- Environmental Management
- □ Targets and Results
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# **Environmental Management**

Toshiba Group wishes to play a leading role in establishing a sustainable society. By minimizing the environmental impacts of our business activities while creating new values through products, we aim to double Toshiba Group's overall eco-efficiency by fiscal 2010 compared with fiscal 2000.

# **Basic Policy**

Environmental management, as practiced by Toshiba Group, has two aspects: firstly, contributing to sustainable development of the Earth based on the creation of new values through products and, secondly, pursuing symbiosis with the Earth by reducing environmental impacts throughout business processes and products

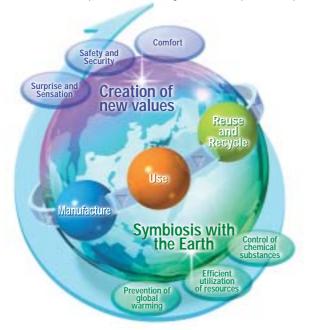
This concept informs our Environmental Vision 2010, which we are endeavoring to achieve by implementing the five-year Voluntary Environmental Plan encompassing concrete action plans and numerical targets for the entire Group.

These activities are in line with Toshiba Group's Basic Policy for the Environment established in 1991. This policy reflects our recognition that the Earth is an irreplaceable asset and it is humankind's duty to hand it on to future generations in a sound

#### Toshiba Group's Environmental Management

# Committed to People, Committed to the Future. TOSHIBA

Contribute to sustainable development of the Earth throughout our business processes and products



state. The policy was completely revised in December 2005 to achieve consistency with the Environmental Vision 2010.

## **Environmental Vision 2010**

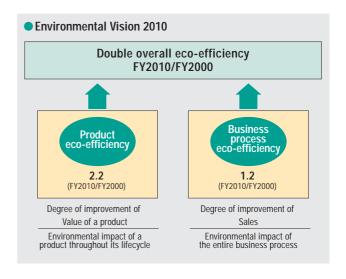
The environmental management that Toshiba Group aims to have in fiscal 2010 is expressed in Environmental Vision 2010. With this vision, the eco-efficiency concept has been introduced for determining targets.

In general, eco-efficiency is calculated by comparing the amount of value created and the amount of environmental impacts. For example, if production of a certain product has a large impact on the environment, eco-efficiency of that product is low. The greater the value created with a given environmental impact, the higher the eco-efficiency.

The key target of Environmental Vision 2010 is for Toshiba Group to double its overall eco-efficiency by fiscal 2010 compared with fiscal 2000. We are advancing toward this goal by promoting environmental management focused on enhancement of product eco-efficiency and business process innovation.



Basic Policy for the Environment



# A Unique Eco-efficiency Indicator

#### Factor T

Toshiba Group has devised a unique eco-efficiency indicator, Factor T, named after the initial "T" of Toshiba, "Factor" is a term used for indicating the degree of improvement of eco-efficiency. For instance, Factor 10 is a well-known concept calling for a tenfold increase in resource productivity or, in the other words, a tenfold increase in eco-efficiency.

Factor T proposed by Toshiba consists of two elements: product eco-efficiency and business process eco-efficiency. Product ecoefficiency is calculated by dividing the value of a product by its environmental impact. Business process eco-efficiency is calculated by dividing the amount of sales by the environmental impact of the business process. Toshiba Group's objective is to double overall eco-efficiency, which is the combination of product ecoefficiency and business process eco-efficiency.

In order to double overall eco-efficiency, Toshiba aims to improve product eco-efficiency 2.2 times and business process ecoefficiency 1.2 times. Procurement and usage account for 80% of the total environmental impacts of Toshiba Group products, with production accounting for the remaining 20%. The weighted average of 2.2 times for product eco-efficiency and 1.2 times for business process eco-efficiency is 2 times for overall ecoefficiency. (2.2 times for product eco-efficiency x 80% + 1.2 times for business process eco-efficiency x 20% = 2 times for overall eco-efficiency)

#### Product Eco-efficiency and Product Value

With Factor T, Toshiba has introduced an eco-efficiency concept taking into account not only the environmental impact but also the value of a product. The value of a product is calculated by evaluating the product's functions and performance based on the voice of customer. The environmental impact of a product is calculated by summing all the environmental impacts attributable to the product throughout its life cycle from procurement of raw materials to manufacturing, distribution, consumption and final disposal. (The total amount of environmental impacts is calculated using the Life Cycle Impact Assessment Method based on Endpoint Modeling (LIME) developed by the Research Center for Life Cycle Assessment, National Institute of Advanced Industrial Science and Technology, in collaboration with the LCA national project.)

Since the introduction of the Factor T concept for products in fiscal 2003, Toshiba Group has been working to expand the range of environmentally conscious products (ECPs). At present, Factor T is available for 50 of Toshiba' Group's 100 product groups. We intend to increase the coverage to 70 product groups by fiscal 2006.

Eco-efficiency of products whose Factor T is available is improving step by step. For example, eco-efficiency of refrigerators and air conditioners has improved thanks to their lower environmental impacts. In the case of mobile phones, the increase in environmental impacts as the component count rises in line with the trend toward multifunctionality has been more than offset by the increase in the value, resulting in higher eco-efficiency. For more information, please refer to the leaflet explaining Factor T.



Explanation of Factor T

#### **■ TOPICS**

# Dialog with ecomom Readers

In March 2006 Toshiba initiated a dialog with four readers of Nikkei Business Publications magazine "ecomom" on Toshiba's eco-efficiency indicator Factor T, home appliances and the environment.

Regarding Factor T, one of the participants commented that although the concept is a step in the right direction, it is difficult to understand. Another suggested it might be easier to grasp if the reduction in the environmental impact were expressed as a percentage or if CO2 emissions were expressed as the number of logs one would have to burn to emit an equivalent amount of CO2. Turning to environmentally conscious home appliances, they voiced their concerns about power consumption during operation and standby, as well as their desire for easy-to-recycle products. Other comments included: "I always try to choose honest companies whenever I make a purchase." "Nowadays, a commitment to the environment is taken for granted. But it would be nice to include a statement of that commitment on leaflets or brochures." "Companies should be willing to take back what they sell. By accepting responsibility for products from cradle to grave they would inspire trust."

Since we intend to make Factor T a more readily understandable and useful indicator, we are paying careful attention to these comments.





Participants with a keen interest in the environment offered plenty of ideas about products.

The producer of ecomom (left) facilitated the dialog.

# To Promote Environmental Management

#### Management System

Toshiba Group's environmental management comprises four principal items: 1) strengthening of the environmental management system, 2) creation of ECPs, 3) business activities designed to reduce environmental impacts and risks, and 4) vigorous environmental communication.

The Corporate Environmental Officer supervises Toshiba Group's environmental management. Toshiba Group's Environmental Management Promotion Organization, centering on the Corporate Environment Management Division which reports directly to the Corporate Environmental Officer, is responsible for formulating measures concerning environmental management.

The Corporate Environmental Management Committee is the supreme decision-making body on environmental management. Chaired by the Corporate Environmental Officer and consisting of executives, environmental management officers of in-house companies and overseas regional directors, the committee meets twice a year. It proposes solutions to problems concerning management, technology development, production and sales that are related to environmental issues, deliberates on how best to reflect the Environmental Vision in the voluntary environmental plan, determines the orientation of activities and reviews the progress made.

