-saving for air conditioning equipment in semiconductor clean rooms**

Toshiba Electronic Devices & Storage Corporation  
Himeji Operations-Semiconductor / Kaga Toshiba Electronics Corporation

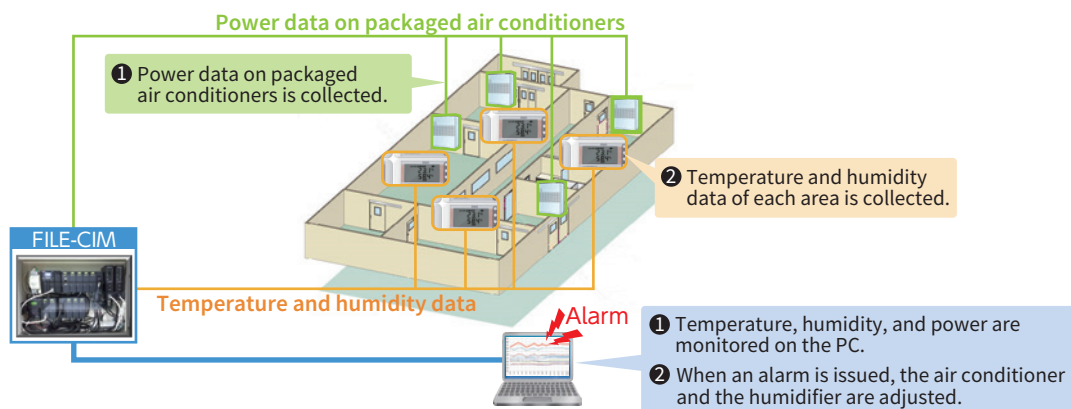
The semiconductor business requires large amounts of electric power for the management of clean rooms where fine processing and assembly of products are carried out with a high degree of accuracy. Therefore, Himeji Operations-Semiconductor and Kaga Toshiba Electronics Corporation focused their attention on air conditioning equipment and are actively working to reduce energy consumption.

For example, Himeji Operations-Semiconductor has introduced a real-time temperature and humidity control system to reduce power consumption by air-conditioning and steam. By reviewing the previous data collection method and monitoring method and introducing a mechanism that allows temperature and humidity data of each area to be constantly and centrally monitored for immediate action, we have reduced CO<sub>2</sub> emissions by 119 tons per year.

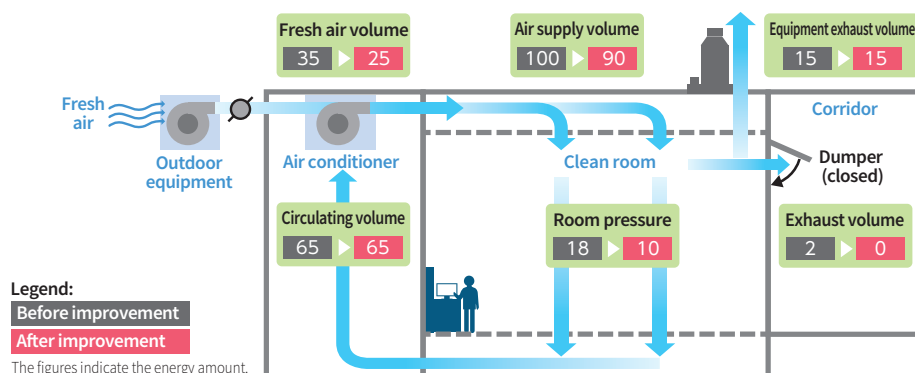
Kaga Toshiba Electronics Corporation is working to reduce air-conditioning power consumption by optimizing the clean room pressure. The person responsible for power and the person responsible for manufacturing collaborated to optimize the pressure of over 20 clean rooms by identifying the impacts from room pressure variation, dust, exhaust, etc. on product processing and applied those results to all clean rooms, reducing CO<sub>2</sub> emissions by 209 tons per year.

We will continue to work on these initiatives to reduce CO<sub>2</sub> emissions during the manufacturing stage as much as possible while linking such efforts towards improving the productivity of the entire factory at the same time.

■ **Reduction of power consumption by air-conditioning and steam by introducing a temperature and humidity control system (Himeji Operations-Semiconductor)**



■ **Reduction of power consumption by air-conditioning through clean room pressure optimization (Kaga Toshiba Electronics Corporation)**



## Downstream

In order to reduce GHG emissions during use of sold products which account for many of Toshiba Group's GHG emissions, we are working to improve energy-saving performance of products.

## Case 3 High-efficiency air-cooled heat pump chiller

Toshiba Carrier Corporation

Universal Smart X EDGE series are high-efficiency, high-performance, compact air-cooled heat pump chillers equipped with the world's largest-class<sup>\*1</sup>, newly developed, high-capacity DC inverter rotary compressors. We optimized compressor tuning and drastically enhanced the cooling cycle including the heat exchangers and ventilators. As a result, the EDGE series AIREEDGE high-efficiency 60-horsepower standard model IPLVc<sup>\*2</sup> realizes leading performance of 5.3, while the high-efficiency model offers performance of 6.0. These new products reduce CO<sub>2</sub> emissions by approximately 62%<sup>\*3</sup> compared to conventional Toshiba Carrier products (FY2000 products). Also, the original edge form reduces product size and makes it easier to build and operate the product.



Universal Smart X EDGE series



トリプル受賞

Triple winning

<sup>\*1</sup> As of July 2018; with an air-cooled heat pump chiller. Survey by Toshiba Carrier Corporation

<sup>\*2</sup> Cooling period performance coefficient (conform to JRA 4066) that indicates operation efficiency is also based on performance during low-load times. Greater values indicate higher energy efficiency.

<sup>\*3</sup> Comparison between the previous product (FY2000 products, TAG-C009) and AIREEDGE RUA-UP511HN when converted to the same horsepower.

<sup>\*4</sup> For Universal Smart X EDGE series, which shared the award with Tohoku Electric Power Co., Inc.

<sup>\*5</sup> For development of HEATEDGE enhanced heating property type air-cooled heat pump chiller, which shared the award with Tohoku Electric Power Co., Inc.

<sup>\*6</sup> For the 1000A4 series high-capacity, high-efficiency rotary compressors

Case 4 LED light bulb with GaN<sup>\*1</sup> power device and high output capacity LED flood-light realized by an innovative technology

Toshiba Lighting &amp; Technology Corporation

This case is a high efficiency small-sized LED light bulb with Gallium Nitride (GaN) power device and LED floodlight that uses a reflecting mirror to reduce light leakage.

For the LED light bulb, we used a GaN power device to realize a higher frequency and make a more compact circuit board. It runs a dimmer control program via a small-sized LED light bulb, thus contributing to promoting replacement with LED lamps. The high output capacity LED floodlight (equivalent to a 2-kW metal-halide stadium floodlight) has established a light distribution design technology that uses only a unique reflecting mirror. It achieves high specific energy consumption efficiency and improves energy-saving performance by efficiently collecting light while reducing light leakage. We will promote the spread of LED floodlights for use at sports stadiums and other facilities. The LED light bulb with GaN power device reduces power consumption when compared with Toshiba's incandescent lamp bulbs (by approximately 84%<sup>\*2</sup> from a mini-krypton bulb and approximately 82%<sup>\*3</sup> from a halogen lamp bulb). The high output capacity LED floodlight (equivalent to a 2-kW metal-halide stadium floodlight) also reduces power consumption when compared with Toshiba's HID floodlight by approximately 55%<sup>\*4</sup>.



LED light bulb with GaN power device



High output capacity LED floodlight (equivalent to a 2-kW metal-halide stadium floodlight)



These products received Agency for Natural Resources and Energy Director-General's Award (Power Saving Field) in the Product and Business Model Category of FY2017 Energy Conservation Grand Prize.

<sup>\*1</sup> A chemical formula for Gallium Nitride

<sup>\*2</sup> Comparison between Toshiba's incandescent lamp bulbs KR100V33WXA and the LED light bulb with GaN power device LDA5L-G-E17/S/D40W

<sup>\*3</sup> Comparison between Toshiba's neo halogen beam PRIDE JDR110V45W/K5M-PD and the LED light bulb with GaN power device LDR7L-M-E11/D

<sup>\*4</sup> Comparison between Toshiba's HID floodlight HT-20013 (N, M, W) + MD2000B + 20MC-4201H and the high output capacity LED floodlight LEDES-12503N (N, M, W) + LEK-3H8P039A01

# 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

The world population topped seven billion in October 2011, and rapid population growth and the urbanization of populations are expected to continue to occur mainly in the emerging countries of Africa, Asia, etc. 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 number. In addition, the temperature is rising due to the effects of 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 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.

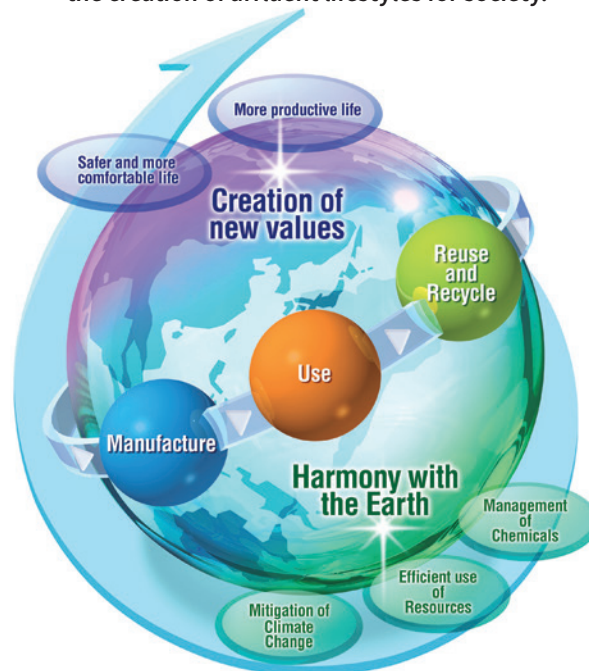
As the international community becomes increasingly aware of environmental issues, companies engaged in global business activities must do more than before to resolve such issues. We believe that as a member of the international community, Toshiba Group has the responsibility of helping resolve global environmental issues through our activities in four business domains: energy, electronic devices, and digital solutions centering around social infrastructure.

To fulfill this responsibility, 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.**

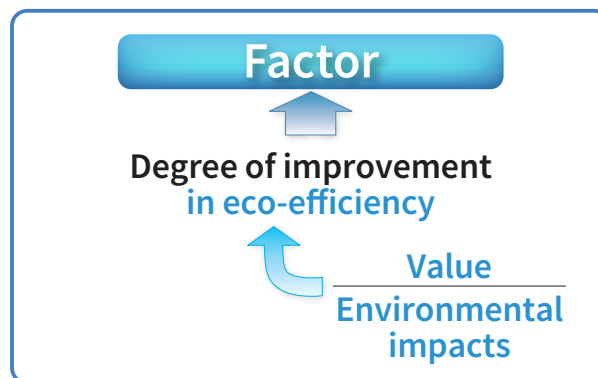


## Performance indicators for our Vision

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.

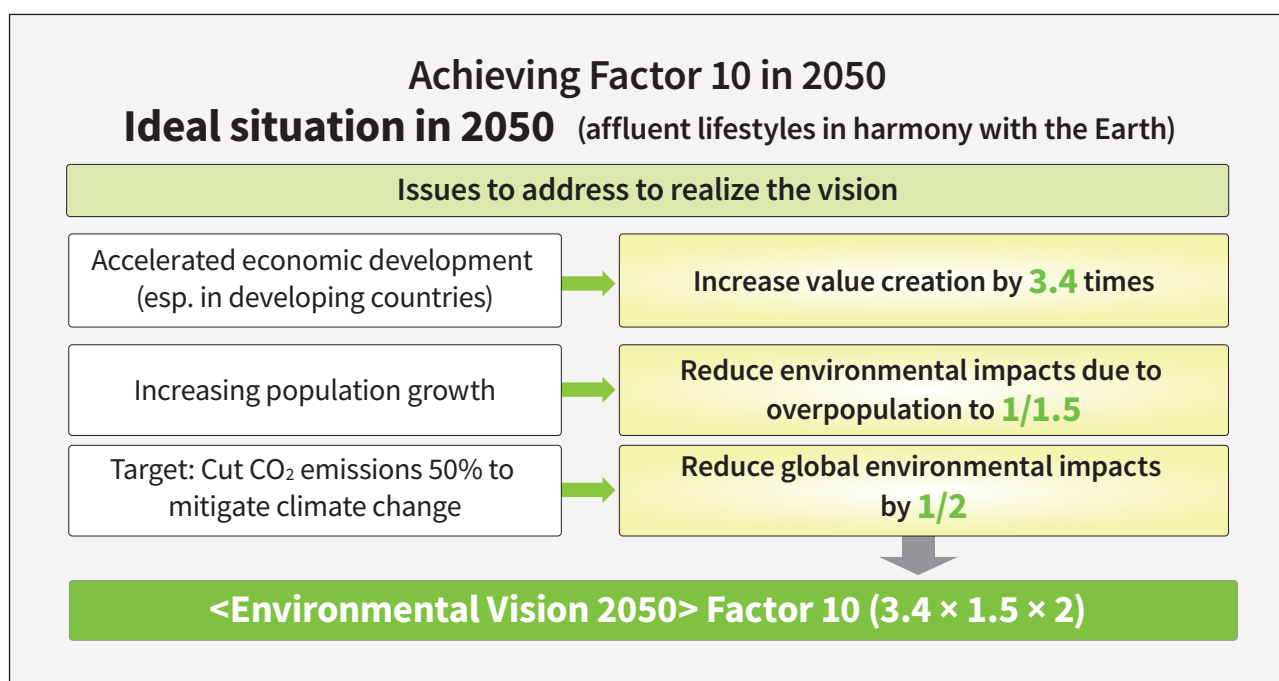
Eco-efficiency can be expressed as a fraction, with the creation of new value as the numerator and environmental impacts as the denominator. The more enriched value created — or the more environmental impacts are reduced and progress made toward coexisting with the Earth — the more eco-efficiency improves. 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.



# Eco-Efficiency and Factor

## Overall eco-efficiency

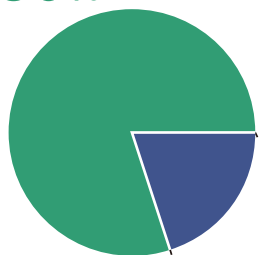
Environmental Vision 2050 requires Toshiba Group to increase the degree of improvement in overall eco-efficiency ten times (Factor 10) by FY2050 compared to the FY2000 level.

Toshiba Group's overall eco-efficiency is calculated by combining product eco-efficiency and business process eco-efficiency. The overall eco-efficiency in FY2017 was 2.27 times the FY2000 level (Factor 2.27). Although our overall eco-efficiency decreased in FY2016 due to impacts from a significant change in the business structure, we will introduce new environmental management measures and aim to achieve Environmental Vision 2050 under the new business portfolio.

## Changes in overall eco-efficiency

**Environmental impacts related to product**  
(From material procurement to product disposal and recycling)

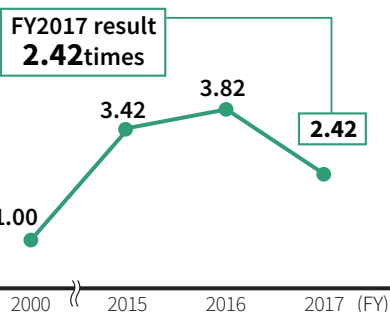
**80%**



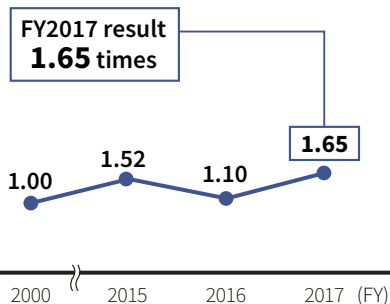
**Environmental impacts in business process**  
(during manufacturing)

**20%**

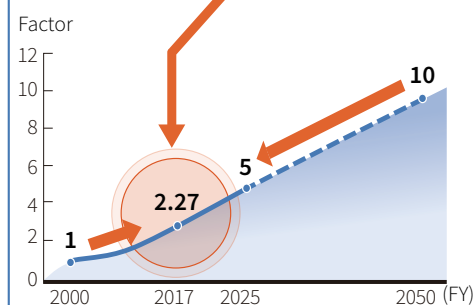
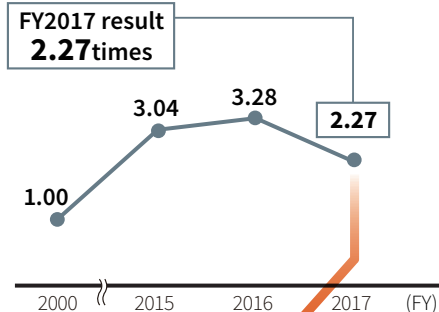
### Product eco-efficiency



### Business process eco-efficiency



### Changes in overall eco-efficiency



**Setting a target based on backcasting from 2050**



## Product eco-efficiency (Factor T)

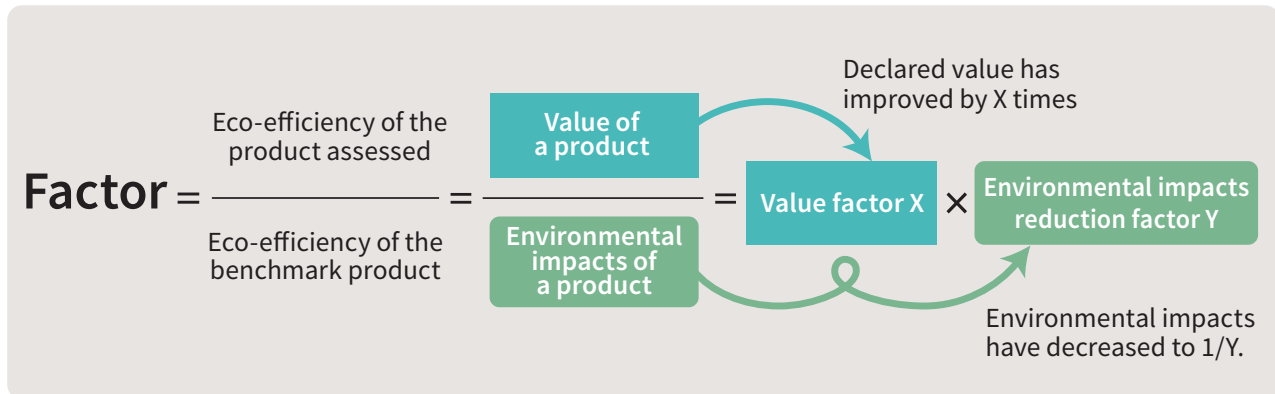
Toshiba Group originally developed a method for calculating eco-efficiency to introduce an indicator that allows overall assessment of products' environmental consciousness. Comprehensive activities for creating ECPs that are aimed at increasing the Factor are part of the Factor T initiative, which was 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<sup>\*1</sup>, while the environmental impacts reduction factor assesses environmental impacts using LIME<sup>\*2</sup>.

