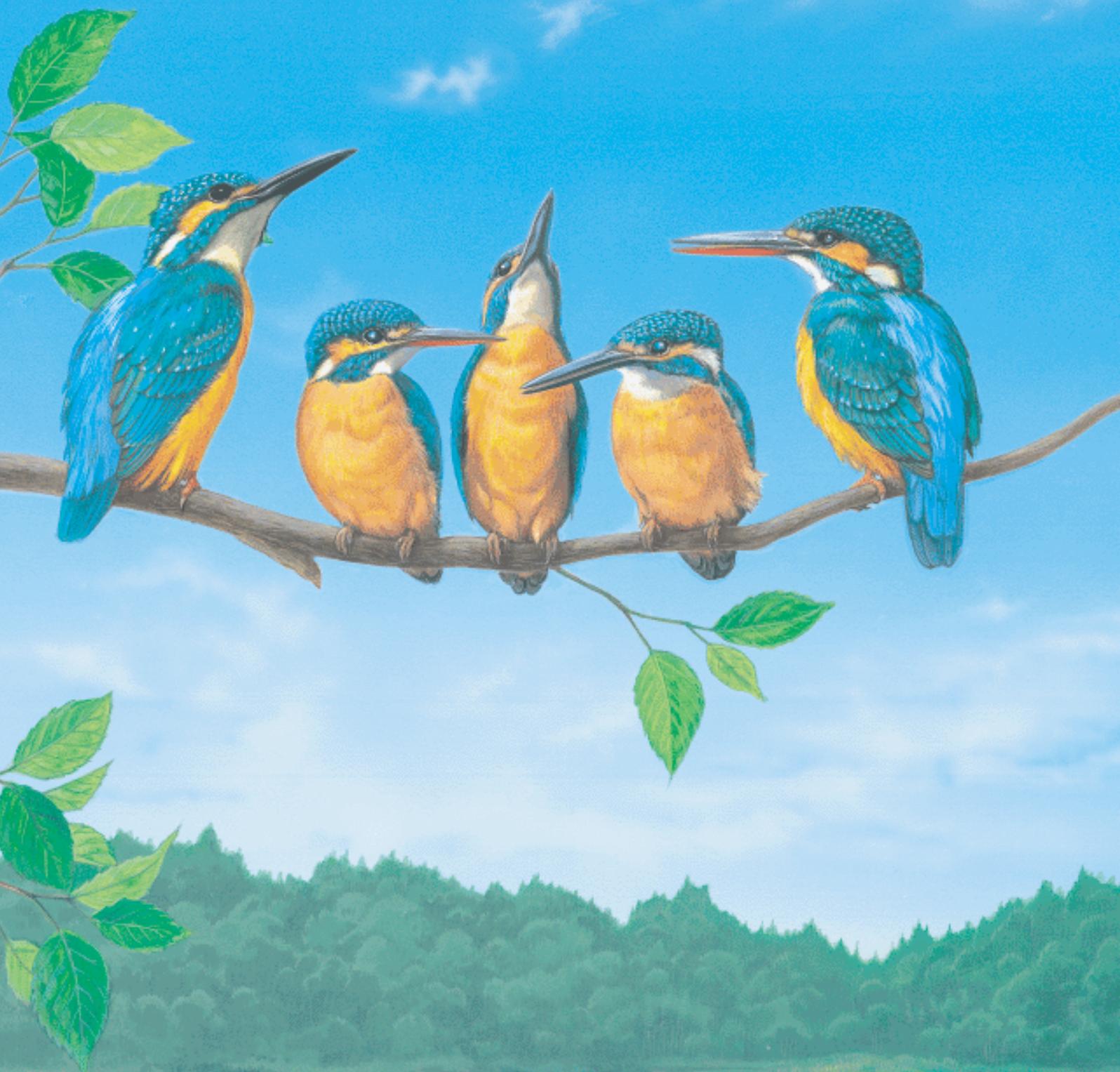


# Toshiba Environmental Report 2001



**TOSHIBA**



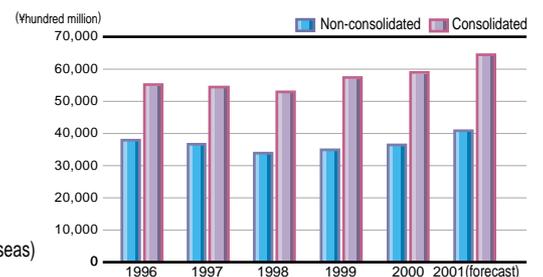
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## Corporate profile

Company name	Toshiba Corporation
Foundation	July 1875
Establishment	June 25, 1904
Paid-in capital	¥274.9 billion (as of March 31, 2001)
Number of employees	Non-consolidated: 52,263
	Consolidated: 188,042 (as of March 31, 2001)
Group	Number of consolidated subsidiaries: 209 (Japan), 114 (overseas)

## Net sales



\* Please refer to the Toshiba Annual Report 2001 for details of Toshiba's business and financial information.  
The information is also available on the Internet at <http://www.toshiba.co.jp/about/ir>.

# Message



President and Chief Executive Officer

*Tadashi Okamura*

Global environmental issues are becoming ever more pressing as we enter the new century. Toshiba has recognized that environmental protection activities are a key task for management and is doing its utmost to enhance the quality and expand the scope of its activities.

In accordance with our Basic Commitment—"Committed to People. Committed to the Future. Toshiba."—at the product development phase, we assess the impact of usage of the contemplated product and how to maximize recyclability and/or ease of disposal when it has come to the end of its life. Toshiba Group is working to reduce the environmental impacts of its products throughout the life. We are convinced that Toshiba Environmental Report is an effective tool for communicating the breath and depth of our environmental protection activities to all our stakeholders and to the public at large.

This is the third issue of the report. The scope of the report has been expanded from Toshiba Corp. to Toshiba Group. We aim to be a customer-centric, Internet-ready enterprise and are committed to earning the positive recognition and confidence of all our stakeholders. As part of these efforts, we have reflected in the report the valuable suggestions solicited from readers of our previous reports, rather than providing a narrowly conceived document shaped solely by the interests of the issuer.

For example, this report introduces the relationship between a Toshiba factory and the community. Also, the report is designed so that the circulation we aim at, i.e. product development, manufacturing, usage and recycling, is articulated.

Following on from 2000, dubbed the first year of the recycling-based society in Japan, in 2001 a framework for that society has come into effect, consisting of the Basic Law for Establishing the Recycling-based Society, the Law for Recycling of Specified Kinds of Home Appliances, the Law for Promotion of Effective Use of Resources, and the Green Purchase Law.

In this context, in order to play a leading role in establishing a recycling-based society, Toshiba is enhancing environmental protection activities on five fronts: effective utilization of resources, prevention of global warming, strengthening control of chemical substances, development of environmentally conscious products and recycling of end-of-life products. To underpin these activities, we are vigorously disseminating environmental information and, at the same time, making efforts to enhance the quality of environmental audits and environmental education.

On a continuous basis, Toshiba discloses information on these activities in environmental reports and at its website.

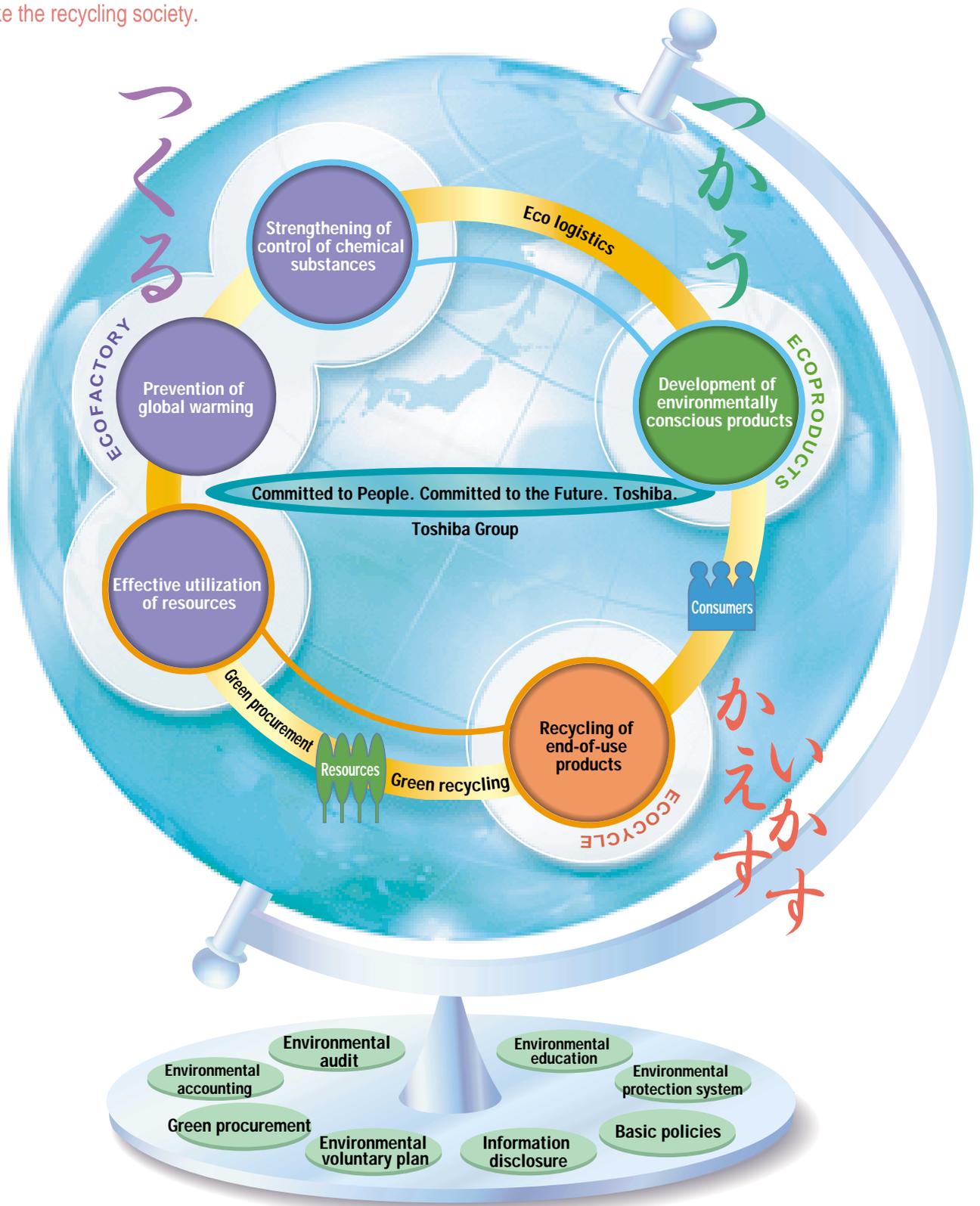
We will be delighted if this report helps you to arrive at a better understanding of the extent and nature of Toshiba's commitment to the environment. Moreover, we warmly welcome your comments and suggestions.

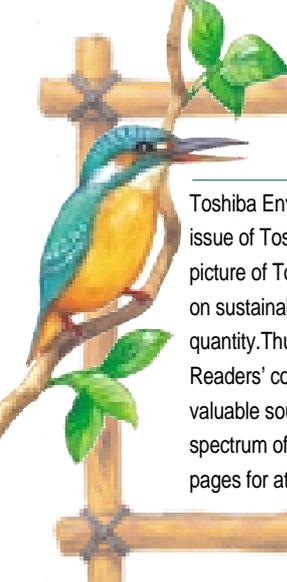
# For readers

\*This section describes Toshiba's approach to environmental protection activities and explains the editorial policy and topics of Toshiba Environmental Report 2001. It will help you grasp the outline of this report so that you can go straight to the details of any subject of interest.

## Editorial policy and topics

Integral to the product-development Toshiba is assessing environmental impact of usage of products and maximizing recovering resources. As Toshiba Basic Commitment says—we are striving to reduce our impact on the Earth's environment.—to encompass effective utilization of resources, to prevent of global warming, to strengthen control of chemical substances, to develop environmentally conscious products, and to recycle used products. These activities are underpinned by environmental accounting, environmental audits, environmental education and a proactive approach to the disclosure of environmental information. Thus, Toshiba is at the forefront of the drive to make the recycling society.





## Editorial policy

Toshiba Environmental Report 2001 mainly presents the results of Toshiba Group's environmental protection activities in fiscal 2000. This is the third issue of Toshiba Environmental Report whereas the first issue was published in February 1999. In accordance with the editorial policy that the big picture of Toshiba's environmental impacts is presented by analyzing environmental impact data using environmental accounting as a tool we focus on sustainability. We expanded the scope of the report to larger Toshiba Group and enhanced the information we provide both in terms of quality and quantity. Thus the number of affiliated companies within the scope is increased by 13.

Readers' comments on the previous report varied greatly. Some readers were of the opinion that the abundance of detailed description made it a valuable source of information. In contrast, others thought that the extensive text made it difficult to grasp the principal points. We have taken the spectrum of readers' comments into consideration. As a result, you will find a mix of text-centric pages for detailed information and visual-oriented pages for at-a-glance understanding.

### ECOFACTORY

#### Prevention of global warming

18 19

Iwate Toshiba Electronics Co., Ltd. won the Award of the Director-General of the Agency of Natural Resources and Energy for its outstanding achievements in energy saving. Energy saving in fiscal 2000 was equivalent to 18,000kl of crude oil.

#### Control of chemical substances

20 21

Data on 354 types of chemical substances based on the PRTR Law were aggregated group-wide.

#### Zero emission of waste

22

Two of Toshiba's operations and four affiliated companies achieved zero emission.

#### Purification of ground water

23

In fiscal 2000 approximately 1,600kg of organochlorine solvent was recovered.

#### Commitment to PCB

24

Information on storage of PCB and the plan for in-house treatment is disclosed for the first time.

### ECOPRODUCTS

#### Development of environmentally conscious products

25

Toshiba established the basic rules for environmental labels.

#### Energy Saving Award

27

Toshiba air conditioners for use in stores won the President's Prize of the Japan Energy Conservation Center. This is the seventh award Toshiba air conditioners have won.

#### More information on PCs disclosed

28

Environmental information on Toshiba PCs is available at dynabook.com.

### ECOCYCLE

#### Recycling of home appliances

32

The Law for Recycling of Specified Kinds of Home Appliance came into effect in April 2001, a step toward establishment of the recycling-based society.

#### Recycling of PCs

33

Recycling of PCs and rechargeable batteries has started.

#### Environmental information service

35

An IT-based information service about waste and discharge treatment has started.

### CORE ACTIVITIES

#### Environmental management

6 7

The dynamism of the environmental management of Semiconductor Company is illustrated.

#### Environmental accounting

10 11

Environmental costs amounting to ¥39 billion (an increase of ¥1.4 billion from 2000) resulted in environmental impact reduction benefits worth ¥16.4 billion (a decrease of ¥2.7 billion from 2000). Customer benefits of major products were calculated.

#### Environmental voluntary plan

12 13

The second voluntary plan was finalized and we achieved the target for 10 of the 12 items. The third voluntary plan is now being implemented.

#### Environmental education

15

A course to assist managers in their efforts to cultivate environmental awareness and an introductory course for engineers on environmentally conscious design have been introduced.

#### Information disclosure

38 39

Toshiba is committed to a proactive approach regarding disclosure of information on its environmental activities. The 10th Toshiba Environmental Exhibition was held open to the general public.

Note

PXX indicates the pages concerning the item.

# Environmental management

The Earth's environment is humankind's life-support system, and issues associated with it are intimately involved with the very foundation of our existence. Given that natural resources are finite, the orientation of society and the economy toward mass production, mass consumption and mass disposal needs to be tempered by adherence to other values. Throughout its operations, Toshiba has embraced preservation of the Earth's environment for future generations as a top priority. We are convinced that economic activities should be informed by the knowledge that our planet's resources and capacity to absorb waste are limited. Mindful of our responsibility to future generations, we are making a concerted corporate-wide effort to utilize resources with the utmost efficiency. As an enterprise committed to sustainable development, Toshiba is resolved to raise consciousness as well as to innovate technology.



## Basic policy for environmental protection

Toshiba Corporation recognizes that the Earth is an irreplaceable asset, and that it is mankind's duty to hand it on to future generations in a sound state. Therefore, Toshiba promotes environmental protection activities, in a technically and financially appropriate way, and in accordance with the Basic Commitment of Toshiba Group and this Basic Policy for Environmental Protection.

- (1) Toshiba considers environmental protection to be one of management's primary responsibilities.
- (2) Toshiba specifies objectives and targets for its business activities, products and services respecting the reduction of environmental impacts and prevention of pollution.
- (3) Toshiba strives to continuously improve the environment through vigorous implementation of environmental measures.
- (4) Toshiba contributes to society through its environmental protection activities, which include the development and supply of excellent, environmentally conscious technologies and products and cooperation with the local community.
- (5) Toshiba complies with all laws and regulations, industry guidelines which it has endorsed, and its own standards for environmental protection.
- (6) Toshiba recognizes that natural resources are finite and promotes their efficient utilization.
- (7) Toshiba strives to enhance the awareness of all its employees respecting the environment and requires that they make a practical contribution to environmental protection through their work.
- (8) Toshiba operates globally, and accordingly, promotes environmental activities throughout Toshiba Group.

## Environmental protection system

With the aims of enhancing the commitment to environmental protection throughout Toshiba Group and making it integral to the operation of every Toshiba Group company, Toshiba set up the Corporate Environmental Protection Council in 1991. Chaired by an executive officer responsible for environmental protection throughout Toshiba, the council has a wide-ranging brief: it proposes solutions to environmental problems affecting management, technological development,

production and sales, determines basic policies, and reviews the progress of in-house companies and operations.

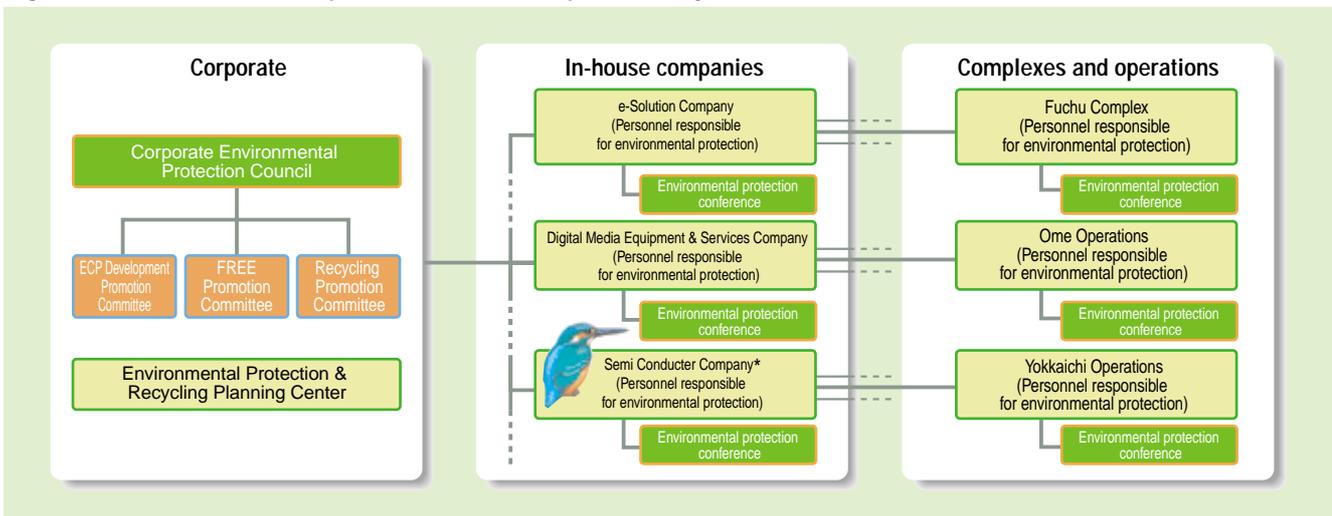
Its subordinate organizations include the Environmentally Conscious Products (ECP) Development Promotion Committee, which promotes development of environmentally conscious products and technologies, the FREE Promotion Committee, which promotes environmental protection at operations, and the Recycling Promo-

tion Committee. Individual in-house companies and operations hold similar driving forces.



Corporate environmental protection conferences.

### Organizational chart of the corporate environmental protection system



\* Semiconductor Company's activities are featured on Pages 6 and 7.

## Environmental management system

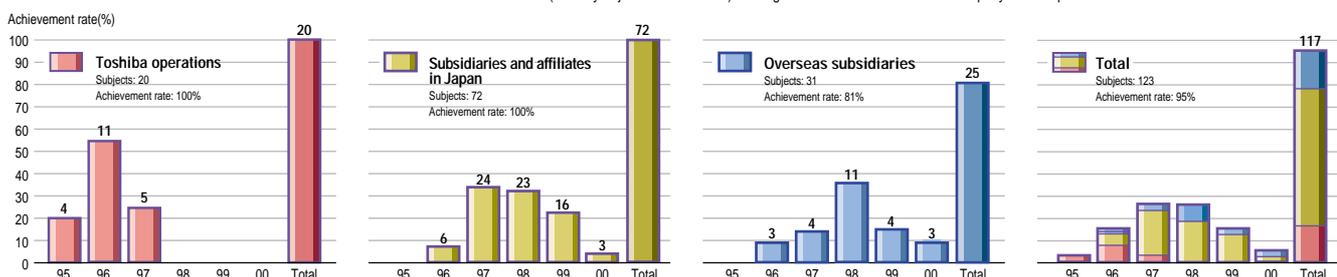
ISO-14001 certification, the international standard for environmentally friendly systems and processes, is designed to promote sustainable economic development and an equitable apportionment of responsibilities among countries. The certification process requires that companies maintain a system to evaluate the environmental impact of their opera-

tions and products, and make continuous efforts to improve their environmental performance. Toshiba considers ISO-14001 certification to be a passport to inclusion in the ranks of the world's most environmentally responsible enterprises.