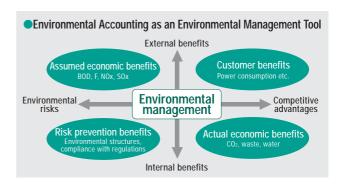
Its subordinate organizations such as ECP Promotion Committee formulate action plans and propose solutions. Under these committees, working groups tackle specific themes. In addition to the Regional Supervisory Environment Divisions covering

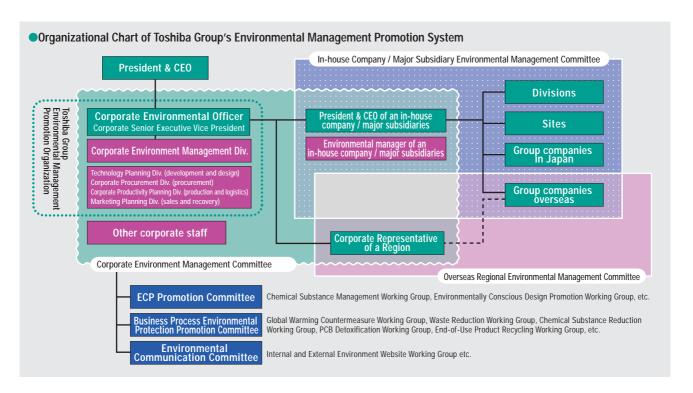
Europe, the Americas and China, a new Division was established in April 2006 to cover Southeast Asia and Oceania.

#### **Environmental Accounting**

In 1999 Toshiba introduced environmental accounting, a powerful tool for promoting environmental management. In the initial year, we emphasized clarification of the actual economic benefits resulting from reductions in waste disposal and energy consumption and of the assumed economic benefits resulting from a reduction in air pollutants etc. By incorporating customer benefits resulting from reduced power consumption since fiscal 2000 and risk prevention benefits since fiscal 2001. We have been working to enhance the integrity of environmental accounting. We intend to use environmental accounting as a tool for quantitative evaluation of the benefits of environmental management.







#### **Environmental Management System**

Toshiba Group is implementing a Plan-Do-Check-Act (PDCA) cycle to achieve continuous improvement of its environmental activities. To attain the numerical targets of the five-year Voluntary Environmental Plan, annual targets for each in-house company and major subsidiary are set (Plan), activities are implemented throughout the Group (Do), environmental measures implemented are reviewed and performance data is aggregated and analyzed (Check) for the purpose of attaining annual targets (Act).

In promoting environmental management, we emphasize a workplace-oriented approach. By 1997 all 16 sites of Toshiba Corporation had gained ISO 14001 certification. Of the 99 sites of Toshiba Group companies in Japan and overseas, 93 sites have gained ISO 14001 certification and the rest of the sites are working to gain certification.



## **Environmental Management Level Evaluation**

We introduced the Environmental Management Level Evaluation System in fiscal 2004 to comprehensively assess and analyze the quality of environmental management of in-house companies and major subsidiaries. Strengths and weaknesses of each company are analyzed based on evaluation of 67 items in six fields: 1) environmental policies and systems, 2) compliance and risk management, 3) business processes, 4) products and services, 5) disclosure and 6) communication. The results, fed back to companies' senior executives and environmental management officers, are used in the design of measures to achieve continuous improvement. Toshiba intends to reflect this system, which is an aspect of the environmental auditing of in-house companies and major subsidiaries, in the evaluation of business performance.

#### **Proprietary Audit System**

Since 1993 annual audits of sites of Toshiba Corporation and the Group companies have been conducted using Toshiba's unique audit system called EASTER (Environmental Audit System in Toshiba on the basis of ECO Responsibility). Each site receives a twoday EASTER audit coverings four aspects: 1) systems (environmental activity promotion systems), 2) workplaces (environmental facilities' compliance with internal criteria), 3) voluntary environmental plans (accomplishment of voluntary plans) and 4) technologies (environmental management system in terms of products, environmental performance, etc.). EASTER shares the workplace-oriented approach Toshiba has been emphasizing.

In fiscal 2003 Toshiba began applying EASTER to major sites overseas. Application of EASTER has inculcated the concept of preventive maintenance at overseas sites, leading to prevention of accidents or breaches of law. In fiscal 2005, 77 sites in Japan and 48 sites overseas received EASTER audits.

## **Environmental Management Information System**

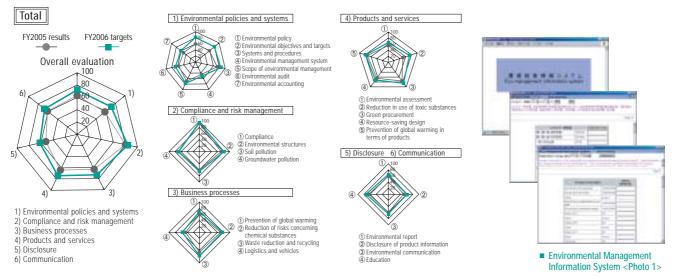
Since environmental management is implemented throughout Toshiba Group worldwide, the Environmental Management Information System was established in fiscal 2004 to manage environmental performance data of Toshiba Corporation and 368 consolidated subsidiaries. Using this system, data is gathered on environmental impacts such as energy consumption and waste discharge. < Photo 1>

In fiscal 2005 data management using this system became a routine task and the system was made available in several languages to facilitate global application.

#### Compliance with Laws and Regulations

In fiscal 2005, Toshiba Group was neither in breach of any law nor subject to any fine or other penalty concerning the environment.

#### Results of Evaluation of the Environmental Management Level



#### Communication with Stakeholders

Sharing of information on environmental activities and their results is not limited to Toshiba Group, since we consider it important to disseminate information to stakeholders. We are convinced that two-way communication leads to improvement of the quality of environmental management.

#### **Environmental Education**

In order to enhance the level of environmental activities, all Toshiba employees receive environmental education according to their positions, tasks and specialties. The curriculum consists of 1) education programs according to position, 2) general environmental education, 3) specialty education and 4) ISO 14001 education.

For corporate-wide general education, e-learning is utilized to eliminate travel time and improve the participation rate, enabling employees to take courses at remote branch offices and via mobile PCs during business trips.

Specialty education programs consist of ECP education and internal auditor education. The objective of ECP education is to ensure that engineers engaged in development and design fully understand the concept of ECP design. The program includes courses on environmentally conscious design and design techniques to facilitate recyclability. We intend to enhance the content of the general environmental education provided to all employees, while also enriching ECP education and expanding IT-based education.

As part of our efforts to raise employee awareness of matters environmental, we suggest they monitor the environmental impact of their own households.

#### **Environmental Communication**

At Toshiba Group, we stress environmental communication because we believe it is important to take the initiative in explaining to stakeholders what we are doing in the environmental field, and moreover, to welcome their requests, comments and suggestions. The 15th Toshiba Group Environment Technology Exhibition, held in February 2006 at Toshiba HQ, was one of the ways in which we reached out to our stakeholders, including the general public. More than 3,300 visitors were able to view and experience the exhibition's 101 themes covering, for example, ECPs to which the Factor T concept is applied, prevention of global warming, and environmental communication efforts around the world. This annual exhibition is a golden opportunity to connect with people who share our passion for the environment. We intend to make the fullest possible use of the exhibition in the years ahead. <Photo 2>

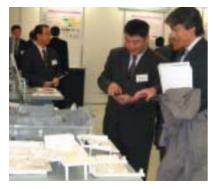
Other influential venues where Toshiba showcased its environmental achievements and reached out to stakeholders were Eco-Products 2005 (Japan), Eco-Products International Fair 2005 (Thailand), CES (U.S.) and CeBIT (Germany). < Photo 3>

Toshiba uses TV, magazines, newspapers and the Internet to communicate its environmental activities to as many people as possible. In fiscal 2005 Toshiba opened eco-web in japan, a gateway for information on what Toshiba is doing in the environmental sphere.