<sup>\*1</sup> QFD : Quality Function Deployment is a standard tool used in product design.

<sup>\*2</sup> 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.

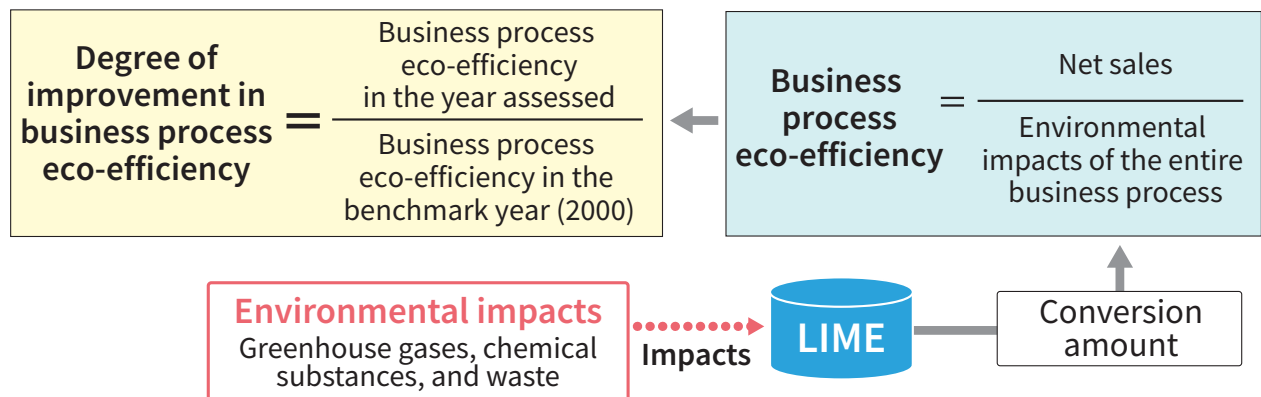
### ■ Calculation of product eco-efficiency (Factor T)



## 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 for medium-term goals and manages specific environmental activities and their targets. Since Toshiba Group formulated our 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 global environmental issues.

## Progress of the Sixth Environmental Action Plan

The achievements made in FY2017 are summarized as follows. Although we fell short of targets on some items, our activities made progress in all areas and there were no items where there was a drastic failure to reach targets.

### 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 FY2017, we proactively promoted energy-saving measures and improved the production processes at our sites, increased the turning

of waste into valuables, and reused water worldwide. As a result, we were able to achieve our targets for all items.

### Business —Improving environmental performance of products and services—

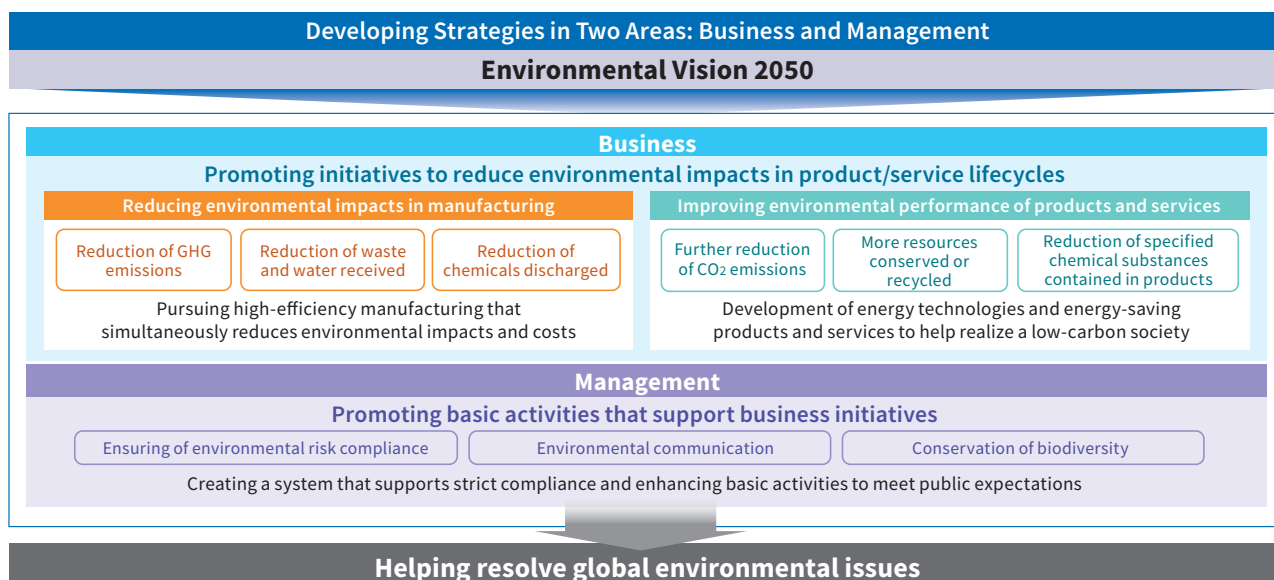
We are working to improve the environmental performance of products and services by reducing CO<sub>2</sub> emissions in terms of both power consumption and supply, by reducing product resource usage, and by managing the chemicals contained in products. In FY2017, although we fell short of these targets for some items including increased reduction of CO<sub>2</sub> emissions (power supply)\*, due to demand fluctuations etc, we steadily improved the energy-saving performance of products and services and reduced product resource usage 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 FY2017, in addition to strengthening the structure for compliance with global laws and regulations, 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 schoolchildren, 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 FY2017 that we could not achieve, we will further intensify our activities toward achieving FY2018 targets.



# Toshiba Group's Sixth Environmental Action Plan

## Business

★★★Achieved   ★★Almost achieved   ★Significantly fell short of goals

Activity area	Activity content		FY2017			FY2018	FY2020
			Target	Result	Evaluation	Target	Goal
Reducing environmental impacts in manufacturing	Reduction of total greenhouse gas emissions*1		1.46 million t-CO2	1.27 million t-CO2	★★★	1.54 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)		98%	97.8%	★★★	96%	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		45,000 t	37,000 t	★★★	48,000 t	52,000 t
			We further turned more waste into valuables and minimized waste volume through efforts to improve production processes and sort waste more carefully.				
	Improvement of the total volume of waste generated per unit production (Compared to FY2013 level)		99%	86%	★★★	98%	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)		99%	89%	★★★	98%	96%	
		We further improved the amount of water received per unit production by reusing water at the sites such as semiconductor sites that normally consume large amounts of water.					
Reduction of the total amount of chemicals discharged per unit production (Compared to FY2013 level)		99%	79%	★★★	98%	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	9.6 million t-CO2	9 million t-CO2	★★	12.9 million t-CO2	16.3 million t-CO2
			We worked to develop and spread a wide range of energy technologies, such as hydroelectric, geothermal, photovoltaic power, and high-efficiency thermal power.				
		Power consumption*4	1.7 million t-CO2	1.86 million t-CO2	★★★	3.4 million t-CO2	6.3 million t-CO2
			We reduced CO2 emissions during use by developing products with the highest energy-saving performance and highly energy efficient products.				
	Increased amount of resources saved (cumulative total)		100,000 t	99,800 t	★★	180,000 t	460,000 t
			We significantly reduced resource consumption for products in each area.				
	Increased amount of recycled resources (recycled plastics) used (cumulative total)		740 t	851 t	★★★	1,500 t	3,000 t
			We increased their usage in multi-function printers and industrial air conditioners.				
Reduction of specified chemical substances contained in products		—	Using alternative materials completed for hard disks and POS systems. Shipment of alternative products for POS systems also started.	★★	Activities will be continued.		
Using alternative materials for four phthalates*5 or identifying alternates for all products by July 2019							

## Management

Activity area	Activity content		FY2017		FY2018	FY2020
			Result	Evaluation	Target	Goal
Ensuring of environmental risk compliance	<b>Enhancement of compliance with global environmental regulations and human resource development</b> <ul style="list-style-type: none"> <li>Reviewing of measures to ensure compliance with global environmental regulations</li> <li>Enhancement of local networks of environmental human resources at overseas production sites</li> </ul>		<ul style="list-style-type: none"> <li>The number of violations of laws and regulations was zero.</li> <li>We created a mechanism for distributing global legal information internally and identifying issues in a timely manner.</li> <li>We prepared for a study meeting on legal issues for persons responsible for the environment at our Chinese sites, which led to a scheduled meeting to be held next year.</li> </ul>	★★	Activities will be continued.	
Environmental communication	<b>Improvement of information disclosure</b> <ul style="list-style-type: none"> <li>Improvement of reporting based on external requirements</li> </ul>		Toshiba Group Environmental Report 2017 received an award of merit in the Ministry of the Environment's Environmental Communication Awards in Japan.	★★★	Activities will be continued.	
	<b>Development of networks with stakeholders</b> <ul style="list-style-type: none"> <li>Enhancement of communication with customers through Toshiba Group Environmental Exhibition and education program at Toshiba Science Museum</li> <li>Enhancement of communication with local communities by implementing Global Environmental Action at our sites worldwide</li> </ul>		<ul style="list-style-type: none"> <li>We held 26th Toshiba Group Environmental Exhibition, which received nearly 3,000 visitors.</li> <li>We held educational programs for elementary school-children at Toshiba Science Museum and elementary schools about 30 times.</li> <li>Energy-saving events, education activities etc. were carried out in Japan, Europe, Americas, Asia, and China.</li> </ul>	★★★	Activities will be continued.	
Conservation of biodiversity	<b>Contributions to Aichi Targets</b> <ul style="list-style-type: none"> <li>Choosing 10 of the 20 Aichi Targets as Toshiba goals to develop measures at our sites worldwide</li> </ul>		We conducted activities toward achieving Aichi Targets at approximately 70 sites worldwide.	★★★	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 CO<sub>2</sub> emission coefficient for electricity in Japan is 5.31 t-CO<sub>2</sub>/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:

Compare with CO<sub>2</sub> emissions (rate to net production output) for average thermal power of the same fuel type; for renewable energy, compare with CO<sub>2</sub> emissions (rate to net production output) for average thermal power of all types; an accumulated total of annual reductions plus reductions achieved by newly built power generation systems. Acquire the accumulative total amount of contribution through power generation in a single-year and at newly installed facilities.

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

[CO<sub>2</sub> emissions of assumed substitute products - CO<sub>2</sub> 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.



# Risks and Opportunities

## 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"> <li>• Climate change mitigation and adaptation</li> <li>• Sustainable resource use</li> <li>• Prevention of pollution</li> </ul>
Middle		<ul style="list-style-type: none"> <li>• Environmental protection, biodiversity and restoration of natural habitats</li> </ul>	
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 CO<sub>2</sub> 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 decarbonized 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.

"Sustainable resource use" is associated with risks, such as introduction of laws and regulations regarding resource efficiency as well as energy efficiency, resource price hikes, and procurement. While reducing costs by improving resource efficiency, we will 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. For greenhouse gas management, 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, 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 CO<sub>2</sub> 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 renewal 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. Note that a structural reform of our business has been underway since last fiscal year, and the target values for the above KPIs for FY2019 onward will be reviewed in order according to the new business portfolio.

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), 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 decarbonized society and further market expansion, and we will update these opportunities as necessary while reflecting the latest external trends in them.

The risk that has the largest financial impact is business suspension. As represented by a backlash against coal fired power generation, 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. For such a risk, we have a business structure covering the entire energy mix and also have established a system for providing the best energy solution matching the customer's requirements in the process of transition to a decarbonized society. In addition, we will continue to work on reducing CO<sub>2</sub> emissions through a 700°C ultra supercritical power generation system (Advanced-USC) that reduces environmental impacts through improved efficiency, a supercritical CO<sub>2</sub> cycle power generation system that can generate power and separate and collect CO<sub>2</sub> at the same time, and technology to separate and collect CO<sub>2</sub> from plants that emit CO<sub>2</sub>.

On the other hand, since our core operation is a social infrastructure business, we believe it is our mission to implement low carbon and decarbonized systems in our society as quickly as possible and to accelerate the transition to a decarbonized society. We believe that pursuing that mission will lead to great business opportunities. Low carbonization of mobility area and buildings and facilities, distributed energy systems, and high efficiency manufacturing are domains where we can increase available opportunities by taking advantage of our strengths.

Although there are no physical risks that have yet surfaced, 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, 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 as a heat stroke countermeasure will help expand our business.

## Overview of Environmental Impacts

We are 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 was collected from 389 Toshiba Group companies (actual results for FY2017). We carry out overall assessments on the environmental impacts of input resources/energy and emission of greenhouse gas and chemicals using the Life-cycle Impact assessment Method based on Endpoint modeling (LIME) and express it in terms of economic value. This makes it easy to compare the impact on sales, grasp improvements in environmental efficiency, and even recognize the impact as the magnitude of environmental risk.

During the material procurement stage, Toshiba Group will make efforts to reduce environmental impacts mainly through reducing product resource consumption, increasing recycled material use, resource recycling, and promoting green procurement. 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.

During the manufacturing stage, 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 CO<sub>2</sub> 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 FY2017, Toshiba Group used about 54 TJ's worth of renewable energy. This amount corresponds to a reduction of 2,887 t-CO<sub>2</sub>. We will continue striving to use more renewable energy to achieve decarbonization during the manufacturing stage.