By September 1997 all 20 of Toshiba Corp.'s operations had gained ISO-14001 certification. All 72 operations

of affiliated companies in Japan have also gained ISO-14001 certification. To date, 25 overseas subsidiaries, accounting for more than 80% of Toshiba's overseas subsidiaries, have gained certification and we are working to achieve certification for all our overseas facilities.

### ISO-14001 certification (as of March 31, 2001)



\* Numbers at the top of the bar graph indicate the number of operations which gained certification during the corresponding year.

\* Toshiba Carrier (formerly Fuji Works of Toshiba) is categorized as a domestic affiliated company in this report.



# Environmental management of Semiconductor Company

Semiconductor Company of Toshiba Corp. manufactures discrete semiconductors, system LSIs, memory devices and various other semiconductor products. At its 19 production facilities—a figure that includes domestic subsidiaries and affiliates and overseas subsidiaries—Semiconductor Company is vigorously promoting environmental protection activities, such as energy saving, reduction in the use of chemical substances and reduction of waste. As of March 31,

## Yokkaichi Operations

### Overview



Address: Yokkaichi, Mie Prefecture 512-8550  
 Established: January 1992 (Operation started in April 1993)  
 Site area: Approx. 312,000m<sup>2</sup>  
 employees: Approx. 1,940  
 Products: 128M and 256M DRAM, 512M NAND, 8M Full C-SRAM, etc.

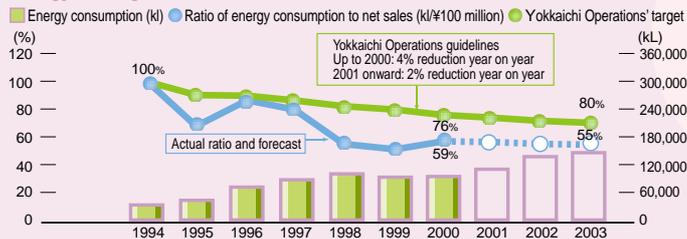
The hub factory for all types of memory devices, covering trial production through to mass production and utilizing the cutting-edge 0.175μm multi-layered process.



**Message from the General Manager (second from right)**  
 "As a youngster I drew inspiration from nature." My friends and I used to spend a lot of time at the beach, gazing awestruck at the star-filled sky and talking of our future aspirations. Our mission is to hand over the environment in a good condition to future generations.

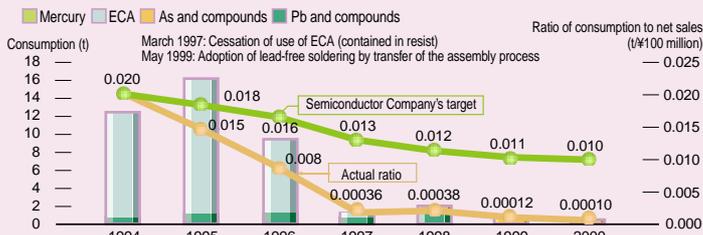
Hayashi, General Manager, and a member of the environmental patrol checks that the carp are flourishing in the monitoring pond after completing the patrol. Carp are bred in the monitoring pond by the entrance to the administration building using process effluent whose quality, thanks to the factory's effluent treatment equipment, is equivalent to that natural stream water.

### Energy saving



Yokkaichi Operations accounts for 16% of Toshiba's energy consumption. Efforts to save energy are an important and integral part of Yokkaichi Operations everyday activities and every one is involved. Ever since the first clean room was constructed there, Yokkaichi Operations has installed highly efficient air conditioning and refrigeration systems, as well as equipment for recovery of waste heat from refrigeration systems. Also promoted are removal of unnecessary lighting equipment and use of the energy-saving mode of PCs. These everyday energy-saving activities resulted in Yokkaichi Operations winning the Energy Management Excellent Factory Award presented by the Director General of Chubu Agency of Economy, Trade and Industry for two years running.

### Reduction of toxic chemical substances



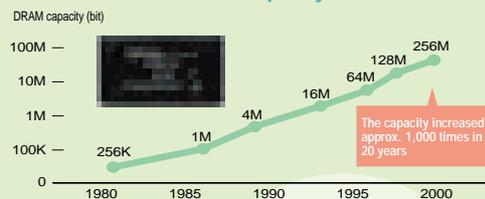
The resist used in baking of circuit patterns contained ethyl cellosolve acetate (ECA). A reduction in the use of ECA was planned. After 18 months during which resist coating conditions were changed several times and exposure conditions fine-tuned in the mass-production process, a system for achieving consistently excellent finishing of circuit patterns was realized and use of ECA ceased.

### Environmental liaison meeting with the local community

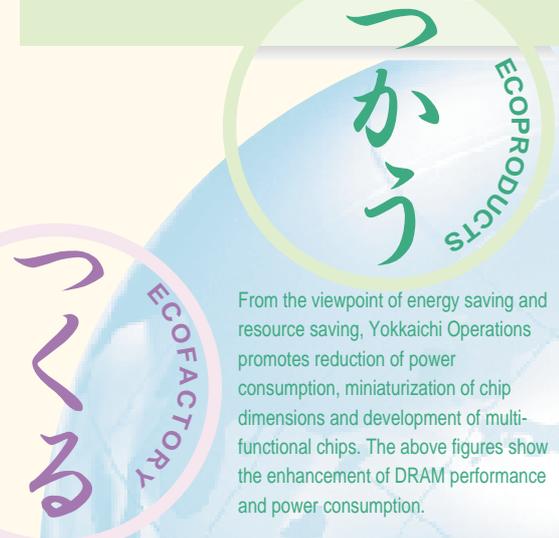
Yokkaichi Operations and the Yamanishiki-cho residents association have a pollution prevention agreement. An environmental liaison meeting has been held every year since 1992. Environmental measurement data on the quality of water discharged, atmosphere, odor, vibration and noise are disclosed. The meeting provides an excellent opportunity for constructive communication on environmental matters.



### Enhancement of DRAM capacity



The capacity increased approx. 1,000 times in 20 years



From the viewpoint of energy saving and resource saving, Yokkaichi Operations promotes reduction of power consumption, miniaturization of chip dimensions and development of multi-functional chips. The above figures show the enhancement of DRAM performance and power consumption.

### Semiconductor Company's production facilities in Japan

- Kaga Toshiba Electronics Co.
- Yokkaichi Operations
- Himeji Operations-Semiconductor
- Himeji Toshiba E.P. Corp.
- Kitakyushu Operations
- Fukuoka Toshiba Electronics Corp.
- Buzen Toshiba Electronics Corp.
- Kitsuji Toshiba Electronics Corp.
- Oita Operations
- Takeda Toshiba Electronics Corp.



### Recycling of resources



End-of-use printed circuit boards with semiconductor devices

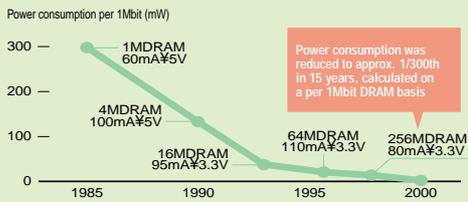


After drying by distillation

2001, all Semiconductor Company's operations had gained ISO-14001 certification.

Let's take a closer look at the environmental management systems and the achievements of Yokkaichi Operations, a manufacturer of memory devices, and those of Iwate Toshiba Electronics Co., Ltd., a manufacturer of system LSIs.

### DRAM power consumption



Iwate Toshiba Electronics Co., Ltd.

Toshiba Components Co., Ltd.

Microelectronics Center

Hamaoka Toshiba Electronics Corp.

Yokkaichi Toshiba Electronics Corp.



Printed circuit boards with semiconductor devices on them are dried by distillation at 500 to 600°C, crushed and then melted at over 1300°C. Finally, resources, such as copper, gold, silver, lead and palladium, are recovered.



Pulverization



Refined material

### Iwate Toshiba Electronics Co., Ltd.

#### Overview

Address: Kitakami, Iwate Prefecture 024-8510  
 Established: Site January 1973  
 area: 326,000m<sup>2</sup>  
 Number of employees: 2,400  
 Products: ASICs, microprocessors, CCDs, etc.



Hub factory for ASICs, doing everything from design and development of cutting-edge LSIs through to manufacturing of chips

#### Activities to raise awareness (walking through a grove of beech trees)

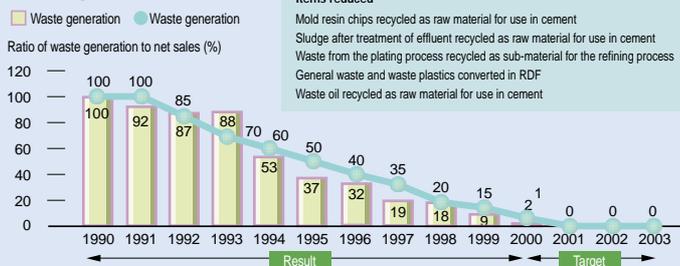


Under the beech trees, experiencing ecology at first-hand through observation of fauna and flora

#### Message from the President (Yamazaki, first on the right at front)

This photo was taken on a ramble beneath the magnificent beech trees of Busugamori Forest during environmental month. Incidentally, this forest is featured in a novel by Kenji Miyazawa. In manufacturing cutting-edge semiconductor devices at Iwate, an area noted for its natural beauty, we strive to excel in environmental protection. Our aim is to be an 'eco-factory' in harmony with nature.

#### Waste generation



Iwate Toshiba Electronics efforts to reduce industrial waste date back to 1990. As alternatives to landfill, the company promoted material recycling and thermal recycling, such as recycling of mold resin and sludge by cement producers after treatment of effluent, recycling of sludge after treatment of soldering plating process effluent of the lead refining process and other toxic industrial waste as sub-materials, and recycling of general waste as solid fuel. As a result, in June 2000, the waste used for landfill accounted for less than 1% of total discharges, thus achieving zero emission. At present, Iwate Toshiba Electronics is working to reduce generation of waste at the source.

#### Elementary schoolchildren visit the factory



140 third graders of Kurosawajiri Kita Elementary School visited the factory



The factory's effluent treatment facility

Iwate Toshiba Electronics, mindful of its responsibilities as a corporate citizen, welcomes visits to the factory by members of the local community. The local elementary school's 140 third graders visited the factory's effluent treatment facility as part of their social studies course. Some children asked whether Iwate Toshiba Electronics was a water-making company. We were pleased to receive thank-you letters from the children. Since we aspire to be an excellent corporate citizen, we will continue our efforts to make a valuable contribution to the local community.

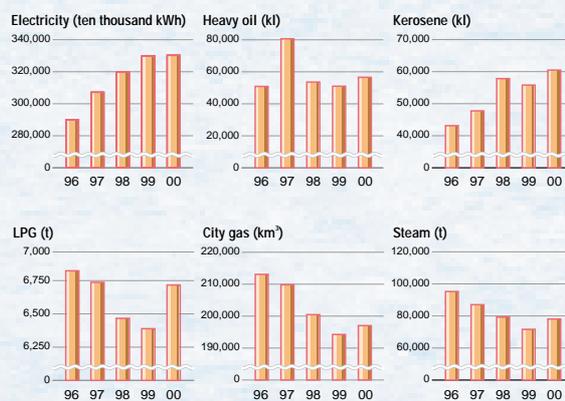
# Toward sustainable development

## Toshiba Group's Environmental Impact

Toshiba Group manufactures and sells a great variety of electronic and electric products ranging from heavy electrical apparatus to consumer electronics, and from information and communications equipment to semiconductors and other electronic components. Among these products, environmental impacts differ widely. This section provides an overview of the environmental impacts of Toshiba Group. These environmental impacts are utilized as indices for verifying sustainability. The figures show 5-year trends of inputs of energy, water and chemical substances, and of outputs, such as environmental impacts on water and atmosphere and discharge of waste.

### INPUT

Energy: Calculated in CO<sub>2</sub> (ten thousand t)

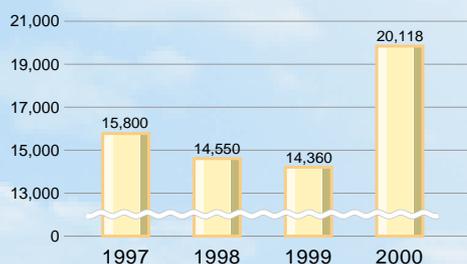


Water (ten thousand t)



### Chemical substances\*

Amount used (t)



Release to the environment (t)





Toshiba intends to expand collection of data that can be utilized for efforts to reduce the environmental impacts imposed by its activities. These data are significant components of indices of environmental protection benefits in the environmental accounting of Toshiba Group.

- \* Environmental impact data are tabulated results of Toshiba Corp. and its 75 subsidiaries and affiliates listed at the end of the report.
- \* Data on chemical substances are data for substances subject to PRTR (refer to page 20). Data up to fiscal 1999 are for Toshiba Corp. on a non-consolidated basis for 179 types of substances, and data for fiscal 2000 are for Toshiba Group for 354 types of substances.
- \* Water environmental impact is calculated as follows: annual average value of the measured concentration of a substance at the drain mouth multiplied by total drain discharge for the year
- \* In the case that measured concentration is less than the lower detection limit, 1/2 of the lower detection limit is used as concentration for calculation.

# OUTPUT

These data constitute the basis of environmental accounting.

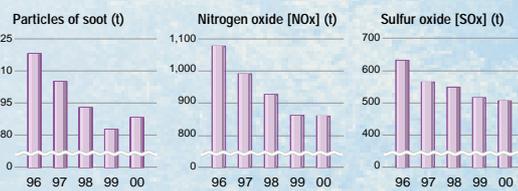
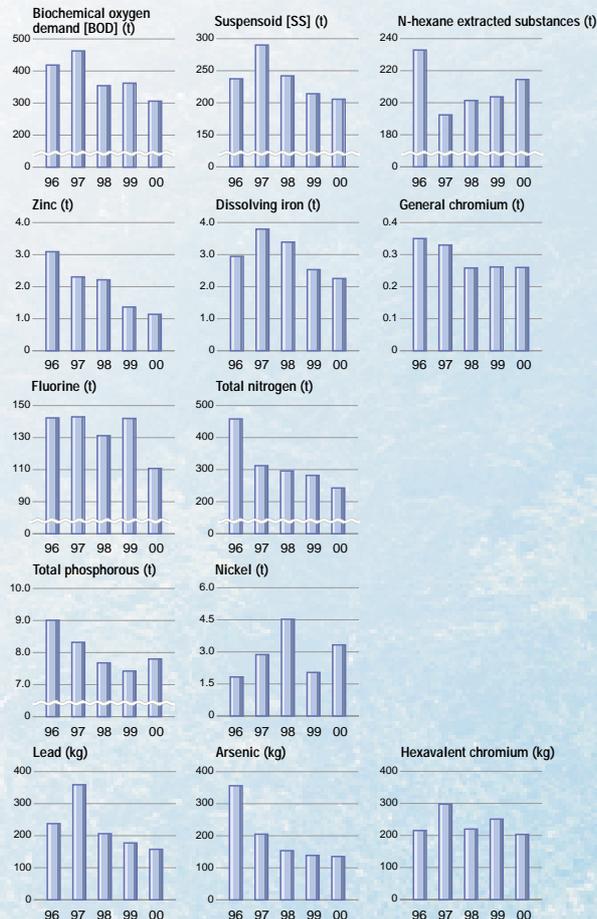
## Water environmental impact (t)

[Annual average value of measured concentration x total drain discharge for the year]



## Atmospheric environmental impact (t)

[Annual average value of measured concentration x total gas discharge for the year]



## Final disposal of waste (t)



# Environmental accounting

## Costs and benefits

- Subject of aggregation: Toshiba Corp. and 46 domestic subsidiaries and affiliates and 28 overseas subsidiaries
- Subject period: April 1, 2000~March 31, 2001

Environmental costs						
Classification	Content	Expenditure		Current expenses		Total costs
Business area costs	Reduction of environmental impacts 1)~3)	7,714	(5,882)	12,041	(8,420)	19,755 (14,302)
Content	1) Pollution prevention costs	4,808	(3,799)	7,269	(5,326)	12,077 (9,125)
	2) Global environmental costs	1,730	(1,122)	423	(289)	2,153 (1,411)
	3) Resource circulation costs	1,176	(961)	4,349	(2,805)	5,525 (3,766)
Upstream/downstream costs	Green procurement, recycling, etc.	25	(5)	838	(378)	863 (383)
Management activity costs	Environmental education etc.	246	(128)	4,929	(2,607)	5,175 (2,735)
R&D costs	Development of ECP	1,055	(1,004)	9,454	(6,520)	10,509 (7,524)
Social activity costs	Planting of plants, disclosure of information, etc.	4	(2)	1,054	(759)	1,058 (761)
Environmental damage costs	Restoration of soil pollution, etc.	621	(409)	1,029	(849)	1,670 (1,258)
Total		9,665	(7,430)	29,365	(19,533)	39,030 (26,963)

Total expenditure during the period	413,000 (221,900)
Total R&D expenditure during the period	327,915 (263,728)

## Basic framework

In fiscal 1999 Toshiba introduced environmental accounting in order to quantitatively grasp the costs and benefits of environmental protection and utilize the quantitative data as guidelines for business activities. Classification of environmental costs and the calculation criteria are in accordance with the guidelines established by the Environment Agency (the current Ministry of Environment) of Japan in May 2000. Regarding benefits, environmental impact reduction benefits are indicated quantitatively. Also, Toshiba defined its own standards, namely "actual economic benefits" and "assumed economic benefits," and the monetary values of these economic benefits are calculated. "Actual economic benefits" are actual proceeds resulting from reduced charges for electricity, water, and disposal of waste, including recycling. "Assumed economic benefits" are the reduction in environmental impacts on atmosphere, water and soil converted into monetary values based on data on compensation regarding environmental matters and

environmental standards. Additionally, in a new development, Toshiba calculated "customer benefits," namely benefits to customers from reduction of environmental impacts of major products. Among life cycle costs, those items that benefit customers, such as reduction of power consumption, are

assessed. Toshiba expects this assessment to facilitate the creation of environmentally conscious products. The table below shows Toshiba Group's classification of benefits.

	Economic benefit items	Environmental impact reduction items
Actual benefits	Environmental impacts can be clarified quantitatively and easily converted into monetary value.	Reduction of electricity Reduction of fuel Reduction of water
Assumed benefits	Environmental impacts can be clarified quantitatively and converted into monetary value based on certain assumptions.	Reduction of waste Reduction of environmental impacts on atmosphere Reduction of environmental impacts on water
Customer benefits	Reduction of environmental impacts during use by customers, such as reduction of power consumption, and other economic benefits are calculated.	Reduction of environmental impacts during use of products

**Basis for calculation of assumed benefits** Monetary values were calculated by giving each substance, calculated in terms of cadmium, a weighting based on environmental standards and ACGIH-TLV (allowable concentration of each substance as determined by the American Conference of Governmental Industrial Hygienists) and multiplying the result by the amount of compensation in the case of cadmium pollution. Reduction in environmental impacts on atmosphere, water and soil is indicated quantitatively and the environmental impact reduction volumes are compared with the previous year's results, and also reduction of environmental impacts is calculated in terms of monetary value to enable comparison of various environmental impacts on the same basis.

\* Explanation of the concept of weighting by referring to cadmium and hexavalent chromium  
Environmental standard values for cadmium and hexavalent chromium are 0.01mg/l and 0.05mg/l, respectively, and the reciprocals, 100 and 20, respectively, are used as weighting coefficients for the substances. According to comparison using weighting coefficients, environmental impact cost of hexavalent chromium is calculated to be ¥2,502,144/kg, which is one fifth of that of cadmium. Regarding atmosphere-related environmental impacts, data of ACGIH are used for weighting.

**Basis for calculation of customer benefits** Benefits of reduction of environmental impacts of products throughout their life cycles are calculated in terms of physical quantity units and monetary units. A life cycle comprises several phases: 1) procurement of raw materials, 2) manufacturing, 3) transport, 4) use, 5) collection, 6) recycling and 7) appropriate processing. Toshiba's environmental accounting focuses on the benefits of reduction of environmental impacts at the use phase. Energy-saving benefits are calculated using the following formula.

Benefits (yen) =  $\sum$  [(power consumption per year of the former model - power consumption per year of the new model) x number of units sold per year x unit price of electricity charge]

\*Ratio of the environmental impacts at the use phase:  
According to LCA of refrigerators, the environmental impacts for the use phase (energy consumption, CO<sub>2</sub> emission, etc.) account for the largest portion of environmental impacts for the entire life cycle and the environmental impacts for the transport, collection and recycling phases are negligible.

