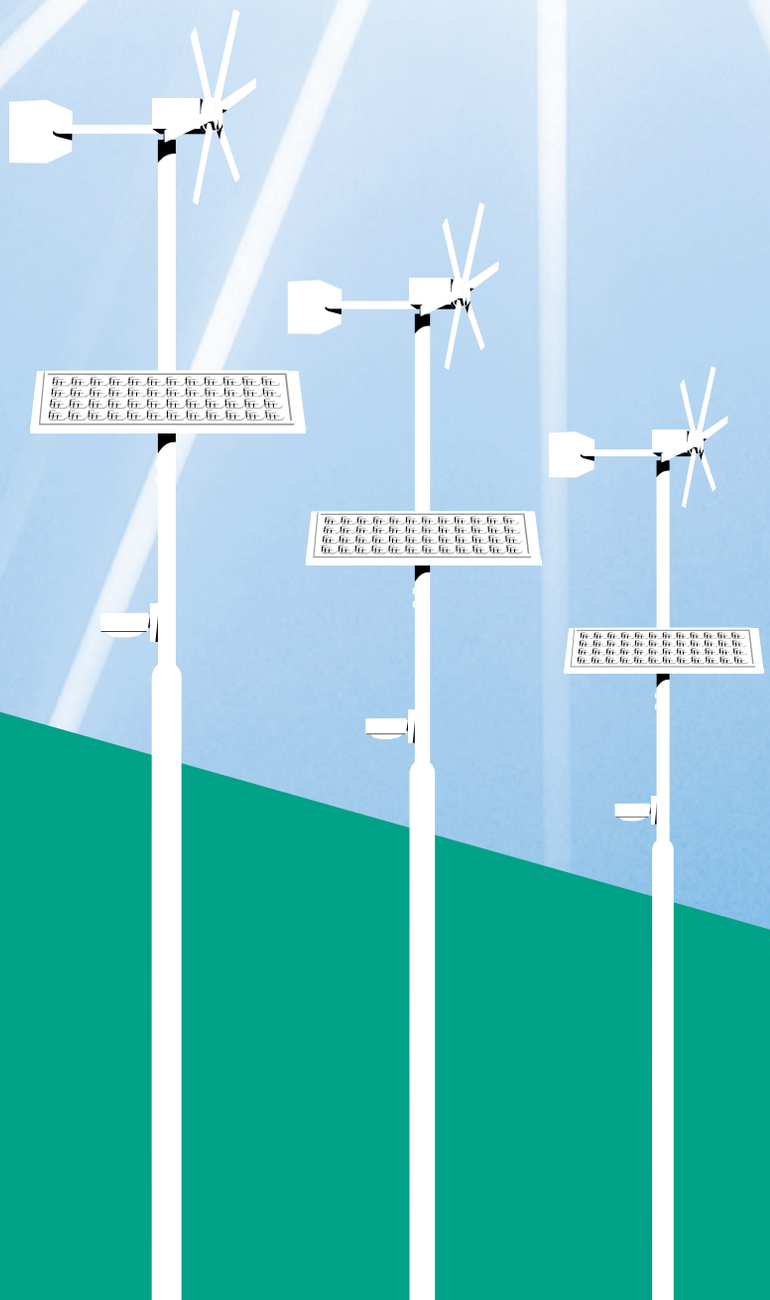
TOYOTA

Environmental Report 2002



TOYOTA INDUSTRIES CORPORATION

Environmental Report 2002 TOYOTA INDUSTRIES CORPORATION

CONTENTS

■About the Cover

Construction of our Higashiura Plant was completed in June 2002 and operations began in July. This plant utilizes a variety of energy sources including solar and wind power. In comparison to a plant of similar scale, the plant uses 20% less energy when its production lines are in operation. The cover of this year's environmental report is based on a motif which incorporates the windmills and solar panels that are distinctive of our environmentally conscious Higashiura Plant. For an overview on our Higashiura Plant, please refer to pages 36-37 in this report.

Reporting Policy for the Environmental Report 2002

In accordance with revisions to the Third Environmental Action Plan made in August 2000, Toyota Industries is working to promote its environmental conservation activities on a daily basis. In 1999, we began publishing an annual environmental report in an effort to promote a wider understanding of our activities.

Toyota Industries' Environmental Report 2002 was created in reference to the Environmental Reporting Guidelines issued by the Ministry of the Environment (FY 2000 version). We believe the greater majority of our readers consists of our customers, shareholders, and business partners. However, taking into consideration that this report may be read by a private consumer and in response to opinions regarding our previous reports, we established the following policies.

Policies
1. Clearly state the level of impact our business activities have on the environment.
2. Make every effort possible to disclose information pertaining to laws, ordinances, and environmental performance.
3. Aim for an easy-to-read page layout effectively utilizing tables, diagrams and pictures.
4. To ensure the reliability of our environmental conservation activities, request a report by an independent review.

In previous reports, we reported on both our company-wide and division activities concurrently. However, it was pointed out to us that this made it difficult to comprehend the efforts of the company overall. As a result, in this report we focus more on the coverage of company-wide activities (with some focus on certain subsidiaries). In addition, we broadened our disclosure on improvements in the workplace. In previous reports, we focused solely on safety and health issues which effected our employees. However, in this report, we are also releasing data on employee health management, and they are reported under the section "Safety and Health Management."

Period and Scope of the Environmental Report 2002

1. This report covers activities for the period from April 1, 2001 to March 31, 2002 (FY 2001)*.

   *Some activities up to July 2002, the time of publication, are included as they were deemed of significant importance to our reporting.
2. The report essentially covers the environmental conservation activities of the parent company, Toyota Industries Corporation. However, there are some references to the activities of both consolidated subsidiaries and affiliates.

	Section	Parent-Only*1	Domestic Subsidiaries	Overseas Subsidiaries
Scope	Business Activities and Environmental Impact	✔	–	–
	Business Activities and Environmental Impact Mass Balance	✔	–	–
	Environmental Action Plan and FY 2001 Results	✔	✔*2	✔*3
	Environmental Management System	✔	–	–
	Environmental Accounting	✔	–	–
	Development of Environmentally Conscious Products	✔	–	–
	Reducing Environmental Impact of Production Activities	✔	–	–
	Reducing Environmental Impact of Distribution System	✔	–	–
	Environmental Communications	✔	–	–
	Environmental Activities of Subsidiaries	–	✔(2 Subsidiaries)	✔(1 Subsidiary)
	Safety and Health Management	✔	–	–

*1 Seven plants except for the newly constructed Higashiura Plant
*2 Consolidated environmental management and ISO 14001 certification
*3 ISO 14001 certification

A Message from the President

Our Precious Earth-

According to some estimates, the Earth's origin dates back some 4.6 billion years. During the history of its evolution, the Earth has fostered various forms of life. The human race as we know it today is one of the life forms that developed during this astounding process. And our rich material civilization owes its evolution to the many benefits we have received from Mother Earth.

The price we are now paying for this material affluence, however, is the appearance of various global environmental problems. Today, we are faced with a hazardous situation that puts the existence of the entire human race in jeopardy. Regardless of whether it be on an individual or corporate level, we must rethink our global economic activities, lifestyles, and in particular our moral values.

In recent years, reflecting the growing severity of this situation, we are seeing more activity aimed at resolving these environmental issues. Since the 1992 Earth Summit held in Rio de Janeiro, focus around the world has turned to the prevention of global warming. Today in industry, technological development and production activities are conducted with the reduction of environmental impacts in mind. Many governments are establishing laws to protect the environment, and academic institutions are making various recommendations. Moreover, on an individual level, consumers are becoming more adamant regarding environmental issues.

While it is expected that we will face further complications, I believe environmental activities should be handled independently at various levels—private, regional, corporate, government, and global. I strongly feel it is necessary to work together on a global level, putting together all our knowledge, to create a sustainable society.

As an assembler of automobiles and a developer and manufacturer of automotive parts, forklift trucks, and other materials handling equipment, we have made various contributions to society and industry on an international level. At the same time, however, we cannot deny the fact that our production activities and the life cycle of our products have an impact on the environment.

We recognize this fact and therefore position environmental conservation and management as one of our top priorities. These activities, which we strongly promote, are outlined in our basic philosophy, policy, and action guidelines.

We are currently in the second year of our Third Environmental Action Plan, which specifically details our strategies. All of us at Toyota Industries are striving to accomplish our targets related to the following concepts:

- Develop and provide clean products with minimal environmental impact,
- Promote manufacturing that strives for zero emissions,
- Expand environmental management systems, and
- Actively participate in public environmental conservation efforts as an upstanding corporate citizen.

The Environmental Report 2002 contains the major results of our activities carried out between April 1, 2001 and March 31, 2002. The purpose of this report is to promote a wider understanding of Toyota Industries' actions in response to environmental issues.

We plan to continue reporting responsibly on our activities. In addition, we invite readers to give us their valuable opinions. Working together with the community, Toyota Industries strives to make a contribution to helping to save our precious Earth.

July 2002

Tadashi Ishikawa

Tadashi Ishikawa
President and Chairman of
the Environmental Committee
TOYOTA INDUSTRIES CORPORATION

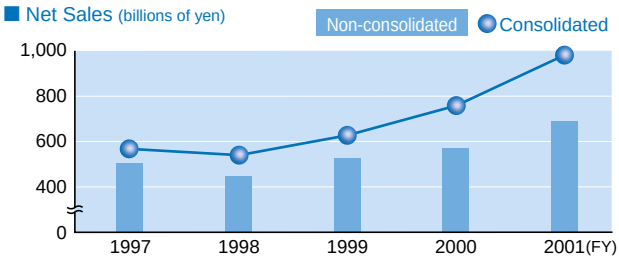
Corporate Information

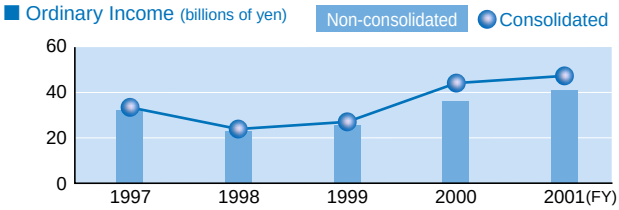
Corporate Information

Name	TOYOTA INDUSTRIES CORPORATION
Date of Establishment	November 18, 1926
Capital	¥68.0 billion (as of March 31, 2002)
Number of Employees*	23,056 (as of March 31, 2002)
Stock Exchange Listings	First sections of the Tokyo, Osaka, and Nagoya stock exchanges
Principal Businesses	Textile machinery, car air-conditioning compressors, materials handling equipment, vehicles, engines, and electronics

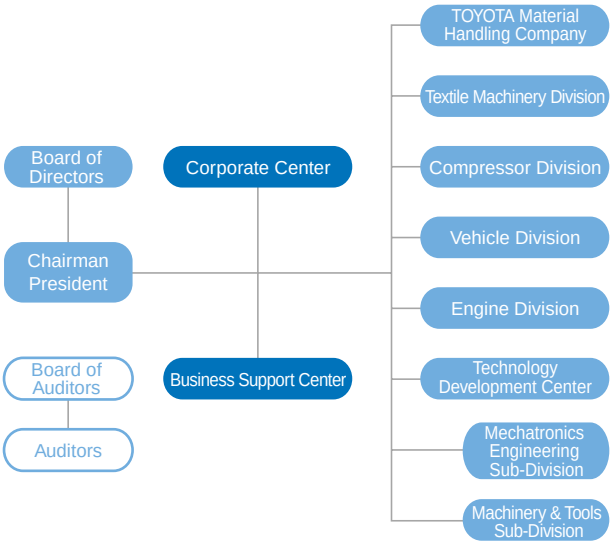
*On a consolidated basis

Consolidated Net Sales and Ordinary Income





Corporate Organization (As of March 31, 2002)



Corporate History

1926	Toyoda Automatic Loom Works, Ltd. (now TOYOTA INDUSTRIES CORPORATION) established
1933	Automobile Division set up
1935	Company unveils Model G1 truck at a new-car-release exhibition in Shibaura, Tokyo
1937	Automobile Division spun off as Toyota Motor Co., Ltd. (now Toyota Motor Corporation)
1940	Steel Production Division spun off as Toyoda Steel Works, Ltd. (now Aichi Steel Corporation)
1944	Obu Plant begins operations (manufacturing foundry parts)
1949	Stock listed on Tokyo, Nagoya, and Osaka stock exchanges
1953	Kyowa Plant begins operations (manufacturing engines and assembling automobiles)
1955	Vehicle Division set up
1960	Toyota Central Research & Development Laboratories, Inc. established with capital from 10 Toyota Group companies
1967	Nagakusa Plant begins operations (manufacturing small commercial vehicles)
1970	Takahama Plant begins operations (manufacturing industrial vehicles)
1971	Divisional structure introduced (Textile Machinery, Industrial Equipment, and Vehicle divisions)
1977	Compressor Division spun off from Textile Machinery Division
1982	Hekinan Plant begins operations (automotive diesel engines) Total Quality Control (TQC) introduced
1985	Engine Division spun off from Vehicle Division
1986	Deming Prize received for quality control implementation
1988	Toyota Industrial Equipment Mfg., Inc. (TIEM) established in Indiana, U.S., as a joint venture with Toyota Motor Corporation
1989	Michigan Automotive Compressor, Inc. (MACI) established in Michigan, U.S., as a joint venture with Nippondenso Co., Ltd. (now DENSO Corporation)
1990	1990 PM Excellent Plant Award received
1992	Material Handling System Division established
1994	Toyota Industry (Kunshan) Co., Ltd. (TIK) established in Jiangsu, China, as a joint venture with Toyota Tsusho Corporation and Lioho Machine Works, Ltd.
1995	Toyota Industrial Equipment, S.A. (TIESA) established in France as a joint venture with Toyota Motor Corporation and Manitou B.F. Forklift truck production reaches 1 million units Kirloskar Toyoda Textile Machinery Ltd. (KTTM) established in India as a joint venture with the Kirloskar Group
1997	Car air-conditioning compressor production reaches 100 million units ST Liquid Crystal Display Corp. jointly established with Sony Corporation for the production of LCDs
1998	TD Deutsche Klimakompressor GmbH (TDDK) jointly established in Germany with DENSO Corporation for the production of car air-conditioning compressors TIBC Corporation jointly established with Ibiden Co., Ltd. for the production of plastic package substrates for IC chipsets
1999	Company takes over water-jet loom business from Nissan Texsys Co., Ltd.
2000	Company acquires BT Industries AB of Sweden, a world-leading manufacturer of warehouse trucks used in the production process Higashichita Plant began operations (manufacturing foundry parts)
2001	Company takes over the industrial equipment sales division of Toyota Motor Corporation, and TOYOTA Material Handling Company established as an in-house company Name changed to TOYOTA INDUSTRIES CORPORATION
2002	Company reorganizes headquarters into Corporate Center and Business Support Center Higashiura Plant begins operations (manufacturing compressor components)

Production Bases (Employee numbers are current as of March 31, 2002.)