## Disclosure using Eco-labeling

Toshiba Group Earth Protection Mark, introduced in 1999, is a potent symbol of our resolve to disclose our products' environmental performances. Only Products in conformity with our Voluntary Environmental Standards for Products bear this hallmark of environmental excellence. It indicates that the product satisfies stringent criteria regarding energy saving, no use of toxic substances, design facilitating recycling, recycling of end-of-life products, etc. Also, if a particular aspect of the environmental performance of a product bearing the mark is truly outstanding, data confirming that attribute is included with the product.

The Voluntary Environmental Standards for Products appear in product manuals.



■ The 15th Toshiba Group Environment Technology Exhibition < Photo 2>



■ Eco-Products International Fair 2005 in Thailand <Photo 3>

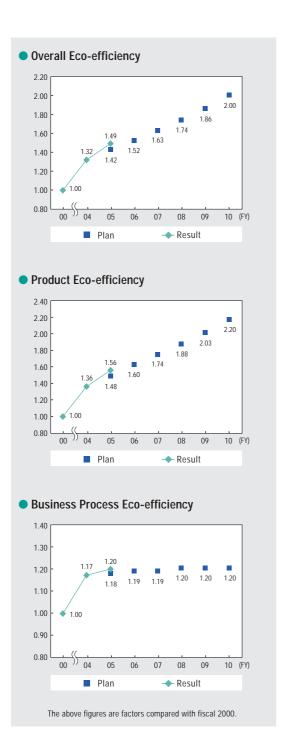
#### Toshiba Group Earth Protection Mark



Toshiba Group Earth Protection Mark

# **Targets and Results**

In accordance with the Fourth Voluntary Environmental Plan launched in fiscal 2005, we are moving ahead to attain the goals of the Environmental Vision 2010.



#### Fourth Voluntary Environmental Plan

Enhancement of product eco-efficiency		Indicator	
enviro	sion of onmentally ious products )	Ratio of ECPs to net sales	
	Abolition of use of certain chemical substances	15 substance groups contained in products*  *15 substance groups subject to restriction: bis (tributyl tin) oxide (TBTO), tributyl tins (TBTs), triphenyl tins (TBTs), polychlorinated biphenyls (PCBs), polychlorinated naphthalenes (PCNs with 3 or more chlorines), short-chain chlorinated paraffins, asbestos, azo colorants, ozone-depleting substances, radioactive substances, cadmium and its compounds, heavalatel thornoimum compounds, lead and its compounds, precury and its compounds, polybrominated diphenyl ethers (PBDEs).  *Detailed definitions and specific applications to be excluded are specified separately.	

Business process innovation		Indicator	
P 9	Reduction of energy-originated	Emission rate *1	
revo	CO <sub>2</sub> emissions	Manufacturing sites in Japan	
Prevention of global warming	Reduction of green- house gas emissions (other than CO <sub>2</sub> )	Total emissions	
	Reduction of CO <sub>2</sub> emissions associated with product logistics		
Management of chemical substances	Reduction of total emissions of chemical substances to air and water	Total emissions	
Effici of re	Reduction in the total quantity of waste generated	Rate of the total quantity of waste generated	
Efficient utilization of resource	Reduction in the quantity of waste for final disposal	Final disposal rate ( Sites achieving zero emissions of waste*2)	
tion	Reuse and recycling of products	Amount of recycling of used products*3	

Unless otherwise specified, the targets are based on comparison with fiscal 2000 and cover manufacturing and non-manufacturing sites in Japan and overseas. For the purpose of evaluating activities, rates used as indicators are based on physical quantity (net output).

Net output = Nominal output in Japan / Corporate goods price index (electrical equipment)

announced by the Bank of Japan for each year (the index for 1990 is 1) + Nominal output overseas

# Voluntary Action Plan

Fiscal 2005

In fiscal 1993 Toshiba launched the First Voluntary Environmental Plan, our first mid-term action plan. Subsequently, with each successive plan up to the current Fourth Voluntary Environmental Plan, we have expanded the scope to include more sites and business processes while setting increasingly tough targets.

# Fiscal 2005 Targets Achievement Level

The Fourth Voluntary Environmental Plan launched in fiscal 2005 provides concrete targets for the achievement of the Environmental Vision 2010. The plan covers 368 consolidated subsidiaries of Toshiba Corporation.

The fiscal 2005 targets for both product eco-efficiency and business process eco-efficiency were achieved and the factor improved to 1.49 compared with fiscal 2000.

Target for

Target for

Target	Result	Evaluation	Summary of fiscal 2005	fiscal 2006	fiscal 2010
10%	17%	7% greater than the target (achieved)	ECP ratios increased for home appliances and digital products as planned. Electronic devices and social infrastructure systems lagged. We will focus on increasing the ECP ratios for these fields.	20%	60%
Clarification of the overall situation	28%	Overall situation was clarified as planned	It was clarified which products contain the substances in question.	40%	Total abolished
	Fiscal 2005			Target for	Target for fiscal 2010
Target	Result	Evaluation	Summary of fiscal 2005	fiscal 2006	
31% reduction	33% reduction 37% reduction	2% greater (achieved) 6% greater (achieved)	Implementation of energy-saving measures such as introduction of highly energy-efficient clean rooms resulted in an excellent result.	29% reduction 31% reduction	25% reduction 25% reduction
27% reduction	32% reduction	5% greater (achieved)	Gas scrubbers were introduced for new production lines to suppress emissions. As a result, total emissions were reduced.	29% reduction	35% reduction
21% reduction	28% reduction	7% greater (achieved)	Energy saving was promoted by implementation of measures to enhance efficiency of logistics.	29% reduction	25% reduction
25% reduction	27% reduction	2% greater (achieved)	Although the quantity of chemical substances handled increased compared with fiscal 2004, emissions decreased thanks to technical measures and installation of equipment for recovery and removal of emissions.	30% reduction	50% reduction
7% reduction	12% reduction	5% greater (achieved)	The total quantity of waste generated was reduced 4,000 tons. Furthermore, the production output increased.	15% reduction	20% reduction
Sites achieving zero emissions of waste to account for 20%	Sites achieving zero emissions of waste to account for 25%	5% greater (achieved)	Although the target was achieved, overseas sites and non- manufacturing sites lagged. We will focus on reducing the final disposal rate at overseas sites and non-manufacturing sites.	40%	Achievement of zero emissions at all sites
Increase to 130%	Increase to 142%	12% greater (achieved)	Although reuse and recycling increased in Japan, we will make efforts to increase them overseas.	Increase to 145%	Increase to 160%