### Refrigerator: Ratio of energy consumption



Unit: millions of yen Figures in parentheses are figures for Toshiba Corp. on a non-consolidated basis

Environmental benefits					
Benefits	Environmental impact reduction volume(99-00)		Economic benefits		
CO <sub>2</sub>	▲20,375t	(8,481t)	-1,271	(-435)	Actual benefits 2,400 (1,501)
Water	785000t	(799000t)	46	(82)	
Final disposal of waste	1,004t	(365t)	3,625	(1,854)	
BOD	56.1t	(4.0t)	3,509	(252)	
Fluorine	31.2t	(25.3t)	2,594	(2,107)	Assumed benefits 13,961 (7,804)
Total nitride	39.3t	(18.8t)	2,463	(1,174)	
Particles of soot	▲5.4t	(▲0.5t)	-365	(-34)	
NOx	2.3t	(5.4t)	96	(225)	
SOx	10.3t	(6.6t)	645	(413)	
Other	8.2t	(0.4t)	5,019	(5,667)	
Total			16,361	(9,305)	

Customer benefits*		Environmental impact reduction	Monetary value of benefits
Environmental impact reduction benefits during use	Toshiba Corp.	121,530MWh	¥3.0 billion
	Affiliated companies	30,330MWh	¥0.7 billion
	Total	151,860MWh	¥3.7 billion

\*Changes in main environmental impacts are presented on pages 8 and 9. Indicated in the above table are differences of volumes of environmental impacts in fiscal 1999 and in fiscal 2000.  
 \*Black triangles indicate that increase in environmental impacts exceeded reduction in benefits due to increased production etc.  
 \*Benefits concerning waste include gain from sale of items with value.  
 \*Main items of assumed economic benefits are shown in the above table.  
 \*Customer benefits were calculated for 12 types of products, including refrigerators, air conditioners and personal computers.

## Tool for environmental management

There is no universally accepted definition of environmental management. It is useful to conceive of environmental management as management that is sensitive to environmental considerations and is based on a recognition that the Earth's environment is vulnerable. A good working definition of environmental accounting is that it is a tool used to reflect environmental considerations in decision-making. Thus, environmental

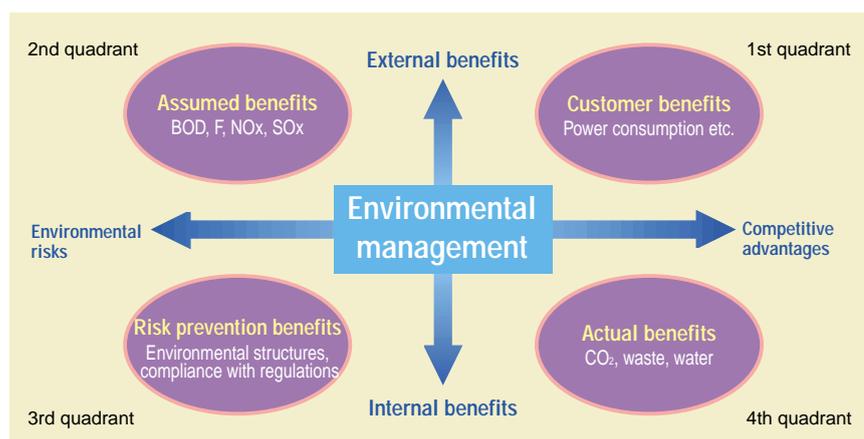
accounting underpins environmental management.

There are various types of environmental impacts, such as waste and air pollution. Because different standards are used for different types of environmental impacts, it is difficult to quantify the total environmental impact. To facilitate the use of environmental accounting in decision-making, it is desirable to have a common standard for environmental impacts of all types. These environmental impacts should be grasped as a cost imposed on society. Environmen-

tal issues involve negative externalities. Toshiba is attempting to make negative externalities to visible account to contribute to the reduction of environmental impacts on society.

The figure left indicates the orientation of Toshiba's environmental accounting. Toshiba's environmental accounting for fiscal 1999 principally concerned the second and the fourth quadrants. The third quadrant was calculated as a part of total benefits for internal control. For fiscal 2000, Toshiba calculated the first quadrant, benefits to society. Regarding life cycle costing, those items that benefit customers are assessed. In the environmental accounting for fiscal 2000, customer benefits were evaluated for 12 types of products that have large environmental impacts during their use. Measurement of benefits is still in its infancy. By providing versatility and through trial and error, Toshiba is working to establish a better approach so that measured benefits serve as appropriate indices for environmental management.

## Environmental accounting as an environmental management tool



## Voluntary Action Plan (Voluntary Environmental Plan)

The ultimate objective of all environmental endeavors is to achieve the transformation to an economy and society functioning in harmony with the Earth's environment. For this purpose, it is incumbent on companies to assume greater social responsibility and act as good corporate citizens. Central to these endeavors is the

formulation of comprehensive voluntary environmental plans (action plans). Toshiba announced its first voluntary plan in March 1993, and by the end of fiscal 1995 achieved the seven initial targets as planned. In accordance with the second voluntary environmental plan launched in fiscal 1996, a corporate-wide effort

was made respecting the 12 items listed below. Fiscal 2000 was the final year of the plan and all targets were achieved except for the two items highlighted in yellow. The reasons for non-achievement of these two items are analyzed and described in the box at the bottom of Page 13.

### The second voluntary environmental plan (announced on May 1, 1996)

	Commitment item	Target			Final result as of fiscal 2000	Achieve ratio
		Item	Comparison	Target		
1	Implement product assessments (Consideration from the design stage to achieve environmentally conscious products)	All products (continued implementation since fiscal 1993)	—	—	100%	
2	Reduce use of parts and materials that are difficult to recycle (Enhancement of resource saving and recyclability)	Subject: Consumer products and information equipment	1995	30% reduction by fiscal 2000	-33% (Achieved)	
3	Reduce weight per product function (Resource saving)	Subject: Information equipment and control devices	1995	10% reduction by fiscal 2000	-39% (Achieved)	
4	Reduce electricity consumed per product function (Energy saving)	Subject: Consumer products and information equipment	1995	10% reduction by fiscal 2000	-70% (Achieved)	
5	Reduce weight of product packaging	Subject: All industrial-use products	1995	30% reduction by fiscal 2000	-38% (Achieved)	
6	Reduce time required to disassemble products	Subject: Consumer products and information equipment	1992	50% reduction by fiscal 1997	-54% (Achieved)	
7	Reduce use of styrofoam packaging (Recyclability)	Subject: All products	1995	50% reduction by fiscal 2000	-41%	
8	Reduce ratio of waste to net sales (Resource saving and extension of lives of final disposal facilities)	Subject: Volume of waste consigned to contractors for final disposal	1990	75% reduction by fiscal 2000	-92% (Achieved)	
9	Reduce ratio of energy consumption to net sales (Prevention of global warming and energy saving)	Subject: All production and research facilities	1990	15% reduction by fiscal 2000	-4%	
10	Secure ISO-14001 certification (Globalization of the company)	Subject: All production and research facilities	—	All production and research facilities by fiscal 1997	Obtained certification by September 1997	
11	Establish and implement an product environmental vision (Environmentally conscious products)	Subject: All operations	—	Articulate vision by fiscal 1996 and then implement	All operations articulated environmental visions	
12	Implement the New 33/50 Project (Reduce utilization of toxic chemical substances)	Subject: Electronic component and semiconductor production facilities	1994	33% reduction by fiscal 1997 and 50% reduction by fiscal 2000	-97% (Achieved)	

 \*This color indicates that the item has been achieved.

## The third voluntary environmental plan launched

Toshiba's third voluntary environmental plan, covering the period from fiscal 2001 to 2005, is now being implemented. The principal themes included in the plan are achievement of zero emission of waste, reduction in release of chemical substances, reduction in release of CO<sub>2</sub>, and creation of environmentally conscious products (adoption of lead-free soldering etc.). This new voluntary plan is being promoted throughout Toshiba Group, including affiliated companies.

### Zero emission of waste

Through task-force-based activities focused on particular types of waste,

reduction of waste at source and thorough reuse and recycling, Toshiba aims to reduce the quantity of final disposal (landfill) to 1% or less of total discharge by fiscal 2003.

### Reduction in release of chemical substances

In order to achieve a 30% reduction in fiscal 2005 compared with fiscal 2000 in the quantity of chemical substances released, Toshiba is developing technologies for reduction and alternatives and installing collection equipment.

### Reduction in CO<sub>2</sub> release

Through optimization of capital expenditure and control, Toshiba aims

to achieve a 25% reduction in fiscal 2010 compared with fiscal 1990 in the ratio of CO<sub>2</sub> release to net sales.

### Lead-free soldering

Application of lead-free soldering for the principal consumer electronics products and personal computers started in fiscal 2000 and is being expanded step by step. Toshiba intends to apply lead-free soldering to new models of the principal consumer electronics products in fiscal 2001 and to all products by fiscal 2003. Also, based on the voluntary environmental standards for products drawn up in fiscal 2000, creation of environmentally conscious products will be promoted.

## The third environmental voluntary plan

	Items	Target
1	Zero emission of waste	Step-by-step implementation and the quantity of final disposal to be 1% or less of total discharge in fiscal 2003
2	Reduce release of chemical substances	30% reduction in fiscal 2005 compared with fiscal 2000
3	Reduce CO <sub>2</sub> release	25% reduction in fiscal 2010 compared with fiscal 1990
4	Green procurement	Set target for fiscal 2005 with fiscal 2000 as a benchmark
5	Provide product information	50% of products to be in compliance with the voluntary environmental standards by fiscal 2005
6	Reduce electricity consumed per product function	30% reduction in fiscal 2005 compared with fiscal 2000
7	Apply lead-free soldering	Application of lead-free soldering to all products by fiscal 2003
8	Abolish HCFCs*	Abolition by December 2004*

\*HCFCs is the abbreviation of hydrochlorofluorocarbons, substances widely used as refrigerant in air conditioners etc.

Pursuant to the Montreal Protocol of 1995 on protection of the ozone layer, HCFCs, substitutes for CFCs, are within the scope of regulation and their use is to be abolished by 2020.

#### Reasons for non-achievement of the target for reduction in use of styrofoam packaging

For each product we investigated the possibility of using cardboard or other materials instead of styrofoam. Use of cardboard is practicable from the technological viewpoint but the fact that it is significantly more costly than styrofoam is an impediment. Toshiba will endeavor to reduce its overall use of packaging materials (reduction in size and volume and simplification) and will examine the possibility of using reusable packaging.

#### Reasons for non-achievement of the targeted ratio of energy consumption to net sales

The targeted 15% reduction in the ratio of energy consumption to net sales from the fiscal 1990 level was not achieved; in fact, a 4% reduction was achieved. This was because high growth of energy-intensive semiconductor and electronics device operations. Toshiba is seeking ways to achieve greater efficiency in the use of energy by these operations.

# Environmental audits

In accordance with Toshiba's audit system known as EASTER (Environmental Audit System in Toshiba on the basis of ECO Responsibility), annual audits of operations of Toshiba Corp. and those of subsidiaries and affiliates are conducted.



Review of the audit results

Audits are performed by a group consisting of a chief auditor and auditors who are qualified in accordance with the Toshiba Standards for Auditors. Participation in auditing provides opportunities for auditors to deepen their experience and refine their skills.

## Audit items and evaluation

The objectives of an audit are to grasp the actual situation regarding environmental protection and to achieve improvement in the level of environmental protection technology so that continuous improvement of environmental protection activities can be achieved. There are four audit items: environmental management systems, control of workplace, degree of achievement of the voluntary plan, and creation of environmentally-conscious products.

## Relation between auditing of environmental management systems and ISO 14001

All operations have ISO 14001 certification for their environmental management systems and the certification organization conducts examination and surveillance of those systems in connection with extension of ISO 14001 certification. EASTER's auditing of environmental management systems constitutes a part of internal

auditing, a requirement for ISO 14001, and includes auditing of all requirements for ISO 14001.

## Auditing of control of workplace

Regarding control of the workplace, inspection and maintenance systems, the control situation, response to irregularity, etc. are evaluated. Any insufficiency in terms of facilities or operation and items requiring improvement are pointed out.



Auditing a workplace

## Auditing of the degree of achievement of the voluntary plan

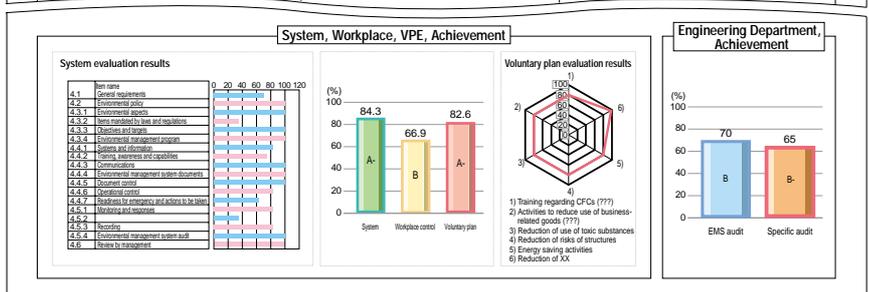
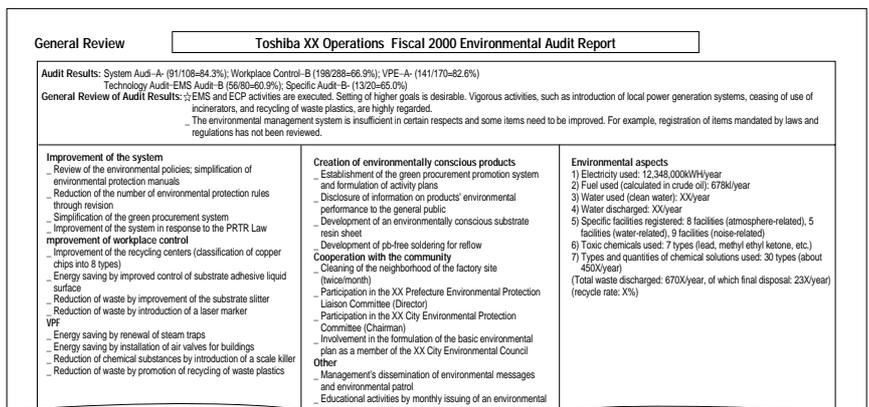
Regarding the degree of achievement of the voluntary plan, the situation concerning achievement of the items of Toshiba Voluntary Environmental Plan, such as energy saving and reduction of waste, is checked.

## Creation of environmentally conscious products

Concerning creation of environmentally conscious products, technology planning and management, the environmental consciousness of the technology development and design sections are evaluated. Since fiscal 2000, in the light of expansion of green procurement, the scope of auditing has been expanded to include environmental considerations when planning a product and systems for disclosing environmental performance of products to users.

## Report and improvement plan

Results of an audit are compiled in an audit report, issues to be addressed and proposals for further improvement, and reported to the personnel responsible for environmental protection at the organization subject to the audit. Then, the personnel responsible for environmental protection draw up an improvement plan covering urgent and important issues pointed out by the audit. After a certain period, a follow-up is executed to monitor progress.



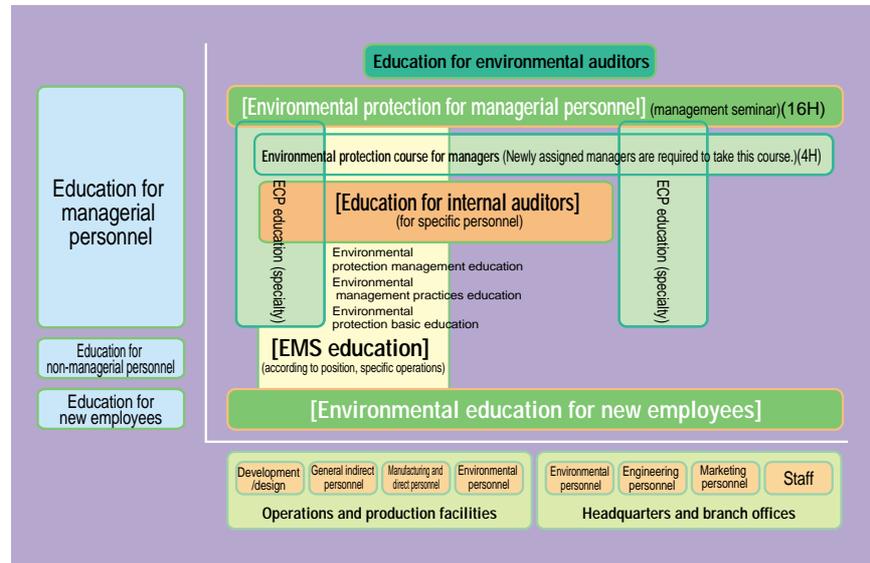
# Environmental education

In order to maintain and enhance the level of environmental protection, all Toshiba personnel receive environmental education according to their positions and the tasks in which they are engaged.

## Education by function

The education system is designed to enhance the environmental consciousness and expertise of personnel at every level from new employees to senior management. Education for managerial personnel focuses on maintenance and improvement of skills necessary for the management of environmental protection activities. Not only Toshiba personnel but also personnel of companies that have a long-term presence at Toshiba operations and those of suppliers receive environmental education according to their tasks and with the aim of further reducing environmental impacts. Specialty education is conducted for internal auditors and specific personnel. Also, education of development and design engineers regarding product assessment and development of environmentally conscious products is conducted. In the education of internal auditors, education about environmental management systems and rules for internal audits is provided by an external certified organization to maintain fairness and improve the level. These various education programs help each employee to understand the environmental issues Toshiba is facing, the impact of his or her task on the environment, and the importance of ensuring compliance with laws and regulations. As a result of the execution of environmental education, participation of all personnel in continuous improvement activities is becoming the norm throughout Toshiba's operations.

Environmental education system chart



## Environmental education for managerial personnel

Toshiba has several programs for managerial personnel, covering such topics as resource management, legal compliance, business skills and specialist knowledge, to provide skill development opportunities meeting the diverse needs and characteristics of individual employees. The latest addition to the educational programs is a course designed to cultivate environmental awareness. It includes lectures on trends in environmental protection, environmental laws and



Disassembling a personal computer

regulations, environmental issues specific to Toshiba as well as those of a more general nature, and Toshiba's environmental protection activities. In addition, through disassembling personal computers by themselves, participants recognize the importance of ease of disassembling and development and marketing of environmentally conscious products.

## Environmental education for engineers

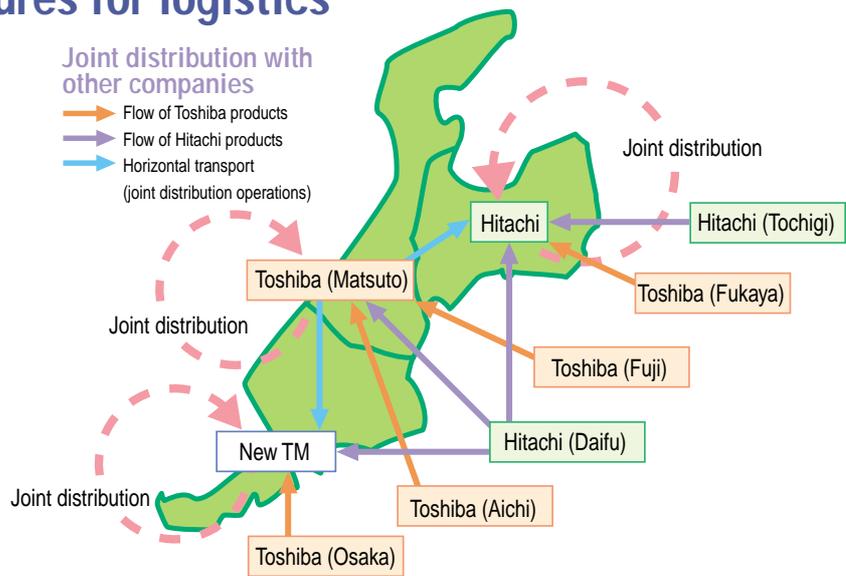
In order to expand the scope of education, an introductory program on environmentally conscious product design has been established. This program is designed to raise designers' awareness of environmental issues and resource constraints so that they will pursue eco-design. Whereas, generally, educational programs on design tend focus on acquisition of practical knowledge, this program focuses on changing attitudes and values. It stresses that environmental friendliness is at the heart of design and offers suggestions on environmentally conscious design and technology development. Participants also learn about LCA, an indispensable design tool for an era marked by increasing emphasis on information disclosure, and a tool which Toshiba is vigorously promoting. In a recycling-based society, it is essential to transform the conventional wisdom of manufacturing. Toshiba is working to foster designers who have a clear development vision and a conviction that the wholehearted embrace of eco-design is essential for success in the marketplace.

# Environmental measures for logistics

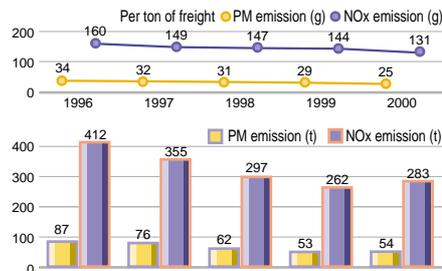
## Reduction of environmental impacts of transport and distribution

Toshiba Logistics Corp., is working to reduce the number of vans and trucks it uses to transport products of Toshiba Group and to reduce environmental impacts at every phase of the supply chain (flow of procurement, production and sales). Major activities are described below.

- 1) Reduction in the number of vans and trucks by enhancing loading efficiency through joint distribution with other companies
- 2) Reduction in the number of vans and trucks by integration and sharing of freight information among distribution centers and branch offices throughout Japan and by establishing a flexible vehicle assignment system attuned to the daily fluctuation of freight volumes
- 3) Reduction of exhaust from vehicles by modal shift from transport by trucks to railway transport.(see the graph)



## Emissions of NOx and PM



\*Toshiba Group's environmental impacts described on pages 8 and 9 include the impact of logistics.



Modal shift to use of JR containers

## Environmental packaging

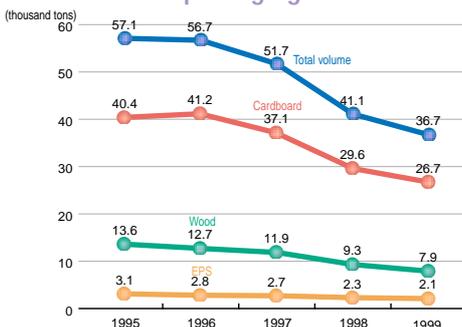
To ensure compliance with environmental laws and regulations and to accomplish the targets of the Toshiba Voluntary Plan, Toshiba has developed and implemented techniques to optimize packaging and transport so as to achieve a great reduction in wasteful packaging.(see the graph)  
3Rs (reduction, reuse and recycling) is the basis of Toshiba's efforts to achieve environmental packaging.