Kariya Plant

Textile Machinery Division, Compressor Division

Address : 2-1, Toyoda-cho, Kariya, Aichi
Main products : Textile machinery, car air-conditioning compressors
Employees : 1,685

Takahama Plant

TOYOTA Material Handling Company

Address : 2-1-1, Toyoda-cho, Takahama, Aichi
Main products : Forklift trucks, materials handling systems
Employees : 1,507

Kyowa Plant

Technology Development Center, Machinery & Tools Sub-Division, Mechatronics Engineering Sub-Division

Address : 8, Chaya, Kyowa-cho, Obu, Aichi
Main products : Semiconductors, electronic equipment, production facilities, press dies
Employees : 978

Nagakusa Plant

Vehicle Division

Address : 9-2, Yamaguchi, Nagakusa-cho, Obu, Aichi
Main product : Automobiles
Employees : 2,146

Obu Plant

Compressor Division

Address : 1-1, Ebata-cho, Obu, Aichi
Main products : Aluminum die-cast parts for car air-conditioning compressors
Employees : 428

Hekinan Plant

Engine Division

Address : 3, Hama-cho, Hekinan, Aichi
Main product : Engines (for use in automobiles and industrial equipment)
Employees : 1,279

Higashichita Plant

Engine Division

Address : 4-15, Nittou-cho, Handa, Aichi
Main product : Foundry parts
Employees : 305

Higashiura Plant

Compressor Division

Address : 1-1, Shimomeotosaka, Ogawa, Higashiura-cho, Chita-gun, Aichi
Main product : Parts for car air-conditioning compressors
Employees : –*

* The Higashiura Plant was scheduled to go online in July 2002. For this reason, there is no figure for employee numbers as of March 31, 2002.

Major Subsidiaries and Affiliates (As of March 31, 2002)

■Japan

TIBC Corporation (TIBC)
TOYOTA L&F Tokyo Co., Ltd.
Logistics Planning Tokyo Co., Ltd.
Altex Co., Ltd.
Sun River Co., Ltd.
Izumi Machine Mfg. Co., Ltd.
TOYOTA L&F Keiji Co., Ltd.
Tokyu Co., Ltd.
Mino Tokyu Co., Ltd.
Advanced Logistics Solutions Co., Ltd.
Toyoda High System, Incorporated
Nishina Industrial Co., Ltd.
Tokaiseiki Co., Ltd.
Logistec Co., Ltd.
SKE Inc.
SK Maintenance Inc.
Iwama Loom Works, Ltd.
Kawamoto System Corporation
Arti Inc.
TOYOTA L&F Shizuoka Co., Ltd.
Hara Corporation
Mizuho Industry Co., Ltd.
Sun Valley Inc.
Sun Staff, Inc.
Tokai System Institute Corp.
Shine's Inc.
ST Liquid Crystal Display Corp. (ST-LCD)
Taikoh Transportation Co., Ltd.

■Overseas

Toyoda International Sweden AB
BT Industries Group
Michigan Automotive Compressor, Inc. (MACI)
Toyota Industries North America, Inc. (TINA)
Toyota Industrial Equipment Mfg., Inc. (TIEM)
Toyota Material Handling USA, Inc. (TMHU)
Toyota-Lift of Los Angeles, Inc.
Toyoda Textile Machinery, Inc.
TAL Personnel Service, Inc. (TALPS)
TD Deutsche Klimakompressor GmbH (TDDK)
Kirloskar Toyoda Textile Machinery Ltd. (KTTM)
Toyota Industry (Kunshan) Co., Ltd. (TIK)
Toyota Truck Norge Group
Toyota Industrial Equipment, S.A. (TIESA)
ACTIS Manufacturing, Ltd. LLC
Toyota Gabelstapler Deutschland GmbH
Toyota Industrial Equipment (UK) Ltd. (TIEUK)
Toyota Industrial Equipment Europe S.A.R.L. (TIEE)

Business Activities and Environmental Impact

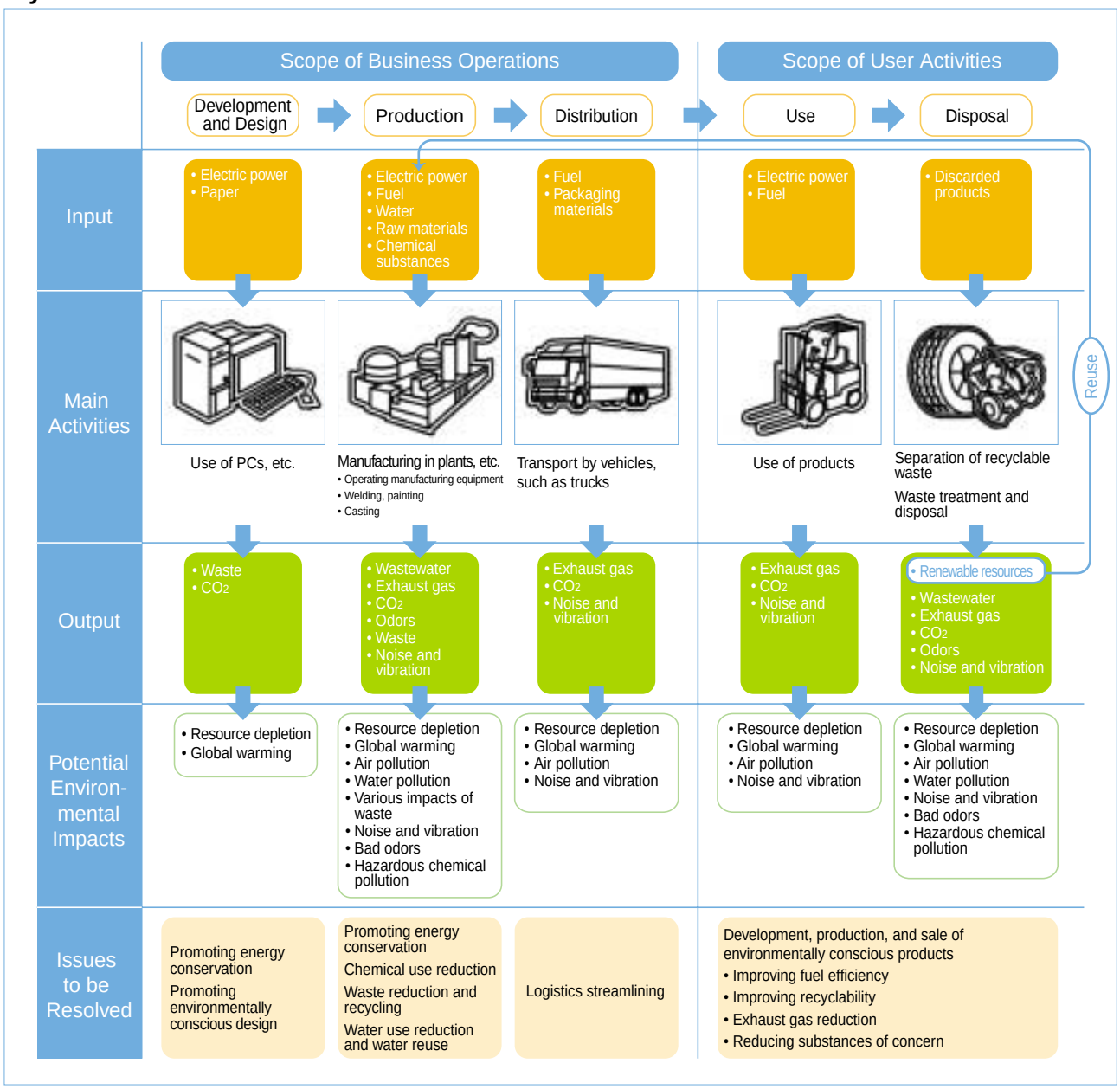
We strive to reduce environmental impact. To effectively accomplish this, we work to obtain a comprehensive and accurate picture of the environmental impacts caused by the use of resources and energy during the overall life cycle of our products.

Toyota Industries is a manufacturer of textile machinery, compressors, materials handling equipment, vehicles, engines, and electronic equipment. Our business activities have a direct impact on the environment at the development and design, production, and distribution stages. In particular, the largest impact stems from production activities. During manufacturing, electric power, fuel, water, raw materials, and chemical substances are utilized. This results in the emissions of wastewater, exhaust gas, CO_2, and other wastes. These activities have the potential to cause environmental impacts such as the depletion of natural resources, global warming, and air and water pollution. The environment can also be adversely affected by waste emissions.

Moreover, once our products are in the hands of our customers, there is a chance of environmental impacts such as resource depletion, global warming, and air pollution from gas emissions and CO_2 caused by electric power and fuel consumption. In addition, waste is emitted during product disposal, possibly causing adverse effects such as the depletion of natural resources, global warming, air and water pollution.

At Toyota Industries, we recognize the existence of such environmental impacts and are implementing various measures to reduce them. We introduce specific measures implemented during the year on page 6 and thereafter in this report.

Toyota Industries' Business Activities and the Environment



Business Activities and Environmental Impact Mass Balance

The diagram below illustrates the company-wide environmental impact mass balance in FY 2001 resulting from production activities, starting from design and development up to the actual manufacturing process. (Refer to the section "Environmental Data" starting on page 40 for mass balance data on each site.)

Electricity		360,833 MWh
Gas	LPG	130,000 kg
	City Gas	46,224 km^3
Fuel	Petroleum	3,489 kl
	Cokes	10,945 tons
Water		3,669 km^3
Chemical Substances		2.760 tons
Paper		156 tons

INPUT

TOYOTA

Toyota Industries

Textile Machinery

Compressors

Materials Handling Equipment

Vehicles

Engines

Electronic Components

OUTPUT

Air	CO_2	338 kt-CO_2
	NOx	40,023 m^3N
	SOx	11,972 m^3N
Water	Total Wastewater	2,696 km^3
	Total COD	16,944 kg
	Total Nitrogen	10,160 kg
	Total Phosphate	178 kg
Municipal Waste	Emissions	1,120 tons
	Recycling Rate	83%
	Direct Landfill	–
Industrial Waste	Emissions	57,616 tons
	Recycling Rate	79%
	Direct Landfill	10,586 tons

Input: Definitions

Electricity	Electric power purchased from power supply companies for use at plants and offices
Gas: LPG	LPG (liquid petroleum gas) used as an energy source at plants and offices
Gas: City Gas	City gas used as an energy source at plants and offices
Fuel: Petroleum	A-type heavy oil, kerosene, diesel, and gasoline used as an energy source at plants and offices
Fuel: Cokes	Cokes used as an energy source at plants and offices
Water	Municipal water, industrial water, and underground water used at plants and offices (excluding recycled water)
Chemical Substances	PRTR-designated substances used in production (including by-products)
Paper	Paper used in office equipment at plants and offices

Output: Definitions

CO_2	CO_2 emitted from the use of electricity, gases, and other fuels
NOx	NOx emitted from the use of gas and other fuels
SOx	SOx emitted from the use of fuels
Total Wastewater	Industrial and domestic wastewater released from plants and offices
Total COD	(Chemical Oxygen Demand) Oxygen spent by chemical oxidization of substances (mainly organic) contained in wastewater from plants and offices
Total Nitrogen	Total amount of nitrogen compounds contained in wastewater emitted from plants and offices
Total Phosphate	Total amount of phosphate compounds contained in wastewater emitted from plants and offices
Municipal Waste	Waste, excluding industrial waste, emitted from plants and offices during the course of business activities (waste paper, kitchen waste, wood shavings, etc.)
Industrial Waste	Waste emitted from plants and offices during the course of business activities which is defined under the Waste Management and Public Cleansing Law (sludge, waste acid, waste alkaline, metals, etc.)
Emissions	Waste emitted from plants
Recycling	Reuse of waste as a raw material, resource, or energy through reuse,*1 material recycling,*2 and thermal recycling.*3
Direct Landfill	Direct transport of waste to landfill without any disposal treatment to reduce the volume or quantity

*1 Reuse: Reuse of waste as is
*2 Material recycling: Recycling of waste for use as a raw material in products (used paper → recycled paper, PET bottles → textiles)
*3 Thermal recycling: Recovery of heat during the incineration of waste or conversion of waste into fuel for use as energy

Environmental Action Plan and FY 2001 Results

Third Environmental Action Plan

Our basic corporate principle states that "Toyota Industries believes that economic growth and conservation of the natural environment are compatible. It strives to offer products that are clean, safe and of high quality." In accordance with this principle, we devised our First Environmental Action Plan in March 1993 which clarified our basic policies and action guidelines related to environmental issues.

In the dawning of the 21st century, we made environmental awareness a key management issue. In August 2000, we revised the second plan and established the Third Environmental Action Plan to guide our environmental conservation activities, aiming to realize harmony between our corporate activities and the global environment and to engage in the creation of a recycling-oriented society.

In FY 2001, we implemented the environmental activities described on the following page, each with its individual target, based on this action plan.