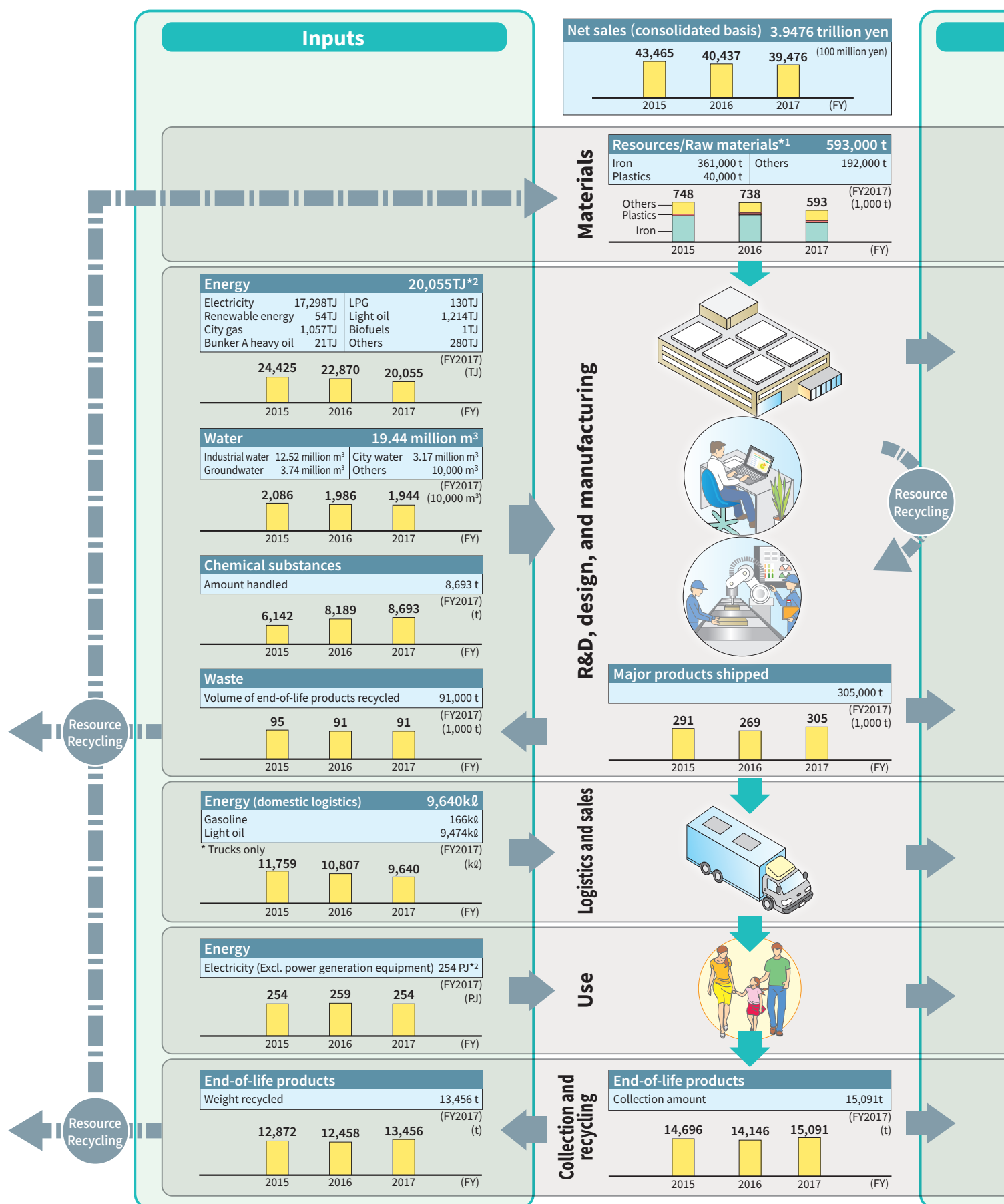
During the transportation stage, in addition to taking various energy and CO<sub>2</sub> reduction measures including improving load factors, applying modal shifts to a wider range of products, and shortening the transport distance by restructuring distribution centers, we are continuously taking 3Rs initiatives for packaging materials.

We realized that environmental impacts are most significant during the use of products and services in the product life cycle. Under the Sixth Environmental Action Plan, we set "Reductions in CO<sub>2</sub> emissions by eco-products" as a KPI and are making efforts 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 society from both the energy supply side and the energy consumption side, we also set two KPIs, for the supply side and the consumption side.

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

Achieving an overview of environmental impacts is absolutely essential for the planning of goals and measures to take. 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 making progress by expanding the target items for data collection and strive to improve the accuracy of the data.

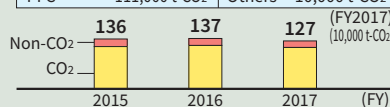
# Overview of Environmental Impacts



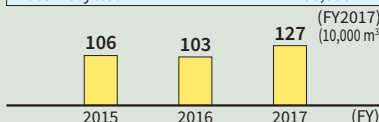
\*<sup>1</sup> Material inputs are calculated based on the Estimation Method for Material Inputs Using Input-Output Table (EMIOT), a method independently developed by Toshiba Group ("EMIOT": Estimation method for Material-inputs using Input-Output Table). EMIOT uses ratios of resources used per unit 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.

## Emissions

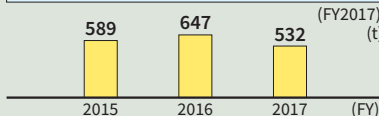
Total GHGs*3		1.27 million t-CO <sub>2</sub>
CO <sub>2</sub>	1.09 million t-CO <sub>2</sub>	-SF <sub>6</sub> 46,000 t-CO <sub>2</sub>
Non-CO <sub>2</sub>	178,000 t-CO <sub>2</sub>	-HFC 14,000 t-CO <sub>2</sub>
-PFC	111,000 t-CO <sub>2</sub>	-Others 10,000 t-CO <sub>2</sub>



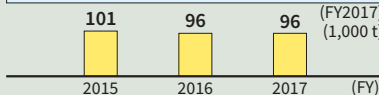
Water reused and recycled		1.27 million m <sup>3</sup>
Water reused	870,000 m <sup>3</sup>	
Water recycled	400,000 m <sup>3</sup>	



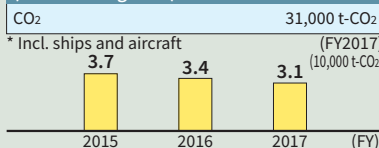
Chemical substances (atmosphere)		532 t
Amount released		



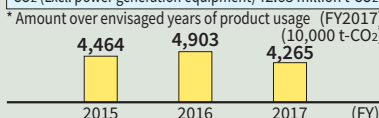
Waste		96,000 t
Waste generated		



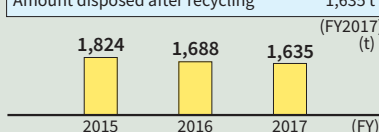
GHGs from transport (domestic logistics)		31,000 t-CO <sub>2</sub>
CO <sub>2</sub>		



Greenhouse gas emissions		42.65 million t-CO <sub>2</sub>
CO <sub>2</sub> (Excl. power generation equipment)		

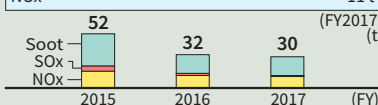


End-of-life products		1,635 t
Amount disposed after recycling		



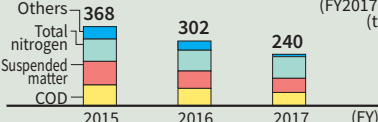
## Emissions to the atmosphere

Soot	18 t
SOx	1 t
NOx	11 t



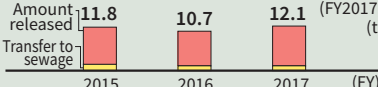
## Emissions to the hydrosphere

Total wastewater	15.66 million m <sup>3</sup>	Total nitrogen	101 t
COD	62 t	Others	11 t
Suspended matter	66 t		

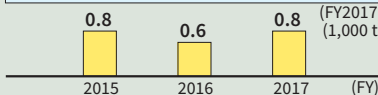


## Chemical substances\*4 (hydrosphere)

Amount released	10.8 t
Transfer to sewage	1.3 t

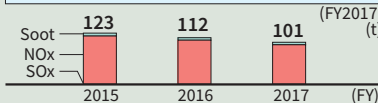


Waste		800 t
Final disposal volume		

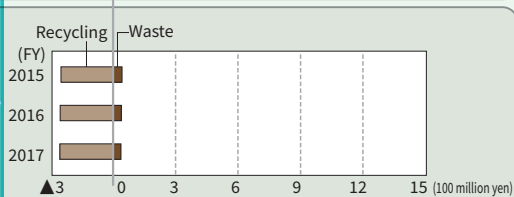
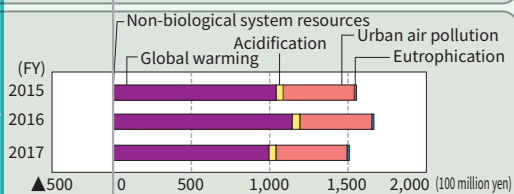
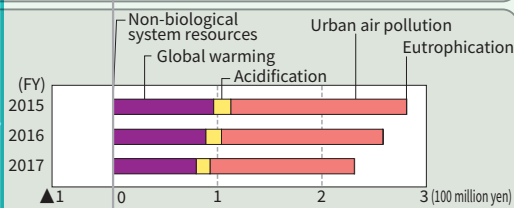
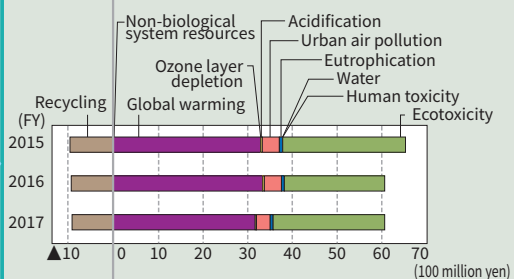
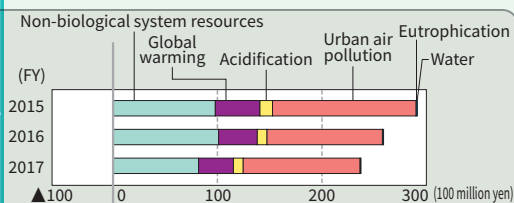


## Emissions to atmosphere during transport

SOx	0.2 t
NOx	95 t
Soot	6 t



## Environmental impacts (Overall evaluation)



\*2 TJ = 10<sup>12</sup> J; PJ = 10<sup>15</sup> 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 CO<sub>2</sub> emission coefficient for electricity in Japan is 5.31 t CO<sub>2</sub>/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.

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

## Major Results for FY2017

<b>Mitigation of Climate Change</b>	• Total GHG emissions: <b>1.27</b> million t-CO <sub>2</sub>
<b>Efficient Use of Resources</b>	<ul style="list-style-type: none"> <li>• Waste volume: <b>37,000</b> tons</li> <li>• Amount of water received per unit production (Compared to FY2013 level): <b>89%</b></li> </ul>
<b>Management of Chemicals</b>	• Total amount of chemicals discharged per unit production (Compared to FY2013 level): <b>79%</b>

### 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.

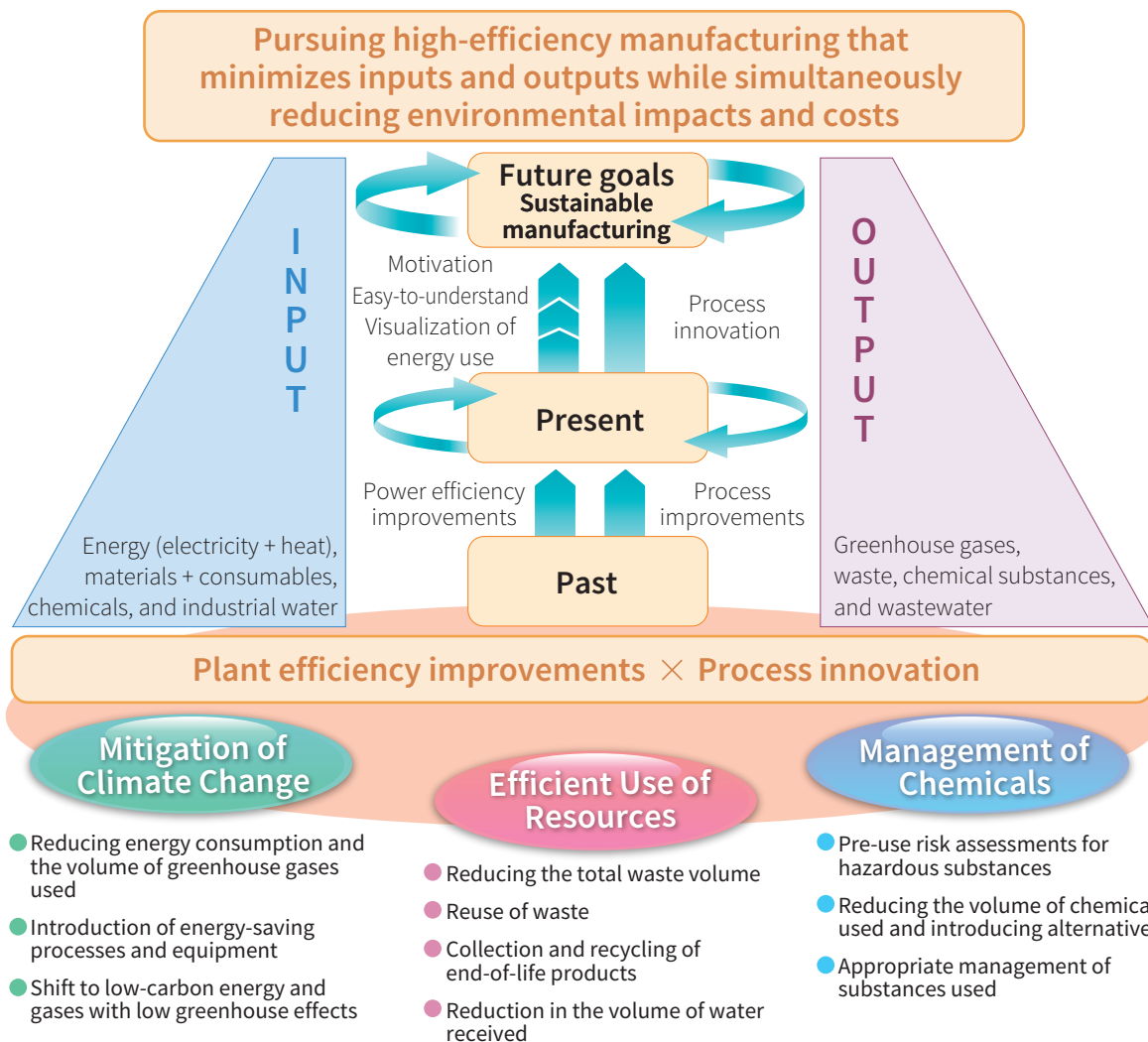
We aim to contribute to resolving climate change and other environmental issues by promoting the following two initiatives: "improvement of plant efficiency," which refers to efforts to grasp energy consumption appropriately in order to ensure effective improvement of equipment operation and introduce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

tion," 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 CO<sub>2</sub> 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

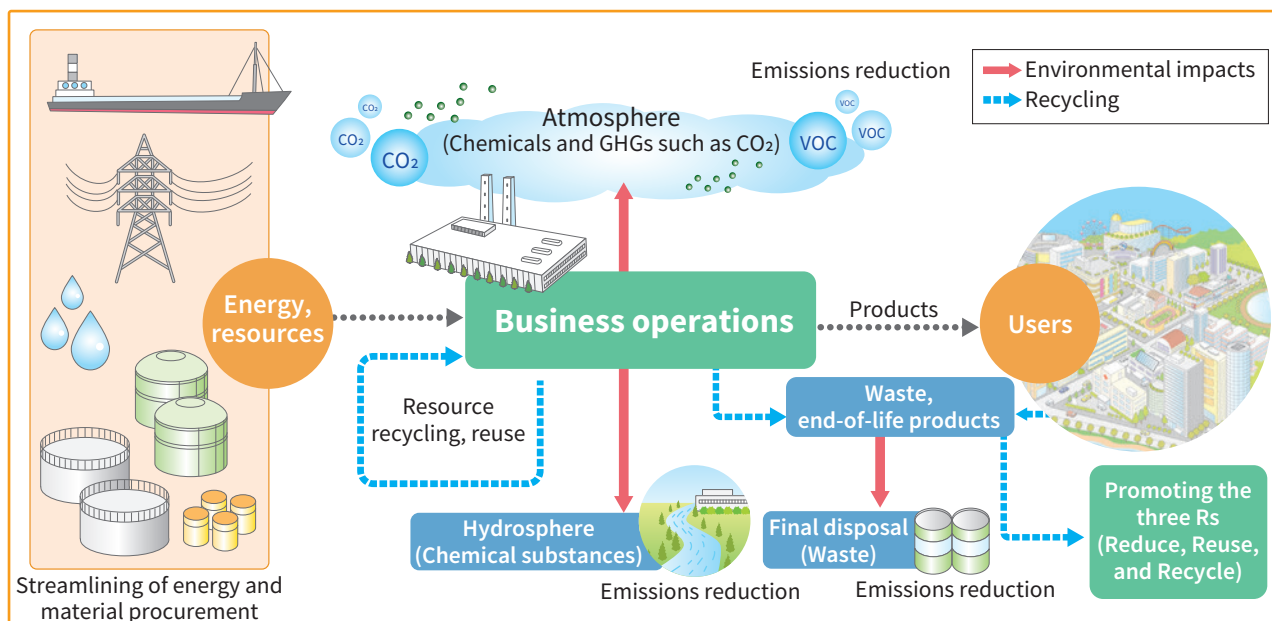
Vision and Strategies

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 hexafluoride (SF<sub>6</sub>), 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 CO<sub>2</sub> 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 (CO<sub>2</sub>), methane (CH<sub>4</sub>), dinitrogen oxide (N<sub>2</sub>O) (= nitrous oxide), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF<sub>6</sub>), and nitrogen trifluoride (NF<sub>3</sub>)

### ●Results of FY2017

Toshiba Group is working to reduce GHG emissions other than energy-derived CO<sub>2</sub> emissions mainly by installing PFC removal equipment and due to this effort emissions have remained almost constant since FY2010. Meanwhile, energy-derived CO<sub>2</sub> emissions were affected by deterioration in the CO<sub>2</sub> 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

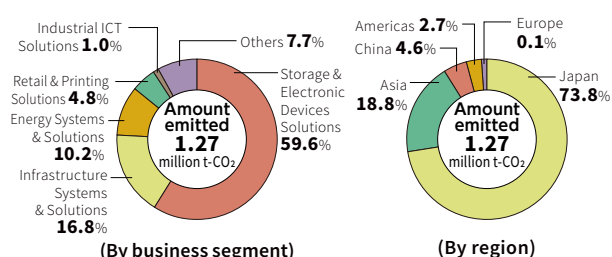
The CO<sub>2</sub> emission coefficient for electricity will continue trending higher in the future, but Toshiba Group will continue to make steady efforts to reduce total GHG emissions by investing proactively in high-efficiency equipment. The Group's goal is to reduce total GHG emissions to 1.66 million tons or less by FY2020.