- 1) Reuse: Packaging of standard electric bulbs was changed from cardboard for one-way use to vibration-proof containers for repeated use to achieve zero emission of packaging waste and enhanced transport quality.
- 2) Recycling: Packaging of optical ocean cable system disks for export was changed from wooden packaging to steel packaging to facilitate recycling.
- 3) Reduction: Packaging of washing machines was changed to cap packaging to reduce packaging materials.



Improvement of packaging for washing machines

## Volume of packaging waste



Vibration-proof container packaging for repeated use



Steel-container packaging

## Toshiba's Commitment Overseas

Toshiba Group operates globally and Toshiba subsidiaries around the world are working to reduce the environmental impacts of their manufacturing and sales and marketing activities. By addressing the ten items critical to development of business overseas, identified in the Global Environment Charter of the Keidanren and Toshiba Group's Basic Policy for Environmental Protection, each subsidiary is endeavoring to act effectively in the light of the actual situation in the country in which it operates. Because Toshiba subsidiaries are acting not only in compliance with the laws and regulations of the countries where they operate, but also in accordance with international environmental standards, their environmental activities are highly regarded.

### Environmental protection activities of overseas subsidiaries

Toshiba Group's Basic Policy for Environmental Protection requires management of overseas subsidiaries to embrace environmental protection as a primary responsibility. Environmental laws and regulations of countries and municipalities where they operate and opinions of the general public have strong impacts on their business activities. Thus, overseas subsidiaries are establishing their own environmental rules, reflecting the local situations, and are promoting fruitful exchanges with people in the local communities.

### DSC receives Governor of Virginia's Award for Environmental Excellence (United States)

Dominion Semiconductor, LLC (DSC), a manufacturer based in Manassas, Virginia, received the fifth Governor's Award for Environmental Excellence (large manufacturers category) in

October 2000. DSC's commitment to protecting the environment is reflected in every aspect of its business, and moreover, is contributing to the reduction of costs. DSC shares the

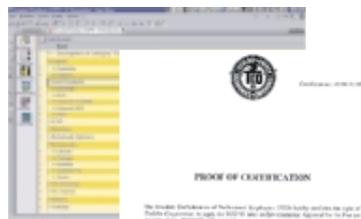


Award ceremony with the Lieutenant Governor of Virginia and the Secretary of Natural Resources

community's determination to protect the environment and is making its environmental protection know-how to business state-wide.

### Disclosure of product information (Germany)

Toshiba Europe GmbH (TEG), a seller and manufacturer of personal computers, copiers and fax machines, has prepared a database containing information on various products and has made it available for dealers so that they can quickly respond to inquiries from customers. The database includes information on environmental labeling, product specifications useful for energy saving and recycling, and information on product safety.



A list of databases and the attached proof of certification

### Environmental fund established and planting of trees (China)

Toshiba Dalian Co., Ltd., a manufacturer of televisions, with a marketer of Toshiba personal computers, contributed a million yuan (approx. 100,000 dollars) in

December 2000 to establish the China Environmental Protection Toshiba Fund. The Fund provides financial support for tree planting and other environmental activities in China. In April 2000, some 700 people, including Toshiba Group employees and local volunteers, planted cherry and walnut trees in Beijing.



Cherry and walnut trees planted in a 13.3ha area

### Seminar on waste treatment (the Philippines)

Toshiba Information Equipment (Philippines), Inc. (TIP), a manufacturer of PCs and peripherals, is highly regarded by other companies and the local community for its excellent environmental protection activities backed by strong leadership by management and vigorous participation of employees. In February 2000, in cooperation with the municipality and waste disposal contractors, TIP held a seminar on waste treatment to make its know-how available to other companies and the community.



TIP personnel explaining waste management

# Environmental considerations in business activities

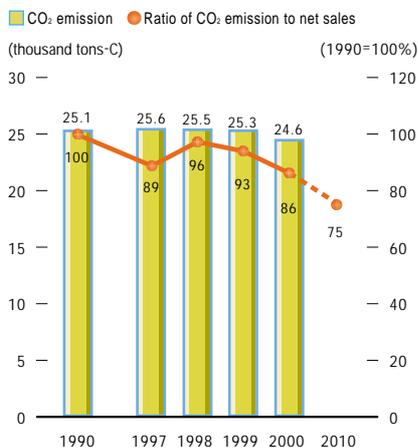
## Prevention of global warming

Prevention of global warming is by definition an issue which needs to be tackled on a worldwide basis. Toshiba is contributing to the prevention of global warming by providing energy-efficient products and by taking action to save energy and reduce CO<sub>2</sub> emissions throughout its operations.

### Targets and results regarding reduction of CO<sub>2</sub> emissions at operations

The target for reduction of CO<sub>2</sub> emissions is to achieve 25% improvement in the ratio of CO<sub>2</sub> emissions to net sales by fiscal 2010 compared with fiscal 1990. This target exceeds that mandated by the Energy Saving Law, i.e. reduction of 1% a year. The results for fiscal 2000 were a 4% decrease of CO<sub>2</sub> emissions compared with the previous year or a 3% decrease compared with fiscal 1990.

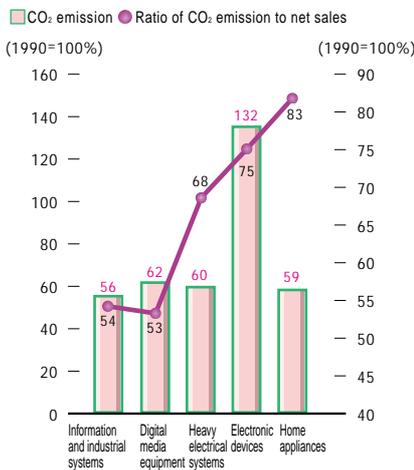
### CO<sub>2</sub> emission and ratio to net sales (corporate-wide)



The results for the ratio of CO<sub>2</sub> emissions to net sales were a 7% improvement compared with the previous year or a 14% improvement compared with fiscal 1990. Although CO<sub>2</sub> emissions of the electronic devices operation increased 32% compared with fiscal 1990, those of other operations declined by 40 to 44%. The ratio of CO<sub>2</sub> emissions to net sales of the electronic devices operation improved by 25%

compared with fiscal 1990. Thus, efficiency of energy consumption has been improving.

### CO<sub>2</sub> emission and ratio to net sales by business (2000)



\*Data is for Toshiba Corp.'s factories and R&D facilities.  
 \*The following values are used as CO<sub>2</sub> emission coefficients for electricity:  
 0.102 for 1990, 0.089 for 1997, 0.087 for 1998, and 0.090 for 1999 and 2000 (unit: kg-C/kWh)

### Implementation of measures

Management's task is to promote energy saving and CO<sub>2</sub> emission reduction measures. Toshiba applies a threefold approach in a consistent, well-balanced manner.

#### (1) Improvement in control

Toshiba seeks to eliminate waste throughout its operations, including air conditioning, lighting and power facilities, and promotes appropriate control of energy consumption by improving production processes and efficiency.

#### (2) Investment in energy-saving equipment

According to a comprehensive plan, investment is executed in order to replace power facilities, production facilities, air conditioning and lighting systems with higher energy efficiency.

#### (3) Energy-saving clean rooms

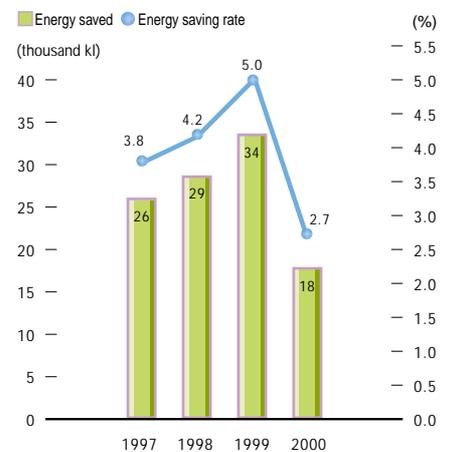
Semiconductors are manufactured in clean rooms. Because it is essential to strictly control the degree of cleanness

and temperature and humidity conditions of clean rooms, their air conditioning systems consume a lot of energy.

Energy saving at clean rooms is promoted by enhancing the efficiency of air-conditioning systems and by adopting manufacturing procedures that use less energy.

These efforts resulted in energy saving equivalent to 18,000kl of crude oil in fiscal 2000.

### Energy saving (result for each fiscal year)



### Commitment regarding greenhouse gases other than CO<sub>2</sub>

Toshiba uses greenhouse gases other than CO<sub>2</sub>. Hydrofluorocarbons (HFCs) are used as a refrigerant and a heat insulating material for air conditioners and refrigerators, perfluorocarbons (PFCs) as etching gas for semiconductor devices, and hexafluoride (SF<sub>6</sub>) as insulating material for power equipment. Toshiba is promoting collection and recycling of these substances and development of substitute substances and technologies.

### Case studies for energy saving and CO<sub>2</sub> emission reduction measures

At Toshiba, all employees at all facilities are involved in energy-saving activities. Throughout Toshiba, it is second nature for employees to switch off computers and OA equipment during lunch or



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whenever there is a break in the workflow, switch lights of when they are not required, set air conditioners at fixed temperatures. Throughout its operations, Toshiba has proactively introduced copiers and personal computers that satisfy the International Energy Star standards.

At factories, Toshiba is investing in measures to improve energy efficiency and achieve uniform consumption of electricity. The new clean room at Oita Operations, the main production base for semiconductors, uses only 68% as much energy as a conventional clean room, thanks to adoption of state-of-the-art energy-saving technologies. Iwate Toshiba Electronics Co., Ltd. enhanced the efficiency of its pure water manufacturing equipment and won an Award of the Director-General of the Agency of Natural Resources and Energy for fiscal 2000.

At Fuchu Complex and Keihin Product Operations, air conditioning by an ice heat storage system that uses nighttime



Cogeneration system at Ome Operations

electricity has been introduced. Use of electricity during the daytime has been reduced, achieving uniform consumption of electricity throughout the day.

By introducing a cogeneration system, Ome Operations has achieved energy saving and reduction of environmental risks at the same time. As well as generating electric power, this in-house cogeneration system provides steam and hot water obtained by recovery of heat produced during power generation. Accordingly, Ome Operations has ceased using heavy oil for boiler fuel, thereby eliminating the environmental risks posed by storage and handling of heavy oil.

Specialists from Toshiba Plant Kensetsu Co., Ltd., an energy services company (ESCO), perform diagnosis of production facilities etc. from the perspective of energy saving and propose improvement measures. Energy-saving measures formulated based on diagnosis of Toshiba's 20 production facilities in Japan in fiscal 2000 are expected to result in a 10,000kl reduction in energy consumption, an amount equivalent to 1.5% of these facilities' aggregate energy consumption in fiscal 1999. Toshiba products contribute to energy saving. Fuel cells have excellent

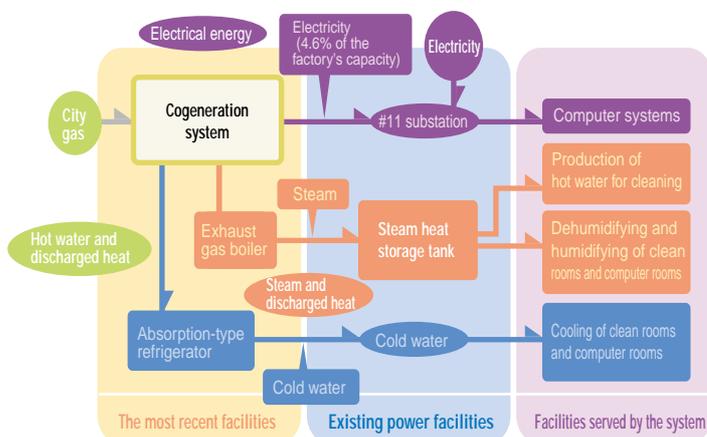
potential for widespread application in factories and other commercial premises, homes and motor vehicle, in view of their high efficiency, clean exhaust and minimal vibration and noise. Our 1kW solid polymer fuel cell for home use is expected to reduce the typical home's CO<sub>2</sub> emissions by 10% and cut annual expenditure on electricity by between 20,000 to 30,000 yen. With an eye to the development of a mass market for fuel cells, Toshiba is working on technologies to reduce the manufacturing cost.



1kW solid polymer fuel cell for home use

High-efficiency motors, ultrahigh-efficiency transformers and general-purpose inverters are excellent products that achieve energy saving in factories and office buildings. Toshiba is keen to bring its activities respecting energy saving and the prevention of global warming to the attention of the public. Toshiba's efforts are highly regarded, as attested by the numerous awards Toshiba has won, including the Award for Excellent Energy Saving Cases and the Award for Excellent Factories for Energy Control.

### Cogeneration system at Ome Operations



### Energy saving awards received

Awards	Fiscal year	Award received	Product etc.	
Energy Saving Awards	1993	Award of the Minister of International Trade and Industry	Air conditioner	
	1994	Award of the Minister of International Trade and Industry	Washing machine	
	1995	President's Prize of the Japan Energy Conservation Center	Air conditioner	
	1996	President's Prize of the Japan Energy Conservation Center	Air conditioner	
	1998	Award of the Minister of International Trade and Industry	Air conditioner	
	1999	President's Prize of the Japan Energy Conservation Center	Refrigerator	
	1999	Award of the Minister of International Trade and Industry	Air conditioner	
	2000	President's Prize of the Japan Energy Conservation Center	Refrigerator	
	Enterprise Special Commendations	1999	Award of the Director-General of the Agency of Natural Resources and Energy	Toshiba Corp.
	Excellent Energy Saving Cases	1997	Award of the Minister of International Trade and Industry	Fuel cell
1994		President's Prize of the Japan Energy Conservation Center and Prize for Excellence	Oita Works	
1995		President's Prize of the Japan Energy Conservation Center	Oita Works	
1997		President's Prize of the Japan Energy Conservation Center	Oita Works	
1998		Award of the Minister of International Trade and Industry	Oita Works	
1999		President's Prize of the Japan Energy Conservation Center	Yokkaichi Operations	
2000		President's Prize of the Japan Energy Conservation Center	Iwate Toshiba	
2000		Award of the Director-General of the Agency of Natural Resources and Energy	Iwate Toshiba	
2000		Award of the Director-General of the Agency of Natural Resources and Energy	Oita Operations	
Excellent Factories for Energy Control		1994	(Heat) Award of the Director-General of International Trade and Industry	Oita Works
	1998	(Heat) Award of the Director-General of the Agency of Natural Resources and Energy	Oita Works	
	1999	(Heat) Award of the Director-General of International Trade and Industry	Yokkaichi Operations	
	1999	(Power) Award of the Director-General of International Trade and Industry	Nasu Operations	
	1999	(Power) Award of the Director-General of International Trade and Industry	Takeda Toshiba	
	2000	(Power) Award of the Director-General of the Economy, Trade and Industry	Yokkaichi Operations	

# Control of chemical substances

A vast number of chemical substances are employed for a correspondingly huge variety of purposes. Some 100,000 different chemical substances are produced for industrial applications. Although chemical substances are indispensable, they may cause serious pollution and harm human health and the environment if appropriate controls are not implemented at each stage of manufacturing, distribution, use and

disposal or if an accident occurs. Toshiba has been executing the "33/50" Project to reduce use of toxic chemical substances in accordance with its voluntary environmental plan. In response to the U.S. Environmental Protection Agency's 33/50 Project, Toshiba is reducing its use of those chemical substances that have the potential to adversely affect human health and the environment. The target

was to achieve a 33% reduction in the ratio of use of such chemical substances to net sales in fiscal 1997 compared with fiscal 1994 and a 50% reduction in fiscal 2000. At factories where electronic components and semiconductors are manufactured, Toshiba reduced use of 21 highly toxic substances, selected by Toshiba for special attention, by 97% in fiscal 2000 compared with fiscal 1994 (comparison of the ratios to net sales).

## Toshiba Group's PRTR (aggregation results for fiscal 2000)

Unit: ton/year

Substance number specified by law	Substance name	CAS number	Number of operations	Amount used	Amount released					Amount transferred		Total amount transferred	Amount consumed	Amount removed and treated	Amount recycled
					Release to atmosphere	Release to public water systems	Release to soil	Landfill within operations	Total amount released	Transfer to waste	Transfer to sewage				
1	Zinc water-soluble compound	-	9	381.26	0.02	0.25	0.00	0.00	0.27	69.27	0.20	69.47	297.91	13.61	0.00
11	Acetaldehyde	75-07-0	1	0.12	0.12	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00
12	Aceitrile	75-05-8	1	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00
16	2-aminoethanol	141-43-5	10	509.31	9.30	0.13	0.00	0.00	9.42	411.71	0.94	412.65	0.00	87.24	0.00
21	m-aminophenol	591-27-5	1	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00
24	ABS	-	5	8.72	0.07	0.00	0.00	0.00	0.07	8.04	0.60	8.64	0.00	0.00	0.00
25	Antimony and antimony compound	-	13	672.70	0.00	0.00	0.00	0.00	0.00	41.62	0.00	41.62	619.61	0.04	11.42
30	Polycondensation of 4,4'-isopropylidene-diphenol and 1-chloro-2,3-epoxypropane	25068-38-6	4	15.20	0.03	0.00	0.00	0.00	0.03	0.93	0.00	0.93	14.24	0.00	0.00
40	Ethylbenzene	100-41-4	2	1.04	0.21	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.83	0.00	0.00
43	Ethylene glycol	107-21-1	8	22.99	12.71	0.25	0.00	0.00	12.96	3.40	0.01	3.41	6.59	0.00	0.04
44	Ethylene glycol monoethyl ether	110-80-5	4	0.70	0.45	0.00	0.00	0.00	0.45	0.06	0.00	0.06	0.00	0.10	0.00
46	Ethylenediamine	107-15-3	1	1.36	0.00	0.00	0.00	0.00	0.00	0.87	0.48	1.35	0.00	0.00	0.00
47	Ethylenediaminetetraacetic acid	60-00-4	2	0.78	0.00	0.22	0.00	0.00	0.22	0.56	0.00	0.56	0.00	0.00	0.00
60	Cadmium and cadmium compound	-	2	0.61	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.60	0.00	0.00
63	Xylene	1330-20-7	21	307.64	211.47	0.01	0.00	0.00	211.48	81.12	0.23	81.35	5.72	2.46	6.63
64	Silver and silver water-soluble compound	-	6	1.15	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.09	1.05	0.00	0.01
68	Chromium and trivalent chromium compound	-	5	4.64	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.13	4.36	0.00	0.16
69	Hexavalent chromium compound	-	7	4.09	0.00	0.02	0.00	0.00	0.02	0.61	0.00	0.61	0.36	3.10	0.00
84	1-chloro-1,1-difluoroethane	75-68-3	1	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
85	Chlorodifluoroethane	75-45-6	5	388.52	4.04	0.00	0.00	0.00	4.04	4.57	0.00	4.57	379.91	0.00	0.00
95	Chloroform	67-66-3	2	0.82	0.01	0.00	0.00	0.00	0.01	0.81	0.00	0.81	0.00	0.00	0.00
99	Vanadium pentoxide	1314-62-1	1	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.03
100	Cobalt and cobalt compound	-	5	602.82	0.00	0.00	0.00	0.00	0.00	1.30	0.00	1.30	557.33	0.00	44.19
101	2-ethoxyethyl acetate	111-15-9	4	2.59	2.26	0.00	0.00	0.00	2.26	0.29	0.00	0.29	0.03	0.00	0.00
102	Vinyl acetate	108-05-4	2	2.89	0.00	0.00	0.00	0.00	0.00	2.88	0.00	2.88	0.00	0.02	0.00
103	2-methoxyethyl acetate	110-49-6	1	0.02	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00
108	Inorganic cyanogen compound (excluding complex cyanide and cyanate)	-	6	1.34	0.07	0.00	0.00	0.00	0.07	0.07	0.00	0.07	0.46	0.74	0.00
132	1,1-dichloro-1-fluoroethane	1717-00-6	2	434.47	4.35	0.00	0.00	0.00	4.35	1.62	0.00	1.62	428.51	0.00	0.00
144	Dichloropentafluoropropane	-	3	0.73	0.71	0.00	0.00	0.00	0.71	0.03	0.00	0.03	0.00	0.00	0.00
145	Dichloromethane	75-09-2	1	18.03	16.86	0.00	0.00	0.00	16.86	1.17	0.00	1.17	0.00	0.00	0.00
172	N,N-dimethylformamide	68-12-2	2	295.68	0.06	0.00	0.00	0.00	0.06	0.62	0.00	0.62	0.00	295.00	0.00
175	Mercury and mercury compound	-	4	1.32	0.01	0.00	0.00	0.00	0.01	0.03	0.00	0.03	1.00	0.00	0.28
177	Styrene	100-42-5	5	56.08	7.91	0.00	0.00	0.00	7.91	0.04	0.00	0.04	38.45	9.68	0.00
178	Selenium and selenium compound	-	1	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
198	1,3,5,7-tetra-aza-tricyclo	100-97-0	3	142.70	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.08	142.62	0.00	0.00
202	[3,3,1,1 (3,7)] decanoic tetrahydromethyl phthalic anhydride	11070-44-3	2	1.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.52	0.00	0.00
204	Tetramethylene thiuram disulfide	137-26-8	1	0.15	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.15	0.00	0.00
207	Copper water-soluble salt (excluding complex salt)	-	3	1,672.64	0.00	0.00	0.00	0.00	0.00	22.79	63.04	85.83	27.21	4.25	1,555.35
227	Toluene	108-88-3	21	425.09	283.50	0.00	0.00	0.00	283.50	54.43	0.00	54.43	12.27	71.42	3.50
230	Lead and lead compound	-	17	4,528.23	0.02	0.02	0.00	0.00	0.04	17.65	0.94	18.59	4,379.13	0.00	130.44
231	Nickel	7440-02-0	8	25.56	0.00	0.00	0.00	0.00	0.00	0.86	0.00	0.86	23.42	0.00	1.28
232	Nickel compound	-	7	849.21	0.00	0.02	0.00	0.00	0.02	0.31	0.00	0.31	663.53	0.04	185.30
243	Barium and barium water-soluble compound	-	6	2,763.52	0.08	0.00	0.00	0.00	0.09	33.02	0.00	33.02	2,666.50	0.00	63.91
252	Arsenic and arsenic inorganic compound	-	7	15.39	0.00	0.00	0.00	0.00	0.00	3.89	0.00	3.89	11.48	0.00	0.03
253	Hydrazine	302-01-2	4	2.39	0.02	0.23	0.00	0.00	0.25	1.76	0.00	1.76	0.00	0.38	0.00
254	Hydroquinone	123-31-9	3	0.55	0.00	0.10	0.00	0.00	0.10	0.04	0.00	0.04	0.41	0.00	0.00
266	Phenol	108-95-2	4	264.86	36.73	0.00	0.00	0.00	36.73	3.39	0.00	3.39	224.62	0.00	0.11
269	Di-n-octyl phthalate	117-84-0	2	228.29	0.00	0.00	0.00	0.00	0.00	11.97	0.00	11.97	200.88	0.00	15.44
270	Di-n-butyl phthalate	84-74-2	3	0.42	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.36	0.05	0.00
272	Bisphthalate (2-ethylhexyl)	117-81-7	1	10.95	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.96	9.99	0.00	0.00
283	Hydrogen fluoride and hydrogen fluoride water-soluble salt	-	14	1,118.10	5.01	84.63	0.00	0.00	89.64	206.33	29.40	235.73	0.33	792.37	0.03
294	Beryllium and beryllium compound	-	1	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00
300	1,2,4-benzenetricarboxylic acid 1,2-anhydride	552-30-7	1	15.05	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02	15.03	0.00	0.00
304	Boron and boron compound	-	15	91.59	0.01	0.62	0.00	0.00	0.63	19.97	0.13	20.10	69.66	0.55	0.54
307	Poly (oxyethylene) = alkyl ether	-	2	0.57	0.00	0.00	0.00	0.00	0.00	0.27	0.30	0.57	0.00	0.00	0.00
308	Poly (oxyethylene) = octyl phenyl ether	9036-19-5	2	0.82	0.00	0.01	0.00	0.00	0.01	0.80	0.00	0.80	0.00	0.01	0.00
309	Poly (oxyethylene) = nonyl phenyl ether	9016-45-9	8	4.23	0.00	0.02	0.00	0.00	0.02	0.46	0.64	1.10	0.00	3.11	0.00
310	Formaldehyde	50-00-0	7	8.38	3.30	0.00	0.00	0.00	3.30	0.02	0.00	0.02	3.90	1.14	0.02
311	Manganese and manganese compound	-	7	2,965.47	0.06	0.00	0.00	0.00	0.06	28.66	0.04	28.70	2,936.32	0.00	0.39
312	Phthalic anhydride	85-44-9	1	74.86	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.04	74.82	0.00	0.00
313	Maleic anhydride	108-31-6	1	172.47	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.08	172.39	0.00	0.00
320	Methyl methacrylate	80-62-6	1	0.63	0.62	0.00	0.00	0.00	0.62	0.01	0.00	0.01	0.00	0.00	0.00
338	Methyl-1,3-phenylene = diisocyanate	26471-62-5	2	755.37	0.00	0.00	0.00	0.00	0.00	5.39	0.00	5.39	749.98	0.00	0.00
340	4,4'-diaminodiphenyl methane	101-77-9	1	7.30	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	7.29	0.00	0.00
346	Molybdenum and molybdenum compound	-	6	233.51	0.00	0.23	0.00	0.00	0.23	9.79	0.00	9.79	182.99	0.33	40.17
	Total			20,117.93	599.95	86.83	0.00	0.00	686.78	1,054.91	96.96	1,151.87	14,934.18	1,285.63	2,059.36