Third Environmental Action Plan

Basic Policies	Action Guidelines	Targets	Action Policies
1. Conduct corporate activities that are considerate of the environment at every stage of the product's life cycle from development through design, production, use, and disposal, to provide clean and safe products to society. 2. Strive to intensify environmental management, including that of consolidated subsidiaries, for the further advancement of corporate activities that support environmental conservation. 3. Promote social contribution efforts, information disclosure, and awareness through wide-ranging cooperation with society on environmental conservation with the ultimate aim of achieving a better global environment.	1. Develop and provide clean products with minimal environmental impact (1) Thoroughly implement environmental considerations in development and design (2) Promote environmentally preferable purchasing*1	Improve fuel efficiency	• Achieve best-in-class fuel efficiency in all countries and regions and reduce CO_2 emissions • Improve fuel efficiency and reduce CO_2 emissions through the development of energy-conservation technologies
		Reduce exhaust gases	• Tailor measures in accordance with usage environments
		Develop clean-energy vehicles*2	• Launch new vehicles in accordance with market conditions • Develop clean products that meet market needs
		Improve recyclability	• Promote recyclable designs contributing to the target of a 95% recycling rate by 2015 • Expand the use of recycled materials
		Control and reduce substances of concern	• Conduct worldwide management of chemical substances
		Reduce noise	• Further reduce noise from all sources in our automobiles and forklift trucks
		Prevent global warming due to car air conditioners	• Develop compressors that are compatible with new alternative refrigerants to HFCs*3
		Strengthen environmental assessment at the development and design stages	• Conduct prior assessments of all environmental impacts throughout products' life cycles from the very first stage of development and design
		Strengthen cooperation with business partners	• Promote environmentally preferable purchasing through strengthened cooperation with business partners
	2. Promote manufacturing that strives for zero emissions*4 (1) Further reduce environmental impact through resource and energy conservation (2) Voluntarily set, carry out, and monitor targets through the Environmental Committee	Set global warming preventive measures	• Actively promote CO_2 reduction initiatives CO_2: Reduce total emissions by 5% compared with FY 1990 levels by March 2006 (10% by FY 2010) Promote thorough energy conservation programs
		Strictly control and reduce the use of substances of concern	• Heighten proper control and voluntary reduction of chemical substances used in production processes PRTR*5: Reduce total emissions of targeted substances by 50% compared with FY 1998 levels by March 2006 VOCs*6: Promote total emissions reduction and reduce emissions from painting lines by 50% compared with 1998 levels by March 2006
		Reduce waste and conserve resources	• Reduce waste for achievement of zero emissions Zero emissions: Eliminate direct landfill disposal at all plants by March 2004 • Promote paperless operations by enhancing in-house IT network systems
		Curtail water use	• Various initiatives
		Conduct logistics streamlining measures	• Improve transport efficiency and promote CO_2 reduction and resource conservation through the reduction of packing materials
	3. Expand environmental management systems (1) Strengthen cooperation with our subsidiaries and suppliers (2) Grasp environmental conservation costs and their benefits	Expand environmental management systems	• Develop basic policies and organize administration systems for group companies • Acquire ISO 14001 certification at group companies
		Enhance environmental accounting systems	• Develop environmental accounting systems
	4. Actively participate in public environmental conservation efforts as an upstanding corporate citizen (1) Engage in the creation of a recycling-oriented society (2) Thoroughly implement active information disclosure and communicate with local communities	Conduct efforts to create a recycling-oriented society	• Participate in initiatives in the public sphere aimed at the achievement of a 95% recycling rate by 2015
		Promote community involvement	• Broaden dialogue with local communities and intensify commitment to greenery activities
		Promote public relations and disclosure activities	• Expand environmental communications

*1 Environmentally preferable purchasing: Procurement of parts and materials that takes into consideration the supplier's ISO 14001 status and the presence of substances of concern in the procured materials and parts
*2 Clean-energy vehicles: Electric forklift trucks and compressed natural gas (CNG)-powered forklift trucks
*3 HFCs: Hydrofluorocarbons. HFCs were used as substitutes for CFCs, but pressure has risen to reduce their use because they contribute to global warming.

Results of Activities in FY 2001

To promote our third action plan, each specialized subcommittee and the General Secretariat act as the main contacts. Each theme is passed through the specialized subcommittees and then implemented by the related department. The following outlines our targets for FY 2001 and the results achieved.

In FY 2001, owing to the fact that the Higashichita Plant became fully operational and because of increased production, we were not able to achieve our comprehensive targets for energy, VOCs, and waste. However, we made improvements in our energy consumption and VOC emissions against sales over the previous year.

In July 2002, a launch was planned for a plant in Higashiura. We are carrying out environmental activities based on last year's results. Moreover, we established concrete numerical targets for the usage of water resources, distribution, and packaging materials, in an effort to further our environmental activities.

FY 2001 Targets and Results

Assessment: ○ Target achieved △ Unattained portion of stated target was less than 10% × Unattained portion of stated target was more than 10%

FY 2001 Targets	Results	Assessment	Reference
Develop energy-saving weaving machinery	• Reduced the energy consumption of the water-jet loom	○	P.18
Cleaner exhaust gases from diesel engines	• Developed the 1HD-FTE diesel engine	○	P.18
Plans for a clean energy vehicle	• Plans under consideration	–	–
Review the Recyclability Evaluation Method	• Surveyed a method connected with evaluating recycling potential	○	P.17
Survey on hazardous substances	• Surveyed the lead, cadmium, and hexavalent chromium content in parts	○	P.16
Lower noise level of diesel engines	• Developed the 1HD-FTE diesel engine	○	P.18
Develop a compressor that uses a new type of refrigerant	• Development under consideration	–	–
Create an LCA manual	• Reviewed LCA method	×	P.14-15
Incorporate into Design Review (DR)	• Established DR rules at 6 divisions	○	P.10
Expand environmentally preferable purchasing know-how	• Surveyed the level of environmental awareness at suppliers • Held a meeting to explain environmentally preferable purchasing	○	P.19
Total CO_2 emissions: 366,400 t-CO_2	• Total CO_2 emissions: 388,300 t-CO_2	△	P.26-27
CO_2 emissions against sales: 56.8 t-CO_2/¥100 million (sales)	• CO_2 emissions against sales: 56.1 t-CO_2/¥100 million (sales)	○	
Reduce CO_2: 12,800 t-CO_2	• Reduced CO_2: 15,800 t-CO_2	○	
Total emission of PRTR-designated substances: 825 tons	• Total emission of PRTR-designated substances: 689 tons	○	P.20-23
Total VOC emissions: 1,268 tons	• Total VOC emissions: 1,814 tons	×	
Promote zero landfill waste	• Achieved zero emissions at Nagakusa, Kariya, Kyowa, Takahama, and Hekinan plants	○	P.28-29
Survey current conditions at the divisions	• Surveyed all plants and pinpointed processes with large consumption • Installed a flow meter (Compressor Division, Nagakusa Plant)	○	P.30
Survey current conditions at the divisions	• Surveyed at all plants • Established in-house standards to measure CO_2 emissions and materials used for packaging during distribution	○	P.31
Expand range covered by ISO 14001 certification (development/design)	• Acquired certification for Textile Machinery, Compressor, and Engine Divisions and TOYOTA Material Handling Company	○	P.9-11
Establish a group environmental management system	• Established a working plan (domestic production plants)	○	
Support the acquisition of ISO 14001 certification (4 domestic subsidiaries)	• Acquired ISO 14001 certification at Tokyu, ST-LCD, Nishina, and Tokaiseiki	○	
Clearly define in-house accounting standards	• Established standards for environmental accounting	○	P.12-13
–	–	–	–
Offer support based on the theme of the global environment (5 cases)	• Provided support to the Japan Eagle and Hawk Research Center and Keidanren Nature Conservation Fund (5 events)	○	P.32-33
Employee volunteer activities (10 cases)	• Clean-up activities, support of iris cluster environmental preservation activities (11 events)	○	
Publish an environmental report	• Published the Environmental Report 2001 (August 2001)	○	
Disclose in-house activities on an environmental Web site	• Created an environmental Web site (opened from April 1, 2002)	○	
Enhance internal communications using a newsletter (6 cases)	• 11 articles on the environment in the in-house magazine	○	

*4 Zero emissions: Toyota Industries defines zero emissions as the reduction of more than 95% of landfill waste, compared to FY 1998 levels.
*5 PRTR: Pollutant Release and Transfer Register
*6 VOCs: Volatile Organic Compounds

Environmental Management System

Organization

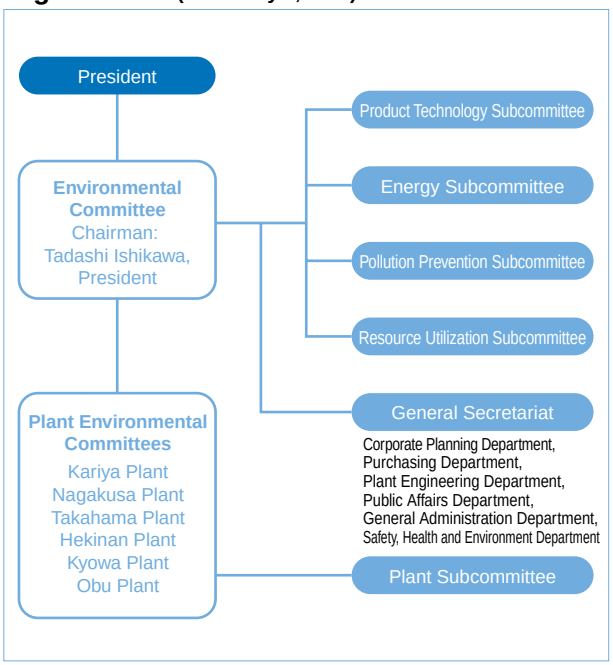
To promote environmental conservation activities throughout the company, the Environmental Committee, chaired by the president, makes decisions on corporate environmental policies and follows up on important environmental activities taken.

Furthermore, to promote activities associated with key issues, we developed four specialized subcommittees which stand below our Environmental Committee. They are the Product Technology, Energy, Pollution Prevention, and Resource Utilization subcommittees.

To smoothly implement the policies and decisions of the committee and subcommittees at each production site, each plant maintains its own Plant Environmental Committee, chaired by the environment conservation director, and specialized subcommittees to handle environmental activities.

In order to strengthen environmental communications and public contributions, we dissolved the Communications and Public Relations Subcommittee in FY 2001 and have incorporated the Public Affairs Department and the General Administration Department into the General Secretariat for the Environmental Committee.

Organization (As of July 1, 2002)



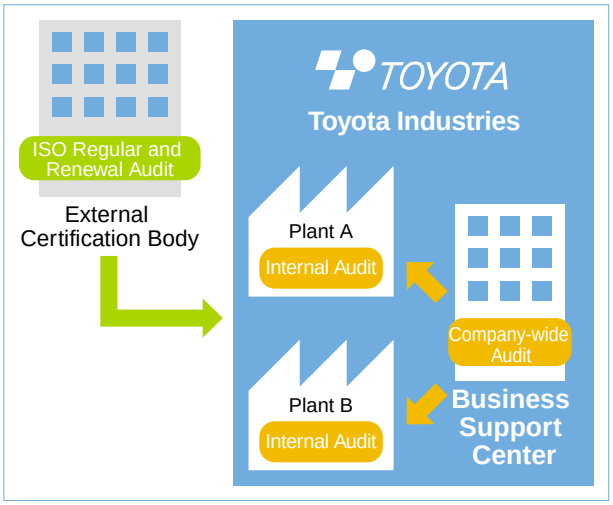
Environmental Audits

At Toyota Industries, we not only undergo regular ISO audits but also check our environmental conservation activities by conducting voluntary audits within the company based on our environmental management system.

Within the company there are two types of environmental audits. One type is an internal "self-check" audit performed at the plant level. The other is a company-wide audit, performed for all of the plants, planned by the Business Support Center (BSC) and performed by a team of qualified individuals within the company.

During FY 2001 the internal and company-wide audits were performed four times and five times, respectively. Due to the increased stringency of the internal audits, we were judged to have no major problems in our system with only three cases of minor incidents and thirty-one observational notes in the ISO regular and renewal audit performed.

Environmental Audit Process



Environmental Education and Awareness Program

It is important for our environmental conservation activities that every employee is aware of what impact our company may have on the environment and what they can do to help.

Therefore we provide our employees with environmental education, training, and awareness activities.

ISO 14001 Audit Cases Reported

ISO 14001 Requirements	Minor Incidents	Observational Notes	Total
Environmental policy	0	0	0
Planning	1	9	10
Implementation and operation	0	7	7
Checking and corrective action	0	11	11
Management review	2	4	6
Total	3	31	34

"Checking and corrective action" improvements are required to achieve the target of reducing plastic waste.

Environmental Education

At Toyota Industries, we supply multi-level environmental education for all employees based on the environmental management system at the plant level, as well as company-wide ISO 14001 internal auditors' training.

Employees are divided into groups according to position (workers, supervisors, and managers), and thoroughgoing courses are systematically tailored to each group.

In addition to general education, we also train personnel who work with important environmental-related equipment to handle any emergency that may have a significant impact on the environment.

The company-wide ISO 14001 internal auditors' training is carried out to nurture environmental management system auditors and prepare leaders to guide the company's environmental conservation activities. In FY 2001, eight training sessions were held and a total of 155 employees became qualified internal auditors.

Awareness Program

To further environmental activities and promote environmental awareness within the company, every year, we invite external specialists to conduct seminars.

For FY 2001, we invited the general manager of the environment division of Toyota Motor Corporation, Mr. Kiyoshi Masuda. He addressed the importance of environmental management in his lecture entitled, "Toyota Environmental Management in the 21st Century."

Because this lecture covered a topic which is crucial to consolidated environmental management, we invited members of our subsidiaries and affiliates to take part in the event as well. As a result, many directors from our group companies participated.

Consolidated Environmental Management

To ensure that our environmental efforts extend beyond the parent company, we are working to establish a consolidated environmental management system that covers all of our subsidiaries and affiliates in the entire group.

In March 2001, we held an explanatory meeting for our subsidiaries and affiliates and now all of them have implemented the development of a environmental management system. Moreover, to assist in implementing environmental management systems in our group companies, we have provided them with environmental education. We are willing to continue this assistance in the future. In addition, four more domestic group companies acquired ISO 14001 certification in FY 2001.

Training for Emergency Situations

Environmental Management System Auditors

		FY 2000	FY 2001
CEAR registration	Lead auditors	1	1
	Auditors	1	1
	Provisional auditors*	11	12
Within the company	Internal auditors	353	508

*This also includes those that passed the auditor training course.

Environmental Seminar

Environmental Education at a Subsidiary

Environmental Management System

ISO 14001 Certification

Our Progress

■Progress towards ISO 14001 Certification Including Product Design and Development

Since the Nagakusa Plant acquired certification in 1997, all six of our plants except for the Higashichita and Higashiura plants were ISO 14001 certified in the production sector by March 2001.

We strove to expand our existing ISO 14001 certifications for production to product design and development in FY 2001. In the course of the October 2001 renewal audit for the Kariya Plant, the technical departments of the Textile Machinery Division and the Compressor Division acquired certification that included product design and development for the first time. The technical departments of the Engine Division, located in the Hekinan Plant, and the TOYOTA Material Handling Company, located at the Takahama Plant, also acquired certification that included product design and development in November and December, respectively. These certifications led to RvA*1 certification, an authoritative accreditation.

We will continue to strive for certification including product design and development in the vehicle technical department and the Kyowa Plant in the future.

In FY 2001 our headquarters acquired ISO 14001 certification. The Higashichita and the Higashiura plants expect to acquire certification by March 2003.

■Our Efforts toward ISO 14001 Certification in Product Design and Development

Using the methods below, the technical departments of the Textile Machinery, Compressor, and Engine divisions, as well as TOYOTA Material Handling Company, were able to acquire ISO 14001 certification.