Summary of fiscal 2005

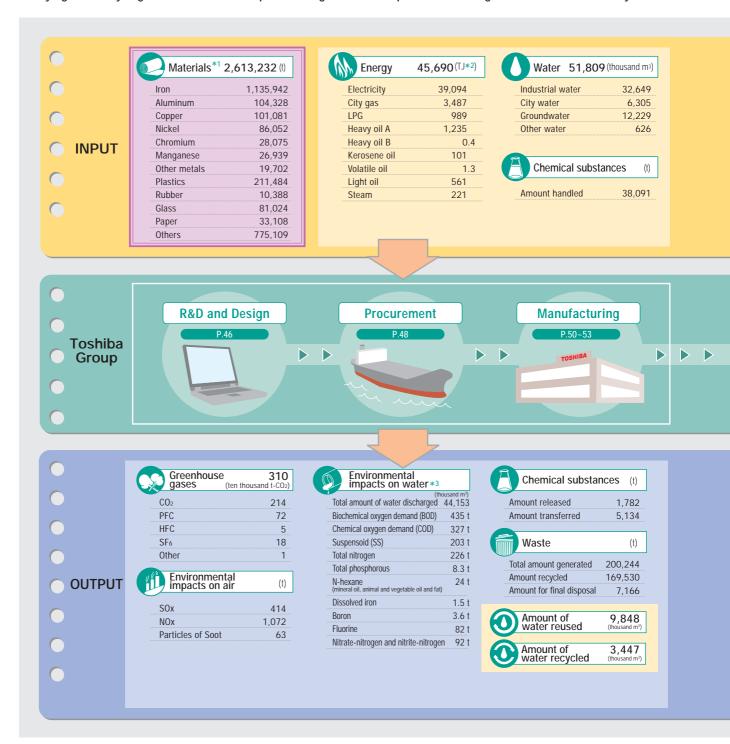
<sup>\*1 :</sup> Compared with fiscal 1990

<sup>\*2 :</sup> Quantity of waste for landfill after treatment is equivalent to 1% or less of the total quantity of by-products and other items generated (total amount of waste discharged) as a result of business activities.

\*3 : Compared with fiscal 2001 (year in which the Home Appliance Recycling Law came into force)

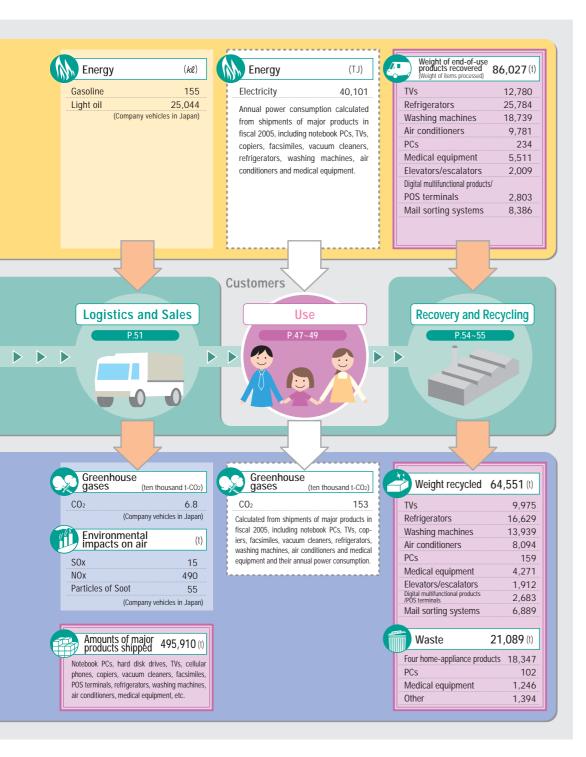
# **Environmental Impacts**

Since Toshiba Group's products and services range from home appliances and information and communications equipment to semiconductor devices, electronic components and heavy electrical apparatus, their environmental impacts vary. By clarifying and analyzing the environmental impacts throughout the Group, we are working to enhance eco-efficiency.



#### **Material Flow Data**

The figures below show inputs of energy, water and chemical substances, and outputs of environmental pollutants and waste discharged to water and air. Also shown are the material inputs and the amount of major products shipped. Whereas the data for fiscal 2004 covered 104 Toshiba Group companies, fiscal 2005 data covers Toshiba Corp. and 368 consolidated subsidiaries. As to material inputs, we grasp the amount of rare metals like Nickel and Chromium. Recognizing that further improvement in data accuracy is desirable, we are addressing this issue. We intend to continue collection and analysis of data that can be of help to us in our efforts to reduce environmental impacts.



- \*1 Material inputs are calculated based on the Estimation method for Material Inputs using Input-Output Table (EMIOT), a method developed by Toshiba, EMIOT uses ratios of materials, which are prepared based on the inputoutput table, to calculate material inputs. A characteristic is that input-output analysis is applied only to the flow of resources from upstream to downstream and ratios of materials by industrial sector are entered in a database. Using this method, it is possible to calculate weights of input resources by resource type from the data on procurement (monetary value) by resource category, which is gathered by procurement organizations. So, data can be gathered not only on direct materials but also on indirect materials. Previously, it was difficult to clarify the amounts of resources in parts made of compound materials or the amounts of resources associated with services. EMIOT has enabled clarification of the amounts of resource inputs by resource type for such materials
- \*2 TJ=1012J
- \*3 Environmental impacts on water are 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. Substances whose discharged amounts are 1 ton or more are listed



Indicates a flow of materials shipped as products, recycled and discharged as waste.

# **Environmental Impacts of Products**

Toshiba Group is emphasizing creation of environmentally conscious products (ECPs) with minimal environmental impacts throughout their life cycles. In order to achieve the target of increasing product eco-efficiency 2.2 times by fiscal 2010, we are striving to reduce environmental impacts of products from three perspectives: prevention of global warming, management of chemical substances and efficient utilization of resources.

#### ☐ Results in Fiscal 2005

- •Whereas the target for average factor compared with fiscal 2000 was 1.48, the result was 1.56. (Target achieved)
- •Whereas the target for the ratio of products complying with the voluntary environmental standards to net sales was 10%, the result was 17%. (Target achieved)
- •Whereas the target was to clarify the ratio of products that do not contain 15 substances groups other than for specific applications, the ratio was clarified and determined to be 28% (Covering all products of Toshiba Corporation and its consolidated subsidiaries)

# Promoting Development of ECPs \*1

# **ECP Concept**

Toshiba Group is promoting development of ECPs, which involves environmentally conscious product design, environmental assessment of products and disclosure of environmental performance of products. Products in compliance with the Voluntary Environmental Standards for Products established in 1999 are certified as ECPs. Having introduced Factor T, Toshiba's original eco-efficiency indicator, in fiscal 2003, we are also working to improve product eco-efficiency.

In accordance with the Environmental Vision 2010 announced in fiscal 2005, Toshiba Group aims to improve product eco-efficiency 2.2 times by fiscal 2010. We have been applying Factor T in ECP development since fiscal 2005, setting annual Factor T targets for

\*1 ECP: Environmentally Conscious Products

all Toshiba Group products other than software and services.

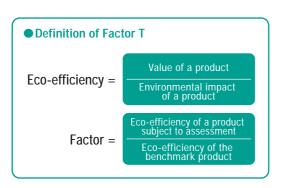
# **Environmental Considerations at** the Product Planning Phase

In the development of ECPs, numerous items, such as resource saving, reuse and recycling, energy saving and reduction in use of toxic substances, have to be taken into account from the product planning phase onward. Toshiba Group has developed and introduced a life cycle planning (LCP) technique for formulating a design concept at the planning stage that satisfies the quality and cost requirements while decisively reducing environmental impacts throughout the product life cycle. Effective utilization of data obtained by life cycle assessment (LCA) and quality function deployment (QFD\*2) contributes to achievement of 3R (reduce, reuse, recycle).

importance customers attach to them when selecting a product

#### **Environmental Assessment of Products**

Upon completion of product design, we conduct LCA to verify the appropriateness of the design from an environmental perspective. Assessment results are also utilized in the planning of subsequent products. Due to the introduction of the Factor T concept, not only environmental impacts but also product value is taken into account in determining eco-efficiency. As a result, it has become possible to clarify quantitatively the degree of improvement compared with previous models. From now on, Toshiba will create ECPs based on the Factor T concept.