\* Number of operations is the number of operations and companies that use the substance.

\* The amount consumed includes the amount of the substance subject to PRTR that changed to other substances by reaction and the amount that left facilities in products or together with products.

\* The amount removed and treated includes the amount of the substance subject to PRTR that changed to other substances by incineration, neutralization, decomposition, reaction treatment, etc. within a facility.

## Toshiba Group's PRTR

The Law Concerning Reporting of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management (PRTR Law) enacted in July 1999 providing for introduction of a Pollutants Release and Transfer Register (PRTR) system for promoting the management of chemical substances by businesses. The enforcement ordinance concerning the law promulgated in March 2000 clarifies chemical substances subject to reporting and businesses subject to PRTR.

Toshiba participated in a pilot PRTR project initiated by the Environment Agency in December 1997, and Toshiba has accumulated experience in PRTR for four years at certain operations and three years at Toshiba as whole. In line with the initiatives of four industry associations representing the electric and electronics industries, Toshiba conducted a survey covering chemical substances released during fiscal 2000 in compliance with the PRTR Law that had not yet come into effect. The differences in scope between the survey for fiscal 2000 and that for fiscal 1999 are described in the box at the bottom of this page. These differences should be taken into account when reviewing the results.

The results for fiscal 1999 and for fiscal 2000 are compared below. 27 substances (shadowed in green in the table at left) are covered by both the fiscal 1999 survey and the fiscal 2000 survey. The

amount of these substances used has been reduced from 4,220 tons to 3,610 tons and the amount released to the environment has been reduced from 633 tons to 528 tons.

## Ranking of substances and release reduction plan

Based on a categorization of chemical substances into three classifications (prohibition of use, reduction in use, control of release), chemical substances are controlled in accordance with the Chemical Substances Control Rules. Some 2,000 substances are classified into three ranks, A, B and C, based on the laws and regulations and hazard, and control classifications (prohibition of use, reduction in use, control of release) for each substance are determined based on the risk associated with the substance. Toshiba adopts a quasi-risk assessment approach in which the risk posed by a substance is expressed as the product of the hazard and the level of exposure.

Listed in the table on this page are chemical substances whose use is prohibited and those whose use is to be reduced. Toshiba does not permit purchase of any substance whose use is prohibited. For substances whose use is to be reduced, Toshiba's target is to achieve a 30% reduction in the amount released in fiscal 2005 compared with fiscal 2000. Furthermore, for substances whose release is to be controlled, Toshiba is conducting appropriate control in accordance with the risks posed.

### Substances whose use is prohibited

39 substances including:

- Asbestos •Polybiphenyl chloride
- CFCs, Halon •Carbon tetrachloride
- 1,1,1-trichloroethane
- Tetrachloroethylene •Trichloroethylene
- Benzene •Dichlorobenzene, Dichloromethane

### Substances whose use is to be reduced (Substances within the scope of the third voluntary environmental plan)

24 types listed below:

- Ammonia •Isobutyl alcohol
- Ethylene glycol monoethyl ether
- Xylene •Styrene •Toluene
- Formaldehyde •Methyl alcohol
- Methyl isobutyl ketone •Hydrogen chloride
- 2-ethoxyethyl acetate •Ethyl acetate
- Sulfuric acid •Hydrazine •Phenol
- Bisphthalate (2-ethylhexyl)
- Hydrogen fluoride and hydrogen fluoride water-soluble salt
- Chlorine
- Inorganic cyanogens compound (excluding complex cyanide and cyanate)
- Hydrogen sulfide •Sulfur hexafluoride
- PFCs •HCFCs •HFCs

## Differences from the previous year's survey

- The number of substances subject to PRTR increased from 179 to 354.
- Landfill at operations (stable type, control type, and shield type) is categorized as release. Release to the public sewage system is categorized as transfer.
- The scope of aggregation has been expanded from a non-consolidated basis to Toshiba Group (Toshiba Corp. and its 35 domestic subsidiaries).
- The law mandates reporting on substances whose consumption exceeds 0.5t or 1t, depending on the substance. However, Toshiba Group's survey requires operations to report any substance whose annual consumption is 0.01t or more.

- Green indicates that the substance is the same as that in the previous PRTR reporting.
- Yellow indicates that the categorization of the substance is the same as that in the previous PRTR reporting but the scope differs slightly. For example, zinc water-soluble compound, substance number 1, was previously reported as zinc compound.

## Risk communication

Toshiba first published its aggregated data on PRTR (for fiscal 1997) in Toshiba Environmental Report 1998. For fiscal 2000 the scope of PRTR was expanded from a non-consolidated basis to Toshiba Group. Regarding communication of information to interested parties, it is important to consider what kinds of information should be disclosed and how. The need for disclosure of information is expected to increase. For example, increasingly, evaluations of companies-made on the basis of data disclosed by the companies themselves-have impacts on companies, either directly or via the mass media. To bring about a situation in which progress in reduction of release of chemical substances leads to reduction of total risk, Toshiba is making efforts to disclose information in an appropriate manner and to provide easy-to-understand explanations.

# Zero emission of waste

## 3R

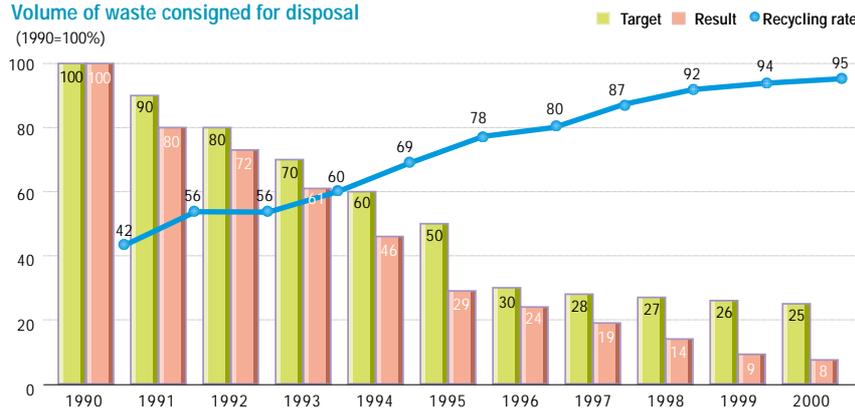
Toshiba pursues three approaches. The first approach is development of environmentally conscious products with low environmental impacts, based on product assessment conducted at the design stage to evaluate the contemplated product's environmental impact. The second approach is reduction of waste generated in the course of manufacturing. And the third approach is reduction of the volume of waste for final disposal by promoting recycling of end-of-life products.

Toshiba's corporate-wide drive to reduce waste is spearheaded by the FREE Promotion Committee and the Recycling Promotion Committee, organizations subordinate to the Corporate Environmental Protection Council. At first, Toshiba concentrated on clarifying the volume of each type of waste. Subsequently, the focus has been shifted from reduction of waste to reuse and recycling and to avoiding the causes of waste at the source.

The graph below shows the results for the volume of waste consigned for disposal. In the last 10 years, the volume has been reduced to one tenth compared with fiscal 1990. A great increase in the recycling rate is apparent, reflecting the decrease of the volume of waste consigned for disposal. The recycling rate for fiscal 2000 was 95%. Recycling of substances other than metal has been increasing.

Volume of waste consigned for disposal

(1990=100%)



## Thorough classification of waste and process improvement

From the current fiscal year, Toshiba's efforts to achieve zero emission, that is, a final disposal quantity equivalent to 1% or less of the total discharge, is based on the new voluntary plan. A Semiconductor Company task force has been implementing thorough classification of waste and frequent exchange of information with waste disposal companies. As a result, Yokkaichi Operations achieved zero emission in fiscal 1999 and four affiliated companies achieved zero emission in fiscal 2000.



Thorough disassembling and classification of waste is performed at the Corporate R&D Center's recycle facility

Ome Operations also achieved zero emission in fiscal 2000. At Yokohama Complex, the cost of treatment and recycling of waste is borne by the workplaces that actually discharge the waste. This arrangement raises employee awareness of the costs involved and we have found it to be effective for reducing the discharge of waste. At Nasu Operations, the size of an effluent treatment facility was reduced to

one tenth through improvement of the plating effluent treatment process, and the volume of sludge generated was reduced by 20%.



Interior of a compact effluent treatment facility enabling inspection from six angles and double protection



Nasu Operations reduced sludge volume by cutting the quantity of effluent

## Appropriate treatment and recycling worldwide

Ome Operations, in cooperation with Term Corp., an environmental engineering company in Toshiba Group, is promoting recycling of end-of-use printed circuit boards discharged by a Toshiba subsidiary at Laguna Technopark in the Philippines. Discharged printed circuit boards are imported to Japan in compliance with the Basel Treaty, and a refining company recovers and recycles lead and valuable metals (gold, silver, copper, platinum and palladium). Several Japanese companies with operations at Laguna have joined forces with Toshiba to promote environmental activities. End-of-use fluorescent lamps discharged by these companies are imported to Japan and recycled after treatment of toxic mercury. Toshiba Group is transferring advanced environmental technology to subsidiaries in developing countries and is working to achieve appropriate treatment and recycling of discharged waste worldwide.

## Response to soil and ground water pollution

### Pollution by organochlorine solvents and overall commitment

Toshiba has conducted a survey of soil and ground water pollution at its factories. At present, purification of ground water and monitoring are being done at Fukaya Operations in Saitama prefecture, Komukai Operations and the Microelectronics Center in Kawasaki, Yanagicho Complex in Kawasaki, Toshiba Carrier Corp. (former Fuji Works of Toshiba Corp.) in Shizuoka prefecture, Nagoya Branch Works in Nagoya, Osaka Operations in Osaka prefecture, Taishi Area of Himeji Operations in Hyogo prefecture and Oita Operations in Oita.

At eight operations and Nagoya Branch Works, 473 pumping wells are installed and 233 observation wells are in operation for monitoring trends. In fiscal 2000, about 1,570kg of solvents was collected by pumping up water. Moreover, at three factories, 40 soil gas suction wells are in operation and about 65kg of solvents was collected from soil. Concentration of pollutants in ground water is declining at a moderate pace.

### Progress at Nagoya Branch Works

In response to the detection of trichloroethylene pollution in 1997, Toshiba conducted a thorough investigation and analyzed the results in accordance with the guidance of Nagoya City and the Pollution Countermeasure Study Committee\* established by Nagoya City. Based on the analysis, chemical decomposition using iron powder\* was adopted as a purification measure and implemented at the site of the former plating workshop.

In July 1999, at first 43 purification piles were installed at the eastern and southern areas of the former plating workshop site. Since February 2000, work has advanced step by step with the installation of an additional 81 purification piles in



Restoration work at former Kawasaki Complex

the vicinity of the former plating workshop site, at the initial plating workshop and the boundary area on the eastern edge of the factory. A total of 124 purification piles were installed by October 2000, and the planned purification work was completed. Monitoring of ground water by observation wells shows that concentration of pollutants in ground water is declining, thereby confirming the effectiveness of the measure implemented. Periodic monitoring will continue.

\*Pollution Countermeasure Study Committee: Nagoya City Soil and Ground Water Pollution Countermeasure Study Committee

\*Chemical decomposition using iron powder: Chlorine is separated from organochlorine compounds by means of the reduction function of iron, and organochlorine compounds are decomposed into non-toxic substances. Holes were excavated in the subject areas and then purification piles, which work as pile-shaped reactors, were constructed by filling the holes with a mixture of iron and cracked stones to ensure water permeation. Purification is performed when polluted ground water passes through these piles.

### Investigation of soil at the former Kawasaki Complex and measures

Following termination of operations at the former Kawasaki Complex, Toshiba conferred with Kawasaki City and conducted an investigation and implemented measures in accordance with Kawasaki City's guidelines.\*

Investigation of documents clarified the fact that organic phosphorous compounds and heavy metals other than agricultural chemicals had been handled at the site. As a result of the detailed investigation (surface soil and boring investigations), measurements revealed

that mercury, arsenic, lead and cyanogens were present in amounts in excess of the environmental standards. Also, it was confirmed that certain portion of soil contains cadmium in excess of the reference value\*. The maximum measured values were arsenic 4.5mg/l (elution limit\* 0.01mg/l), mercury 0.13mg/l (elution limit 0.0005mg/l), lead 0.79mg/l (elution limit 0.01mg/l), and cyanogens 1.1mg/l (not to be detected).

Soil that contains chemical substances exceeding the elution limits will be excavated and removed, and, following intermediary treatment, will be discharged to a supervised final disposal site. Soil that contains chemical substances exceeding the reference value will be shielded at the site and measures will be implemented to prevent diffusion or scattering. Implementation of these measures started in February 2001 and they are scheduled to be completed in March 2002.

It was confirmed that ground water at the site is not polluted by organochlorine solvents or heavy metals. Ground water was investigated in 1998 for organochlorine solvents in accordance with the guidance of Kawasaki City and recently for heavy metals. Monitoring of soil and ground water will continue.

\*Guidelines: Kawasaki City Soil Pollution Countermeasures Guidelines  
\*Reference value: Reference for treatment regarding the quantity of a substance contained in soil and not eluted into water

\*Elution limit: Limit of the quantity of a substance eluted from soil into water  
Efforts to purify soil and ground water will continue at all operations of Toshiba.

# PCB (polychlorinated biphenyl)

## Storage and control

Since 1972 when manufacturing of products using polychlorinated biphenyl (PCB) ceased in Japan, some 20 Toshiba operations in Japan have retained PCB and products containing PCB in storage under strict control. The products stored are semi-manufactured products left over when production lines were taken out of service, parts and materials, power incoming/transformer facilities and fluorescent lamp ballasts. As of 2000, the products stored include 111 high-pressure transformers, 5,792 high-pressure condensers, about 70,000 low-pressure condensers, fluorescent lamp ballasts and other equipment and 173kl of waste oil (including oil containing trace amounts of PCB), waste cloth and paper to which PCB is adhered.

For strict control, these products are stored in a dedicated building at each operations site in compliance with the prescribed rules. Moreover, dikes and double containers (receiver tanks) are installed to ensure safety.



Building stored PCB



Storage of high-pressure condensers

## Plan for in-house treatment

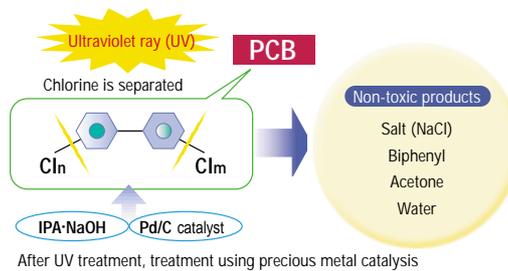
Recently, a committee appointed by the Japanese government pointed out that continuing storage does not constitute a fundamental solution to the problem posed by PCB. What is required is the treatment of PCB and products containing PCB as soon as possible using reliable technology. It is in this context that Toshiba has set itself the goal of completing treatment of its entire stock of PCB stored in house by fiscal 2010.

For this purpose, Ukishima Resource Recycling Center (tentative name) will be established and a small-scale treatment facility will be constructed. That facility will use an in-house developed optical catalysis decomposition method for safe recycling of PCB.

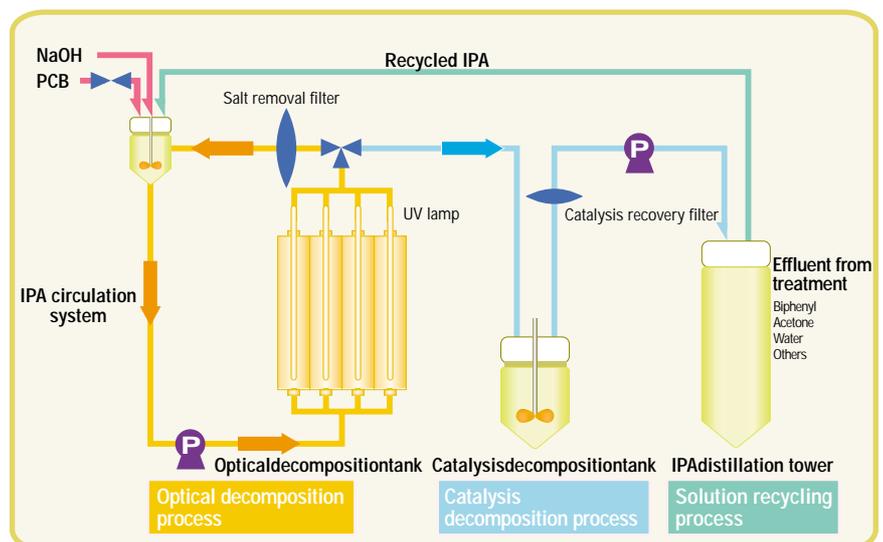
Toshiba's optical catalysis decomposition method was approved

by the Ministry of Health and Welfare on October 1, 2000. The principle of this method is as follows: PCB is diluted using alcohol and irradiated by ultraviolet ray, and by means of palladium-based catalysis it is transformed into non-toxic salt and biphenyl. (Refer to the figure below.) Ukishima Resource Recycling Center will detoxify PCB stored at Toshiba's Hamakawasaki Operations in Kawasaki. Toshiba is keeping local residents fully informed of its intentions and construction will start as soon as the necessary approvals are secured from the municipality. Operation of the treatment facility is scheduled to start in fiscal 2001. This facility will be able to treat a 4.6kg batch of PCB every 48 hours. That means 1 ton of PCB will be treated in four years.