• Evaluation of Environmental Aspects of Products and Establishment of "Guidelines for Evaluating the Environmental Impacts of Products"

To acquire ISO 14001 certification in product design and development, it is necessary to identify environmental aspects of products and then select significant environmental aspects. Therefore, the Product Technology Subcommittee issued "Guidelines for Evaluating the Environmental Impacts of Products," and implemented a prior assessment system at the development stage of every technical department.

We use the identified significant aspects to plan environmental management programs as well as environmental objectives and targets. Using Design Review (DR) we are always checking their progress. With DR we also research the needs of the customer, market information, and the various environmental laws and regulations related to our products.

• Publication of List of Environmental Regulations and Environmental Regulation News

The Product Technology Subcommittee compiled a list of identified environmental regulations as well as the latest regulation news and published an environmental regulations newsletter. The list and newsletters contain resources on recycling, environmentally preferable purchasing, eco-labels and a list of substances of concern useful for all of our divisions.

Environmental Regulation News

• Environmental Regulations

In every division we promote the identification of the rules and regulations concerning the environment of our products, as well as the regulations of ISO 14001 and other environmental requirements.

• Training for Designers and Internal Auditors

To ensure designers' proficiency, the Product Technology Subcommittee administered training and then a test on substances of concern guidelines and recycling design guidelines for designers in TOYOTA Material Handling Company and the Kyowa Plant. The designers that passed the test were registered and a series of training standards were issued.

Internal auditor training that incorporates content required for product design and development so as to enable audits of those fields has been carried out twice. This has permitted the training of internal auditors in the product design and development fields, making continual improvement in the future a possibility.

Internal Auditor Training

*1 RvA is the abbreviation of Raad voor Accreditatie, a Dutch institution of certification.

Subsidiaries and Affiliates' Progress in ISO 14001 Certification

In FY 2001, four of our domestic subsidiaries and affiliates (Tokyu Co., Ltd., ST Liquid Crystal Display Corp., Nishina Industrial Co., Ltd., and Tokaiseiki Co., Ltd.) acquired ISO 14001 certification. Among our overseas subsidiaries, Toyota Industry (Kunshan) Co., Ltd., Kirloskar Toyoda Textile Machinery Ltd., and TD Deutsche Klimakompressor GmbH also acquired certification. Except for BT Group, acquired as a subsidiary in FY 2000, all of our overseas production facilities acquired the certification.

From a consolidated environmental management point of view, we fully support all subsidiaries and affiliates in their efforts to achieve ISO 14001 certification in the future.

Companies/Facilities that Have Acquired ISO 14001 Certification and Date

Category	Company/Facility		Location	Certification Date
Toyota Industries' Plants and Offices in Japan	Nagakusa Plant		Obu, Aichi	October 1997
	Kariya Plant		Kariya, Aichi	October 1998 (October 2001*1)
	Takahama Plant		Takahama, Aichi	December 1998 (December 2001*1)
	Hekinan Plant		Hekinan, Aichi	November 1999 (November 2001*1)
	Kyowa Plant		Obu, Aichi	January 2000
	Obu Plant		Obu, Aichi	March 2000
	Kariya Plant (Headquarters)		Kariya, Aichi	October 2001
Domestic Consolidated Subsidiaries	TIBC Corporation		Obu, Aichi	January 2000
	Tokyu Co., Ltd.		Niwa-gun, Aichi	November 2001
	ST Liquid Crystal Display Corp.		Chita-gun, Aichi	January 2002
	Nishina Industrial Co., Ltd.		Kamiminochi-gun, Nagano	January 2002
	Tokaiseiki Co., Ltd.		Iwata, Shizuoka	March 2002
Overseas Consolidated Subsidiaries	Toyota Industrial Equipment Mfg., Inc.		U.S.	June 1999
	Michigan Automotive Compressor, Inc.		U.S.	June 1999
	Toyota Industrial Equipment, S.A.		France	January 2001
	Toyota Industry (Kunshan) Co., Ltd.		China	October 2001
	Kirloskar Toyoda Textile Machinery Ltd.		India	January 2002
	TD Deutsche Klimakompressor GmbH		Germany	March 2002
	BT Group	BT Industries AB	Mjölby, Sweden (PT*2)	November 1997
			Mjölby, Sweden (MT*3)	November 1997
		BT Raymond Inc.	Brantford, Canada	March 1999
			Greene, U.S.	February 2001

*1 Acquisition in product design and development sectors
*2 PT is the abbreviation of Powered Truck and refers to a specialized plant for powered trucks.
*3 MT is the abbreviation of Manual Truck and refers to a specialized plant for hand pallet trucks.

ISO 14001 Acquisition Pending

Category	Company/Facility		Location	Target Certification Date
Domestic Plants	Higashichita Plant		Handa, Aichi	By March 2003
	Higashiura Plant		Chita-gun, Aichi	By March 2003
Domestic Consolidated Subsidiaries	Taikoh Transportation Co., Ltd.		Kariya, Aichi	October 2002
	Izumi Machine Mfg. Co., Ltd.		Obu, Aichi	November 2002
	Iwama Loom Works, Ltd.		Niwa-gun, Aichi	March 2003
Overseas Consolidated Subsidiaries	BT Group	BT Products AB	Antwerp, Belgium	By March 2003
		Lift-Rite Inc.	Brampton, Canada	By March 2004
		Cesab Carrelli Elevatori S.p.A.	Bologna, Italy	Under consideration
		BT Raymond Inc.	Muscatine, U.S.	By March 2003

Environmental Accounting

In our Third Environmental Action Plan, established in August 2000, one of the policies which we listed was the establishment of an environmental accounting system for use in the management of our operations. Environmental accounting is positioned as one of our key issues.

By actively disclosing the findings of our environmental accounting, we can provide a better picture of our environmental activities to a larger number of interested parties. At the same time, we aim to use environmental accounting as a method to assess our operations and to support the further promotion of our environmental conservation activities and improve performance.

Environmental Accounting in FY 2001

The following is a report on our findings for FY 2001.

Environmental accounting during FY 2001 was done on a parent-only basis (excluding the Higashiura Plant).

Environmental Conservation Costs (Units: millions of yen)

Cost Categories		FY 2001 Cumulative Results			Purpose	Page
		Investment	Expense	Total		
Business area costs	Pollution prevention	1,394	944	2,338	• Management of chemical substances • Prevention of pollution (air, water, noise, vibration, and odors)	20-25
	Prevention of global warming	113	1,123	1,236	• Curtail the greenhouse gas emissions (CO_2, CFCs, etc.)	23, 26, 27
	Resource recycling	58	421	479	• Suitable disposal of waste emitted from business sites and reduction of such waste • Effective use of resources	28-30
Upstream/downstream costs		9	30	39	• Gap between cost of materials procured through environmentally preferable purchasing and through normal channels • Reduction of environmental impact such as from packaging and distribution	31
Management costs		1	513	514	• Establishment and operation of an environmental management system • Communication and environmental training • Plant greenery around offices and in areas surrounding the business site	6-9, 32, 33
R&D costs			1,512	1,512	• Personnel costs related to the development of environmentally conscious products • Personnel costs related to the development of production technology for reducing environmental impact	14-18
Social activity costs			5	5	• Social activities encompassing contribution, support, and information exchange with groups and local residents to preserve the environment	33
Environmental damage costs		297	331	628	• Survey and treatment of past pollution (soil, underground water, etc.)	24
Total		1,872	4,879	6,751		

Note: We measure the effects of our investments over a one-year period. For this reason, depreciation is not included under expenses.
The difference and proportions of investments and expenditures that serve several purposes have been calculated.

Effects of Environmental Performance

Environmental Conservation Categories			Effects in FY 2001 (Reduction)	Page
Business area benefits	Input resources	Energy [Figures in ( ) have been converted to represent CO_2 emissions]	23,889 MWh (15,767 t-CO_2)	26-27
		Water resources	104,400 m^3	30
	Substances of concern	Release and transfer of PRTR-designated substances	364 tons	20-21
		VOC emissions	298 tons	22
		Greenhouse gas emissions*1 [Figures in ( ) have been converted to represent CO_2 emissions]	HFC-134a*2: 2 tons (2,600 t-CO_2)	23
	Industrial waste	Emission of sludge from the treatment of wastewater	72 tons	28-29

Note: Effects of environmental performance are actual effects stemming from our environmental conservation measures. The effects obtained were measured over a one-year period.
*1 This figure represents hydrofluorocarbons and other greenhouse gases (excluding CO_2). CO_2 emissions are calculated under the effects of energy reduction from the input of resources.
*2 HFC-134a is another name for 1,1,1,2-tetrafluoroethane.

Economic Effects of Environmental Conservation Measures (Unit: millions of yen)

Categories		FY 2001	Purpose	Pages
Energy savings		346	• Reduced expense for energy savings	26-27
Reduced usage of substances of concern		7	• Lower raw material costs through reducing usage of substances of concern	20-23
Resource recycling	Gain on sale of reusable materials	646	• Business profit from the sale of reusable materials	28-29
	Disposal and recycling of waste	2	• Lower disposal cost owing to reduction of industrial waste	
Water conservation		3	• Lower water bill owing to conservation and more effective usage of water	30
Total		1,004		

Note: Earnings included above are those actually recorded in the company's FY 2001 financial statements.
Reductions in expense are mainly only those for which actual effects were obtained from environmental conservation measures. The effects obtained were measured over a one-year period.

Environmental Accounting

In FY 1999, we began environmental accounting, at which time we also began to accumulate relevant data.

Up until FY 2000, we had accumulated data on a company-wide basis. In accordance with the environmental accounting guidelines released by the Ministry of the Environment, our headquarters amassed data on investment and those expenses related to environmental conservation for the entire company.

From FY 2000, to improve the reliability of the information in our environmental report, we began implementing independent review. At that time, an independent review agency proposed a method for tallying environmental accounting data, as a means of helping us to improve our environmental conservation activities.

We not only incorporated this proposal, but decided to further improve the precision of our calculations and enhance the internal usage of environmental accounting. In FY 2001 we worked to create well-defined, in-house standards, using the ministry's 2002 Environmental Accounting Guidelines as a reference, and began implementing these accounting practices at each of our plants.

To ensure full compliance with these standards, we held meetings at each of our plants to explain procedures and conducted environmental accounting for FY 2001 on a site basis.

FY 2001 Environmental Accounting Results

During the fiscal year, our environmental conservation costs totaled ¥6.75 billion, including investments of ¥1.87 billion and expenses of ¥4.88 billion.

Investments accounted for 27.7% of all environmental conservation costs. The core of this investment was used for facilities at the Higashichita Plant. Other major spending was related to the introduction of pollution prevention facilities such as underground water purification and an exhaust gas combustion system to reduce VOC emissions.

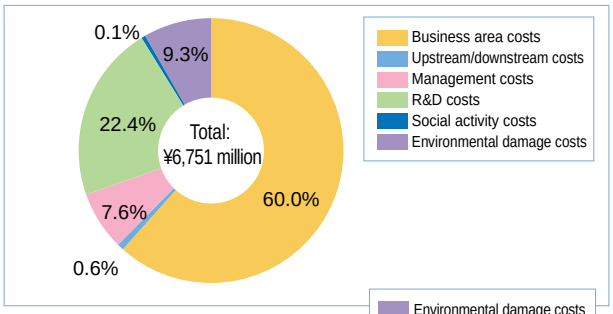
The major portion of expenses covered maintenance and management costs for environmental facilities and personnel costs. Environmental damage costs associated with measures to purify underground water represented 9.3% of environmental conservation costs, or ¥630 million.

In addition, R&D costs for developing environmentally conscious products accounted for 22.4% of all environmental conservation costs, or ¥1.5 billion. In contrast, the economic effects from the implementation of environmental measures was ¥1.0 billion.

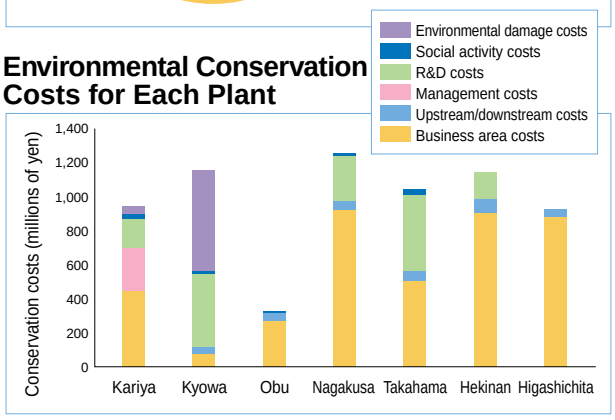
Energy savings and the gain of sale of reusable materials were the two largest contributors to economic effects. In FY 2001, we added items that enabled us to achieve reliable expense reduction.

Environmental Accounting Information Session

Environmental Conservation Costs



Environmental Conservation Costs for Each Plant



Breakdown of Environmental Costs for Each Plant

Plant	Main Business Activities	Key Features
Kariya	Maintaining headquarter functions, developing and manufacturing textile machinery, developing compressors, processing and assembling parts	• Headquarters are based here, therefore management activity costs are high • Incurred environmental damage costs
Kyowa	R&D of various technologies, R&D of electronics technologies, manufacturing electronic components, developing and manufacturing press equipment and facilities used in the automotive industry, performing engine assessments, processing compressor parts, producing plastic/glass for automobiles	• Incurred environmental damage costs • R&D costs were high as this plant handles the development of technologies
Obu	Dissolution of aluminum, processing compressor parts, manufacturing foundry parts (This line is to be transferred completely to Higashichita in FY 2002.)	• Environmental conservation costs were relatively low owing to a revision of business operations in FY 2000
Nagakusa	Developing and assembling automotive equipment	• Business area costs were high in FY 2001 owing to the implementation of VOC and zero emissions measures
Takahama	Developing industrial equipment, processing and assembling parts	• R&D costs were high owing to the development of a green fuel vehicle
Hekinan	Developing engines, processing and assembling parts	• Business area costs were high owing to the implementation of energy conservation measures in FY 2001
Higashi-chita	Began operation in FY 2000 (fully operational in FY 2001) Manufacturing foundry parts	• Incurred business area costs (investment) owing to the building of a new plant

Development of Environmentally Conscious Products

Product Technology Subcommittee Activities

Masazumi Konishi
Managing Director
Chairman, Product Technology Subcommittee

Today we reap the benefits of a civilization rich with various commodities as a result of our massive consumption of resources and energy. However, this has put us face-to-face with serious environmental problems on a global level.

It has been Toyota Industries' mission to supply products which contribute to improving the convenience and satisfaction of our customers. But in recent years, we have realized the need to deal with environmental issues.

We are developing technologies to deal with these issues which will help enable everyone to achieve sustainable growth. We now acknowledge that our greatest mission is to supply our customers with environmentally conscious products.