# **Global Warming**

# Products and Global Warming

According to an investigation of CO2 emissions of Toshiba Group products throughout their life cycles, emissions during the usage phase account for the greatest proportion. For example, in the case of digital products, 60% of CO2 emissions occur during the usage phase, with the figure rising to 80% for home appliances and social infrastructure systems. So, in our efforts to create ECPs based on the Factor T concept, we are striving to reduce overall ecoefficiency, including energy consumption during the usage phase.



 Case Study: LCD TV, Refrigerator, Room Air Conditioner, Open Showcase, Fluorescent Light Bulb

# Development of Renewable Energy Systems

Toshiba Group is promoting development of environmentally conscious energy systems offering superior efficiency. We have commercialized micro wind power generation and micro hydro power generation that effectively utilizes natural energy.

# Case Study: Washing Machine with Drier

Washing machines consume electricity, water, and detergent and are operated virtually every day. Reduction of power consumption during the usage phase substantially reduces environmental impacts throughout the product life cycle, for example, resulting in lower CO<sub>2</sub> emissions associated with power generation. Toshiba's The Front-in Drum TW-150VC washing machine with drier cuts power consumption thanks to two innovative features.

The newly developed S-DD engine enabling high-speed spinning at 1,500 rpm reduces the moisture content of laundry prior to drying to a level 30% less than that attainable with the previous model. As a result, power consumption during drying is reduced.

The optimum control of the heater output according to the progress of drying in the latter part of the drying process has slashed power consumption by about 20%.



■ The Front-in Drum TW-150VC washing machine with drier

Factor 1.52 (2005/2000) (Value factor 1.35, 1/Environmental impact factor 1.12)

#### Case Study: Micro Wind Power Generation

Toshiba Plant Systems & Services Corp. manufactures and sells Wind Flower, a hybrid micro wind power generation system combining wind power generation and solar batteries. Using an efficient vertical-axis windmill, Wind Flower operates so guietly that it is suitable for installation even in urban areas.

#### Case Study: Micro Hydro Power Generation

Toshiba Corp. and Toshiba Plant Systems & Services Corp. manufacture and sell Hydro-eKIDS, micro hydro power generation equipment for low head and small-scale hydroelectric power plants. This product with an output ranging from 1 kW to 200 kW enables efficient use of hydro-energy at a head as low as 2 m, which has not been possible previously. Three types of units and runners are available for Hydro-eKIDS, making it suitable for a wide range of applications, including for rivers, check dams, water and sewage facilities and canals for industrial wastewater and agricultural water. Units can be combined according to the effective head and the volume of water to maximize efficiency.



■ Hydro-eKIDS S3C micro hydro power generation equipment

Factor 5.21 (2004/2000) (Value factor 1.46, 1/Environmental impact factor 3.57)

# Chemicals

# Management of Chemicals in Products

Our comprehensive management of chemical substances is designed to ensure customers can use Toshiba products with confidence and to prevent release of environmentally harmful substances.

#### Early Compliance with the RoHS Directive

Whereas the RoHS (Restriction of Hazardous Substances in electrical and electronic equipment) Directive of the European Union (EU) bans use of six substances, including lead, mercury and cadmium, in products released in the EU from July 2006 onward, Toshiba Group ceased use of the six substances specified by the RoHS Directive in all products introduced since April 2005.

#### **Abolition of Use of Certain Chemical Substances**

In accordance with the Fourth Voluntary Environmental Plan launched in fiscal 2005, we intend to abolish the use of 15 substance groups, including ozone-depleting substances, tributyl tins (TBTs) and polybrominated biphenyls (PBBs), by fiscal 2010. In fiscal 2005, the first year of the plan, we investigated the current situation and clarified that the ratio of products that do not contain these 15 substance groups to net sales was 28%.

# Supply Chain Management

# **Promoting Green Procurement Worldwide**

Toshiba Group has been championing green procurement worldwide in accordance with the Green Procurement Guidelines established in 1999 (revised in 2003). We require suppliers to evaluate their environmental activities using criteria determined by Toshiba. When selecting suppliers, we accord priority to suppliers with superior environmental credentials.



Green Procurement Guidelines

# **Environmental Performance Survey of** Parts and Materials

In cooperation with suppliers, Toshiba surveys the environmental performance of parts and materials manufacturers. Once ratios of environmentally harmful substances and scarce resources to the weight of a procurement item have been checked, Toshiba accords priority to parts and materials superior in terms of environmental impacts. In developing ECPs, we utilize a database containing the results of the environmental performance survey. In addition, chemical substance analysis is applied to detect chemical substances contained in products. Working in cooperation with parts manufacturers, parts containing chemical substances banned by the RoHS Directive etc. have been replaced by alternatives.



Case Study: Notebook PCs, Elevators, LCD Modules

## Case Study: Mobile Phones

For all mobile phones, regardless of whether they are destined for the Japanese market or overseas markets, we are endeavoring to abolish use of harmful substances, including the six substances specified by the RoHS Directive, from the initial development phase. Working in cooperation with parts manufacturers, Toshiba has dispensed with soldering and plating involving the use of harmful substances and now uses alternatives. In addition, environmental analysis of all parts and materials (including sub-materials) used in mobile phones has been conducted in collaboration with parts manufacturers to eliminate harmful substances. As a result, Toshiba is already shipping mobile phones in compliance with the RoHS Directive not only to Europe, but also in Japan and elsewhere in Asia.



■ Vodafone 803T mobile phone

Factor 3.34 (2005/2000) (Value factor 5.78, 1/environmental impact factor 0.58)

# **Resource Utilization**

# **Efficient Resource Utilization** in terms of Products

Manufacturing involves the use of diverse resources and virtually all products consume resources during the usage phase. We are striving to minimize consumption of resources and discharge of resources as waste. To this end, we are promoting resourcesaving design (design to reduce product weight and extend life, design facilitating repair by use of modules, design facilitating upgrading, etc.) and design to facilitate reuse and recycling.

# Reflecting Recycling Information in Product Development

Term Corp. and Nishinihon Kaden Recycle Corp. operate recycling facilities used by Toshiba Group. Engineers from these companies who are engaged in decomposition work closely with product designers, feeding back information on decomposition obtained during the recycling phase directly to product designers so that they can reflect it in development of easy-to-recycle products.



Case Study: Hard Disk Drive

## Case Study: e-blue™\* Decolorable toner

Having introduced e-blue<sup>™</sup> decolorable toner developed in house, Toshiba is at the forefront of efforts to reduce paper consumption in offices.

As images printed in e-blue™ are erasable using a dedicated erasing machine, copier paper can be reused many times. Since its introduction in December 2003, eblue™ has been eagerly taken up by businesses keen to reduce their impact on the environment. Toshiba organizations using e-blue™ cut their purchases of copy paper by about 40% in fiscal 2005. In fiscal 2006, more Toshiba organizations will shift to e-blue™.

At present, R&D of technology capable of completely erasing images printed in e-blue™ is underway to enhance quality.