### ■ Total GHG emissions

FY2017 target	FY2017 result	FY2018 target	FY2020 (Final fiscal year) goal
1.46 million tons	<b>1.27 million tons</b>	1.54 million tons	1.66 million tons

Note: The power receiving end coefficient (in Japan: 5.31t-CO<sub>2</sub>/10,000kWh) is used as the CO<sub>2</sub> emission coefficient for electricity in the calculation of CO<sub>2</sub> emissions. Overseas electricity is based on the GHG Protocol data.

### ■ Breakdown of total GHG emissions (FY2017)



## Reducing energy-derived CO<sub>2</sub> emissions

### ●Results of FY2017

In FY2017, energy-derived CO<sub>2</sub> emissions amounted to 1.09 million tons. 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 CO<sub>2</sub> emissions per unit activity to 97.8% of the FY2013 level, exceeding the initial target by 0.2 percentage points.

### ●Future initiatives

In order to meet growing market demand, Toshiba Group plans to introduce more facilities. Therefore, energy-derived CO<sub>2</sub> emissions are likely to increase in the near future. The Group will continue its efforts to reduce CO<sub>2</sub> 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.

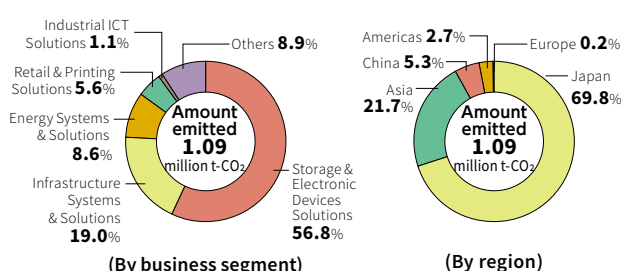
### ■ Energy-derived CO<sub>2</sub> emissions and those per unit activity

	FY2013 (Benchmark year) result	FY2017 target	FY2017 result	FY2018 target	FY2020 (Final fiscal year) goal
Amount emitted	1.18 million tons	—	<b>1.09 million tons</b>	—	—
Per unit activity*	100%	98%	<b>97.8%</b>	96%	92%

Note: The power receiving end coefficient (in Japan: 5.31t-CO<sub>2</sub>/10,000kWh) is used as the CO<sub>2</sub> emission coefficient for electricity in the calculation of CO<sub>2</sub> 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 CO<sub>2</sub> emissions (FY2017)



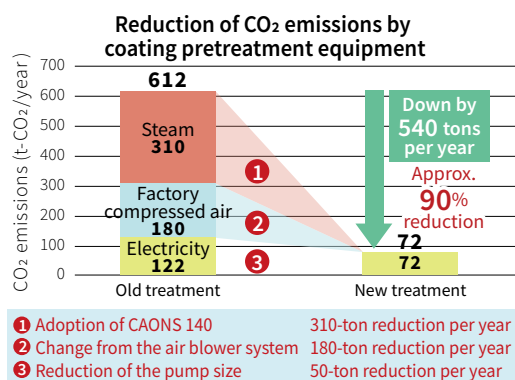
Case  
1

## Introduction of a circular heating heat pump for compressor coating pretreatment

Toshiba Carrier Corporation

In our pretreatment process for coating of compressor line, we apply degreasing and chemical conversion coating\* as a treatment for the coating surface. In these degreasing and chemical conversion coatings, the degreasing liquid and chemical treatment liquid must be used after heating. Previously, we utilized steam generated from a factory boiler by the heat source. By installing our "CAONS 140 circulated heating heat pump system" to convert the heat source and discontinue the use of steam, we succeeded in reducing CO<sub>2</sub> emissions by 310 tons per year. By also introducing various energy-saving measures, we succeeded in achieving a reduction of CO<sub>2</sub> emissions by 540 tons per year for the entire coating pretreatment.

\* Treatment to form a coating film on the surface of the material by chemical reaction



CAONS140

Case  
2

## Energy-saving for air conditioning equipment in semiconductor clean rooms

[Refer to page 19](#)

# 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 FY2017

The volume of waste (excluding that of objects with value) totaled 37,000 tons, which is 8,000 tons lower than the initial target. The total volume of waste generated per unit production was 86% compared to that of FY2013, achieving the initial target.

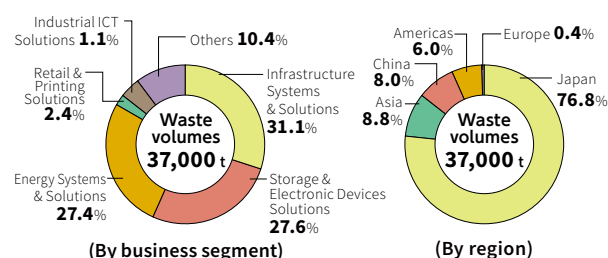
### ●Future initiatives

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 target	FY2017 result	FY2018 target	FY2020 (Final fiscal year) goal
Waste volume	—	45,000 tons	37,000 tons	48,000 tons	52,000 tons
Total waste volume	108,000 tons	—	96,000 tons	—	—
Total waste volume per unit production	100%	99%	86%	98%	96%

### ■ Breakdown of the waste volume (FY2017)



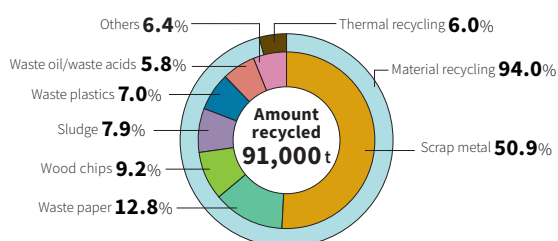


# Efficient Use of Resources

## Promoting recycling

In FY2017, Toshiba Group recycled 91,000 tons of resources. 95% 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 94% of them were used effectively for material recycling (recycled into materials for products), and the remaining 6% 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 (FY2017)



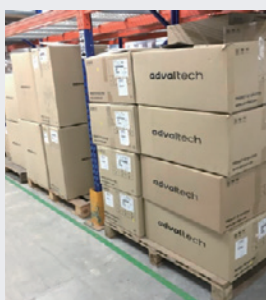
### Case 1

#### Wooden pallet reduction project

TOSHIBA TEC SINGAPORE PTE LTD

At TOSHIBA TEC SINGAPORE PTE LTD, reducing wooden pallets that had been disposed of as waste was an issue for concern. Previously, parts for printer manufacturing delivered from suppliers were packaged in cardboard boxes and stacked on wooden pallets, and such pallets that were no longer necessary after shipment were disposed of as waste. Therefore, TOSHIBA TEC SINGAPORE created platform trucks that can be reused as alternatives to wooden pallets and requested suppliers to continuously use these platform trucks for delivery. As a result of this improvement, the company reduced the waste volume of wooden pallets by approximately 10 tons per year. This activity was also recognized elsewhere and received the Distinction Award and Gold Award in the FY2016 Singapore Packaging Agreement Award.

Before



After



## 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 FY2017

The total amount of water received in FY2017 was 19.4 million m<sup>3</sup> and the amount of water received per unit production was 89% of the total for FY2013, exceeding the initial target by 10 percentage points.

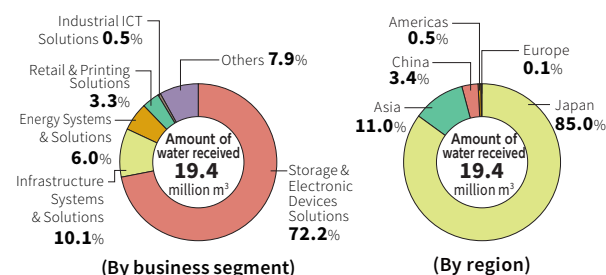
### Future initiatives

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 target	FY2017 result	FY2018 target	FY2020 (Final fiscal year) goal
Amount of water received	21.2 million m <sup>3</sup>	—	19.4 million m <sup>3</sup>	—	—
Per unit production	100%	99%	89%	98%	96%

### Breakdown of the amount of water received (FY2017)



### Case 2

#### Environmental Impact Reduction Measures at Toshiba Subsidiaries in India

[Refer to page 16](#)

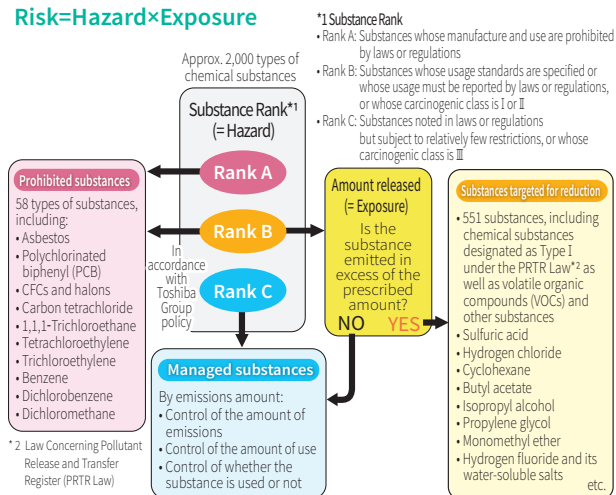
# Management of Chemicals

## 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 approximately

80% of the total emissions of such substances, and by region, approximately 80% of such emissions originate from Japan.

### Results of FY2017

In FY2017, 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, starting operation of combustion detoxifying devices, and improving powder coating and other 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 128 tons (19%) compared to the 2013 level. The amount of chemical substance emissions per unit production was 79% of the FY2013 level and we therefore achieved our target.

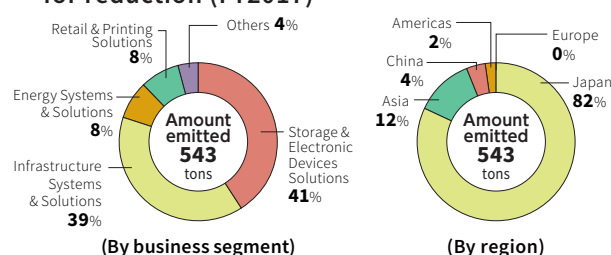
### Future initiatives

In the Sixth Environmental Action Plan, Toshiba Group aims to reduce emissions from 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 target	FY2017 result	FY2018 target	FY2020 (Final fiscal year) goal
Amount emitted	671 tons	—	543 tons	—	—
Per unit production	100%	99%	79%	98%	96%

### Breakdown of emissions of substances targeted for reduction (FY2017)



### Case

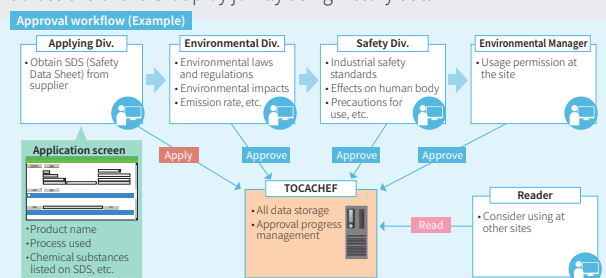
## Global deployment of a chemical substance management system used in the manufacturing processes


Today, regulations on chemical substances are being made stricter in Japan and around the world and chemical substances used in manufacturing processes are required to be managed speedily and meticulously. We have therefore developed "TOCACHEF\*1" to reliably deal with the increase in regulated substances and improve efficiency in reporting to the administration in compliance with laws such as PRTR Law. The system provides an electronic approval workflow feature to circulate applications for registration of a material within our company's internal departments concerned, which allows them to conduct and record assessments of such an application. Also, by registering all the chemical substances contained in the materials, the system allows you to automatically count and manage the amounts of such substances that are being used and transferred.

\*1 TOCACHEF: Toshiba Carrier Chemical Control system for Future

### Toshiba Carrier Corporation

The operation of this system has commenced at Toshiba Carrier Group manufacturing sites in China and Thailand as well as Japan, and we are trying to minimize environmental and safety risks and sharing materials across the entire Group by jointly using history data.





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

## Major Results for FY2017

### Mitigation of Climate Change

- Reduction of CO<sub>2</sub> emissions through products and services associated with power supply : **9 million t-CO<sub>2</sub>**
- Reduction of CO<sub>2</sub> emissions through products and services associated with power consumption: **1.86 million t-CO<sub>2</sub>**

### Efficient Use of Resources

- Amount of resources saved for products: **99,800 tons**
- Amount of recycled plastics used for products: **851 tons**

### Management of Chemicals

- Completed replacement of four phthalates used in **hard disks and POS systems** with alternatives

## Basic approach

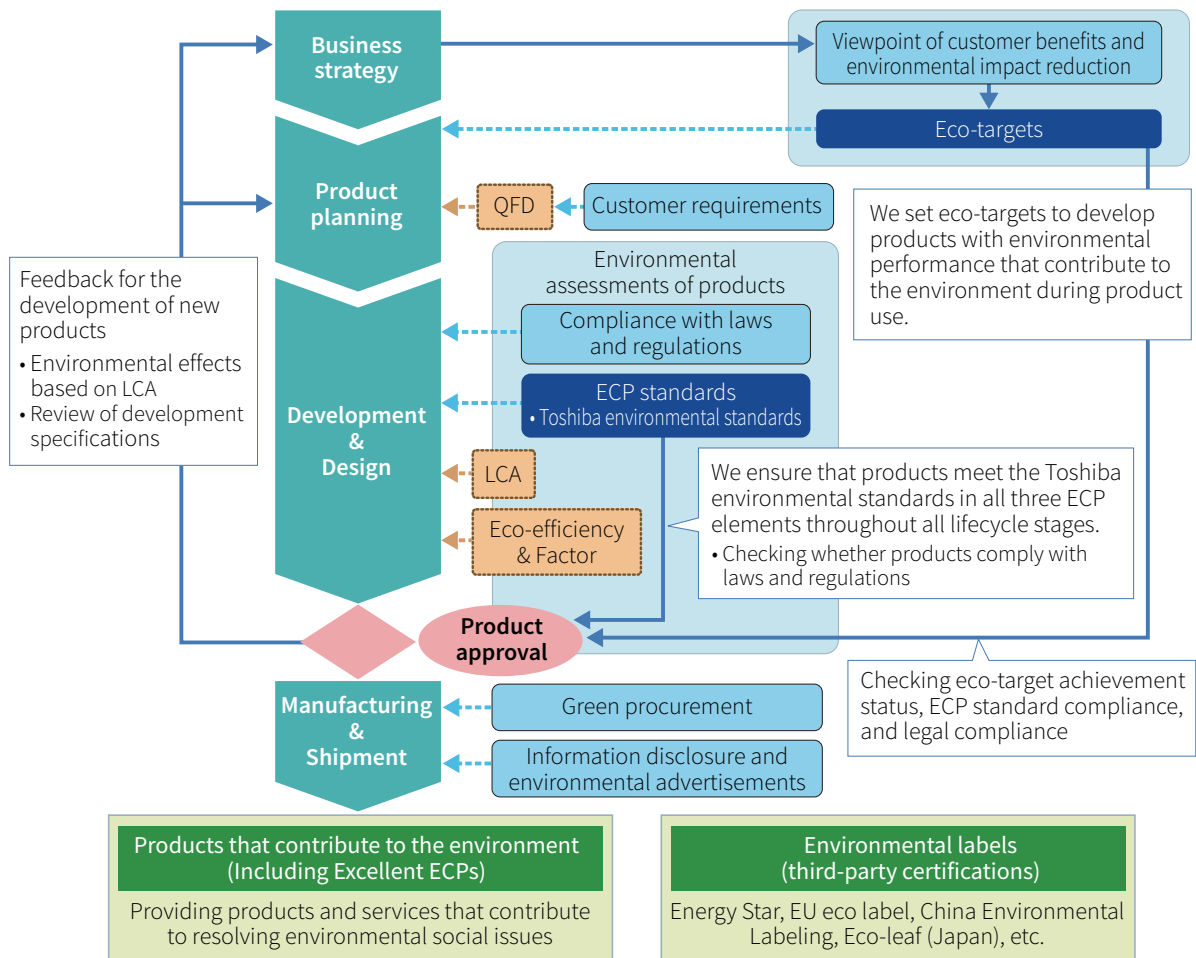
Toshiba Group aims to contribute to resolving climate change and other environmental issues by continuing to improve the environmental performance of all products and services that we develop.

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.

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.

### ■ Process of creating Excellent ECPs



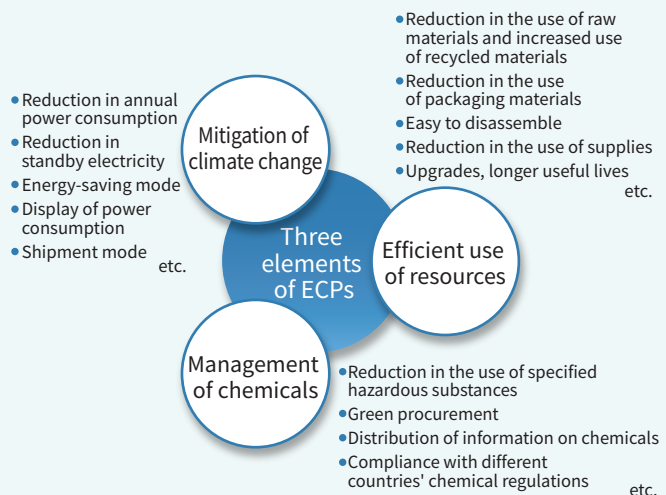
## Toshiba Environmental Standards

### - Assessment based on the three elements of ECPs -

Environmentally Conscious Products (ECPs) are designed to minimize environmental impacts throughout all stages of their lifecycles, including during procurement of materials, manufacture, distribution, use, disposal, and recycling.