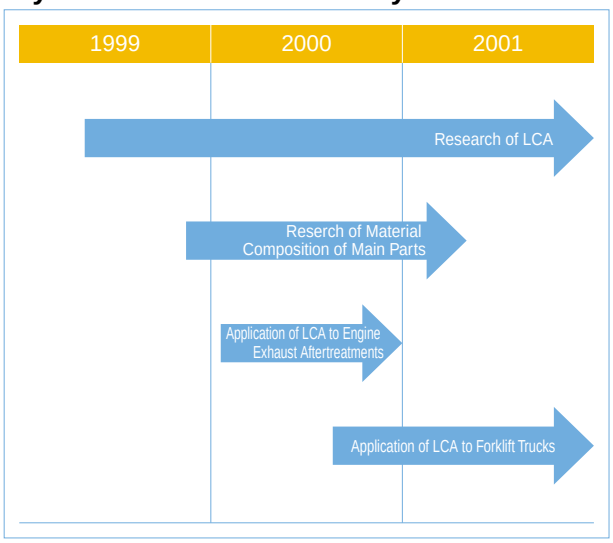
To accomplish our goal, we do our utmost to understand all environmental impacts and are aggressively working to develop products with lower environmental impact.

LCA

To reduce the environmental impact of products, it is important to assess the impact of a product over its entire life cycle. One such system is the Life Cycle Assessment (LCA).*1 Since 1999, our Product Technology Subcommittee has surveyed various applications related to LCA.

In the course of the trial, the subcommittee researched the composition of materials and units of each material per production and made a life cycle assessment of engine exhaust aftertreatments, the results of which were published in the Environmental Report 2001. This year we performed a life cycle analysis (inventory analysis*2) of a forklift truck.

Toyota Industries' LCA History



Life Cycle Assessment of Forklift Truck

Forklift Truck Specification

We assessed a diesel engine-powered forklift truck (rated loading 2.5 tons), currently our core model, (hereinafter, "internal combustion forklift") as well as an electric-powered model (hereinafter, "electric forklift") of the same class.

Specifications of Forklift Trucks Analyzed

Type	Weight	Power Specifications
Internal Combustion Forklift	3,840 kg	Engine Capacity 2,486 x 10^{-6} m^3 four-cylinder Rated power 40 kw/2,400 min^{-1}
Electric Forklift	3,965 kg	Rated power 10.7 kw/48 V

Forklifts Subject to Assessment

Internal Combustion Forklift (7FD)

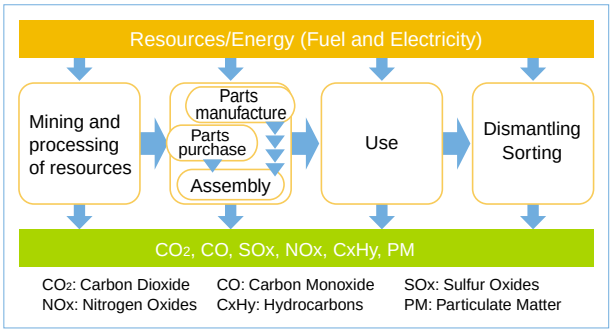
Electric Forklift (7FB)

*1 Life Cycle Assessment: Assessment of the overall environmental impact of a product from its manufacture to use and disposal
*2 Inventory Analysis: Analysis of the gases that effect the environment such as CO_2, SOx, etc., emitted during a product's life cycle

Scope of Analysis

As indicated in the right-hand diagram, the analysis encompassed the product's entire life cycle from the mining of resources to the dismantling and sorting of the finished product. The inventory analysis focused on CO_2 and air pollutants, which have a particularly high impact on the environment once the forklift truck begins operation.

Scope of Forklift Truck LCA



Conditions for LCA Comparison

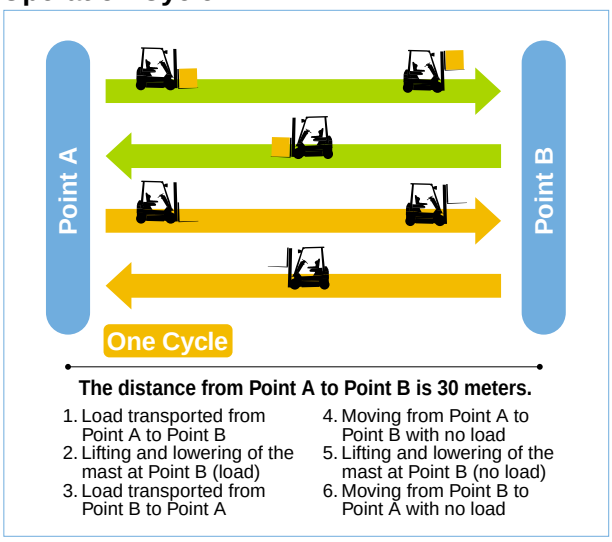
As indicated in the following table, we selected a fixed set of conditions so that the comparison could be carried out using a common measure for capabilities and operations. We also compared operating conditions the same number of times as we did for our evaluation method for forklift truck operation. Operating life was based on market data. Consequently, this does not always reflect a comparison with actual operational conditions.

Conditions for Comparing Operations

- Work cycle carried out 410,000 times
- 2 battery changes
- 55 engine oil changes

(14 years operation; model calculation based on market data)

Operation Cycle

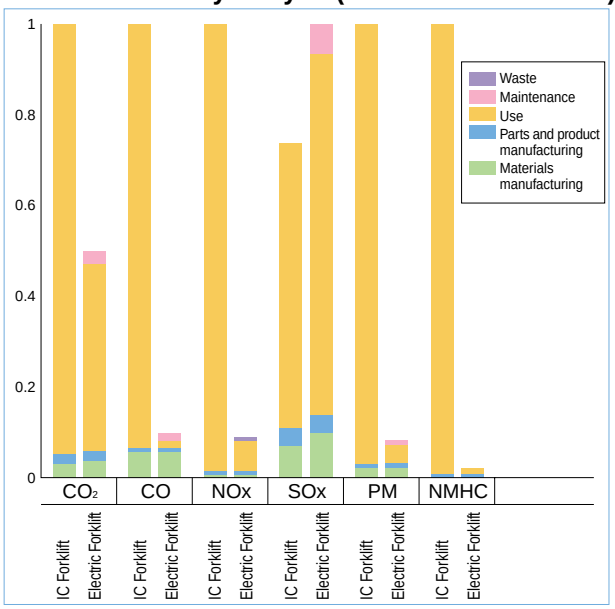


Results of Inventory Analysis

The results of the inventory analysis indicated that a large proportion of CO_2 and air pollutants were generated during operation of both the internal combustion and electric forklifts. In addition, it was observed that under these conditions, the electric forklift emitted around 50% less CO_2 than its internal combustion counterpart.

It should be noted that the amount of CO_2 and air pollutants generated during use of an electric forklift includes the amount arising from the power station, which generates power to recharge the battery's electricity, as well as that arising from the mining and processing of fuel for power generation. These amounts vary depending on the type of power generated. The data for such calculations were based on averages taken from JEMAI-LCA.*3

Results of Inventory Analysis (Air Pollutant Emissions)



Note: We used an index to allow easy comparison of the relative differences between the internal combustion (IC) and electric forklifts.

Future Issues

LCA requires a large amount of inventory data and comparisons of units per production, which means that the final outcome of the analysis varies depending on the units per production. To resolve this problem, we plan to gather related data and establish our own LCA method.

*3 JEMAI-LCA: LCA software developed by the National Institute of Advanced Industrial Science and Technology. Japan Environmental Management Association for Industry has developed and sold the software under license.

Development of Environmentally Conscious Products

Control and Reduction of Content of Substances of Concern

We at Toyota Industries are working to manage and reduce substances of concern in product design and development. Owing to the differences between our automobile and industrial businesses, the content of environmental regulations that apply to these products also changes. Reflecting the rapid enactment of environmental regulations aimed at automobile-related products and owing to the acknowledgment of the fact that such regulations will eventually be applied to other products, we are promoting a company-wide effort to manage and reduce the content of substances of concern in our products.

Complying with EU ELV*1

■Investigation of Use of Four Banned Substances and Use of Alternatives

Under the EU's end-of-life vehicle directive (EU ELV), the use of lead, mercury, cadmium, and hexavalent chromium are to be banned in vehicles sold from July 2003. In preparation for this, we examined our own use of these substances and their content in our vehicles, engines, compressors, and electronic components as well as the use of alternatives. The results revealed no instances that would constitute an infringement of regulations at the time of their enforcement.

We are currently examining what effect the use of alternatives have on capital investment and product pricing and will make necessary design adjustments and switch to use of alternative substances in 2002.

■Company-wide Effort to Eliminate Use of Hexavalent Chromium

Of the four substances prohibited under EU ELV, the phasing out of hexavalent chromium will require the most stringent effort. Hexavalent chromium is widely used throughout the company in the chromate surface treatment of zinc plated nuts and bolts.

As a comprehensive effort against the use of hexavalent chromium, the headquarters took the initiative to examine our eight surface finishers and suppliers of plating solutions regarding the use and content of hexavalent chromium and presented the results to various departments within the company via the intranet. In addition, we had our hexavalent chromium solution suppliers give presentations three times on the latest developments in plating technology. The talks were attended by twenty-nine engineers in concerned departments.

■Presentation on Complying with EU ELV

We attended a total of five information sessions on responding to EU ELV held by our customers in FY 2001. We also held a total of eleven similar presentations in-house, directed at our employees in our automotive-related departments.

Seminars on Environmentally Conscious Design

As a follow-up to the seminars of FY 2000 we held environmental seminars, including presentations by guest speakers, on two occasions. The guest speakers gave presentations on the latest industry trends, including regulations on the use of hexavalent chromium and the development of lead-free soldering, etc., which proved to be very useful to the designers and engineers of automotive and auto component technical departments.

1st Seminar: July 2001	"Surface Treatments and Heat Treatments of Environmentally Conscious Automobiles" (58 attendees)
2nd Seminar: November 2001	"Environmentally Conscious Electronic Components" (77 attendees)

Environmental Seminar

Providing Employees with Information on Environmental Regulations via the Intranet

We established a Web site concerning environmental issues on the company intranet to allow our designers and engineers to view the results of the activities of the Product Technology Subcommittee in FY 2000. We regularly summarized our findings on environmental trends pertaining to our products and published them in five separate news reports during FY 2001. Company employees may also access information concerning such environmental seminars and the results of our surveys on surface finishing companies.

Sharing of Environmental Information over the Intranet

*1 EU's end-of-life vehicle directive (EU ELV): EU directive for reducing environmental impact and improving recyclability when scrapping used vehicles

Improving Recyclability

From the design and development stage, we make assessments of our products at various stages of the life cycle to improve their recyclability and have established a method to evaluate the recyclability rate of used products.

Compliance with EU ELV

Under EU ELV, all vehicles sold as of 2005 will be regulated to meet the recycling requirements in the directive. As Toyota Industries only handles assembly and parts manufacturing and is not a manufacturer of complete vehicles, its role is to continually improve the recyclability of components it designs and develops.

Owing to the fact that automobiles will need to be certified for marketing in Europe under EU ELV, the International Organization for Standardization (ISO) is also considering establishing a similar set of standards. In line with the ISO's considerations, we are also reviewing our plans for recycling guidelines. In December 2001, our Product Technology Subcommittee examined our plans and has decided to revise our recycling design guidelines.

Surveying the Disposal of ELV

FY 2001 was the second consecutive year in which we conducted a survey on the disposal of ELV, a subject closely related to our operations. During the period, we surveyed the disassembly of automobiles, shredder waste emissions, and the reuse of parts.

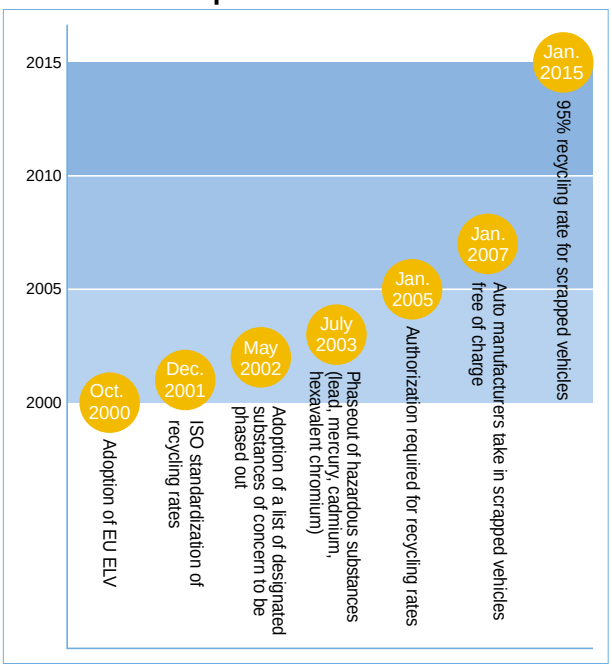
The survey was conducted in January 2002, and fifteen members from various divisions participated. We focused on the distribution of reused parts via the Internet, and discovered that this is a rapidly growing business. In addition, we ascertained various other key aspects related to product design for better recyclability. This included the recovery of CFC gases, which deplete the ozone layer, and the removable of unused airbags, to prevent the sudden inflation of airbags during disassembly.

Survey Related to the Automobile Recycling Law*2

Legislation is under consideration for the recycling of automobiles. We began a study on the effect of such a law in April 2000. In FY 2001, by attending symposiums on automobile recycling and interviewing many experts in this field, we studied global trends and made our findings available to our designers and engineers via our intranet environmental site.

Automobile Recycling Symposiums	
May 2001	JSAE Annual Congress & Exposition
December 2001	JSAE Symposium

Process of Compliance with EU ELV



Survey of ELV

Survey Results on Forklift Truck Recycling

We released the results of our survey on forklift truck recycling in the 43rd edition of our in-house technological bulletin, *Toyota Industries Technical Report*, published in August 2001. The survey covered recycling-conscious design efforts, the dismantling of forklift trucks after they are put on the market, reuse of parts, and recycling. This information proved effective for our forklift truck designers. For example, over 98% of our scrapped forklift trucks are recycled. We found that the parts not being recycled were made from materials such as plastic or rubber. For this reason, we discovered it is necessary to clearly label, mark or code the plastic and rubber parts used in newly designed forklift trucks.

Our technological bulletin is distributed to other companies as well. We want our peers to know that we are working to improve the recyclability of our products.