\*e-blue™ is a registered trademark of Toshiba Corp.



# **■** TOPICS

# Making Sure Everyone Knows about e-blue™

I've been involved in the R&D of decolorable toner technology ever since Toshiba took up the theme nine years ago. After much trial and error, e-blue™, an environmental technology in which we take great pride, was commercialized. Everything came together in 2005 when Toshiba held a press conference to tell the world about the equipment for completely erasing e-blue™

images that we are currently developing and our decolorable toner technology won the Nihon Keizai Shimbun Environmental Technology Award.

# Satoshi Takayama

Environmental Technology Laboratory Corporate Research & Development Center Toshiba Corp.



# **Environmental Impacts of Business Activities**

Toshiba Group is fully aware of the impacts of its business activities on the environment and is striving to reduce those impacts. In this section Toshiba Group's efforts to reduce the environmental impacts of its business activities are reported from three perspectives: prevention of global warming, control of chemicals and efficient utilization of resources.

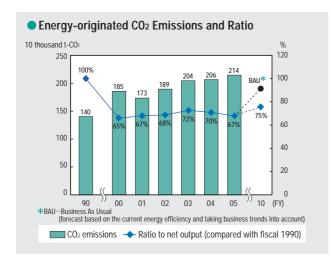
# **Global Warming**

#### □ Results in Fiscal 2005

- Whereas the target was to reduce the energy-originated CO<sub>2</sub> emission rate 31% compared with fiscal 1990, the result was a 33% reduction. (Target achieved)
- •Whereas the target was to reduce the greenhouse gas emissions (other than CO<sub>2</sub>) 27% compared with fiscal 2000, the result was a 32% reduction. (Target achieved)
- •Whereas the target was to reduce the CO2 emission rate associated with product logistics in Japan 21% compared with fiscal 2000, the result was a 28% reduction. (Target achieved)

# To prevent Global Warming in **Business Activities**

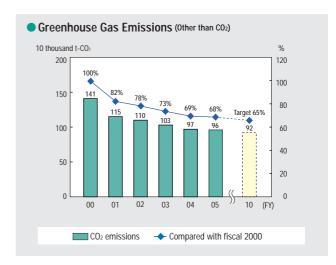
Greenhouse gases emitted in the course of business activities include not only energy-originated CO2 emitted as a result of the use of electricity and fuels, but also CO<sub>2</sub> emissions associated with product logistics and gases other than CO<sub>2</sub> used in manufacturing processes. Having set reduction targets for all these greenhouse gas emissions attributable to business activities, we are implementing measures to achieve the targets.\*1



#### Reducing Energy Consumption

We are working to reduce energy consumption by promoting improved administration, energy-saving investment and saving of energy in clean rooms throughout business activities globally, including at laboratories and offices, so as to reduce energyoriginated CO2 emissions. Regarding production sites, we are focusing on energy saving at semiconductor factories, since these facilities are notable for their large appetite for energy. Energyoriginated CO2 emissions (Toshiba worldwide) increased 4% in fiscal 2005 compared with fiscal 2004 because of the opening of new clean rooms. However, the impact was minimized by introduction of energy-saving clean rooms. Although expansion of the semiconductor and LCD businesses is expected to result higher energy consumption, we intend to achieve the target for fiscal 2010 by implementing energy-saving measures.

\*1 Calculation of greenhouse gas emissions is in accordance with the "Guideline for Investigation of Greenhouse Gases Emitted by Businesses (tentative)" issued by the Ministry of the Environment. For electricity, the coefficient announced by The Federation of Electric Power Companies of Japan (average of all power sources at generating ends) had been used until fiscal 2004 and the coefficient for fiscal 2004 was used for calculation of the amount in fiscal 2005.



#### Reducing Emissions of Greenhouse Gases other than CO<sub>2</sub>

Besides energy-originated CO<sub>2</sub>, we are also working to reduce emissions of other greenhouse gases subject to the Kyoto Protocol through reduction of the use of CFC substitutes and replacement with alternatives as well as through recovery of emitted greenhouse gases and introduction of gas scrubbers.

In fiscal 2005 we reduced emissions of greenhouse gases other than CO2 32% compared with fiscal 2000, installing gas scrubbers at all new production lines. However, emissions are trending upward in the semiconductor business in line with the expansion of output. From fiscal 2006 onward, we intend to introduce gas scrubbers at existing lines and shift to use of alternative gases to achieve the target for fiscal 2010.

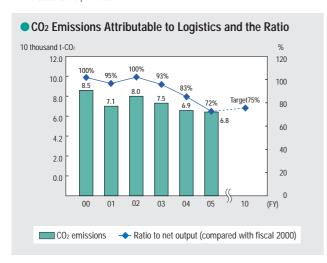
#### Reducing CO<sub>2</sub> Emissions Attributable to Logistics

We are collaborating with Toshiba Logistics Corp. to save energy during transportation of products. Efforts to reduce CO2 emissions associated with logistics include modal shift to rail transport, optimization of transport based on a flexible vehicle assignment system attuned to daily variations in freight volumes and destinations, and joint delivery with logistics subsidiaries of other electronics and electrical companies through optimization of freight and use of vehicles. CO2 emissions in fiscal 2005 were reduced 20% compared with fiscal 2000. We intend to reduce the number of vans and trucks used for transportation by improving load efficiency so as to further reduce emissions.

# Using Renewable Energy

In order to facilitate the use of renewable energy, in January 2005 Toshiba entered into a contract to purchase electricity generated using renewable energy under a green power certificate system\*2. In accordance with the contract, at least 4% of the electricity demand at the Toshiba headquarters building is to be fulfilled by biomass power generation until December 2008.

\*2 Green power certificate system: A system under which a purchaser is supplied with electricity produced by renewable energy power generation and a green power certificate is issued to the purchaser.



#### Measures to Prevent Global Warming at **New LCD Production Line**

At the new LCD production line of Ishikawa Works, a facility of Toshiba Matsushita Display Technology Co., Ltd., three measures to combat global warming have been implemented. Firstly, thanks to a clean room with a ballroom structure, the floor to which circulating air is returned can be used for processes, thereby reducing the required floor area 44% and the power consumption for air conditioning. Secondly, while the use of two systems (6°C and 14°C) of cooling water for air conditioning improves efficiency, a free cooling system allowing use of the naturally low temperature in the winter has been introduced, so that energy is saved throughout the year. Thirdly, due to the installation of a gas scrubber, more than 95% of PFC gas emissions, which are thought to be a cause of global warming, are eliminated.

#### **■ TOPICS**

# **New Environmentally Conscious Clean Room Lowers Costs**

Toshiba Matsushita Display Technology Co., Ltd

Masaki Yasuda (left) Facilities Management Group Product Control Department Ishikawa Works

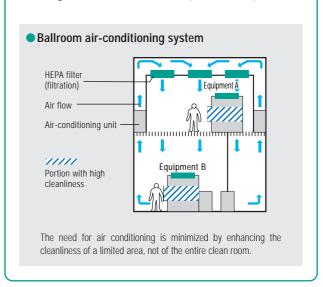


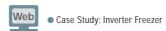
Integration Engineering Group Process & Manufacturing Engineering Center



"From now on we need to sharpen our focus on safety and maintenance so that we can look back in five or 10 years time and see that this investment was successful. The effectiveness of what we are doing here will be revealed as time passes." (Masaki Yasuda)

"What we have achieved at the new production line is not attributable to a single organization. It is the fruit of collaboration among people from various organizations across the business." (Kazuhiko Tomita)





# **Chemicals**

#### ☐ Results in Fiscal 2005

Whereas the target was to reduce total emissions of chemical substances to the air and water 25% compared with fiscal 2000, the result was a 27% reduction. (Target achieved)

# Management of Chemicals in Business Activities

Toshiba's use of chemical substances is based on three policies: avoid use of hazardous substances to the maximum extent possible, promote reduction and substitution to the maximum extent possible, and subject use to appropriate controls.