ECPs have three elements: mitigation of climate change, efficient use of resources, and management of chemicals. Toshiba Group sets its own environmental standards (ECP standards) for each product model to assess overall environmental performance, which includes all three of these elements. Environmental assessments are performed during development of every product to check not only whether the product complies with laws and regulations but also to check whether the product meets the ECP standards.

### ■ Three elements of ECPs



# 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 GHG 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 GHG 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 FY2017

We reduced emissions by 10.86 million tons in terms of combined "Power supply" and "Power consumption."

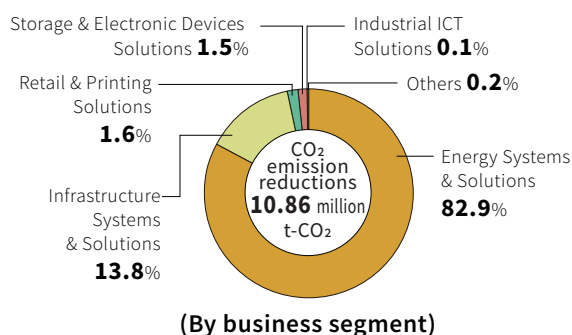
#### (1) Results achieved by eco-products (Power supply)

Although sales in energy-related businesses did not increase as much as initially expected, we succeeded in reducing CO<sub>2</sub> emissions by 9 million tons.

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

We developed and provided products and services worldwide by setting eco-targets for mitigation of climate change, thereby reducing CO<sub>2</sub> emissions by 1.86 million tons in FY2017, exceeding our original target.

### ■ Breakdown of reductions in CO<sub>2</sub> emissions by business segment (FY2017)



### ●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 CO<sub>2</sub> emissions.

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

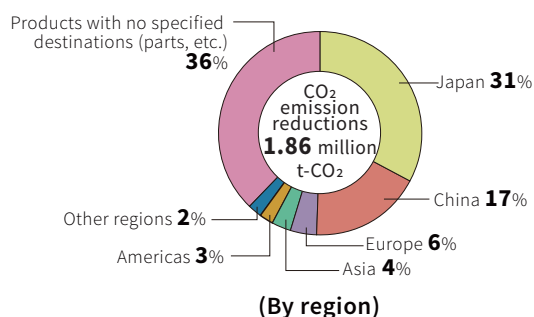
### ■ Reductions in CO<sub>2</sub> emission by eco-products (Power supply)

FY2017 target	FY2017 result	FY2018 target	FY2020 goal
9.6 million t-CO <sub>2</sub>	<b>9 million t-CO<sub>2</sub></b>	12.9 million t-CO <sub>2</sub>	16.3 million t-CO <sub>2</sub>

### ■ Reductions in CO<sub>2</sub> emission by eco-products (Power consumption)

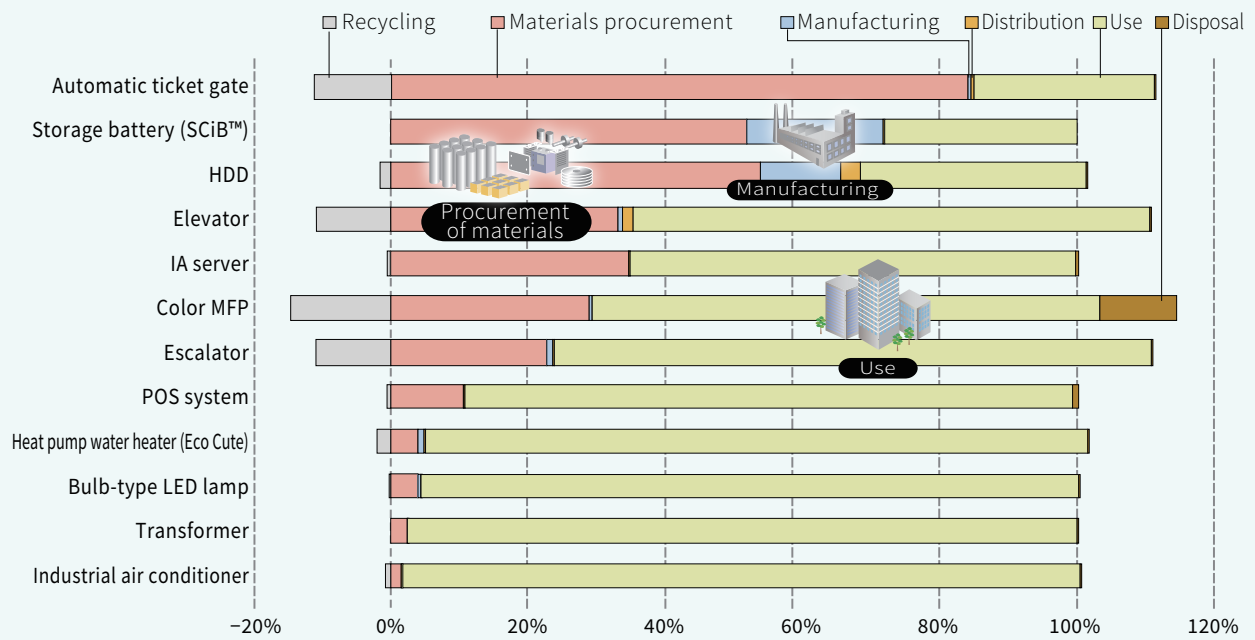
FY2017 target	FY2017 result	FY2018 target	FY2020 goal
1.7 million t-CO <sub>2</sub>	<b>1.86 million t-CO<sub>2</sub></b>	3.4 million t-CO <sub>2</sub>	6.3 million t-CO <sub>2</sub>

### ■ Breakdown of reductions in CO<sub>2</sub> emissions by eco-products (Power consumption) by region (FY2017)





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



Special Feature

Vision and Strategies

Business - Manufacturing

Business - Products / Services

Management

# 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 supply of power as well as to mitigate climate change.

#### ■ Main power source

Currently, approximately 80% of the world's power is produced by thermal power generation with fossil fuels. Toshiba Group aims to achieve its goal of zero-emissions by employing a variety of thermal power technologies, including Advanced Ultra Super Critical (A-USC<sup>\*1</sup>) coal-fired power generation, which enables a significant increase in efficiency; high-efficiency gas combined-cycle power generation; technologies for separating and collecting CO<sub>2</sub> (CCS<sup>\*2</sup>) from emissions caused by thermal power generation; and super critical CO<sub>2</sub> cycle power generation, which facilitates generating power and capturing CO<sub>2</sub>.

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 further improve the safety of nuclear power plants, we will

continue ongoing efforts to develop a reactor core material that can reduce the amount of hydrogen in the event of a major accident as well as to protect against cyber attacks.

With regard to hydroelectric power generation, Toshiba Group has developed a technology that improves water runner efficiency by applying Computational Fluid Dynamics (CFD<sup>\*3</sup>) and also successfully increased output by renovating aged turbine facilities. Furthermore, we are also working to promote the introduction of renewable energy devices 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 CO<sub>2</sub> emissions.

Case  
1

### Geothermal power generation system

[Refer to page 08](#)

### ● Storing power

#### — Contributing to climate change mitigation with power storage technologies —

The amount of power generated by renewable energy varies with the weather, so generating power with renewable energy is an unstable power generation method. Expanding the use of this method requires controlling sharp output fluctuations and achieving load leveling through peak shifts by charging batteries at night when demand is low and discharging electricity during the day when demand peaks. 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.

\*1 A-USC: Advanced-Ultra Super Critical

\*2 CCS: Carbon Dioxide Capture and Storage

\*3 CFD: Computational Fluid Dynamics

### Contributions by products and services associated with power consumption

With regard to product groups such as air conditioners and LED lights for which CO<sub>2</sub> emissions during use account for the largest percentage of emissions generated throughout product lifecycles, improving energy-saving performance leads to significant reductions in CO<sub>2</sub> emissions. Toshiba Group helps reduce CO<sub>2</sub> emissions by developing and providing advanced energy-saving technologies.

#### Case 2 Locomotive and freight transportation system supporting modal shift

[Refer to page 09](#)

#### Case 3 Lazona Kawasaki Toshiba Building Smart Community Center

[Refer to page 13](#)

#### Case 4 High-efficiency air-cooled heat pump chiller

[Refer to page 20](#)

#### Case 5 LED light bulb with GaN power device and high output capacity LED floodlight realized by an innovative technology

[Refer to page 20](#)

# 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

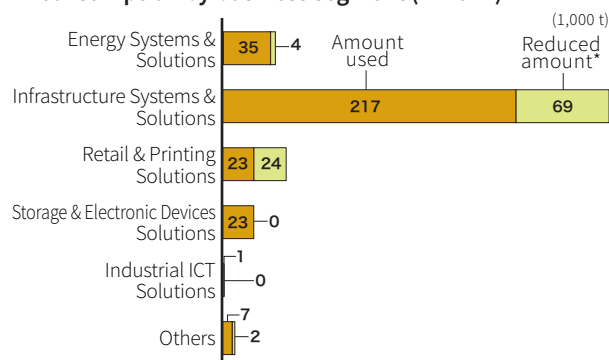
### ●Results of FY2017

Under the Sixth Environmental Action Plan, we aim to reduce resource consumption by a cumulative total of 460,000 tons by FY2020. In FY2017, 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 300,000 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 99,800 tons compared to previous product models, thus nearly achieving the planned amount of 100,000 tons for FY2017.

### ■ Amount of resources saved (cumulative total)

FY2017 target	FY2017 result	FY2018 target	FY2020 goal
100,000 t	<b>99,800 t</b>	180,000 t	460,000 t

### ■ Amount of resources used and reductions in resource consumption by business segment (FY2017)



\* Calculated by comparison with the previous product models adjusting for the expected number of years of use

### ●Future initiatives

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



## Increasing the Use of Recycled Plastics

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

### ●Results of FY2017

The use of recycled plastics by Toshiba Group is increasing mainly in multi-function printers and industrial air conditioners. In FY2017, the amount of recycled plastics used was 851 tons, exceeding the initial target (740 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 target	FY2017 result	FY2018 target	FY2020 goal
740 t	<b>851 t</b>	1,500 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 Electric and Electronic Equipment (WEEE) in Europe\*<sup>1</sup> 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.

\*1 The WEEE Directive is a directive of the European Union concerning waste electrical and electronic equipment.

## Case 1 Magnet-less synchronous reluctance motor

Toshiba Industrial Products and Systems Corporation

As the global demand for energy increases, there are ever stronger demands to increase energy efficiency in industrial motors. The performance of high efficiency motors generally depends on the neodymium magnet, which is a magnetic material and a type of permanent magnet. Dysprosium which is the rare earth element (heavy rare earth element), to be added to the magnet, is unevenly distributed throughout our planet and present only in extremely small amounts so making efforts to reduce consumption is very important.

Toshiba Industrial Products and Systems Corporation therefore developed a magnet-less synchronous reluctance motor with excellent resource-saving capability that does not use any aluminum conductor or permanent magnet (which is a rare earth metal) since it instead utilizes a rotor composed of an iron core with a slit-like gap called a flux barrier\*<sup>1</sup>. By also making the most of the reluctance torque\*<sup>2</sup> through an optimized flux barrier, the motor achieves high efficiency equivalent to IE5\*<sup>3</sup>.

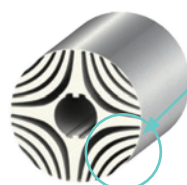
\*1 Currently, a prototype has been developed (as of September 2018).

\*2 A torque generated by a (magnetic) reluctance.

\*3 The highest level of efficiency defined in the motor energy efficiency guideline in Annex A of the international standard IEC60034-30-1.



Magnet-less synchronous reluctance motor (prototype)



Rotor construction

### Flux barrier (gap)

Only magnetic steel sheets are used as rotor materials

## Case 2 Paper reuse system Loops

[Refer to page 14](#)



# Management of Chemicals

## Initiatives for management of chemicals contained in Toshiba Group's 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<sup>\*1</sup>) 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.

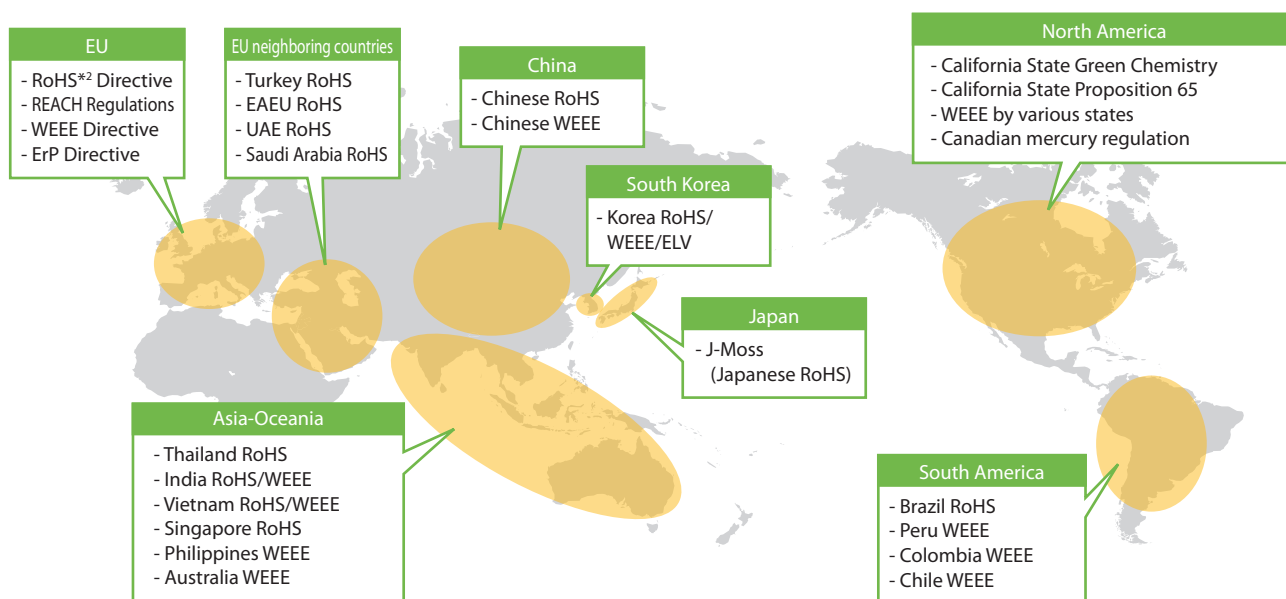
Furthermore, to promote the Green Procurement initiative, Toshiba Group has specified "prohibited substances," whose presence is prohibited in procurement items, including product materials and parts, and "managed substances," whose environmental impact should be reduced, based on their actual usage, 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 impact.

## Toshiba Group Environment-related Substance List

Category	Definition
<b>Rank A</b> (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.
<b>Rank B</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



<sup>\*1</sup> WSSD: World Summit on Sustainable Development

<sup>\*2</sup> RoHS: Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment

## Promoting use of alternatives to the four phthalates\*<sup>3</sup>

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 on June 4, 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 will be regulated for electrical and electronic equipment sold in EU countries' markets after July 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)\*<sup>4</sup>.

### ●Results of FY2017

We have completed replacement of hard disks and POS systems with alternatives. We have already started shipping alternative products for POS systems.

### ●Future initiatives

We will continue to investigate and take necessary action with the aim of completing replacement with alternatives for all products (product groups) by July 2019\*<sup>4</sup>. We will first take action needed for MFP and air conditioners, and then from FY2019 onward we will further replace or take other actions for energy and social infrastructure products as well.

\*3 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.

\*4 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

## Development of a simplified screening method for phthalates

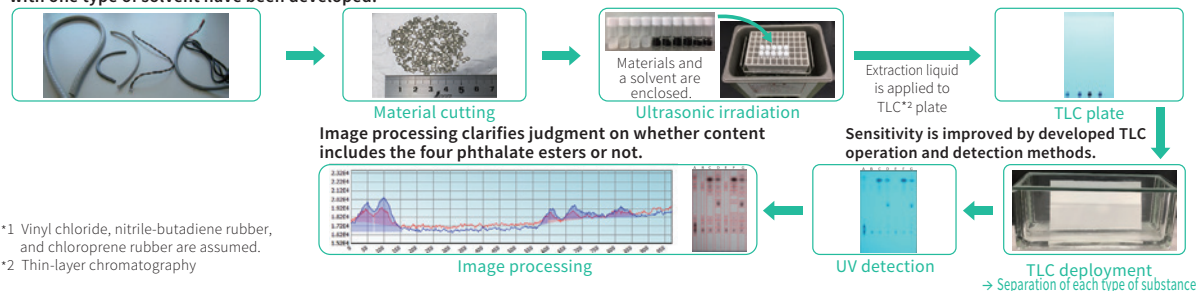
Toshiba Corporation Corporate Research & Development Center

In order to manage the use of the four phthalates which will be subject to regulation in EU from July 2019, a simplified screening method for phthalates is needed for the acceptance inspection and quality control in manufacturing processes.