*2 Automobile Recycling Law: Legislation for the recycling of used automobiles

Development of Environmentally Conscious Products

Other Environmentally Conscious Products

Toyota Industries is working to introduce LCA, manage and reduce the use of substances of concern, and improve the recyclability of our products. In addition, in accordance with the Third Environmental Action Plan, we are implementing a variety of other steps to develop and supply environmentally conscious products. This section introduces three examples of our endeavors.

Development of the 1HD-FTE Low-Emission Diesel Engine

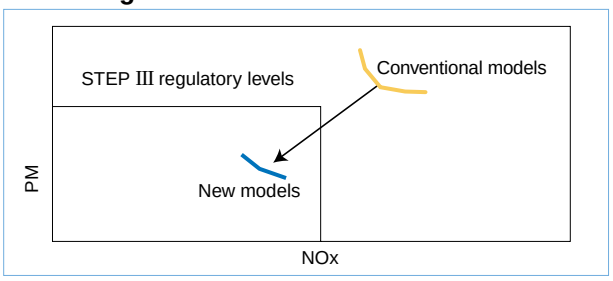
Owing to high thermal efficiency and low fuel consumption, diesel engines are superior from the standpoint of preventing global warming. However, in recent years, regulations on diesel engine emissions have grown strict. As a result, the quest to create a clean diesel engine has become an important development theme over the years.

The Toyota 1HD-FTE direct-injection diesel engine was developed in 2001, a top-of-the-line SUV engine for the 21st century.

The diesel engine is in compliance with the STEP III (EURO III) European exhaust emissions regulation. NOx and particulate matter (PM) were reduced using a swirl control valve (SCV), a Toyota first, a diesel throttle, and EGR gas electronic control with an EGR cooler.

Over recent years, demand has increased for a quieter diesel engine. We have reduced suction noise by adopting a resonator placed on the intake system and curbed gear noise with the use of scissors gears.

Diesel Engine 1HD-FTE with Lower Air Pollutants

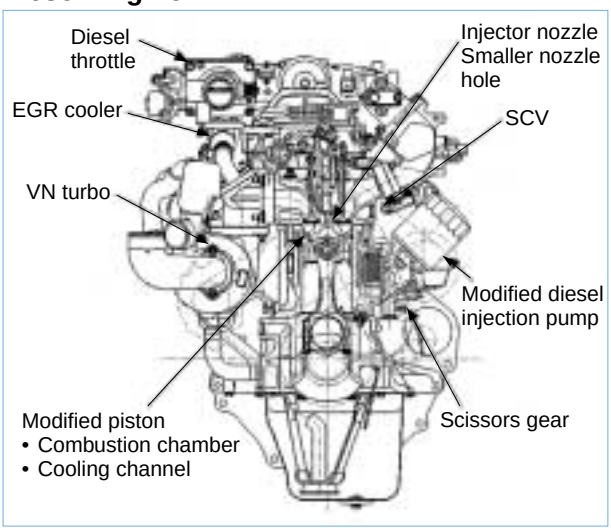


Energy Efficient Water-Jet Loom

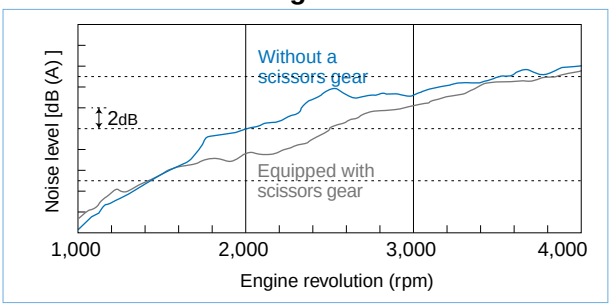
Over its product life cycle, textile machinery consumes an extremely large amount of electric power during use. Consequently, we are continuously striving to find ways to conserve energy in the design and development of our products.

In 2001, we developed a drum without a turbo blower for use in our mass-produced water-jet looms. Owing to this, we achieved overall energy reduction of 25%. For 100 units operating simultaneously, the CO_2 reduction is 250 t-CO_2 per year.

Diesel Engine 1HD-FTE



Noise Reduction Using Scissors Gear



Launching of our North American Compressor Remanufacturer, ACTIS

ACTIS Manufacturing, Ltd. LLC (ACTIS) is a remanufacturer of car air-conditioning compressors in North America jointly established by Toyota Industries, DENSO, and Toyota Tsusho. Operations started up on March 18, 2002 in Grapevine, Texas (U.S.).

ACTIS was established to fulfill environmental needs in North America through the effective use of resources, namely the recycling of automobile parts. In North America there is a growing demand for remanufactured compressors. ACTIS strives to make a contribution to the trend of remanufacturing automobile parts.

Corporate Summary
Established: 2001
Capital: $2 million
Business activities:
Remanufacturing of car air-conditioning compressors
Location: Texas, U.S.

Environmentally Preferable Purchasing

To manufacture products that are friendly to both humans and the environment, we implemented environmentally preferable purchasing in March 2001. This requires environmental awareness from the stage of procuring materials and parts.

In FY 2001, the first year of our environmentally preferable purchasing efforts, we performed a survey to check the environmental awareness of our suppliers and held meetings to fully educate those involved on our environmentally preferable purchasing guidelines.

Survey Results on Supplier Environmental Awareness

We surveyed the 847 companies which do business with us (excluding equipment and logistics) on environmentally preferable purchasing guidelines. The average score among suppliers was 53.8 points. (Survey results were tallied on December 25, 2001.)

Because of these results, TOYOTA Material Handling Company held training sessions for its suppliers to allow them to boost their scores. The aim of the company's training sessions is to improve the average score of its suppliers to above 60 points for the next survey, which was scheduled to be held in July 2002.

Environmentally Preferable Purchasing Guideline Meeting

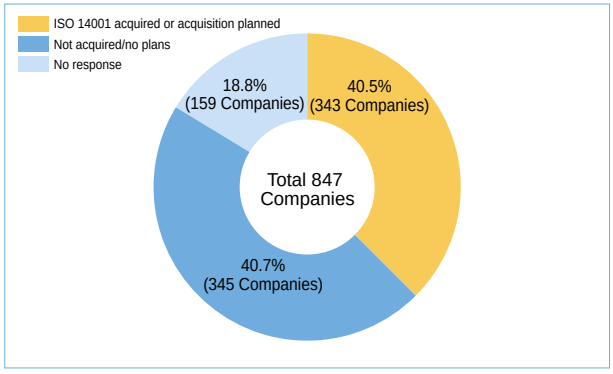
In the Compressor Division, the Engine Division, and TOYOTA Material Handling Company, we held an explanatory meeting for the environmentally preferable purchasing guidelines.

We explained trends in product environmental regulations which are likely to become stricter and also policies on how each division plans to respond to these laws. In addition, for all business partners, specific requests were made to examine the use of substances of concern and to find alternatives to improve the environmental soundness of the parts we use.

EU ELV is set to be enacted in 2003. To comply with this law, we are asking suppliers to report their use of the four banned substances*1 and submit plans by December 2002 for finding alternative materials.

Environmentally Preferable Purchasing Meeting at the Engine Division

2001 Environmental Awareness Survey Results



Training Session

Environmental Management Survey

*1 The four banned substances are lead, mercury, cadmium, and hexavalent chromium (see page 16).

Reducing Environmental Impact of Production Activities

Pollution Prevention Subcommittee Activities

Shiro Endo
Senior Managing Director
Chairman, Pollution Prevention Subcommittee

Today there is an abundance of chemicals, more than ten thousand types, in use around the world. As exhibited by the various environmental issues we face, such as depletion of the ozone layer, the majority of problems these days arise from the emissions of these chemical substances into the environment. Furthermore, a new dilemma has cropped up, the issue of endocrine disruptors. To promptly deal with the emergence of new pollutants, we believe it is necessary to carry out full-scale risk management.

Here at Toyota Industries, we use a wide range of chemicals in our production activities. Thus far, we have built a management structure which aids in the reduction of chemical substances. To maintain our position as a good corporate citizen, we are working to strengthen our management of environmental pollutants and to continue reducing emissions. In addition, we place importance on communications with various members of society.

Chemical Management

Toyota Industries manages chemical substances from two different perspectives, input management (purchasing) and output management (emissions).

At the input management stage, to prevent pollution we have introduced a prior assessment system for environmental pollutants. In addition, at the output management stage, to reduce emissions we are implementing the management of mass balance for chemical substances designated under the PRTR system.*1

Prior Assessment System for Environmental Pollutants

In 1995, we began implementing a prior assessment system for environmental pollutants.

The assessment mainly covers sub-materials and chemical content, to guarantee safety and health during the use and disposal of such substances. To implement necessary policies, this evaluation is done prior to introduction of sub-materials. All substances that do not undergo assessment cannot be purchased, thereby helping to prevent illness among employees as well as environmental pollution.

In FY 2001, 372 prior assessments were conducted under this system.

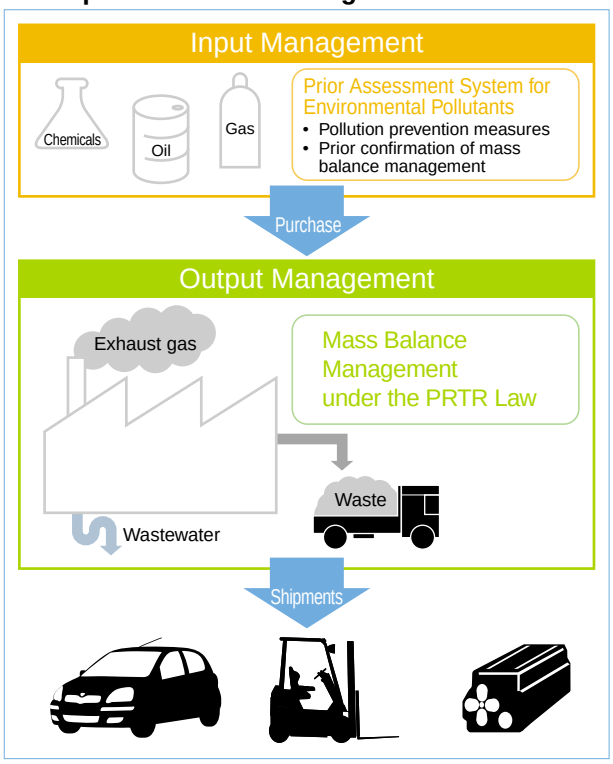
Mass Balance Management Based on the PRTR System

As a part of our plans to reduce the emissions of environmental pollutants, our target is to lower our total emissions of PRTR-designated substances by 50% in comparison with FY 1998 levels by March 2006.

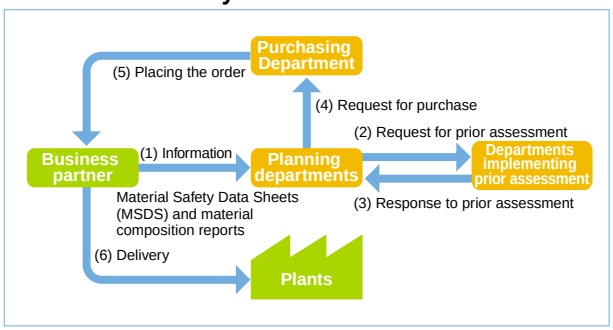
In FY 2001, our total emissions equalled 689 tons. Toluene and xylene, used during the painting process, accounted for 94% of total emissions. Thanks to measures implemented thus far, we succeeded in reducing VOC emissions by 35% compared to FY 2000.

We plan to continue reducing our emissions of environmental pollutants, mainly VOCs.

Concept of Chemical Management

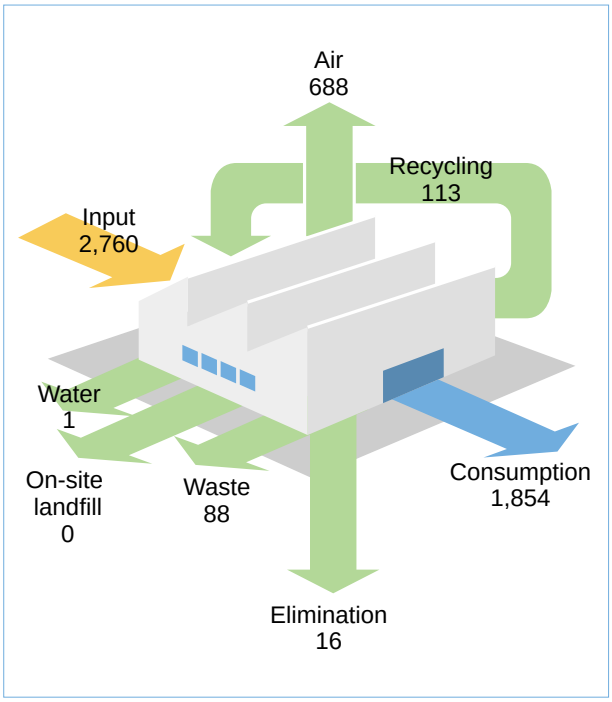


Prior Assessment System for Environmental Pollutants

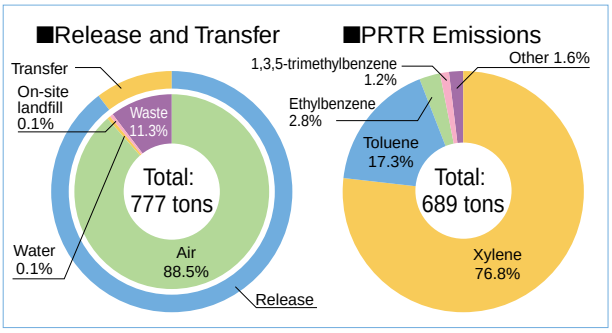


*1 PRTR system: Pollutant Release and Transfer Register. The Japanese PRTR law was enacted in July 1999. This system allows for the calculation and reporting of releases and transfers from the place of business. The manufacturer collects data on environmental releases of chemical substances thought to be hazardous to human health or to the ecosystem from its respective facilities. It also tracks transfers of such substances which may be contained in industrial waste shipped outside the site. This data is then reported to the government. The government uses this data to disseminate facts on pollutant release and transfer.