Once experience has been gained at the Ukishima Resource Recycling Center, Toshiba intends to construct a larger treatment facility. Eventually, Toshiba would like to apply its expertise to the treatment of PCB stored by other companies and organizations in Japan.



## Principle of optical catalysis decomposition method and facility outline



# Environmental considerations in products



## Development of environmentally conscious products

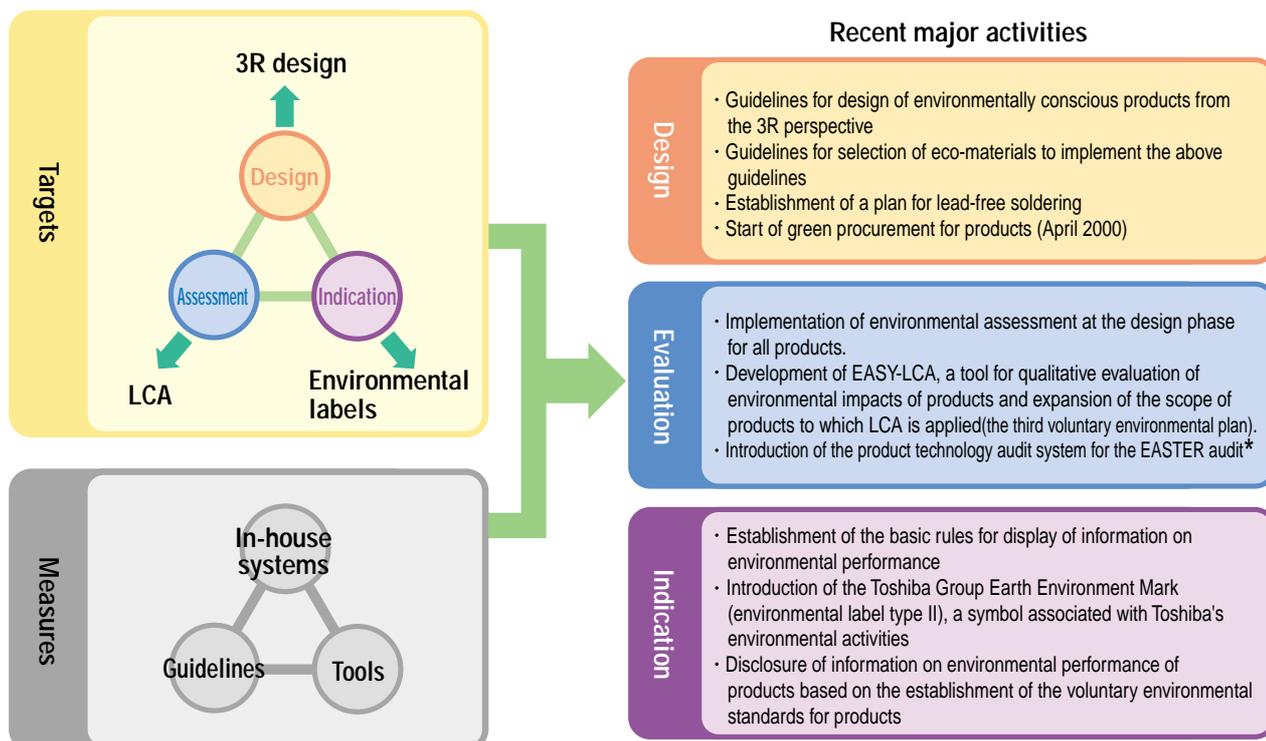
Toshiba strives to create environmentally conscious products (ECPs): that is, products whose environmental impacts are minimized at every stage of their entire life cycles—from materials procurement, manufacturing and distribution, through to consumption and eventual disposal. All Toshiba products are subjected to environmental assessments. Toshiba considers there are three aspects to environmentally conscious products (ECPs). They are design, assessment and indication, and specifically, environmentally conscious design, life cycle assessment (LCA) and environmental labels. The figure below shows Toshiba's recent activities in terms of in-house systems, guidelines and tools to promote development of ECPs. In view of the expansion of green procurement, Toshiba is strongly promoting establishment of an in-house

system for environmental labels. Toshiba has established the basic rules for display of environmental performance that provide for presentation of environmental performance of a product in advertising etc. Moreover, the scope of voluntary environmental standards, established for PCs in fiscal 2000, has been extended to include other main products, thereby providing a framework for dissemination of information on environmental performance of products for the third voluntary environmental plan. Green procurement at affiliated companies started in April 2001, and a system for green procurement was established. In design, in addition to the 3Rs (reduce, reuse, recycle), use of lead-free soldering is being promoted. The basic technology to be used throughout Toshiba is being developed at the

Corporate R&D Center. In fiscal 2000 lead-free soldering was adopted for washing machines, microwave ovens and other consumer products. Our efforts to create ECPs have met with considerable success. In February 2001, Toshiba air conditioners for use in stores won the President's Prize of the Japan Energy Conservation Center. This is the seventh award Toshiba air conditioners have won. In December 2000, Toshiba's notebook personal computers gained the Blue Angel Mark (environmental label type I), a German certification for products with excellent environmental performance. Toshiba's are the first notebook personal computers to gain this mark.



Toshiba considers design, assessment and indication to be the three aspects of environmentally conscious products (ECPs) and is establishing in-house systems, guidelines and tools to promote development of ECPs.



\*Toshiba's internal audit (Refer to Page 14.)

## Washing machine/dryer

In February 2000 Toshiba introduced the world's first washing machine/dryer equipped with a direct drive (DD) inverter, model TW-F70. Thanks to its extremely quiet operation, the TW-F70 became very popular.

The TW-G70, introduced in January 2001, provides higher basic performance and easy-of-use than its predecessor. Unlike other drum-type washing machines, the TW-G70 can use regular detergent powder because it is equipped with a function to detect

and control excessive bubbling.

### (1) Detergent saving

The new detergent amount indicator shows how much detergent should be put in based on sensing of the amount of washing by the DD inverter motor immediately after the start of operation. Indication of the optimum amount of detergent prevents use of too much detergent.

### (2) Environmental considerations

Due to improvement of the control system, noise is further reduced to

35dB for washing, 44dB for spinning and 40dB for drying.

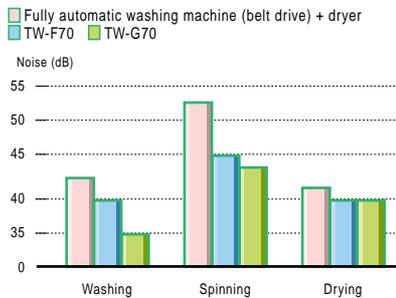
In accordance with Toshiba's policy of using easy-to-recycle raw materials with less environmental impacts, the following was adopted.

- Adoption of lead-free soldering (approximately 20g)
- 50% reduction in use of cardboard for packaging

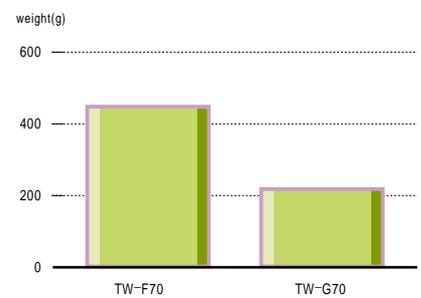


washing machines/dryer(TW-G70)

### Comparison of noise



### Comparison of weight of cardboard



## Refrigerators

### (1) Reduction of power consumption

In 1998, Toshiba revolutionized the cooling system of refrigerators by developing the twin cooling system. With the twin cooling system, two dedicated coolers are used for the freezer compartment and the refrigeration compartments to achieve optimum control of the freezing cycle

and the refrigeration cycle.

Products introduced in fiscal 2000 are also equipped with energy-saving technologies for reduction of power consumption. The advantages are as follows:

- Improved efficiency of freezing cycle by a cooler pipe with spiral groove
- Optimized control of inverter compressor frequency
- Reduced heat loss at the partition
- Improved efficiency of the DC inverter compressor
- Reduced loss of the power drive circuit

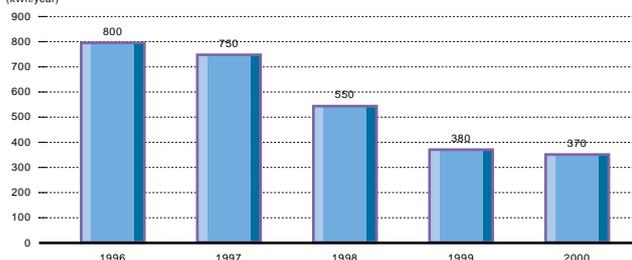
### (2) Commitment to environmentally conscious refrigerators

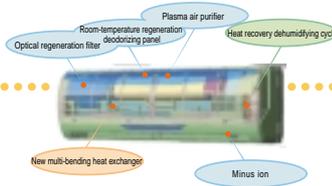
Toshiba is committed to achieving environmentally conscious refrigerators not only in terms of energy saving but also in various other respects. Refrigerators introduced in fiscal 2000 can retain the freshness of foods for three times the length of time possible with previous models, and so they help reduce food waste. Due to improved cooling capacity, storage at constant low temperature with high humidity is possible and plasma deodorizing and an anti-bacteria function are adopted. R&D of easy-to-recycle products using materials and parts with little environmental impact has been stepped up.



Refrigerator (GR-472K)

### Power consumption 460L class (kWh/year)





Room air conditioner (PDR series)

## Room air conditioners

Room air conditioners's power consumption during their life cycle, exceed those of other home appliances. Room air conditioners are subject to the Energy Saving Law and the Recycling Law and the switch to non-freon refrigerant will become mandatory. In view of this legal framework, Toshiba is developing new technologies.

In addition to adoption of a new refrigerant (R410A), innovative technologies are employed for key components and control systems to achieve resource saving (reduced parts count and improved recyclability) and energy saving (reduced energy consumption during operation).

### (1) Energy saving

Regarding energy utilization efficiency, average COP for cooling and heating of 5.77 (standard set by the Energy Saving Law: 4.90) is achieved. Annual electricity consumption is reduced to

922kWh, which is about 46% of the power used by a model introduced eight years ago. Heating performance at low temperature of 5.9kW is the best in the industry. Display of electricity charge on the remote controller enables users to execute energy-saving operation that meets their needs.

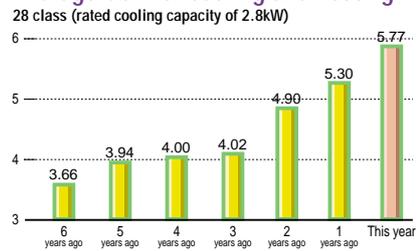
### (2) Energy saving technology

To enhance the efficiency of the compressor, thin, low-heat-loss electromagnetic steel plate is adopted. Vector control, which is considered to be the best possible motor control, is adopted for the drive control of inverter air conditioners, for the first time in the industry. A digital signal processor (DSP) is used for the vector control.

### (3) Environmental protection

Since fiscal 1997, HFC refrigerant R410A whose ozone depleting coefficient is zero is adopted for all main models, and Toshiba gained the Ozone Layer Protection Award. An air purifying function and a function to generate negative ions are equipped to ensure health and comfort.

### Average COP for cooling and heating



28 class (rated cooling capacity of 2.8kW)  
COP (coefficient of power)  
COP = capacity (kW) / power consumption (kW)  
The average value of cooling COP and heating COP is used for cooling/heating models.

## Air conditioners for use in stores

In the industry, the switch to a new refrigerant whose ozone depleting coefficient is zero, reduction of CO<sub>2</sub> emission and energy saving are urgent issues from the viewpoint environmental protection.

Air conditioners for use in stores constitute an important portion of the industrial air conditioner business. To address the issues mentioned above, Toshiba commercialized the Super Power Eco series of air conditioners for stores.

At the Energy Saving Awards for fiscal 2000, this series won the President's Prize of the Japan Energy Conservation Center. The inverter-driven DC rotary compressor used for this series also won the Award of the Director-general of the Agency of Natural Resources and Energy.

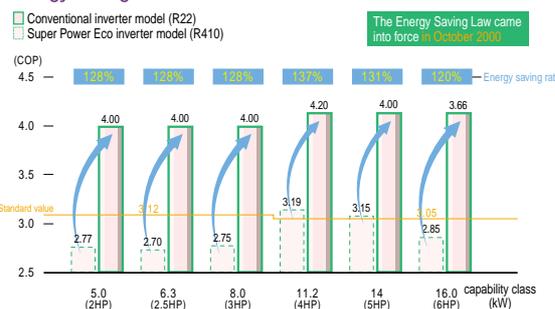
### (1) Protection of the ozone layer

Toshiba was the first company in the industry to adopt R410A, a new refrigerant whose ozone depleting coefficient is zero. It had been considered technically difficult to adopt R410A for industrial air conditioning.

### (2) Prevention of global warming

The inverter-driven DC rotary compressor and the vector control inverter for the DC motor bring the characteristics of R410A, high refrigeration capability and high efficiency, into full play, achieving the world's highest COP.

### Energy saving rate

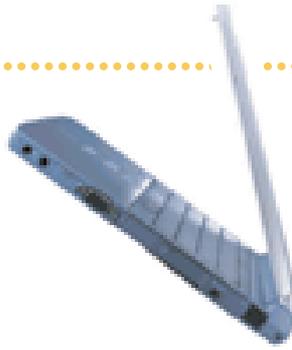


Air conditioner for use in stores (Super Power Eco series)

## Personal computers

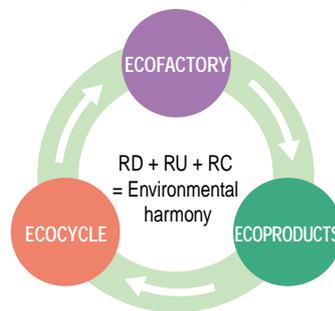
Toshiba adopted lead-free soldering for the printed circuit board of the DynaBook SS3490, a notebook personal computer introduced in February 2001. The printed circuit board of this model is made of halogen/antimony-free materials which Toshiba developed and began mass producing for notebook computers in November 1998.

The revised Recycling Law requires that manufacturers ensure the design of PCs facilitates the 3Rs (reduce, reuse, recycle), and accordingly, Toshiba is stepping up its efforts, focusing on compactness, resource saving, long life, upgradability for long-term use, and adoption of reusable units and recyclable plastics (use of recycled plastic materials for the body).



Lead-free, halogen/antimony-free print circuit board

For establishment of a recycling-based society



For establishment of a recycling-based society, Toshiba has set targets from the viewpoint of the 3Rs throughout product life cycles and is improving systems and developing tools for achievement of the targets.

- Reduce = Reduction of waste = RD
- Reuse = Reuse of parts = RU
- Recycle = Recycling of end-of-use products as raw materials = RC

These efforts resulted in gaining of the Japan Environment Association's Eco Mark certification for three types (290 models) of Toshiba notebook PCs for business use (DynaBookSS 3490 series B5-size slim PCs, 1 type (2 models), and DynaBook Satellite 4600 series A4-size notebook PCs, 2 types (288 models) in April 2001.

Toshiba's notebook PCs for Europe gained the German Blue Angel Mark (RAL-UZ93), the most prestigious environmental label in Europe, in December 2000. Toshiba's were the first notebook PCs to gain this mark. Information on voluntary environmental standards for PCs, environmental labels, PC recycling systems, response to the Green Procurement Law, etc. is available at <http://www.dynabook.com>.



Blue Angel Mark

## Copying machines

Copiers fix toner by applying heat and pressure to form copy images, a process requiring considerable power and time. In view of the desire to save energy and improve usability, there is increasing demand for copiers with low power consumption and short warm-up time.

To achieve these two attributes at the same time, a tough technical challenge, Toshiba developed a new fixer that uses induction heating (IH) instead of a conventional halogen lamp. The Premage 355 and 455 are the first copiers in the industry to be equipped with IH technology.

The principle of IH is as follows. By applying high-frequency current to the wire adjacent to the conductor, eddy current is generated to the conductor

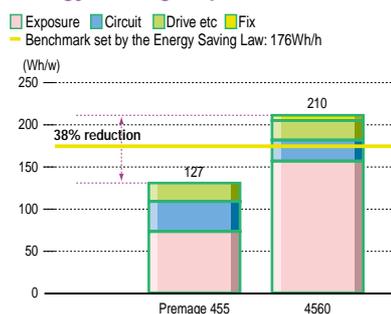
and the conductor generates heat by Joule heating. In contrast to the halogen lamp system which converts energy to light, energy efficiency is high and control of high-



Copier Premage 455

frequency current enables rapid heating and on-demand heating. Thanks to adoption of IH technology, the warm-up time of the Premage 455 is one eighth that of the conventional model (4560), and it takes only 30 seconds for the first copy after the power is turned on. Moreover, energy consumption efficiency, a criterion of the Energy Saving Law, is greatly improved; energy consumption was reduced by 38% to 127Wh/h, far lower than the benchmark set by the Energy Saving Law for 2006 (176Wh/h). Toshiba intends to expand the line-up of copiers and MFPs equipped with IH technology.

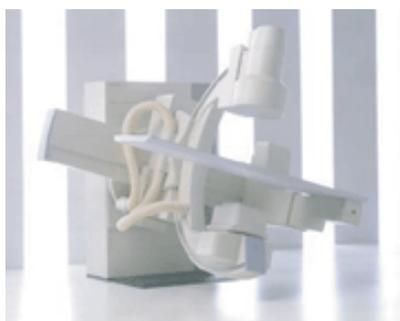
### Energy-saving impact



## Medical equipment

### Diagnostic X-ray system

Change of the drive system eliminated lead used for the balance weight. Also, to reduce environmental impacts, the material of the kaidak cover (vinyl chloride) is also changed. Furthermore, the parts count was reduced by 35% due to change of the circuit system.



Diagnostic X-ray system MDX-800A

### X-ray computed tomography system

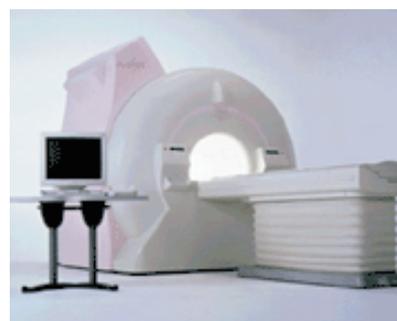
Thanks to development of high-density packages and a dedicated IC, a 40% reduction in the size of the printed circuit board and a 25% reduction in the parts count are achieved. To reduce use of substances with high environmental impacts, Toshiba is developing units using substitute materials.



X-ray CT system TSX-101A/4 series

### Magnetic resonance imaging system

The newly developed unit achieves a 39% reduction in energy consumption. Toshiba has developed a special tool for transport and is cooperating with overseas manufacturers on recycling of packaging materials.



MRI system MRT-2001/P3

## Automatic mail sorting system

Automatic mail sorting systems that read postal codes and addresses on mail and sort it automatically have been available for the past 30 years. The fourth-generation system processes mail by reading postal codes, addresses and barcodes. Toshiba has reduced the weight of the system by simplifying the mechanism, reduced use of materials that are difficult to recycle and reduced the time required for disassembly for recycling.

### (1) Mass reduction

As a result of the use of uniform parts for transportation of mail, the parts count of the mail sorting units was reduced to about one third and the mass greatly reduced.

### (2) Reduction of use of materials hard to recycle

Adoption of inverter control halved the number of motors. The number of printed circuit boards used for reading addresses was reduced to one fourth.

### (3) Reduction of time required for disassembly for recycling

To reduce the time required for disassembly, standardization of screws was promoted, thereby reducing the number of types of screws to one third and the number of screws to one sixth.



Mail sorting system TT-210

## Semiconductor products/Adoption of lead-free soldering

In accordance with Toshiba's voluntary environmental plan, and in response to the EU-Waste Electrical and Electronic Equipment and Reduction of Hazardous Substances Directives and customers' growing preference green procurement, Toshiba is systematically developing technologies for adoption of lead-free soldering for semiconductor products.

Semiconductor packages can be classified into the surface-mounted type, including the lead type and the ball type, and the pin insertion type. In principle, Toshiba intends to use Sn-Ag external plating as a substitute for Sn-Pb external plating for the lead type and pin insertion type, but Pd-PPF and Sn-Bi external plating will also be used during the transition. For the pin insertion type, Sn-Ag soldering dip can be used. For the ball type for BGA,

Toshiba has proposed use of Sn-Ag-Cu soldering, considering wettability and strength of the joint. Toshiba has already established basic technologies concerning heat resistance, which is a major issue in adoption of lead-free

soldering, and external plating technology. Samples are already available and semiconductor products using lead-free soldering have already been commercialized.

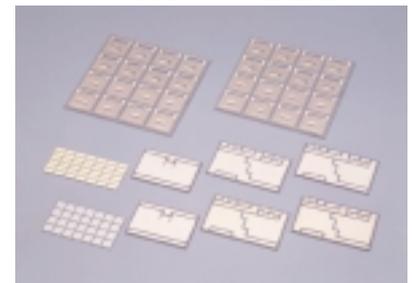
	Package		External specification			
	Package type	Internal structure	Sn-Ag	Sn-Ag-Cu	Sn-Bi	Pd-PPF
Surface-mounted type	QFP type		●		●	●
	SOP type		●		●	●
	SOJ type		●		●	●
	SON-QON-QFN		●			
	BGA type			●		
	FC BGA type			● (Chip bump)	● (Ball)	
Pin insertion type	Diode		●		●	●
	DIP type		●			●
	ZIP type		●		●	●
	Transistor		●			

## Highly heat conductive ceramic substrates using BeO substitute

Semiconductor substrates of power modules used for inverters require electrical insulation and high heat conductivity in order to dissipate heat. Beryllium oxide (BeO) has both characteristics. However, BeO is a toxic chemical substance and inadvertent inhalation of crushed BeO poses a health risk to humans. Also, its environmental impact when discharged is a problem.