However, phthalates are made up of carbon and hydrogen, which makes it difficult to perform nondestructive inspection through the X-ray fluorescence analysis as performed so far for products regulated by the RoHS Directive. Complex analysis and evaluation methods were thus employed for phthalates which also required expensive analytical equipment and the engineers with high skill. We therefore investigated a simplified screening method that reduces the initial introduction costs and running costs and can also be implemented at factory and manufacturing sites. As a result, we have developed a method to easily and accurately evaluate the four phthalates at about 1/70 to 1/100 of the introduction costs required up to now.

In the future, we will apply our method to management of the four phthalates within Toshiba Group and also provide support to other companies requiring similar substance management. We will work to expand the scope of application of this simplified screening method so that it will gain recognition as an international standard method.

Conditions that can easily be extracted from high risk materials\*<sup>1</sup> with one type of solvent have been developed.



## Chapter 4 Management

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

### Major Results for FY2017

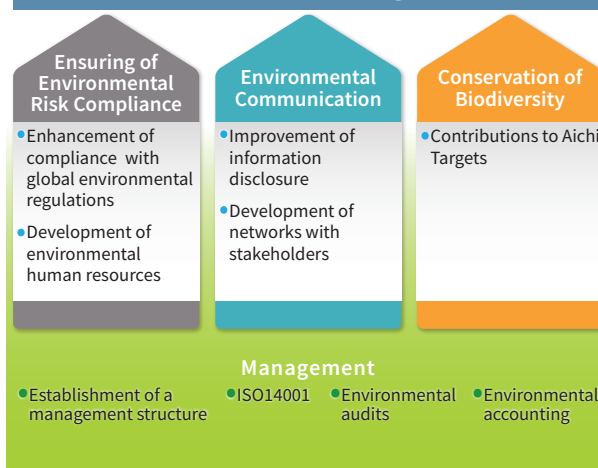
<b>Environmental Management Structure</b>	<ul style="list-style-type: none"> <li>• Number of audits (cumulative): <b>4,800</b></li> </ul>
<b>Environmental Risks and Compliance</b>	<ul style="list-style-type: none"> <li>• Number of legal violations related to environment: <b>0</b></li> <li>• <b>Enhancement of compliance with global environmental regulations, environmental human resource development</b></li> </ul>
<b>Environmental Communication</b>	<ul style="list-style-type: none"> <li>• Toshiba Group Environmental Report 2017 won <b>the award of merit in the Environmental Communication Awards</b></li> <li>• The 26th <b>Toshiba Group Environmental Exhibition</b> was held with <b>3,000</b> visitors</li> <li>• <b>Educational programs for elementary schoolchildren</b> was conducted approximately <b>30</b> times</li> <li>• <b>Environmental actions</b>, such as energy-saving events and education, were implemented at our sites worldwide</li> </ul>
<b>Conservation of Biodiversity</b>	<ul style="list-style-type: none"> <li>• <b>Activities to achieve Aichi Targets</b> were carried out at approximately <b>70</b> sites worldwide</li> </ul>

### 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 Management, 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 proactively promote communication with stakeholders and conservation of biodiversity.

### Strengthening the foundation of environmental management



We appreciate your opinions and comments about this report. [Questionnaire for Environmental Report 2018](#)

### ● Results of FY2017 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, we enhanced compliance with global environmental regulations by preparing a system for distributing information on laws and regulations throughout the Group and collecting issues in a timely manner. In addition, we worked to improve programs for environmental human resources development by preparing study sessions on legal compliance for persons responsible for the environment at our sites in China. As a result of these efforts, the number of legal violations in FY2017 turned out to be zero.

To achieve the second goal of promoting environmental communication, we worked to appropriately disclose information. As a result of these efforts, Toshiba Group Environmental Report 2017 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. In Japan, we conducted educational programs for elementary school children at Toshiba Science Museum and peripheral elementary schools for approximately 30 times and held Toshiba Group Environmental Exhibition with nearly 3,000 visitors. At our sites worldwide, we conducted Global Environmental Action program, including energy-saving events

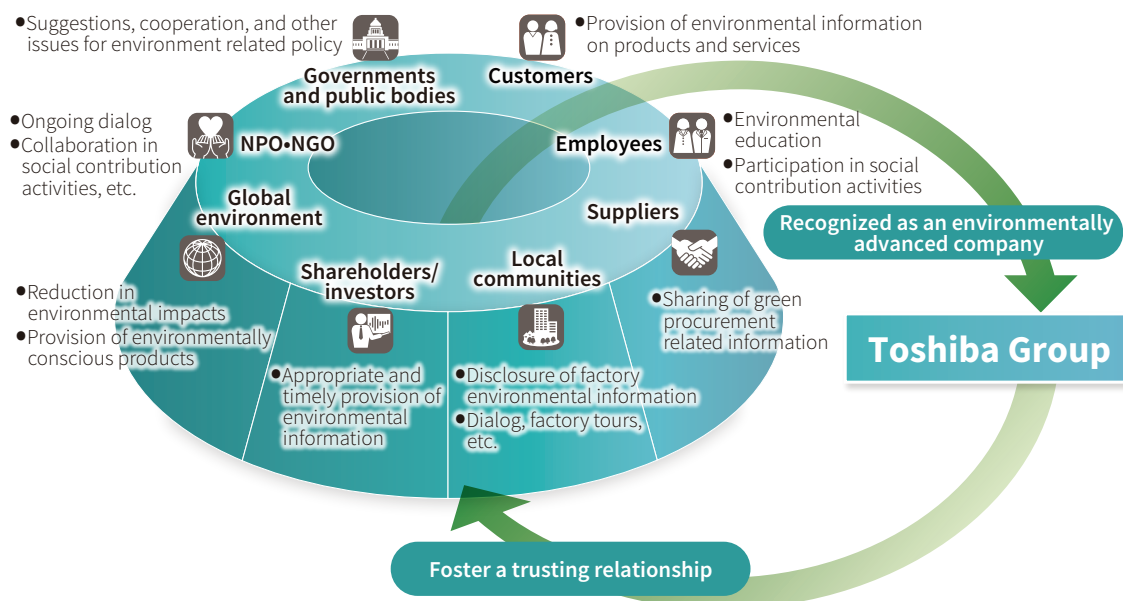
and education activities in Japan, Europe, Americas, Asia, and China.

To achieve the third goal of conserving biodiversity, we set 10 of the 20 Aichi Targets as goals for Toshiba Group and implemented various activities, such as employee enlightenment activities, building ecosystem networks, and protecting rare animal and plant species at our approximately 70 sites around the world.

### ■ Main activities with stakeholders

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

### ■ 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

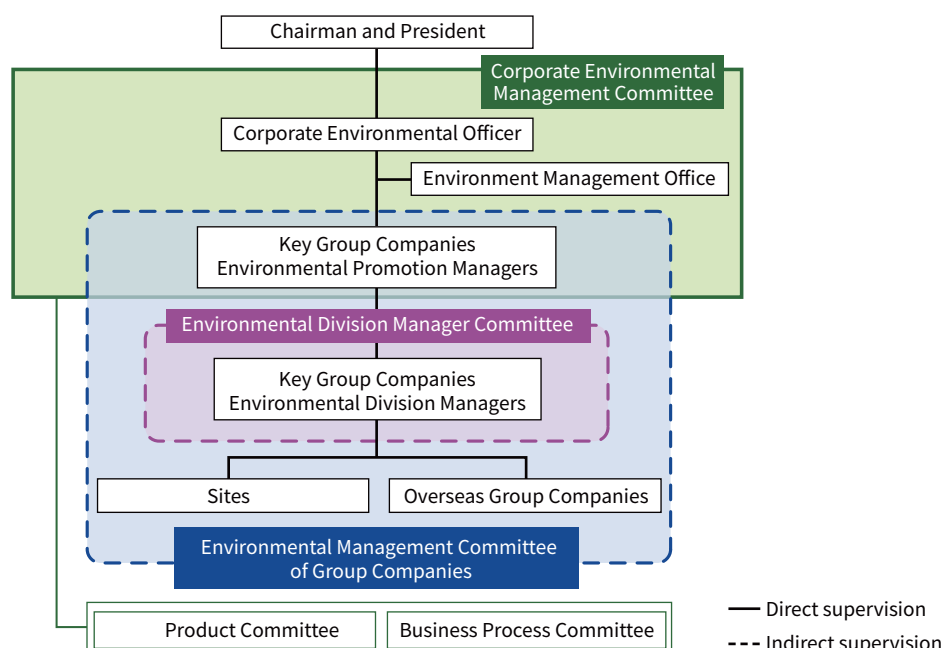
discussed in the Corporate Environmental Management Committee are explained to Directors in a meeting of the Audit Committee held every year and to the Chairman and President in a meeting of the Board of Directors.

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.



Corporate Environmental Management Committee

## ■ 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 and have maintained the certification to this day. In addition, Toshiba Group's 138 sites have obtained ISO 14001 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

	Number of certified sites
Production sites in Japan	54
Non-production sites in Japan	41
Overseas production sites	30
Overseas non-production sites	13
<b>Total</b>	<b>138</b>

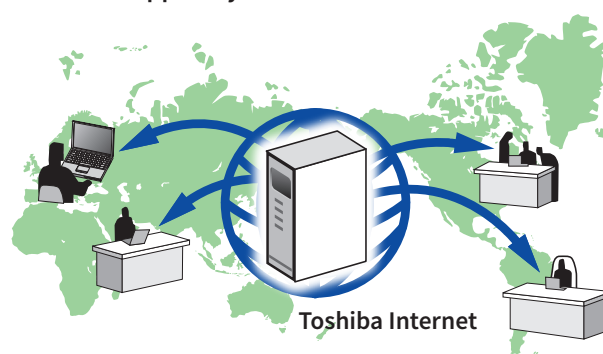
As of June 30, 2018

### 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 (389 companies in FY2017) and is accessible from countries around the world.

### ■ Global support system



# Environmental Management Structure

## Environmental Audits

### ●Toshiba Group's environmental audit system

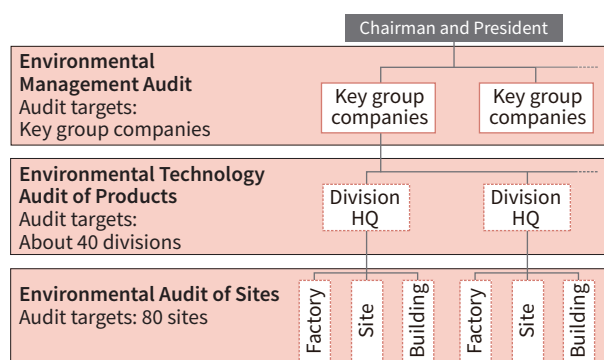
After conducting environmental audits for the first time in 1989, Toshiba Group developed a comprehensive environmental audit system and has been using the system since FY1993 to conduct audits based on standards established by the group. The audit system initially developed was composed of four categories: (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 (FY2017)

#### ■ Environmental management audit

Audit targets: 8 key group companies

No.	Items to be confirmed (Number)	Non-conformance	Good example
1	Environmental policies and systems (14)	3	3
2	Legal compliance and risk management (11)	1	2
3	Business processes (10)	—	2
4	Products and services (11)	1	2
5	Information disclosure and communication (6)	—	2
6	Supply chain management (3) * Added in FY2017	—	1

#### Main non-conformance examples

- Inconsistency between the actual state of environmental management and descriptions in documents
- Unclear responsibilities and authorities of supervisors

#### Main good examples

- Integrated management of relevant environmental laws and regulations and the environmental risk map
- Departments share the results of environmental audits of sites to make improvements

#### ■ Environmental technology audit of products

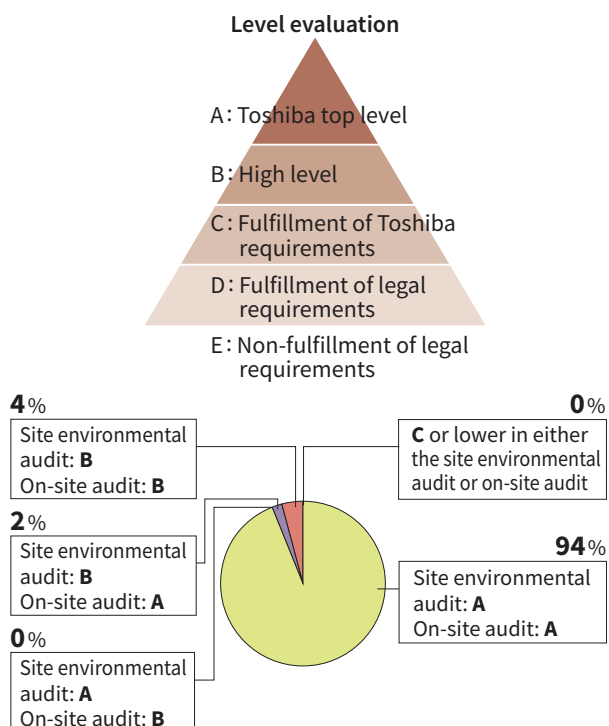
Environmental technology audits of products are intended to improve environmental quality of products and increase contribution to the environment by confirming the level of conformance with ECP\* standards set for each product (group) to ensure the environmental quality of products and the relevant 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

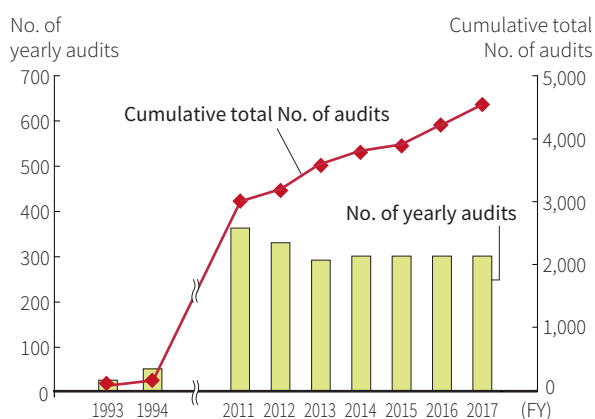
Product area	Main comment
Energy Systems & Solutions	Product development plans that contribute to reducing environmental impacts are becoming clear, and the challenging of 3R initiatives for products is also being promoted. Firm compliance with environmental regulations.
Infrastructure Systems & Solutions	Product development plans that contribute to reducing environmental impacts are becoming clear, and a management structure including the sales division has been created.
Retail & Printing Solutions	Product development plans that contribute to environmentally conscious design are becoming clear, and activities to eliminate signs of non-conformance in planning and design stages are making progress.
Storage & Electronic Devices Solutions	Product development plans that contribute to environmentally conscious design are becoming clear, and a mechanism to secure compliance with laws through to product shipment has been created.
Industrial ICT Solutions	The contribution of products and services is visualized (CO <sub>2</sub> reduction at customers, etc.) 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. We conduct over 300 audits, including self-audits, annually, and the total number of audits conducted since FY1993 exceeds 4,800. We also provide in-house training for auditors who conduct audits.



## ■ Toshiba Group's environmental audit records

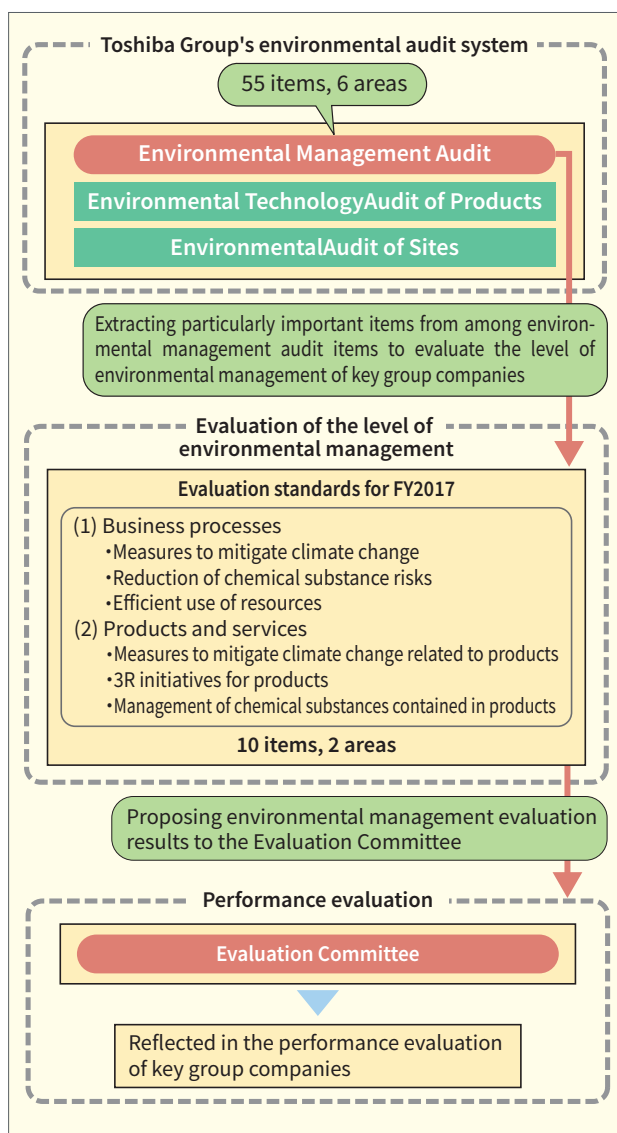


## ● Performance Evaluation System

### 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 55 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 FY2017, 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

<b>Management education</b>	Education for management
<b>General education</b>	e-learning (for all Toshiba Group members)
	Education for new employees
	Education for managers
<b>ISO 14001 education</b>	Education for employees
	Education for managers
	Education for special employees
	Training courses for internal auditors
<b>Specialized education</b>	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 as a general education course 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 FY2017

### ●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 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. Technology auditors are certified through group education and a written examination. In FY2017, 11 employees were certified as site auditors, 2 as technology auditors, and 6 as overseas local auditors. The current number of certified auditors is about 300.