Mass Balance of PRTR-Designated Substances in FY 2001 (Unit: tons/year)

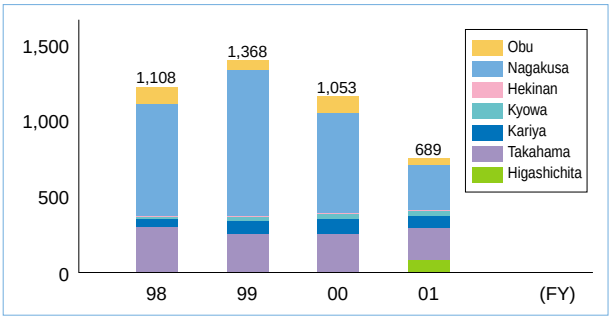


PRTR-Designated Substances Released and Transferred in FY2001



Releases of PRTR-Designated Substances

(Unit: tons/year)



Company-wide Total for the Release and Transfer of PRTR-Designated Substances

(Unit: kg/year, Dioxins: mg-TEQ/year)

Substance	Quantity	Releases					Transfers			Total for the Releases and Transfers	Amount Recycled	Amount Removed	Amount Consumed
		Air	Water	Soil	On-site landfill	Subtotal	Waste	Sewage	Subtotal				
Zinc compounds (water-soluble)	14,661	—	370	—	—	370	2,564	—	2,564	2,934	—	—	11,728
2-Aminoethan	1,094	—	—	—	—	—	—	—	—	—	—	1,094	—
Antimony and its compounds	17,022	—	—	—	—	—	—	—	—	—	—	—	17,022
Bisphenol A	5,000	—	—	—	—	—	—	—	—	—	5,000	—	—
Bisphenol A type epoxy resin	6,151	—	—	—	—	—	706	—	706	706	—	—	5,444
Ethylbenzene	47,275	21,660	—	—	—	21,660	—	—	—	21,660	3,714	—	21,901
Ethylene glycol	767,438	1,650	—	—	—	1,650	862	—	862	2,512	—	—	764,926
Xylene	791,472	528,811	—	—	—	528,811	43,569	—	43,569	572.380	76,631	11,864	130,596
Chromium and chromium (III) compounds	111,745	4	—	—	—	4	—	—	—	4	—	—	111,741
Organic tin compounds	3,763	—	—	—	—	—	—	—	—	—	—	151	3,612
Styrene	1,513	1,513	—	—	—	1,513	—	—	—	1,513	—	—	—
Dioxins	10	4	—	—	—	4	7	—	7	10	—	—	—
Hexamethylenetetramine	50,576	—	—	—	—	—	—	—	—	—	—	—	50,576
1,3,5-trimethylbenzene	9,554	8,121	—	—	—	8,121	—	—	—	8,121	1,433	—	—
Toluene	357,426	119,459	—	—	—	119,459	33,406	—	33,406	152,865	23,701	2,940	177,917
Lead and its compounds	4,432	—	—	—	—	—	—	—	—	—	2,231	—	2,201
Nickel	37,530	10	—	—	—	10	—	—	—	10	—	—	37,520
Nickel compounds	2,101	—	193	—	—	193	857	—	857	1,051	—	—	1,051
Phenol	15,134	2	—	—	—	2	—	—	—	2	—	—	15,132
Benzene	7,381	114	—	—	—	114	—	—	—	114	—	—	7,267
Poly (oxyethylene) alkyl ether (alkyl C=12-15)	6,910	—	102	—	—	102	4,347	—	4,347	4,449	—	102	2,359
Poly (oxyethylene) nonylphenyl ether	1,209	—	—	—	—	—	54	—	54	54	—	—	1,155
Formaldehyde	7,630	6,129	—	—	—	6,129	—	—	—	6,129	—	—	1,501
Manganese and its compounds	457,347	2	100	—	331	433	1,794	—	1,794	2,227	—	—	455,120
Molybdenum and its compounds	35,234	—	—	—	—	—	—	—	—	—	—	—	35,234

Note: See Environmental Data starting on page 40 for the release and transfer of PRTR-designated substances for each plant.

Reducing Environmental Impact of Production Activities

Reducing VOC*1 Emissions

A high level of VOC emissions is released during the painting process. In our Third Environmental Action Plan, our target is to reduce VOC emissions by 50% compared to levels in FY 1998 by March 2006.

In FY 2001, VOC emissions totalled 1,814 tons. This was 14% less than was released in FY 2000.

Activities in our Vehicle Division

■Introducing an Exhaust Gas Combustion System

In August 2001, our Vehicle Division installed an exhaust gas combustion system to reduce VOC emissions from the painting process. As a result, VOC emissions declined by 99 tons.

In addition, as VOC emissions are odorous, the furnace helped to reduce odor density significantly.

Activities in TOYOTA Material Handling Company

■Employing an Electrostatic Spraying Gun/ Low-Pressure Spraying Gun

From April to September 2001, ten low-pressure spraying guns were installed. Compared to conventional spraying guns, these new guns spray around 50% less paint and improve coating efficiency.

To improve coating efficiency further, an electrostatic spraying gun was introduced to paint forklift truck frames in January 2002.

By implementing these methods, VOC emissions were reduced by 12 tons annually.

■Expanded Use of Water-Soluble Paint

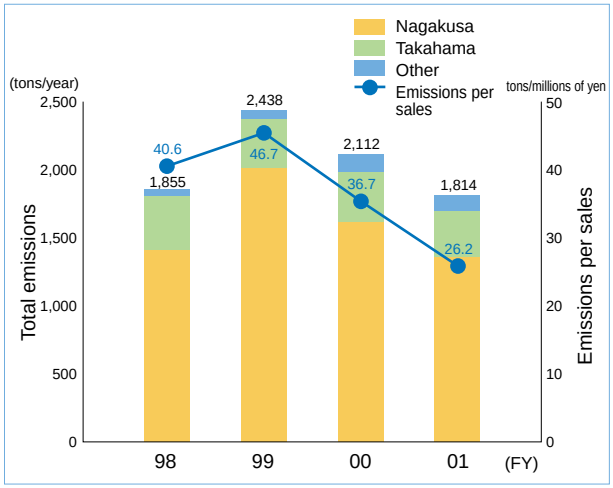
Since April 2000, we have promoted the use of water-soluble paints. In FY 2000, these paints were used to paint forklift trucks, and their use was then expanded to the painting of rear axles in April 2001. This contributed to reducing VOC emissions by about nine tons per year.

■Introduction of a Paint Flow Management System

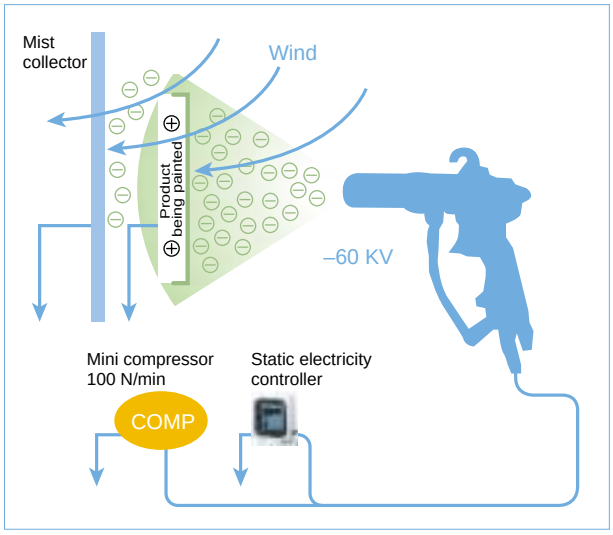
To fortify the management of paint usage and reduce loss, we introduced a paint flow management system in October 2001.

This system uses a sensor to detect the flow of paint during the coating process. The system is connected online to the company's PC network. As a result, it can be used to track the details of paint usage in real time. We plan to introduce the system to our key painting lines in the future.

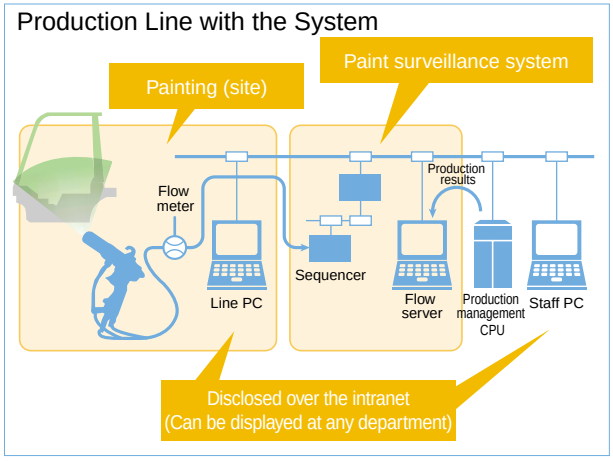
Total VOC Emissions



Principle of Electrostatic Spraying



Paint Flow Management System



*1 VOC: Volatile Organic Compound

Reducing Nickel Emissions

In addition to toluene and xylene, for which emissions are high, we independently conducted measures to reduce nickel compound emissions, which have a significant impact on the environment.

Nickel compounds are used in agents to prepare products for painting or plating. The wastewater released from the painting and plating processes therefore contains nickel compounds.

As a measure to reduce emissions to waterways, we installed a water treatment plant that specifically handles the treatment of wastewater containing nickel compounds in April 2001. As a result, the nickel compound concentration in our wastewater has decreased by 78.2% compared to levels prior to the introduction of these treatment facilities.

Nickel Processing Facility

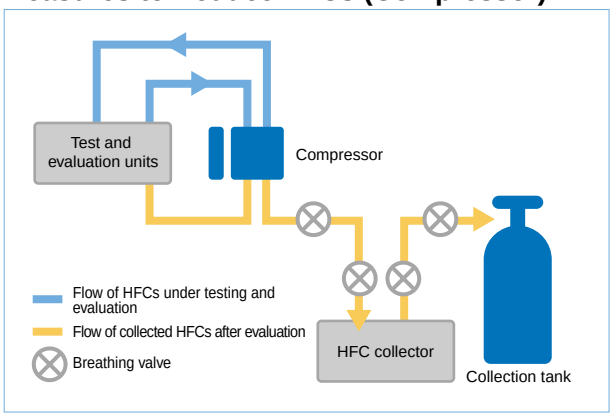
Reducing Hydrofluorocarbons (HFCs)

We use the CFC substitute HFC-134a*2 during the development of compressors and assembly of automobiles.

HFC-134a was introduced as an alternative to CFC-12, a specific substance that destroys the earth's ozone layer. As a key cause of global warming, if CO_2 were rated a 1 for its greenhouse effect, HFC-134a would be 1,300 times that. Because of this, even if emissions are small, its impact on the earth is extremely great.

Consequently, to help remedy this problem, we have installed devices that collect HFC emissions and work to curtail the emissions.

Measures to Reduce HFCs (Compressor)



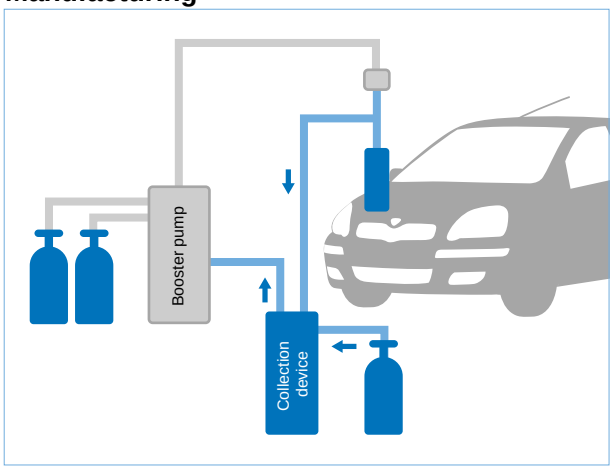
■Compressor Development

HFC-134a is used as a refrigerant at the performance and durability testing stages during the development of new compressors.

Typically after tests, refrigerant is discharged into the air. When converting this into CO_2, we were emitting 7,500 tons of CO_2 into the air every year.

In April 2001 we launched a collection device and began retrieving the used HFCs from the air after the tests. When we converted these results into CO_2 emissions, we found that we had reduced emissions by around 2,600 tons of CO_2 per year. Treatment of the collected HFCs is consigned to a company for disposal.

HFC Collection and Reuse During Automotive Manufacturing



■Automotive Manufacturing

During the automotive manufacturing process, HFC-134a is used as a refrigerant in car air-conditioning.

Conventionally, the HFCs remaining in the piping were released into the air when refrigerant was poured into the air conditioners. This was equivalent to around 3,000 tons of CO_2 emissions per year. We inspected our facilities not only with the objective of preventing global warming but also for more efficient use of resources. As a result, in March 2002 we installed a collection device that collects HFCs for reuse. Using this device, we aim to reduce our emissions by 98%.

*2 HFC-134a: 1,1,1,2-tetrafluoroethane. It is designated as a green effect gas by the law concerning the promotion of the measures to cope with global warming.

Reducing Environmental Impact of Production Activities

Risk Management

Risk Communication Guidelines

The PRTR law was implemented in April 2001. We have begun reporting to governments on the release and transfer of designated chemical substances into the environment since April 2002. We started disclosing information on soil and groundwater treatment activities in April 2001.

As a result of these actions and the management review of our environmental management system, we drew up our Risk Communication Guidelines on April 1, 2002.

These guidelines call for active communication with interested parties, in particular local residents, to maintain our stance as a corporate citizen. The frequency with which we carry out our risk communication is also outlined in these guidelines.

We had held regular meetings to exchange opinions with local residents. In the future, in accordance with these guidelines, we plan to use the meetings to convey risk communication, report on our environmental conservation activities, and promote a better understanding of our efforts in the surrounding communities.

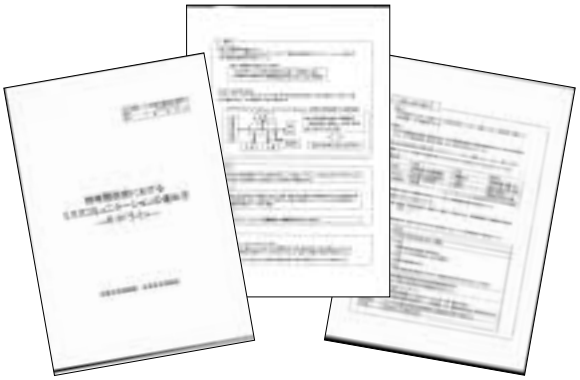
PCB Storage

PCBs*1 were used as insulation in transformers and condensers. PCBs are highly toxic and pose the risk of damage to internal organs. For these reasons, PCB usage was phased out in 1976.

The 600 transformers containing PCBs are securely locked away in a storage warehouse to prevent leakage. These transformers will be kept in storage until a sure-fire method of dealing with PCBs is developed.

PCB Storage Area

Risk Communication Guidelines



Outline of Risk Communication Guidelines

Presentations	Held at each site
Participants	The program is aimed at area representatives and government officials dealing with environmental issues.
Frequency	Presentations are given once a year (usually held in conjunction with the release of our environmental report)
Report on environmental conservation activities (by site)	• PRTR • Pollution prevention (measures to halt air, water, and soil pollution, etc.) • Update on environmental conservation activities

Our Continuing Report on Soil and Groundwater Measures

At the Kariya Plant in April 1998, and at the Kyowa Plant in March 1999, we began efforts to purify the groundwater under the guidance of the local government authorities. This purification project was due to the fact that we previously used trichloroethylene in our business operations.