Some 2,000 substances covered by the PRTR Law\*1 of Japan and other environment-related laws and regulations are classified into three ranks based on the control level set by laws and regulations and the hazard. Control classifications (prohibition of use, reduction in use, control of release) for substances are determined based on the risk associated with the substance. For determining the risk, a risk assessment approach is adopted in which the risk posed by a substance is expressed as the product of the hazard and the level of exposure.

\*1 PRTR Law...Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management. PRTR is the abbreviation of Pollutant Release and Transfer Register.



Substance Ranking and Control Classifications

#### **Reducing Release of Chemicals**

We have been implementing measures to reduce release of substances whose use is to be reduced in accordance with Toshiba's criteria. Measures applied, such as substitution of materials, process changes, and installation of recovery/removal equipment, have yielded good results. In the Fourth Voluntary Environmental Plan launched in fiscal 2005, the scope of substances whose use is to be reduced has been increased from 24 to 100 types.

The amount of release in fiscal 2005 was 1,782 tons, which is 73% of that in the benchmark year (2,439 tons). The figures show the amounts of chemical substances whose use is to be reduced that were handled and released by Toshiba Group.

Regarding substances covered by the PRTR Law, whereas the amount of substances handled by Toshiba decreased 1,728 tons, the amount released increased 0.8 tons. The reduction in the amount handled was primarily attributable to the switch to lead-free soldering. Although releases of paints and solvents to the air have been reduced, an increase in the wastewater from acid treatment of semiconductors resulted in a slight increase in the amount of substances released.

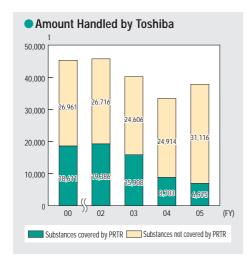


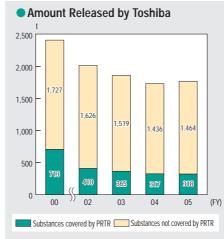
- Substances covered by PRTR
- Toshiba Group's PRTR data for individual business sites

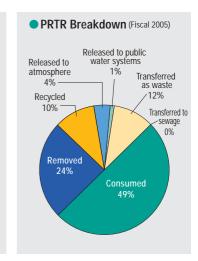
## Management of Ozone-depleting Substances

In the past, we used chlorofluorocarbons (CFCs), trichloroethane and other ozone-depleting substances for parts cleaning and dry etching for semiconductors, and as refrigerant for refrigerators and blowing agent for insulation materials. Regarding specified CFCs, we ceased use of those for cleaning in 1993 and those contained in products in 1995.

Meanwhile, 1,629 air-conditioning systems containing 25 tons of CFCs and 2,078 fire extinguishing systems containing 47 tons of halon are still in use. Every facility containing CFCs/halon bears a sticker indicating the fact. When such a facility is withdrawn from use, the CFCs/halon are recovered and appropriately treated. In fiscal 2005, 1.2 tons of CFCs and 10 tons of halon were recovered and treated.







#### **PCB Storage and Control**

Since 1972 when manufacturing of products using polychlorinated biphenyl (PCB) ceased in Japan, some Toshiba operations in Japan have retained PCB and products containing PCB in storage under strict control in accordance with the Waste Management and Public Cleansing Law and the Law Concerning Special Measures Against PCB Waste. In addition to the mandatory storage rules, installation of dikes and double containers (receiver tanks) ensures safety. For the purpose of treating PCB and products containing PCB as soon as possible, Toshiba has completed early registration of products containing PCB in storage with Japan Environmental Safety Corporation, a special company wholly owned by the government engaged in treatment of PCB. Toshiba has registered about 7,600 units of transformers and condensers for systematic treatment from now on, including those of affiliated companies.

#### Preventing Air and Water Pollution

We are working to apply appropriate control based on the data on environmental impacts due to sulfur oxides (SOx) and nitrogen oxides (NOx), which are the main causes of air pollution, and wastewater. All operations have set voluntary standards to ensure compliance with the regulatory environmental standards. The total amount changes according to fluctuations in production.

## Measures to Prevent Pollution and Achieve Purification

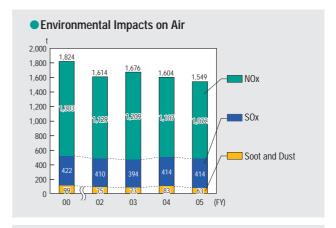
# Preventing Pollution and Purifying Soil and Groundwater

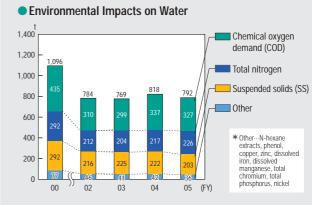
As well as monitoring soil and groundwater pollution at factory sites and executing purification, Toshiba Group is implementing fail-safe measures for facilities to prevent pollution by chemical substances and reduce risk. Toshiba Group is conducting purification and monitoring of pollution caused by volatile organic compounds (VOCs) at 16 sites where pollution was detected during an investigation covering all sites. Toshiba has guidelines for eight types of structural design, including waste water treatment facilities. These guidelines are also applied to overseas sites. In fiscal 2005 the conformity ratio with these Structural Design Guidelines at all Toshiba sites in Japan was 96%.

Toshiba Group is conducting pollution risk assessment of overseas sites based on the history of the use of the land and environmental assessment when purchasing new sites or changing the use of existing sites. Our policy is to ensure compliance with the laws and regulations of the country in which the site is located. In countries where a regulatory framework is not established, we apply stringent voluntary standards,.



- Amount of Volatile Organic Compounds Recovered from Soil and Groundwater
- Conformity Ratios of Structural Design Guidelines





#### Purification of Volatile Organic Compounds in Soil and Groundwater

Site	Location	Progress	Purification method*1	Amount recovered *2 (kg)
Fukaya Operations	Fukaya, Saitama prefecture	Transition to monitoring	А	_
Toshiba Electric Appliances Co., Ltd.	Maebashi, Gunma prefecture	Transition to monitoring	D, F	_
Site of the former Yokohama Operations, Asia Electronics Inc.	Yokohama, Kanagawa prefecture	Transition to monitoring	A, E, G	_
Komukai Operations	Kawasaki, Kanagawa prefecture	Purification in progress	А	44.8
Microelectronics Center	Kawasaki, Kanagawa prefecture	Purification in progress	А	8.9
Taishi Area of Himeji Operations	Taishi-cho, Ibo-gun, Hyogo	Work in progress (North area)	D, F, G	_
Taistii Area or Tiirrieji Operations	raisiii-ciio, ibo-guii, nyogo	Purification in progress	А	458.7
Oita Operations	Oita, Oita prefecture	Purification in progress	А	3.2
Fuji Operations, Toshiba Carrier Corp.	Fuji, Shizuoka prefecture	Purification in progress	A, B	314.2
Tsuyama Operations, Toyo Carrier Engineering Co., Ltd.	Tsuyama, Okayama prefecture	Purification in progress	A, B	5.6
Osaka Works, Toshiba HA Products Co., Ltd.	Ibaraki, Osaka	Purification in progress	А	0.2
Site of the former Yokohama Works, Toshiba Components Co., Ltd.	Yokohama, Kanagawa prefecture	Purification in progress	A	53.6
Kawamata Seiki Co., Ltd.	Kawamata-machi, Date-gun, Fukushima prefecture	Purification in progress	А	0.1
Kitashiba Electric Co., Ltd.	Fukushima, Fukushima prefecture	Purification in progress	А	0.6
Site of the former Kawasaki Works, Toshiba Shomei Precision Co., Ltd.	Kawasaki, Kanagawa prefecture	Purification in progress	A, B, F	6.9
Kimitsu Operations, Toshiba Components Co., Ltd.	Kimitsu, Chiba prefecture	Purification in progress	A, B	148.5
Yanagicho Complex	Kawasaki, Kanagawa prefecture	Work in progress	C, F	_