#### Education and written examination (1 day)

#### Chosen as a candidate

#### Practical training

#### Assistance in audits (2 days, twice)

#### Submission of audit reports (twice)

#### Certified as an auditor

### ●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 decreased by 12% from 2016 to 18.7 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 8% from 2016 to 3.8 billion yen.

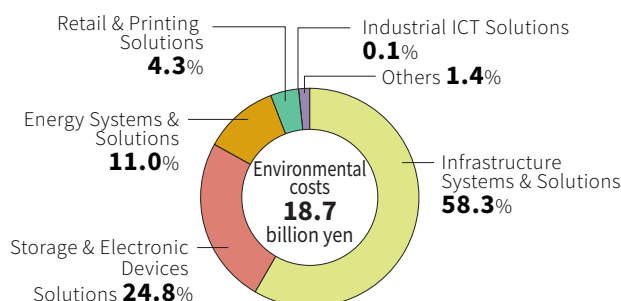
The total amount of environmental benefits was 404.2 billion yen. The breakdown of the total is as follows: actual economic benefits were 7.9 billion yen and assumed economic benefits were 396.3 billion yen.

### ■ Environmental costs (FY2017)

Unit: million yen

Category	Description	Investments	Costs
Business area costs	Reduction in environmental impacts	2,493	5,587
Upstream/downstream costs	Green procurement, recycling, etc.	423	616
Administration costs	Environmental education, EMS maintenance, tree planting on factory grounds, etc.	174	2,716
R&D costs	Development of environmentally conscious products, etc.	687	9,556
Public relations costs	Support for local environmental activities, donations, etc.	10	28
Environmental damage restoration costs	Restoration of polluted soil, etc.	24	177
<b>Total</b>		<b>3,811</b>	<b>18,680</b>

### ■ Breakdown of environmental costs by business segment (FY2017)



### ■ Environmental benefits (FY2017)

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	2,335,791(GJ)	Reductions in electricity charges and waste processing costs compared to the previous year, plus sales of valuables.
		Waste	-12,333,173(t)	
		Water	596,261(m³)	
		Total monetary benefits	7,877	
(B) Assumed benefits	Reductions in environmental impacts measured as a monetary value	Reductions in the amount of chemicals discharged	7,213(t)	396,326
<b>Total monetary benefits</b>			<b>404,203</b>	

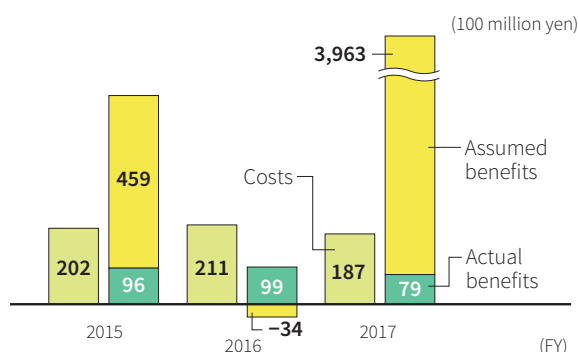
Reductions in environmental impacts for actual and assumed benefits indicate differences between FY2016 and FY2017.

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

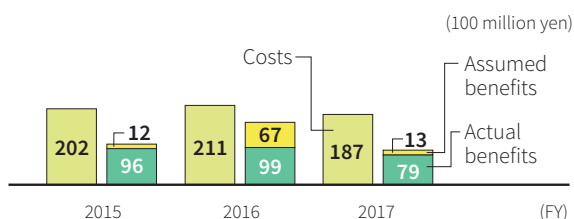


With respect to assumed economic benefits, in light of the major impact of Sigma Power Ariake Co., Ltd., which engages in the thermal power generation business, we also present data on changes in environmental benefits for Toshiba Group after excluding Sigma Power Ariake. We will continue to appropriately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



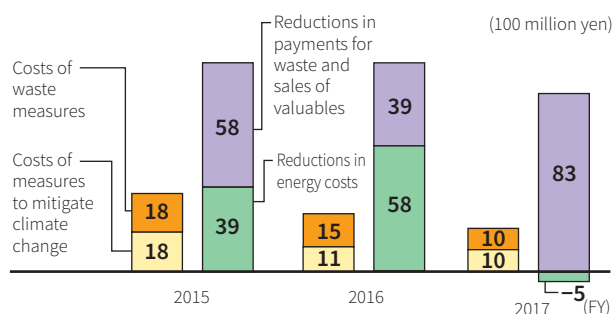
### ● Cost benefits of environmental management measures

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 FY2017, measures to dispose of waste 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



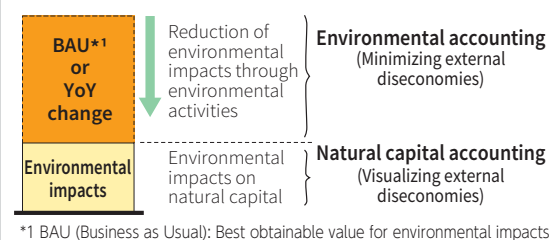
## Natural capital accounting initiatives

Natural capital refers to capital (stock) generated by nature, including forests, soil, water, atmosphere, and biological resources. Flows generated from natural capital can be regarded as ecosystem services. Business activities are realized by many ecosystem services and natural capital accounting is known as a tool to quantitatively analyze impacts and dependency on the natural capital.

Even in the environmental accounting, costs incurred for environmental conservation activities are aggregated and the reduction in environmental impacts achieved as a result of such activities is measured as a monetary value as well as a physical amount. Natural capital accounting on the other hand, is considered as an initiative to visualize the extent of environmental impacts due to business activities (external diseconomies) and grasp dependency on the natural capital. Since FY2009, Toshiba Group has annually published data on environmental impacts throughout entire product life cycles, including supply chains, which we convert into monetary values using the Life-cycle Impact assessment Method based on Endpoint modeling (LIME).

Evaluating business sustainability from an environmental aspect requires analysis of the complex supply chain on a global basis and use of the results for supplier selection as necessary. In addition, there are various options for reducing the dependency on natural capital: use of renewable energy using photovoltaic, hydroelectric, wind, and tidal power, collecting and recycling used products, expansion of circulative resources, and reusing water in our sites. The ecosystem can also be directly restored through biodiversity conservation activities. We will continue to conduct and develop environmental impacts assessments carried out across the entire product life cycles.

### ■ Environmental accounting and natural capital accounting



# 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.

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. As a result of these efforts, the number of legal violations in FY2017 turned out to be zero.

In the area of products and services, in order to enhance compliance with global environmental laws and regulations, we share regulation trends and response policies by collecting and assessing the impacts of legal information around the world in a timely manner while newly establishing and running meeting bodies for distributing such information across Toshiba Group. We have also built up a mechanism to identify issues in each business in such meeting bodies and reflect them in subsequent information collection and impact assessment activities, and we have put it into operation. In the future, while continuing such activities, we will develop human resources who will be responsible for legal compliance through discussions to be made as part of the activities. In the area of manufacturing, in order to develop environmental human resources at production sites, we promoted site management and creation of materials for legal compliance and also prepared study sessions intended for persons responsible for the environment in China where we have many production sites. In the future, we will hold study sessions and have discussions to 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.

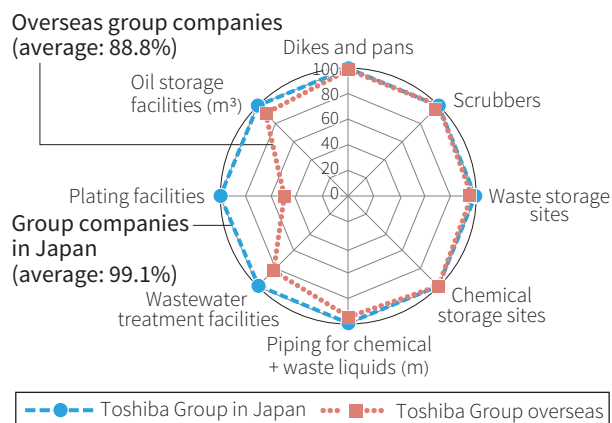
If any environmental risk should materialize, Corporate Environment Management Office works in collaboration with environmental promotion managers and related persons of key group companies and the sites under the direction of the Corporate Environmental Officer to implement appropriate measures, including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

## 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 FY2017, Toshiba Group achieved a compliance rate of 99.1% in Japan and 88.8% 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 (FY2017)



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 2018).

# 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 measures

as stepping up water pumping efforts in other areas with relatively high VOC concentrations. In FY2017, the Group collected 337 kg of VOCs. The amount collected was about 7% 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	43.8
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	122.4
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	75.0
Toshiba Carrier Corporation Tsuyama Factory	Tsuyama, Okayama Prefecture	Purification in progress	A,B	0.1
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	Less than 0.01
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	96.0

\*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 2017 to March 2018

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

## 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 (42 facilities across Japan as of the end of March 2018).

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.

## 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.	<b>Transformers:</b> Analyze oil during maintenance. Formulate plans to upgrade or dispose of devices containing PCB. <b>Condensers:</b> Formulate plans to gradually upgrade fully sealed devices while taking care not to impair business activities. Formulate plans to dispose of devices containing PCB.



PCB-containing equipment being transported to JESCO



## 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 FY2017, due to measures such as facility upgrades, we reduced the amount of specified CFCs to 8.9 tons, a reduction of about 9% compared to the previous year. Our CFC leaks were 456 t-CO<sub>2</sub>, or below 1,000 t-CO<sub>2</sub>, at which level the relevant organization is subject to reporting under the system for reporting and publishing the estimated amount of CFC leaks stipulated in the Fluorocarbons Emissions Control Act. We will continue to further enhance our management of chemicals through routine and periodic inspections as well as environmental audits.



# Environmental Communication

## Educational programs for elementary school children to learn about the environment

As part of our environmental communication initiative, we worked 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 in elementary schools in the Tokyo 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.

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 FY2017, we held two programs titled: "What's on the other side of the power outlet?" (theme: energy) and "The mysterious material which controls electricity" (theme: semiconductor) at the Toshiba Science Museum, in eight elementary schools in the Tokyo area and at two event sites in the Tohoku area. 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.

\*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).



Association of Corporation and Education  
**Shota Wada**

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.

Program  
No.1

### 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.



Program  
No.2

### The Mysterious Material Which Controls Electricity (Theme: Semiconductor)

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 have low adverse impacts on the environment during manufacturing, and got a deeper understanding of the roles of semiconductors in society. We believe this program will also contribute to smooth introduction of programming instruction to be made compulsory in elementary schools starting from FY2020.



## 26th Toshiba Group Environmental Exhibition

On February 1 and 2, 2017, the 26th Toshiba Group Environmental Exhibition was held at Smart Community Center in Kawasaki City. Approximately 3,000 guests visited the exhibition. At this year's exhibition whose theme was "Contribution to Low-Carbon Society," we presented 40 examples of environmentally conscious products and services as well as high efficiency manufacturing technologies in the areas of social infrastructure, energy, electronic devices, and digital solutions which are high priority businesses of Toshiba Group. On the same day, we also held a special tour at the Toshiba Science Museum whose theme was the environment. Customers from a wide range of sectors ranging from companies to government and municipal offices through to research and education institutions and students, visited the exhibition and observed how Toshiba Group companies joined forces to implement activities toward solving social issues. We received many messages from participants such as: "I was surprised to know that Toshiba Group is handling a wide range of products, from electronic devices to various power generators" and "I hope Toshiba Group will publicize and transmit such information on a regular basis."



## Environmental advertisements

We gave a report on the 26th Toshiba Group Environmental Exhibition as a magazine advertisement. In addition to explaining "Toshiba Group's Environmental Management", we introduced the rechargeable battery SCiB™, hydrogen-based autonomous energy supply system H2One™, image recognition processor Visconti™, and next-generation manufacturing solution Meister Series™ along with photographs taken at the exhibition booth as representative products in the Social Infrastructure, Energy, Electronic Device, and Manufacturing zones.



Nikkei ecology (March 2018 issue) issued by Nikkei Business Publications, Inc.



## 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 FY2017 is energy, and each of our site is organizing activities such as energy-saving events and education and light reduction programs. 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 2018 and beyond, we plan to set themes related to issues that stimulate public interest, such as water, 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.

**Waste reduction initiative**  
**TOSHIBA TEC EUROPE IMAGING SYSTEMS S. A. (France)**  
The company holds a training session every year for persons responsible for managing waste within the site, and who visit the contractor which disposes of the company's waste in order to learn the process of waste disposal. These persons who participated in the session gained knowledge about waste disposal and their motivation was increased. They will use the knowledge obtained in the session to ensure waste separation and promote waste reduction.

**TELC-BATON2018 Toshiba Elevator and Building Systems Corporation (Japan and China)**  
All employees of Toshiba Elevator Group sites in Japan and China (256 sites) are conducting regionally-oriented environmental activities. In this unique activity of the company, employees of a site which has received a baton just like in a track relay race conduct environmentally related activities for one week in addition to daily activities and then pass the baton on to the next site. When the baton is finally passed to the Environmental Management Officer (President of Toshiba Elevator and Building Systems), the activity ends.

**Tree planting on the outskirts of Beijing**  
**Toshiba (China) Co., Ltd.**  
The company held a tree planting event, with all 90 of its employees participating. They planted 50 pine trees, 50 plum trees, and 50 cherry trees at the Beijing Greening Place of the China Environmental Protection Foundation in Beijing's Fangshan District.

**Energy-saving competition**  
**Toshiba International Corporation (U.S.)**  
The company solicited ideas for energy saving from employees. About 100 ideas, including carpool commuting were received and excellent ideas were awarded.

**Green curtain activity**  
**Toshiba Corporation Komukai Complex (Japan)**  
The company grows goya (bitter tasting melon plant) as green curtains. It worked to raise employees' awareness of energy saving by holding various events such as a seedling events, lectures, and harvest festivals as well as serving a goya menu at the cafeteria.

**Cleaning the banks of the Arakawa River**  
**Toshiba Digital Solutions Corporation**  
The company participates every year in the cleaning of the banks of the Arakawa River, which is the main event of a nationwide civic action that first started in 2007. In FY2017, a total of nearly 350 people from Toshiba Digital Solutions Group including directors, employees, and their families, gathered along the river banks to collect a total of 779 bags (45-liter garbage bags) containing combustibles, incombustibles, and PET bottles and 124 bulky trash items including motorcycles.

**Environmental education for students**  
**Toshiba JSW Power Systems Private Limited (India)**  
The company introduced Toshiba Group's environmental activities to about 120 students in the neighborhood as well as provided basic education on environmental conservation regarding energy, waste reduction, and water quality management.

**Environmental events for employees**  
**Safety and Environmental & Energy Exhibition**  
**Toshiba Semiconductor (Thailand) Co., Ltd.**  
The company held the Safety and Environmental & Energy Exhibition which is an in-house event aimed at raising employees' environmental awareness. Approximately 470 employees participated in a contest on slogans on environmental and energy-saving activities they promoted themselves, created declarations, and conducted energy-saving promotion activities for the company by way of games.

**Creating and showing environmental education video footage**  
**Toshiba TEC Singapore Pte Ltd.(Singapore)**  
The company created an educational video that reports abnormal weather caused by global warming and calls for possible action to prevent such phenomenon. The video was shown at the cafeteria during lunch break to raise the awareness of employees on preventing global warming.

**Earth Hour event**  
**Toshiba Information Equipment (Philippines), Inc. (Philippines)**  
The company held the customary Earth Hour (lights-out) event along with its employees, suppliers, customers, and local residents. By distributing posters introducing lights-out activities that can be done at the workplace and home, they succeeded in reducing CO2 by approximately 470 kg in one day.

**Bicycle campaign**  
**Toshiba Industrial Products Asia Co., Ltd. (Vietnam)**  
In the Earth Hour event, about 25 employees and their families paraded on bicycles as a campaign for effective energy use with about 3,000 young persons in Bien Hoa City in Dong Nai Province.