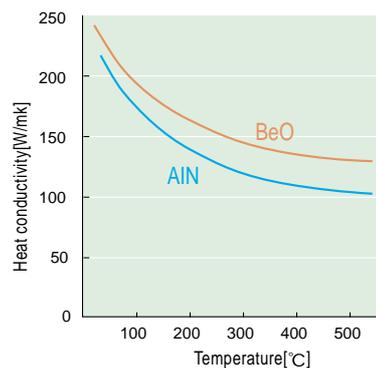
Heat conductivity of the highly heat conductive aluminum nitride (AlN) developed by Toshiba (max. 220W/mK) is 4 to 10 times higher than that of conventional Al<sub>2</sub>O<sub>3</sub> (alumina) and is equivalent to that of BeO. AlN also has other excellent characteristics, such as high electrical insulation (more than 10<sup>12</sup>Ω·m), thermal expansion coefficient (4.6 x 10<sup>-6</sup>/°C) which is close

to that of an Si chip, and low dielectric constant. Unlike BeO, AlN is not poisonous and is easy to handle. As a substitute for BeO, AlN is used for various types of semiconductor substrates, including metalized substrates, copper circuit junction substrates and multi-layer substrates.

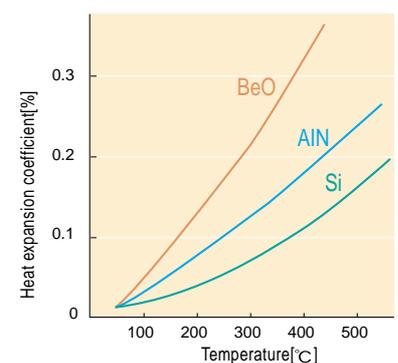


Various aluminum nitride substrates

### Comparison of heat conductivity



### Comparison of heat expansion coefficient



# Green procurement

Since April 2001, Toshiba has been conducting green procurement throughout its operations. Now, Toshiba is encouraging its group companies to start green procurement and is working to synchronize green procurement with creation of environmentally conscious products. Also, information systems to support green procurement are being established.

## Toshiba Group companies

Toshiba TEC Corp., Toshiba Lighting & Technology Corp. and 10 other manufacturing and sales subsidiaries in Japan started green procurement from April 2001.

These group companies apply the same criteria and procedures for evaluation of suppliers and procurement items as Toshiba and also apply the same classification for control of substances with considerable environmental impacts.

## Synchronization with creation of environmentally conscious products

Toshiba has included green procurement of materials and parts in the criteria of environmentally conscious products, and has positioned green procurement as an important activity for creation of environmentally conscious products. By linking the environmental performance data of procured items with product information at each stage of product planning, design and product assessment, the positioning of green procurement as a system to support creation of environmentally conscious products has been clarified.

## Information systems for green procurement

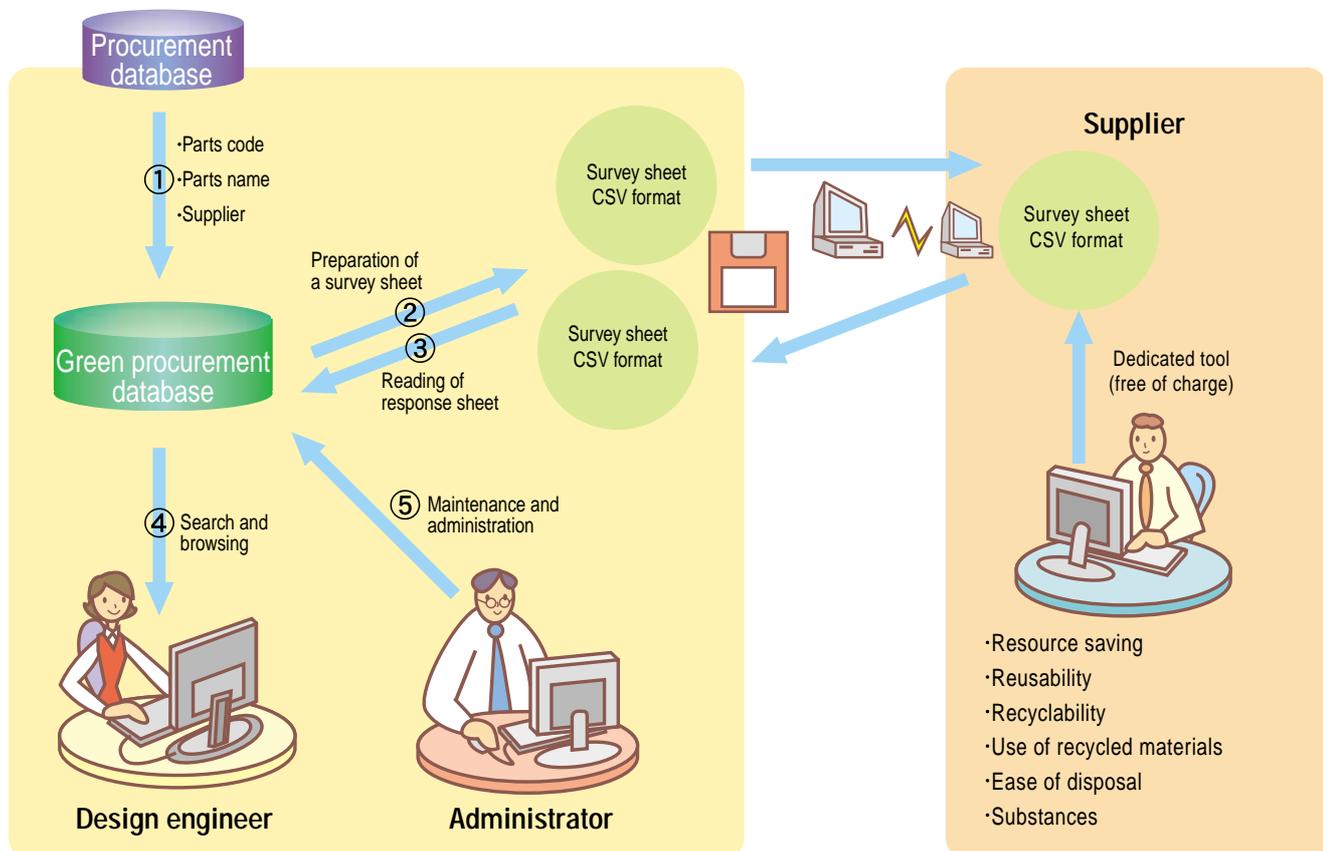
A supplier evaluation tool, green procurement database, and environmental performance survey tool were developed in-house and are used as standard tools within Toshiba Group.

The environmental performance survey tool allows transmission and receipt of electronic data, and thus enhances the efficiency of suppliers in responding to inquiries about substances with considerable environmental impacts contained in parts and materials and supports their efforts to construct databases.

To support green procurement of suppliers, Toshiba preparing to commercialize a software package containing green procurement-related systems.



## Concept of the green procurement system



# Environmental considerations at recycling



## Recycling of household appliances

The Law for Recycling of Specified kinds of Home Appliance enacted in June 1998 came into force in April 2001. Toshiba has set up facilities for collection and recycling of end-of-use home appliances (air conditioners, televisions, refrigerators and washing machines) throughout Japan. Vigorous promotion of the 3Rs (reduce, reuse, recycle) is essential for establishment of a recycling-based society. Recycling of home appliances is a part of this effort.

### Framework for recycling of home appliances

The flow of end-of-use home appliances in accordance with the Law is described below. End-of-use home appliances are first taken back by retailers and then transferred to take-back facilities designated by manufacturers. Toshiba has 190 designated facilities nationwide to take back end-of-use home appliances from retailers.

End-of-use home appliances collected at designated facilities are transferred to recycling facilities and turned into resources through disassembly, crushing and classification processes. Toshiba has set up recycling facilities throughout Japan, including Nishi Nihon Consumer Electronics Recycle Co., Ltd. in Kita-kyushu. It is costly to recycle high-quality raw materials suitable for use in the manufacturing of products. In accordance with the Law, the discarders of products are required to bear the costs for take-back of end-of-use home appliances and transport to designated take-back facilities, and recycling costs that include costs for transport of end-of-use home appliances from designated take-back facilities to recycling facilities, and costs for processing them for recycling. Retailers charge consumers for

collection and transport of end-of-use home appliances to designated take-back facilities and manufacturers charge retailers for recycling of end-of-use appliances taken back from retailers. These fees must be made public. Recycling fees of the four products manufactured by Toshiba, as of April 1, 2001, are shown in the figure below.

### Recycling processing technology

Basic recycling processes for the four products roughly consist of the following three processes.

#### (1) Separation and recovery of main parts and materials

In the case of air conditioners, compressors and heat exchangers are separated and CFC refrigerant is recovered. In the case of televisions, picture tubes are separated. In the case of refrigerators, compressors are separated and CFC refrigerant is recovered. In the case of washing machines, motors are separated.

#### (2) Crushing of main units

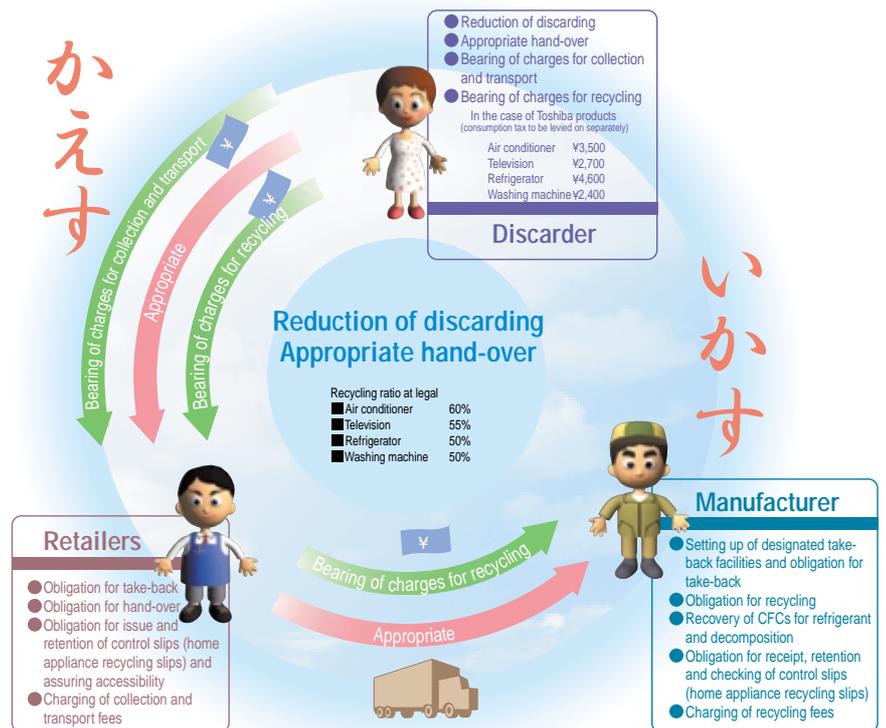
Main units after removal of main parts are shredded by large shredders.

#### (3) Separation of materials

Magnetic separators, eddy current separators and wind-force separators are used in combination to classify materials into iron, copper, aluminum, plastic, etc. Recovered materials are recycled as raw materials of products. Recycling rates mandated by the Law are indicated in the figure below.

### Development of next-generation recycling technology

Toshiba is developing next-generation recycling technology and environmentally conscious products. For example, technology for recycling of plastics, which are widely used in home appliances, is being developed. As part of the drive to establish a recycling-based society, it is essential to develop a more efficient recycling system and to develop excellent recycling technologies and environmentally conscious products.



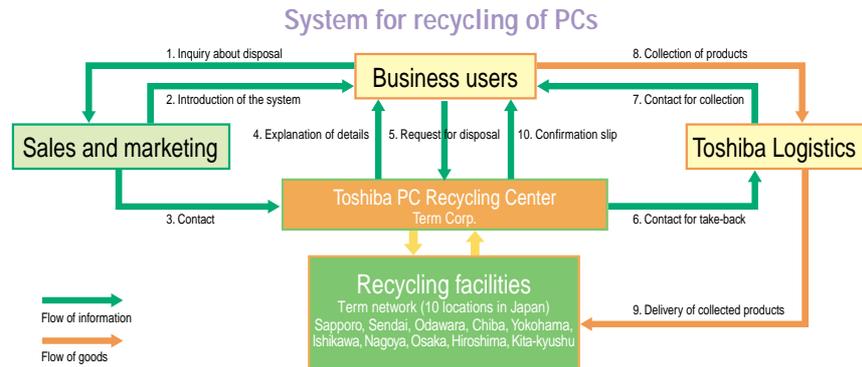
## Recycling of personal computers

In accordance with the Law for Promotion of Effective Use of Resources, Toshiba put in place a system for recycling of end-of-use personal computers from businesses in April 2000. To prepare for this system, Toshiba conducted verification experiments on material recycling of manually disassembled PCs in cooperation with Term Corp., a subsidiary engaged in the recycling business. Based on the accumulated know-how, collected PCs are classified into waste plastics, metal, glass, substrates and batteries and recycled through crushing, selection and cleaning processes.

Toshiba has set up Toshiba PC Recycling Center\* in Yokohama and recycling facilities in ten major cities including Sapporo, Sendai, Nagoya, Osaka, Hiroshima and Kita-kyushu for nationwide collection and recycling of end-of-use PCs discharged by businesses. Operation of this nationwide system started in April 2001.

### Outline of recycling

Products covered by this system are personal computers and display devices, and accessories sold with



these products (keyboard, mouse, cables, etc.) are also collected upon request of users. The Toshiba PC Recycling Center takes applications and provides quotations on charges for collection and treatment following confirmation of the models to be discharged and the number of units. Once a contract is entered into in accordance with prescribed procedures, products are collected, transported to a recycling facility, and disassembled and treated.

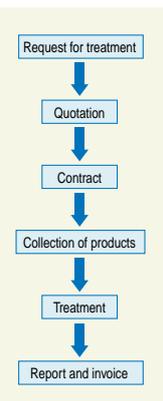
### Recycling target

The Law for Promotion of Effective Use of Resources stipulates recycling ratios to be achieved in fiscal 2003. Chemical recycling or thermal recycling are not considered to be "recycling" in the case

of PCs and reuse of parts and material recycling are required.

The target recycling rates are high: 50% for desktop PCs, 20% for notebook PCs and 55% for CRT and LCD displays. Accordingly, work of a high standard is required in manual disassembly and throughout the recycling processes.

On a regular basis, Toshiba issues instructions and gives guidance to recycling facilities at 10 locations.



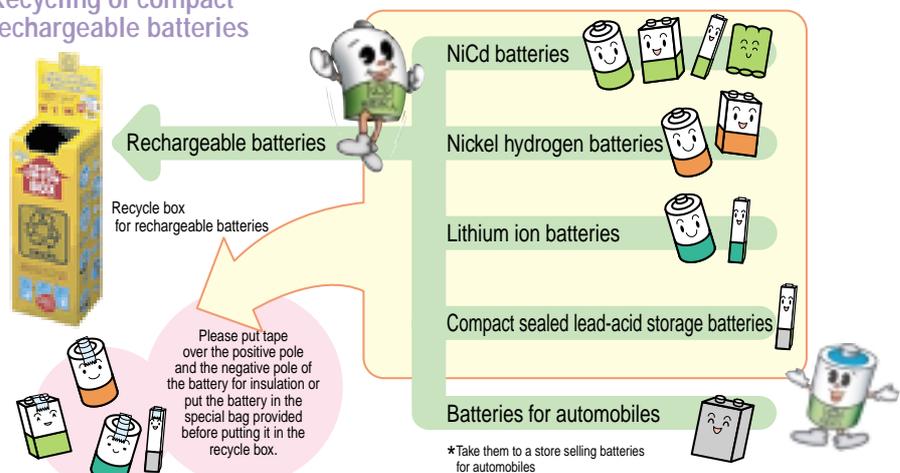
\*Toshiba PC Recycling Center at Term Corp.  
20-1 Kansei-cho, Tsurumi-ku, Yokohama 230-0034  
Tel: 045-510-0255  
(office open from 9:00 to 17:00)

## Recycling of secondary batteries

Many Toshiba products use rechargeable batteries. There are various types of rechargeable batteries NiCd batteries, nickel hydrogen batteries, lithium ion batteries and compact sealed lead-acid storage batteries. Resources such as nickel, cadmium, cobalt and lead are the main materials used in these batteries. For effective use of limited resources, Toshiba is collecting and recycling rechargeable batteries.

Toshiba is a member of the Compact Rechargeable Battery Recycling

### Recycling of compact rechargeable batteries



Promotion Center of the Battery Association of Japan and is active in

industry-wide efforts to promote recycling of batteries.

## Comprehensive solutions for the environment

At the dawn of the 21st century, it is incumbent on humankind to address the problem of global warming, exercise responsibility in the use of limited resources, and deal with various other issues. Based on the recognition that the Earth's environment is under threat, Toshiba is committed to doing its utmost to protect the environment. It is Toshiba's earnest desire to contribute to society through reduction of the environmental impacts of production activities, development of environmentally conscious products based on a consideration of manufacturing, use, disposal and recycling, development of recycling technologies, and construction of environmental plants and involvement in environment-related services.

With regard to comprehensive solutions for the environment, the key words are "reduce," "reuse," "recycle" and "recover."

For further information about environmental solutions, please contact the Environment Management Business Sales Department. Tel: 03-3457-2276

### Toshiba's comprehensive solutions for the environment

#### Consulting on environmental issues

Regional environment improvement plan  
Environmental business plan  
Investigation of environmental impacts  
Investigation of effects on the environment  
Basic plant plan  
Execution of plant plan  
Life cycle assessment

#### Services

Support concerning plant operation and maintenance  
Support concerning environmental information  
Support concerning environmental education  
Support concerning environmental audit  
Support concerning gaining ISO 14001 certification  
Environmental analysis

#### Businesses

Environmental information services  
Recycling of plastics  
Recycling of end-of-use household appliances  
Recycling of waste  
Environmental engineering

#### Tools

Environmental impact evaluation (LCA)  
Recyclability evaluation  
Ease-of-dismantling evaluation  
LCC estimation support  
Ease-of-assembly evaluation  
CAE and CAD  
Product environmental information  
Environmental data management  
PRTR support  
Chemical substance comprehensive control

#### Systems

Treatment system for heavily contaminated organic waste water  
Power generation system by conversion of food waste into gases  
Sludge gas fuel cell power generation system  
Thermal decomposition gas conversion, quality transformation, melting system  
Cogeneration system

#### Equipment

##### <Waste>

Food waste recycling equipment  
Thermal decomposition gas conversion equipment  
Oil reclamation equipment for waste plastics  
Dechlorination equipment for waste plastics  
Crusher for large waste

##### <Energy>

Cogeneration equipment  
Fuel cell, solar cell

##### <Water>

Ozonizer  
Electrodeless ultraviolet sterilizer  
Anaerobic bioreactor  
Equipment for converting sludge into gas  
Equipment for converting sludge into compost  
Centrifugal thin-film sludge dryer  
Waste effluent filtration equipment

##### <Atmosphere>

CFC decomposition equipment

### Food waste gas conversion power generation system Sludge gas fuel cell power generation system

#### <Conversion of food waste and sludge into energy>

Food waste and drain sludge, which previously were incinerated or disposed of by landfill, are converted into biogases for use in fuel-cell power generation to produce electricity and heat.



Verification test facility for conversion of food waste into biogases

### Treatment system for heavily contaminated organic waste water

#### <Efficient treatment of water using biotechnology>

For treatment of heavily contaminated waste water containing high concentrations of organic effluent at food processing plants, Toshiba developed a methane fermentation bioreactor that replaces conventional active sludge treatment systems.



Waste water treatment plant at a food processing factory

Reduce

Reuse

つかう

かい  
えか  
すす

Recover

Recycle

### Cogeneration system

<Environmentally friendly energy system>

Cogeneration systems promote energy saving and reduce emissions of CO<sub>2</sub> through effective utilization of electricity and heat. They are economical, too. Use of a cogeneration system in combination with commercial power sources assures stable power supply and reduces contract demand for commercial power.

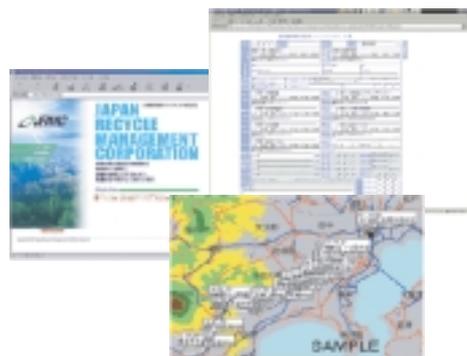


Toshiba Fuchu Operations' Energy Center

### Environmental information services

<IT-based information service for treatment of waste and discharge>

Toshiba executes preparation and control of manifest slips for waste and discharge on behalf of clients, and thus provides the information infrastructure for integrated control of discharge through to final disposal.



Computerized services

### Environmental consulting services

<Toshiba technologies are brought into full play>

To help realize a recycling-based society, Toshiba utilizes its expertise in the provision of consulting services on environmental themes.



Environmental education

### Environmental investigation and recovery services

<Purification of polluted soil and ground water>

Know-how accumulated through past experience is applied.