\*1 Purification method··· A: Groundwater pumping

- B: Soil gas suction method
- C: Reduction decomposition method
- (fine iron permeation piles) D: Oxidation decomposition method
- E: Interception containment method
- F: Removal by excavating soil G: Bio-active method
- \*2 Amount recovered···· Amount recovered during the period from April 2005 to March 2006

# **Resource Utilization**

#### □ Results in Fiscal 2005

- Whereas the target was to reduce the ratio of total quantity of waste generated 7% compared with fiscal 2000, the result was a 12% reduction. (Target achieved)
- •Whereas the target for the ratio of sites achieving zero emissions of waste to all sites was 20%, the result was 25%. (Target ach-
- •Whereas the target was to increase the amount of recycling of used products 130% compared with fiscal 2001, the result was a 142% increase. (Target achieved)

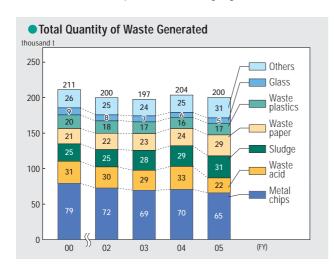
#### **Efficient Utilization of Resources in Business Activities**

In accordance with the Fourth Voluntary Environmental Plan, in order to use resources efficiently, we are implementing measures to 1) reduce the total quantity of waste generated, 2) reduce the quantity of waste for final disposal and 3) expand reuse and recycling of end-of-use products.

#### Governance concerning Waste and Recycling

Toshiba Group recognizes appropriate treatment of waste is an important management issue and responsibilities are clarified according to position, from management to waste control supervisors at workplaces. For example, general managers of sites are required to conduct an annual inspection of the situation regarding disposal of waste by the companies to which waste treatment is consigned and senior managers are required to inspect the situation regarding management of manifests twice a year. We are working to optimize the system involving the wide range of parties concerned in cooperation with waste treatment and recycling companies, affiliated companies, suppliers and distributors.

We also monitor the waste treatment route from intermediary treatment to final disposal. For thorough governance, we are



focusing on education and activities to raise awareness as well as the gathering and dissemination of information on a regular basis.

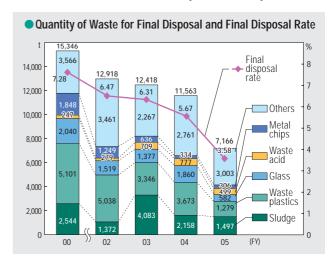
## Reducing Waste Generated and Waste for Final Disposal

According to Toshiba's definition, zero emissions is achieved when the quantity of waste for landfill after treatment is equivalent to 1% or less of the total quantity of by-products and other items generated (total amount of waste discharged) as a result of business activities. Thanks to recycling of sludge as raw material for cement and reduction of the quantity of mixed waste through thorough sorting as well as an effort to develop channels for contracting recycling of sorted plastic and glass, 36 more sites achieved zero emissions.

The total quantity of waste for final disposal, including waste discharged by affiliated companies in Japan and overseas production sites, amounted to 200,000 tons and the final disposal rate was 3.6%. From now on, we aim to reduce the total quantity of waste and achieve zero emissions at all sites.

## Increasing the Amount of End-of-Use Products Recycled

Vigorous promotion of recycling of end-of-use products is central to our efforts to utilize resources efficiently. For example, we are focusing on development of recycling technologies to facilitate use of resources recovered from end-of-use products. Plastic parts used for tubs of washing machines and refrigerators' vegetable containers and shelves are recovered and classified according to materials before crushing so that they can be recycled as materials for parts for new products. These recycled materials are mainly applied in base plates for washing machines/driers and dish washers/driers and fixtures for printed circuit boards for refrigerators. Other plastics are recycled as raw materials for items used in the construction industry and for sundry articles.

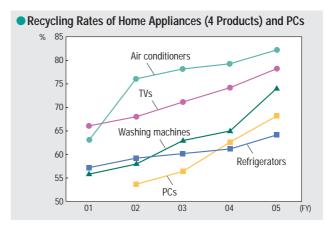


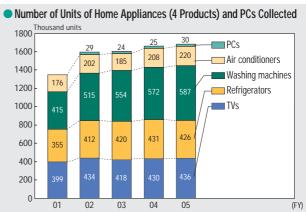
Recovery and recycling of individual products are performed in accordance with laws and regulations. Recovery, transportation and recycling of end-of-use home appliances in Japan are stipulated by the Home Appliance Recycling Law. In fiscal 2005 Toshiba collected 1.67 million units of end-of-use home appliances, accounting for 14% of the total number of units collected nationwide. We also recycle end-of-use personal computers discharged by businesses and homes. In fiscal 2005 Toshiba collected 30,000 end-of-use notebook PCs and recycled them.

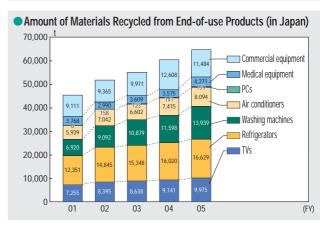
Toshiba is promoting recovery and recycling of other products, including automatic ticket gates, automatic letter processing systems, elevators, X-ray CT systems and POS systems, in cooperation with customers. In fiscal 2005 some 16,000 tons of resources were recycled from such recovered products. We are working to expand the scope of products for recovery and to deploy recovery channels facilitating efficient recycling of resources for all products of Toshiba Group.

In view of the international trend toward mandatory recycling of products, Toshiba Group is establishing product recycling systems in the countries and regions where it operates to ensure legal compliance or based on a voluntary plan. Regarding product recycling in accordance with the directive on waste electrical and electronic equipment (WEEE Directive) in the EU from August 2005, Toshiba is ensuring fulfillment of producer responsibility by checking compliance in step with the legislative schedules of EU countries while at the same time promoting establishment of recycling systems. In line with the mandating of recovery and recycling in Germany from March 2006 onward, we have started recycling Toshiba products. < Photo 1>

In the United States, as well as promoting product recycling step by step in accordance with the implementation of legislation by individual states, Toshiba has started voluntary recycling of PCs and TVs. Recycling events have been held in collaboration with major retailers to facilitate recovery and recycling. <Photo 2> Also, for PCs, we have introduced a system to collect end-of-use PCs upon sales of new PCs.









■ Product collection point in Germany in compliance with the WEEE Directive < Photo 1>



■ Recycling events in the United States < Photo 2>