## Participation in a demonstration project for promoting ESG dialog in Japan

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 five consecutive years since its launch in 2013. We will come to understand 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](#)

# Conservation of Biodiversity

## Toward realizing a society in harmony with nature

Toshiba Group is systematically implementing measures to fulfill three requirements for a sustainable society with a view to achieving a low-carbon, sound material-cycle society that strives to be in harmony with nature.

In an effort to achieve a low-carbon, sound material-cycle society, we are working to reduce greenhouse gas emissions and waste generated by manufacturing processes. At the same time, we are also striving to reduce environmental impacts throughout product life cycles by providing energy-efficient products and by conserving resources when manufacturing products, as well as to develop low-carbon power generation technologies and renewable energy sources, thereby contributing to climate change mitigation.

To achieve a society in harmony with nature we need to achieve a world in which biodiversity is appropriately maintained and humans and all other living species live in harmony on the earth and continue to benefit from the bounty of the ecosystem. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services\* (IPBES), the so-called biodiversity version of the Intergovernmental Panel on Climate Change (IPCC), released a comment: "Biodiversity – the essential variety of life forms on Earth – continues to decline in every region of the world, significantly reducing nature's capacity to contribute to people's well-being." (Media release on March 11, 2018) Toshiba Group will contribute

to the restoration and maintenance of biodiversity through activities aimed at conserving biodiversity, as well as mitigating climate change, efficiently using resources, and managing chemical substances in our business activities.











\*An intergovernmental platform covering biodiversity and ecosystem services. It has the 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.

## The Sixth Environmental Action Plan

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 long-term goal of achieving "a society in harmony with nature" by 2050 and a short-term goal of taking effective and urgent actions to minimize the loss of biodiversity to ensure that by 2020 ecosystems are resilient and continue to provide essential services. Aichi Targets, the global goal serving as the core of the plan, define 20 goals for the international community to achieve by 2020.

Toshiba Group considers biodiversity conservation activities an important item in environmental management and has set a medium-term goal by 2020 to contribute to 10 of the 20 individual Aichi targets that 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 have been promoting biodiversity conservation activities at 69 (45 in Japan, 24 overseas) sites worldwide.

## ■ Aichi Targets and the Sixth Environmental Action Plan

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

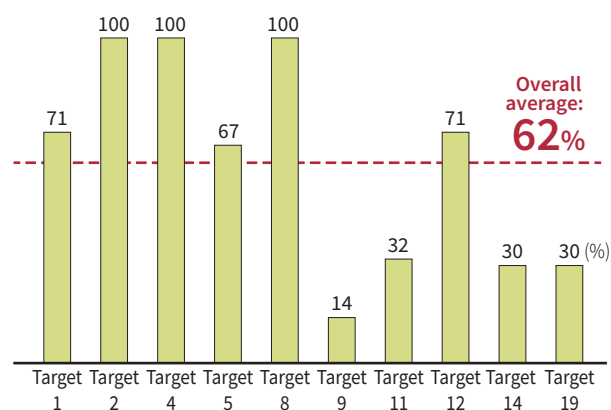
## Developing biodiversity conservation activities for the achievement of Aichi Targets at 69 sites worldwide

As results of FY2017, which was the first year of the Sixth Environmental Action Plan, the degree of efforts for targets 1, 2, 4, 5, 8, and 12 was higher, while the degree of efforts for targets 9, 11, 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\*. The rate of implementation of target 4 (Sustainable production) and target 8 (Reducing chemical pollution) was also 100% as a result of promoting the on-going 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) was 71% 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 67% and 71%.

For target 9 (Eliminating alien species), target 11 (Conserving protected areas), target 14 (Maintaining and managing ecosystem services), and target 19 (Improving and spreading knowledge and technology) that have low implementation rates, we will carry out feasibility case studies that include examples found from other companies.

\*\*"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.

## Results from efforts for FY2017 by target (All 69 sites are targeted.)\*



\* Total number of sites that achieved targets / All target sites (69) x 100

## 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.



[http://www.toshiba.co.jp/env/jp/biodiversity\\_database/](http://www.toshiba.co.jp/env/jp/biodiversity_database/)



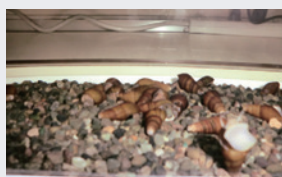
# Conservation of Biodiversity

## Case 1

### [Aichi Target 4\*] Activities to call back fireflies to Kitabana River

Japan Semiconductor Corporation Oita Operations

Japan Semiconductor Corporation Oita Operations used treated waste water on the premise to breed Nina, shellfish, which firefly larvae feed on, in the upstream of the Kitabana River, and released them in the downstream of the river. Also, employees (881 in total in FY2018) of the Operations cleaned up around the site and the Kitabana River. Existence of fireflies in the area was confirmed in 2015 and since then employees and citizens hold an observation event to watch fireflies around the river.



## Case 2

### [Aichi Target 5] Protecting birds and building ecosystem networks

TOSHIBA TEC EUROPE IMAGING SYSTEMS S. A.

In an effort to protect bird species and build ecosystem networks, the company based in France collaborates with a local NPO to manage green areas on the factory premise. The company adjusts lawn-mowing schedules, and conducts surveys to count the number of birds that visit this area.



## Case 3

### [Aichi Target 11] Forest conservation at Yumenomori Park in Kashiwazaki City

Toshiba Infrastructure Systems & Solutions Corporation (Kashiwazaki Operations)

To conserve the valuable Satoyama environment and hand it down to the next generation, the Kashiwazaki Operations supports satoyama conservation program led by Satoyama Environment Creation Network, a citizen group. Its employees join seasonal activities 9 times a year (April to November) to maintain woods and waterfronts as volunteers.



## Case 4

### [Aichi Target 12] Activities to protect Japanese eight-barbel loach which is a rare species

Toshiba Energy Systems & Solutions Corporation (Keihin Product Operations)

Keihin Product Operations conserves Japanese eight-barbel loach, which is on the red list at the site. In order to contribute to conserving regional populations of Japanese eight-barbel loach, the Operation is carefully breeding them by regularly investigating the biotope along with experts.



\* 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.

## 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

Together with other companies, we implement measures to improve electric and electronic companies' recognition of biodiversity and conduct research on international trends. During FY2017 to FY2018, we issued and spread our activity guidelines, "Let's Try Biodiversity" and revised\* "Guidelines for Biodiversity Conservation Action in the Electrical and Electronic Industry" (FY2015 issue).

\*Added relationship with "Sustainable Development Goals (SDGs)" of the UN



Let's Try Biodiversity



Guidelines for Biodiversity Conservation Action in the Electrical and Electronic Industries

### ●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.

#### Collaboration (3) Tsuyama, Okayama Prefecture

Toshiba Carrier Corporation Tsuyama Factory / DNP Imagingcomm Corporation, DNP Life Space Corporation, DNP Fine Optronics Co., Ltd., DNP Logistics Co., Ltd.

#### Collaboration (4) Kitakyushu, Fukuoka Prefecture\*1

Nishinihon Kaden Recycle Corporation / Kurosaki Plant, DNP Fine Optronics Co., Ltd.

#### Collaboration (5) Aichi Prefecture\*2

Toshiba Lifestyle Products & Services Corporation (Aichi Operations) / Nagoya Operations, Dai Nippon Printing Co., Ltd.

#### Collaboration (6) Yokohama / Yokosuka, Kanagawa Prefecture\*3

Toshiba Lighting & Technology Corporation Yokosuka Operations / Yokohama Plant, DNP Technopack

\*1 This collaboration has ended in May, 2018

\*2 Toshiba Lifestyle Products & Services Corporation is now a subsidiary of the Chinese corporation Midea Group as of July 2016. However, collaboration with Nagoya Operations, Dai Nippon Printing Co., Ltd. will continue.

\*3 The Hamakanzo daylily protection program, a joint program started in FY2015, ended in FY2017.



Biological research at Daishigawara tideland (Collaboration (2))



Volunteer clean-up activities (Collaboration (3))



# 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<sup>\*1</sup>)

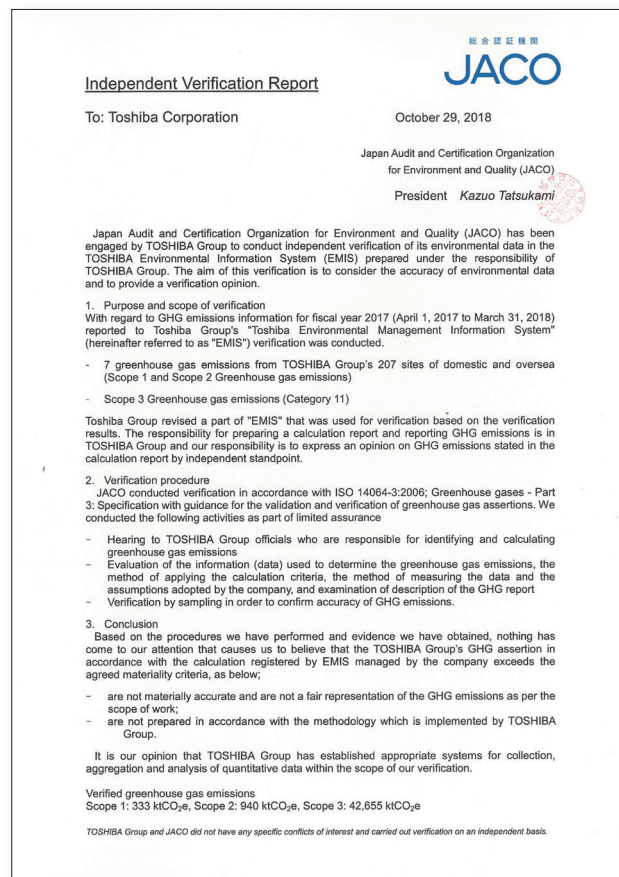
We selected and visited two production sites (Toshiba Energy Systems & Solutions Co., Ltd. Hamakawasaki Operations and Toshiba Electronic Devices & Storage Co., Ltd. Himeji Operations-Semiconductor).

### ●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<sup>\*2</sup>)

<sup>\*1</sup> 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)

<sup>\*2</sup> 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<sup>\*3</sup>, it was concluded that there are no significant items that have not been disclosed or covered by the report.

<sup>\*3</sup> ISO14064-3: Specification with guidance for the validation and verification of greenhouse gas assertions

## Methods of calculation

- CO<sub>2</sub> 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 4.3.2).
- CO<sub>2</sub> emissions coefficient for electricity purchasing: 5.31 t-CO<sub>2</sub>/10,000 kWh is used as the CO<sub>2</sub> emissions coefficient in Japan. GHG Protocol data is used overseas.
- Greenhouse gases other than CO<sub>2</sub>: 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).
- CO<sub>2</sub> 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 (FY2017)

## ■ Evaluation of products and services

Award title		Award-winning item(s)	Winner
FY2017 Energy Conservation Grand Prize	Agency for Natural Resources and Energy Director-General's Award Product and Business Model Category	Universal Smart X EDGE Series	Toshiba Carrier Corporation / Tohoku Electric Power Co., Inc.
	Agency for Natural Resources and Energy Director-General's Award Product and Business Model Category	LED Lighting Achieved by Innovative Technology LED Light Bulb with Gallium Nitride Power Device and 2kW Projector	Toshiba Lighting & Technology Corporation
FY2017 Minister of the Environment's Award for Activities to Mitigate Global Warming	Technology development and productization Category	Development of HEATEDGE, an Air-cooled Heat Pump Chiller with Reinforced Heating Performance	Toshiba Carrier Corporation / Tohoku Electric Power Co., Inc.
	Technology development and productization Category	Path to Productization of LED Projector Equivalent to 2kW Metal Halide Lamp and LED Conversion of All Large Luminous Flux Lighting	Toshiba Lighting & Technology Corporation
27th Grand Prize for the Global Environment Award	Encouragement Award	Development of LED Lighting with Gallium Nitride Power Device and Progress in Leading in Preventing Global Warming and Establishing Sound Material-cycle Society	Toshiba Lighting & Technology Corporation
2017 Nikkei Global Environmental Technology Awards	Awarded for Excellence	Development and Productization of a Small-sized Dimmable LED Light Bulb with Gallium Nitride Power Device and LED Conversion of All Light-bulb Type Light Source	Toshiba Lighting & Technology Corporation
FY2017 Award of Japan Society of Refrigerating and Air Conditioning Engineers	Technology Award	High-volume and High-efficiency Rotary Compressors 1000A4 Series	Toshiba Carrier Corporation
FY2017 Kawasaki Mechanism Certification System		• Doppler VHF Omnidirectional Radio Range (TW4332)	Toshiba Infrastructure Systems & Solutions Corporation Komukai Complex
City of Kawasaki's Low CO2 Kawasaki Brand 2017		• Doppler VHF Omnidirectional Radio Range (TW4332) • OCR Scanner S12000	Toshiba Infrastructure Systems & Solutions Corporation Komukai Complex
JECA FAIR 2017—65th Electrical Construction Equipment and Materials Fair— PRODUCTS AWARD	Encouragement Award of Japan Electrical Construction Association	72kV Solid Insulated Switchgear	Toshiba Corporation*
66th Electrical Manufacturers' Technology Award	Encouragement Award	Upgrade and Development of Horizontal Water-Turbine Generator	NISHISHIBA ELECTRIC CO., LTD.
	Encouragement Award	Development of Small Thin Emergency Generator	NISHISHIBA ELECTRIC CO., LTD.
H&V news AWARDS 2017	Commercial HVAC Product of the Year -Cooling/Ventilation	SHRM-e VRF System	Toshiba Carrier UK Ltd.
2016 Best Product Award	Best A3 Color MFP Category Product Award	FC-2000AC	TOSHIBA TEC INFORMATION SYSTEMS(SHENZHEN) CO., LTD.

\* Currently, Toshiba Infrastructure Systems & Solutions Corporation

## ■ Evaluation of business activities

Award title		Award-winning item(s)	Winner
Wide Southern Prefectural Area Promotion Bureau's Environmental Award	Environmental Award	Environmental Conservation Activities	Japan Semiconductor Corporation Iwate Operations
Start from What You Can Do Eco Action Award	Eco Action Award	Global Warming Prevention Initiative in the Office	Japan Semiconductor Corporation Iwate Operations
Iwate Prefecture Liaison Council for Environmental Conservation Excellent Employee Award for Environmental Conservation	Charman's Award	Management and Operation of the ISO14001 system	Japan Semiconductor Corporation Iwate Operations Kiyoshi Yamaguchi
FY2017 the Excellent Green Logistics Commendation Program	Special Awards of the Green Logistics Partnership Conference	Model for reducing environmental burden and improving productivity in apparel supply chains, taking advantage of electronic tags	TOSHIBA TEC CORPORATION Adastria Co., Ltd. / Adastria Logistics Co., Ltd. / NAXIS Co., Ltd.
2017 Niigata Prefecture Excellent Office Award for Environmental Conservation	Niigata Prefecture Excellent Office in Environmental Conservation	Environmental Conservation Activities	Toshiba Infrastructure Systems & Solutions Corporation Kashiwazaki Operations
2017 Office Taking Excellent Specific Global Warming Countermeasures	Certified as 2017 Office Taking Excellent Specific Global Warming Countermeasures (Category II top-level office)	Toshiba Infrastructure Systems & Solutions Corporation Fuchu Complex	Toshiba Infrastructure Systems & Solutions Corporation Fuchu Complex
2016 Fukushima Protocol Project	First Prize in Advanced Category	Environmental Activities in General	KITASHIBA ELECTRIC CO., LTD.
Singapore Packaging Agreement Awards 2017	Merit Award	Measure to Reduce Packaging Waste	TOSHIBA TEC SINGAPORE PTE LTD
The Prime Minister's Industry Award 2017 (Environmental Quality Conservation Category)	Award & Certificate	Environmental Conservation Activities by Employees	Toshiba Semiconductor (Thailand) Co., Ltd.
CSR-DIW Continuous Awards (3rd year)	Award & certificate	CSR Activities including Environmental Activities in General	Toshiba Semiconductor (Thailand) Co., Ltd.

## ■ Evaluation of communication and human resources development programs

Award title		Award-winning item(s)	Winner
Environmental Communication Awards	Award of merit	Toshiba Group Environmental Report 2017	Toshiba Corporation
2017 Excellent Enterprise Award for Environmental Human Resource Development	Excellence Award (Large Enterprise Category)	Environmental awareness raising and human development through CSR and communication	Japan Semiconductor Corporation
2017 Excellent Enterprise Award for Environmental Human Resource Development	Encouragement Award (Large Enterprise Category)	Human resource development through environmental activities in offices and regions	Toshiba Electronic Devices & Storage Corporation Himeji Operations-Semiconductor
Education Support Grand Prix 2017	Encouragement Award	Education program for primary school children: Where Does Electricity Come From? The World Beyond the Power Outlet.	Toshiba Corporation

We appreciate your opinions and comments about this report. [Questionnaire for Environmental Report 2018](#)