Ground water pumping injection system

Soil gas investigation

### Sapporo Plastic Recycling Co., Ltd.

<Oil reclamation from waste plastics>

In view of the Containers and Packaging Recycling Law, establishment of technologies for recycling of waste plastics is a pressing issue. In order to promote recycling of waste plastics, which previously were incinerated or disposed of by landfill, reclamation of oil from plastics has started on a commercial basis.



External appearance of the plant

### Thermal decomposition gas conversion system for quality transformation and melting

<Utilization of organic substances in a new form>

With this system, dioxin is within the limit stipulated by the environmental regulations and substances with value contained in residue are collected as resources for reuse.



10t/day verification plant

# Symbiosis with the community

## Working with communities for a better environment

In accordance with the spirit of the Basic Commitment, "Committed to People, Committed to the Future," Toshiba Group is actively contributing to further the goals of society as a good corporate citizen and is constantly seeking new approaches that help realize the goals of the world community, including ways to improve the global environment. In our work, we are striving to grasp the needs of communities in accordance with Toshiba Group's Standards of Behavior concerning Relations with Communities.

Toshiba's activities for the benefit of communities are classified into activities directly executed by the company and Toshiba employees' voluntary activities supported by the company.

### Activities of Toshiba Science Museum, Toshiba foundations and operations

Toshiba Science Museum, opened in 1961, welcomes over 110,000 visitors a year. Interest in science among children in Japan is said to be on the wane. Toshiba Science Museum is working to enhance children's interest in science through exhibitions and experiments.

Toshiba International Foundation, Toshiba America Foundation and Toshiba Thai Foundation are providing support in the cultural and educational spheres.

Toshiba's operations in Japan are working in their own right to meet the needs of local communities, for example, by organizing event in cooperation with local organizations.

### Provision of information on voluntary activities

Toshiba supports its employees' voluntary activities. An intranet site devoted to voluntary activities provides information on recruitment of volunteers throughout Japan, links to web sites of voluntary organizations, and introduction of the various activities Toshiba engages in so as to contribute to society.

### Standards of Behavior concerning Relations with Communities

Toshiba is committed to fulfilling its responsibilities as a member of the community through cooperation with local communities and by maintaining good relations with communities.

#### Standards of Behavior

Officers and employees are required to act in accordance with the following.

- (1) Respect the culture and customs of the communities in which Toshiba does business.
- (2) Participate in local organizations and cooperate with community activities vigorously in order to contribute to solving the problems of communities and to achieve benefits for communities.
- (3) Expand opportunities for contact with local communities in order to promote and secure the community's understanding of Toshiba's management policies and business activities.

### Supporting employees' activities

In addition to providing financial support to voluntary organizations in which Toshiba employees participate, Toshiba itself is directly involved in certain voluntary activities on a continuous basis. One of them is KIDS, a group working for handicapped children. Toshiba is providing support to KIDS and many Toshiba employees are participating in various events organized by KIDS and deepening exchange with children and people in the community.

Some Toshiba employees are actively involved in non-profit organizations (NPOs) and non-governmental organizations (NGOs). In particular, they spread the word about what is happening in the voluntary sector.



Children are fascinated by experiments at Toshiba Science Museum



Charity concert Toshiba headquarters in support of Miyakejima Island following the volcanic eruption there



International exchange program organized in cooperation with voluntary organizations in Minato-ku, Tokyo



Former members of Toshiba Fuchu Rugby Team, one of the strongest company teams in Japan, coach children at Fuchu Junior Rugby Club



## Occupational safety and health

To a considerable degree, business activities derive their vitality from the physical and mental well-being of employees. It is important for management and supervisors to ensure the safety and well-being of employees through appropriate management of safety and health. It is important that employees have opportunities to derive personal satisfaction from their work. Toshiba is endeavoring to provide working environments that encourage employees to realize their potential and are conducive to the achievement of personal satisfaction.

For this purpose, it is necessary to grasp the actual situation of workplaces that are changing dramatically as a consequence of technological innovation and to forecast developments. Prior to use of new types of raw materials, it is important to execute scientific examination from the viewpoint of safety and hygiene and prevention of environmental pollution and to implement preventive measures.

### Safety control

Toshiba has long been working to eliminate the occurrence of accidents at work. The figure shows rates of occurrence of accidents at work per one million hours. Compared with the average for industry as a whole in Japan and that for manufacturing industry, Toshiba is doing very well. And we are stepping up our efforts to eliminate accidents. A risk assessment method is used to clarify potential risk factors so as to enhance safety. As a part of its efforts to eliminate accidents at work, from fiscal 2001 onward Toshiba intends to vigorously promote activities that incorporate the guidelines of the Ministry of Health, Labour and Welfare for safety and hygiene management systems, in addition to the conventional safety and hygiene control techniques.

Rates of occurrence of accidents at work  
(per one million hours)



### Occupational health control

procedures, use of non-toxic substitutes, control of working environments, work control and health control are promoted to prevent any medical problems associated with occupations.

To realize comfortable workplaces, working environments, work procedures and workplace life support systems have been evaluated using a quantitative evaluation system developed by Toshiba. The number of workplaces considered by the employees who work in them to be inconvenient or unpleasant has decreased greatly in recent years. Keeping fit is largely up to the individual. However, Toshiba is utilizing its corporate network system (TOPSS) to support the efforts of employees to get in shape in the event that the periodic health check-up indicates that they have problems. Such employees have an opportunity for personal consultations with medical professionals who use a PC-based tool to advise them on what they need to do in order to cultivate healthy lifestyles. Toshiba is vigorously working to enhance awareness of employees

maintaining good mental health. Education is provided for employees and supervisors and information on mental health is available on the intranet and in in-house magazines. Healthcare staff are making efforts to improve their skills and to share their expertise and experience. Based on cooperation between healthcare staff and the corporate health insurance association, a hot line has been opened for employees and their families so that they can receive advice from health-care professionals.



Consultation on the results of a health check-up

## Environmental communication

Toshiba Group has been enhancing its environmental protection activities on a continuous basis. We are stepping up our environmental protection efforts, and at the same time, intend to disseminate environmental information through various media in order to communicate Toshiba's viewpoint and activities.

### The 10th Toshiba Environment Technology Exhibition

The 10th Environment Technology Exhibition held in February 2001 at Toshiba headquarters building was the first such exhibition to be open to the general public. It attracted some 2,600 visitors, including customers, central and local government officials, journalists, academics, people engaged in environmental protection at other companies and employees of Toshiba Group.

The main theme of the exhibition was Toshiba's environmental activities concerning personal computers. Additionally, detoxification of polychlorinated biphenyl (PCB), recycling of home appliances, lead-free soldering and CO<sub>2</sub> absorption ceramics were exhibited and attracted considerable attention. We also received many written comments on the content and style of the exhibition themes. A selection of these comments representing the spectrum of opinions expressed are presented at right.

Bearing these comments in mind, we are expediting our efforts to commercialize certain systems and reconsidering the content and size of the exhibition in order to make it more accessible.



Visitors at the exhibition

#### Visitors' comments

- "Treatment of PCB is a social issue. A treatment plant should be established as soon as possible."
- "I am keen to watch industry trends now that the Law for Recycling of Specified Kinds of Home Appliances has come into effect."
- "Toshiba provided a good explanation on how it is shifting to lead-free soldering."
- "What is needed is commercialization of a recycling system for thermosetting resins as soon as possible."
- "Improvement of workplaces, for example in terms of energy saving, provides a good point of reference for us."
- "It would be better if benefits to consumers were shown."
- "Toshiba has many innovative technologies and products. It should publicize them more."
- "I hope subsequent exhibitions will also be open to the general public."
- "It would be a good idea to make the exhibition more lively, for example by making greater use of videos."
- "Too many items are exhibited. Display panels should clarify the main points in fewer words."

### Readers' comments on Toshiba Environmental Report 2000

The following are some comments from readers who responded to the questionnaire distributed with the report.

- "Pollution of ground water and the clean-up are described in detail." (Male, 54 years old)
- "Some very important subjects are treated in depth. Although an effort has been made to ensure that the report is accessible, it is still a little too difficult for the general public." (Male, 35)
- "Regarding the voluntary environmental plan's items that were not achieved, an explanation should be provided and the issues involved clarified." (Male, 58)
- "I now have a good understanding of Toshiba Group's environmental impact because of the many useful graphs included in the report." (Male, 41)
- "It would be better if a title were provided on the spine of the report for filing purposes." (Male, 40)
- "The report would be more accessible if the text were broken up by the use of more visuals." (Male, 38)
- "Disclosure of information on activities at each factory is desirable." (Male, 37)



- "Toshiba should raise viewers' awareness of environmental protection by broadcasting commercials on environmental themes during the Toshiba Sunday Theater TV program." (Male, 25)
- "Replacement of a product with an environmentally friendly product means that the previous product becomes waste, and even if the recycling rate increases, the volume of waste will continue to increase. It would be better if only the accessories were replaced." (Female)
- "There are too many small graphs. The report would be easier to understand if only important graphs were included and were made bigger." (Female, 19)
- "I am impressed by Toshiba's attempt to put a monetary value on the benefits of environmental protection activities regarding substances in its environmental accounting." (Male, 32)
- "Preparation of a report based on the six sigma approach is interesting, but evaluation by an external audit should also be included." (Male, 54)

We welcome readers' comments. Indeed, your comments will change Toshiba Groups environmental reports.

## Environmental Report for Children

Toshiba's Corporate R&D Center compiled an Environmental Report for Children. The report, designed for youngsters in grades four to six, introduces Toshiba's environmental activities. In an outreach program for elementary schools in Kawasaki, pupils visited the Corporate R&D Center and Toshiba employees gave talks at schools. Questions from children and teachers' comments were reflected in the making of the Environmental Report for Children. The report includes a comparison of consumption of electricity and water at home and at the Corporate R&D Center, and various environmental problems are outlined along with what Toshiba is doing to solve them. It explains if everyone makes a small effort, the combined impact can be greater than that of any company. This report includes useful teaching materials for environmental education at elementary schools.



## Decolorable ink

In order to recycle paper with printing on it, large inputs of electricity, water and chemicals are required for bleaching. Toshiba's Corporate R&D Center developed decolorable ink that vanishes easily when treated with heat or alcohol. This ink was featured as an example of environmentally friendly technology in a science textbook for junior high school students. In recent years, the amount of attention paid to environmental education has been increasing at elementary and junior high schools in Japan. Through vigorous disclosure of information, Toshiba intends to support environmental education.



## Environmental newsletter

Nasu Operations and Nasu Operations-Electron Tubes publish a monthly newsletter on environmental topics for employees, other companies that have premises within the factory sites and affiliated companies.

The objectives are to enhance awareness of both global and local environmental issues and to facilitate understanding of the environmental activities of Toshiba and Nasu Operations and Nasu-Operations-Electron Tubes so as to promote environmental protection efforts by everyone.

The environmental newsletter, issued on the first day of each month since November 2000, has been well received by readers.



## Cover of the Environmental White Paper for fiscal 2000

As a part of a summer festival at Fukuoka Operations, employees and their families are encouraged to create posters on environmental themes. The poster painted by Erika Mizohata, daughter of a Toshiba employee, was selected for the cover of the Environmental White Paper for fiscal 2000 issued by the Environment Agency.



I was delighted to receive the Award of the Director-General of the Environment Agency. I hope lots of people see my poster and that it triggers their interest in environmental issues.

Erika Mizohata

## Editorial comment

Toshiba Environmental Report 2000 received a commendation for excellence in the Environmental Report Awards sponsored by Toyo Keizai Shimpo Co., Ltd. and Green Reporting Forum. The detailed explanations and original approaches used in environmental accounting were praised.

In designing environmental reports and editing their content, communication with customers, shareholders, investors and other stakeholders will play an increasingly important role. We utilized the six sigma approach in creating Toshiba Environmental Report 2001, as we did in the previous year's report. Based on the "voice of customer," we aimed to achieve a report which addresses the needs of readers. The scope of Toshiba Environmental Report 2001 includes more group companies than ever before. And more information is disclosed than in the previous year's issue. We intended to provide easy-to-understand and informative descriptions. Some readers may find certain parts of the report rather too detailed or somewhat difficult to grasp. We welcome your comments on our efforts to improve our environmental report. The next environmental report is scheduled to be published in June 2002.



Commendation for excellence in the Environmental Report Awards

## History of Toshiba's environmental commitment

Toshiba has developed its anti-pollution activities step by step and put in place an organization to systematize and direct environmental protection activities. Thus, the scope and effectiveness of Toshiba's environmental protection activities have been progressively enhanced. In April 1988, Toshiba established the corporate-level Environmental Protection Center. In January 1989, the Environmental Basic Rules were introduced. The subsequent activities are listed in the table below. In April 1999, the organization responsible for environmental issues was renamed the Environmental Protection & Recycling Planning Center and its functions were enhanced and integrated.

In fiscal 2000 Toshiba received a commendation for excellence in the Green Awards and Ozone Layer Protection Awards sponsored by The Nikkan Kogyo Shimbun, Ltd. Also, Toshiba received the Fuji Sankei Award for its efforts to reduce environmental impacts of products



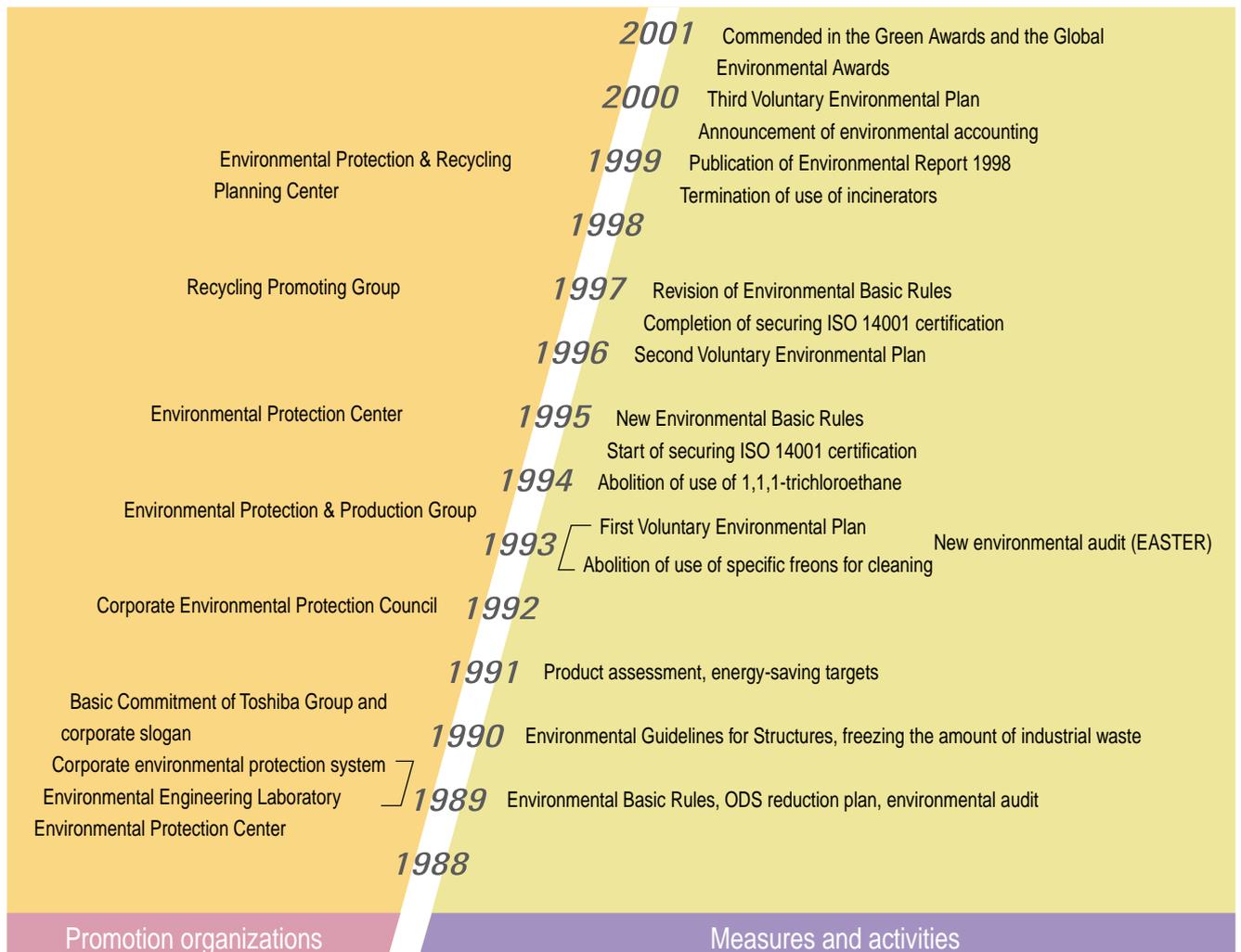
Toshiba received the Excellence Award in the third Ozone Layer Protection Awards

throughout their life cycles in the Global Environment Awards sponsored by the Japan Industrial Journal. Tadashi Okamura, president and CEO of Toshiba Corp., attended the ceremony in the presence of Prince Akishinomiya.



The Global Environment Awards' ceremony

### History of Toshiba's environmental protection activities



# Scope of Toshiba Environmental Report 2001

This report includes activities of Toshiba Corp. and its subsidiaries and affiliates listed below:

Toshiba Electronic Systems Co., Ltd.  
Tokyo Electronic Industry Co., Ltd.  
Toshiba Logistic Support Corp.  
Toshiba Control System Corp.  
Toshiba Industrial Products Manufacturing Corp.  
Toshiba Personal Computer System Corp.  
Toshiba Computer Technology Co., Ltd.  
Toshiba Multimedia Devices Co., Ltd.  
Toshiba Visual-Equipment Corp.  
Kitashiba Electric Co., Ltd.  
Iwate Toshiba Electronics Co., Ltd.  
Kaga Toshiba Electronics Corp.  
Fukuoka Toshiba Corp.  
Toshiba Components Co., Ltd.  
Kitsuki Toshiba Electronics Corp.  
Taketa Toshiba Electronics Corp.  
Buzen Toshiba Electronics Corp.  
Hamaoka Toshiba Electronics Corp.  
Yokkaichi Toshiba Electronics Corp.  
Himeji Toshiba E.P. Corp.  
A&T Battery Corp.  
Toshiba Hokuto Electronics Corp.  
Toshiba Metal Parts Co., Ltd.  
Toshiba Battery Co., Ltd.  
Toshiba Medical Manufacturing Co., Ltd.  
Toshiba Home Technology Corp.  
Toshiba Electric Appliances Co., Ltd.  
Toshiba Elevator and Building Systems Corp.  
Toshiba Elevator Products Corp.  
Term Corp.  
Toshiba Lighting & Technology Corp.  
Toshiba Shomei Precision Corp.  
Wako Electric Co., Ltd.  
Harison Toshiba Lighting Co.,Ltd.  
Toshiba TEC Corp.  
Fujiken Co., Ltd.  
Tosei Denki Co., Ltd.  
TEC Izu Electronic Co., Ltd.  
Toshiba Carrier Corp.  
Toshiba Carrier Engineering Corp.  
Fuji Toshiba Carrier Products Corp.  
Shibaura Mechatronics Corp.  
Toshiba Chemical Corp.  
Techno Chemical Corp.  
Toshiba Kyoka Plastic Kogyo Co., Ltd.  
Toshiba Logistics Corp.  
(46 domestic affiliated companies)

Toshiba Information Systems (UK) Ltd.  
Toshiba Europe GmbH  
Dalian Toshiba Television Co., Ltd.  
Toshiba Information Equipment (Philippines), Inc.  
Toshiba Singapore Pte., Ltd.  
Toshiba America Information Systems, Inc.  
P.T. Toshiba Consumer Products Indonesia  
Toshiba America Consumer Products, Inc.  
Toshiba Electromex, S.A. de C.V.  
Toshiba Computer Systems (Shanghai) Co., Ltd.  
Changzhou Toshiba Transformer Co., Ltd.  
Toshiba Semiconductor (Thailand) Co., Ltd.  
Toshiba Electronics Malaysia Sdn., Bhd.  
Toshiba Semiconductor GmbH  
Wuxi Huazhi Semiconductor Co., Ltd.  
P.T. Toshiba Display Device Indonesia  
Toshiba Display Devices, Inc.  
Toshiba America MRI Inc.  
Toshiba Consumer Products (Thailand) Co., Ltd.  
Toshiba Dalian Co., Ltd.  
Hangzhi Machinery & Electronics Co., Ltd.  
TEC Singapore Electronics P.L.  
TIM MalaysiaAdn Sdn.Bhd.  
Toshiba TEC Europe Image Information Systems S.A.  
Toshiba Copying Machine (S.Z) Co.,Ltd.  
Toshiba Lighting Products S.A.  
Toshiba Chemical Singapore Pte., Ltd.  
Tochemi Wuxi Electro-Chemical Corp.  
(28 overseas affiliated companies)

## Cover illustration

The birds with glorious plumage depicted on the cover are kingfishers, fellow creatures with whom we share the Earth. Like them we need water and vegetation to sustain our existence. The cover alludes to Toshiba Group's profound commitment to environmental protection in the 21st century.



Please address any comments or inquiries you may have on Toshiba Environmental Report 2001 to the following organization:

Environmental Protection & Recycling Planning Center  
Toshiba Corp.  
1-1-1 Shibaura, Minato-ku, Tokyo 105-8001, Japan  
Tel: +81-3-3457-2403  
Fax: +81-3-5444-9206  
email: environment@toshiba.co.jp



Toshiba Group Earth Protection Mark

## **TOSHIBA CORPORATION**

Environmental Protection & Recycling Planning Center  
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Tel: +81-3-3457-2403

Toshiba Environmental Report 2001 is available on the Internet at:  
URL <http://www.toshiba.co.jp/env/>