We continue to implement measures to prevent off-site run-off and still use the pumping aeration method. We report our observations and results to local government authorities and residents on a regular basis.

In FY 2001, the average groundwater density at the Kariya Plant was 1.0 mg/ℓ and at the Kyowa Plant it was 2.9 mg/ℓ .

Compared to FY 2000, the average groundwater density remained unchanged year-on-year at the Kariya Plant, and decreased by 0.2 mg/ℓ at the Kyowa Plant. Slowly but surely we are seeing a gradual decline.

We aim to continue our purification measures and make regular reports on our progress.

*1 PCB: Polychlorinated Biphenyl

Pollution Prevention

Air Management*2

During the course of our business operations, sulfur oxide (SOx), nitrogen oxide (NOx), and other air pollutants are emitted into the atmosphere from our casting and smelting furnaces, boilers, and incinerators. To reduce these emissions, we introduced alternative fuels and installed removal devices.

In FY 2001, to prevent dioxin emissions, we disassembled and removed all of our incinerators.

Water Quality Management*2

Wastewater from our plants is discharged into nearby rivers. From there it flows into the Ise Bay, which currently suffers from eutrophication. In an effort to thoroughly prevent eutrophication of the waterways, we are conducting advanced wastewater treatment methods, such as the use of the simultaneous nitrification-denitrification process, and have fortified the analysis of in-house wastewater to detect substances such as nitrogen and phosphorous.

In FY 2001, automatic analytical devices were installed at the wastewater treatment facilities in the Takahama and Hekinan plants to detect nitrogen and phosphorous, to further strengthen our management of water pollutants.

Odor Prevention Measures

VOCs emitted during the coating process are air pollutants and also release bad odors.

Owing to the large-scale of coating processes carried out at the Kariya, Nagakusa, and Takahama plants, we are implementing various measures to control odor. (For activities conducted in FY 2001, see page 22, “Reducing VOC Emissions.”)

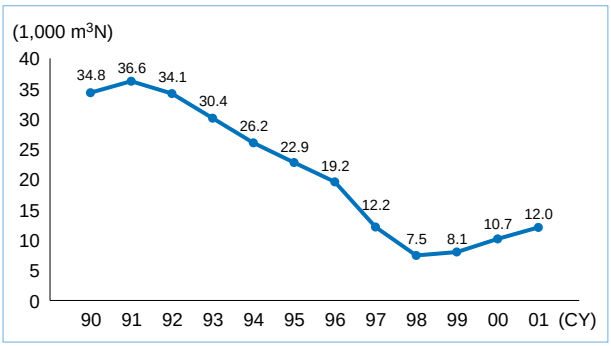
Noise Prevention Measures

The Nagakusa Plant, which assembles automobiles, is adjacent to a residential area. We have implemented various measures to curtail noise, such as the construction of soundproof walls.

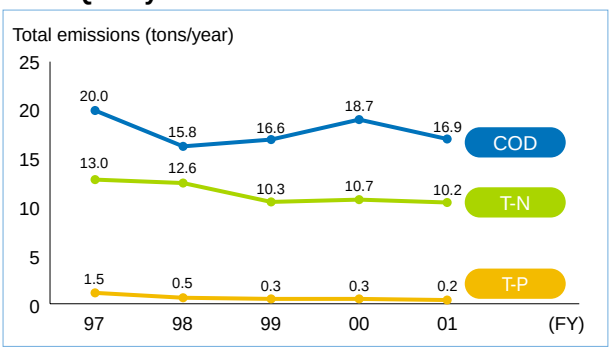
In FY 2001, to create a quieter environment, we promoted a variety of measures, twenty-eight in all, to pinpoint the source of the noise and resolve noise problems by repairing roads.

During the fiscal year, all of our plants managed to meet regulatory standards for noise pollution and we did not receive any complaints from local residents.

SOx Emissions



Water Quality



Noise Prevention Measures at the Nagakusa Plant in FY 2001

Item	Example	Cases
Facilities measures	• Soundproofing facilities • Installation of soundproof covers	14
On-site vehicle operation regulations	• Speed regulations • Installation of signs aimed at improving awareness	4
Revamping of distribution route	• Removing barriers • Change in materials used for grating	3
Improvements to work	• Review of work done outside • Review of the opening and closing of the shutter at the press factory	7

Examples of Noise Prevention Measures: Soundproof Wall

*2 For air and water pollution data, see page 40, "Environmental Data."

Reducing Environmental Impact of Production Activities

Energy Subcommittee Activities

Iwao Katayama
Senior Managing Director
Chairman, Energy Subcommittee

The recent high level of economic growth we have experienced as a legacy of the industrial revolution has resulted in a wealthy society, but the price we have had to pay are the global environmental issues we face today.

In particular, one of the most serious problems we face today is global warming. During 2002, the "Kyoto Protocol to the United Nations Framework Convention on Climate Change" is expected to be put into effect. We have come to realize that it is necessary for industry, governments and private corporations to work together to resolve these problems.

In 1993, we established specialized organizations and are working to reduce energy consumption, but there is still plenty of room for improvement.

As a chairman, I am working to review our present conditions, improve the level of environmental consciousness among our employees, make all workers fully aware, and promote effective activities.

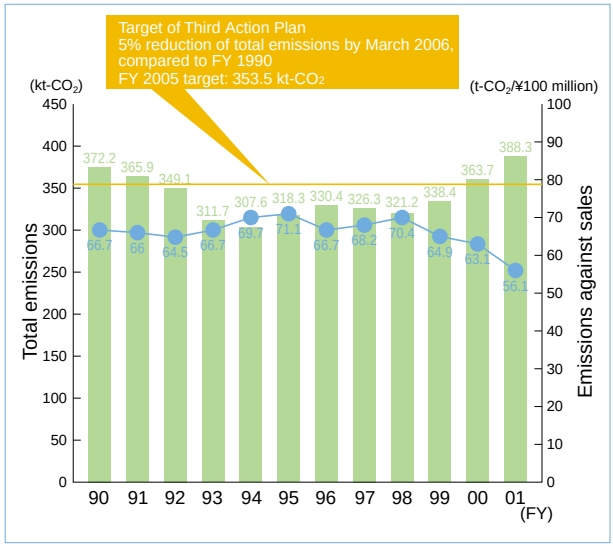
Reducing CO_2 Emissions*1

FY 2001 Results

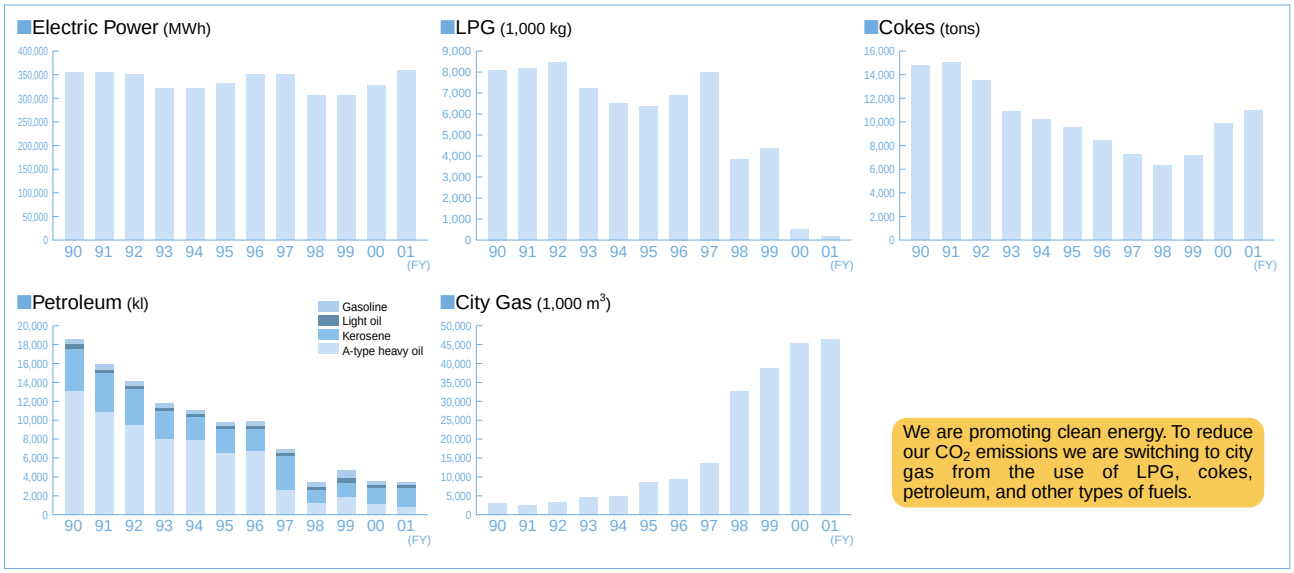
We aim to conserve energy to meet our target of a 5% reduction in total CO_2 emissions as compared with FY 1990 levels in our Third Environmental Action Plan.

In FY 2001, our energy conservation activities focused on the improvement of power supply and the reduction in energy loss in our production lines. In conjunction with an increase in production and the full-fledged operation of the Higashichita Plant, our total CO_2 emissions were 388.3 kt-CO_2, an increase of 24.6 kt-CO_2 over FY 2000, and a 4% rise over FY 1990. However, our CO_2 emissions per sales were 56.1 t-CO_2 /¥100 million, a decrease of 7 t-CO_2/¥100 million over FY 2000, and a 16% decrease over FY 1990.

CO_2 Emissions



Energy Consumption



*1 CO_2 Emissions: Carbon dioxide caused by the use of energy (electricity, gas, fuel). Up until our Environmental Report 2001, emissions were expressed using carbon conversion values, but from this edition onward we will use CO_2 conversion values.

Reducing CO_2 Emissions through Energy Conservation

FY 2001 Actions

In FY 2001, to enhance our power supply methods, we improved the efficiency of our air compressor and introduced a steam-powered air compressor. We reduced energy loss in our production lines through measures to prevent air leakage and through shutdowns between shifts and on holidays. In addition, improvements were made to production facilities.

In constructing the Higashiura Plant, one of our targets from the standpoint of preventing global warming was to reduce electric power consumption by 20% in comparison with the amount of electricity used by conventional plant facilities. To accomplish this, we introduced clean equipment and facilities such as solar and wind power generators to conserve energy. (For details on the Higashiura Plant, see pages 36-37.)

Improving Energy Conservation in FY 2001

■Installing Steam-Powered Air Compressor

In the Nagakusa Plant, we installed a steam-powered compressor to replace our old air compressor facilities. This steam-powered compressor utilizes the difference in pressure of the high pressure steam emitted by the cogeneration system to create air. As a result, the plant was able to reduce electric power consumption by 1,150 MW annually, or 760 t-CO_2 per year.

■Improving Production Facilities to Reduce Electric Power Consumption

In the Hekinan Plant, we use a coolant (oil) at the cutting stage during the processing of parts. By creating a more compact nozzle and performing head cleaning intermittently, we were able to reduce the coolant used. In addition, we could reduce the number of spray pumps. As a result, annual electric power consumption was reduced by 620 MW, or 410 t-CO_2 per year.

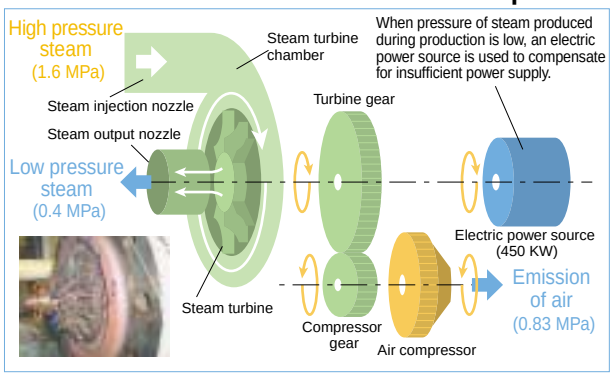
Future Actions

In FY 2002, at our Kyowa Plant, we plan to introduce a cogeneration system, minimize electric power loss during non-operating hours, and improve efficiency through the integration of production lines. In the future, we aim to aggressively work at conserving energy and reducing CO_2 emissions.

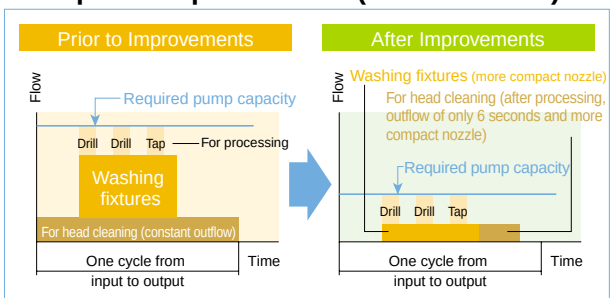
Key Energy Conservation Activities in FY 2001

Action	Details
Improving power supply methods	• Improving efficiency of air compressors • Introducing a steam-powered air compressor
Reducing energy loss in production lines	• Measures to prevent air leakage • Facilities shutdown between shifts and on holidays
Improving production facilities	• Better energy efficiency owing to shorter cycle time • Employing air blowers with nozzles which conserve energy • Converting to fluorescent lighting (phase out mercury lighting)
Surveying energy saving items by adopting a system to measure energy usage	• Introducing in-house examples (introduce horizontally throughout other divisions)
Introducing energy saving facilities at the Higashiura Plant	• Employment of micro gas turbine, solar power, and hybrid solar and wind street lamps • High efficiency air compressors

Structure of the Steam-Powered Air Compressor



Example of Improvements (Hekinan Plant)



By creating a more compact nozzle and performing intermittent head cleaning, we were able to reduce water usage/outflow and the number of pumps.

• Energy Conservation Month

December of every year is Energy Conservation Month. We ask employees to send in posters or to give us proposals for energy conservation. In FY 2001, 122 posters were sent in. Three were chosen for display in the office. This event helps to heighten awareness on energy conservation.

Reducing Environmental Impact of Production Activities

Resource Utilization Subcommittee Activities

Shinjiro Kamimura
Managing Director
Chairman, Resource Utilization Subcommittee

We must break away from our patterns of mass production, mass consumption, and mass disposal. By promoting the effective use of materials over the stages of production, consumption and ultimate disposal, or encourage recycling, we can help contribute to a recycling-oriented society that has minimal impact on the environment. This is one of the most important issues we face today. To achieve this, various laws including the "Basic Law for Establishing a Recycling-Based Society" have been established in Japan.

Since 1990, we have aggressively worked to reduce our waste emissions and have had significant success.

We will continue to promote our environmental activities. We plan to fortify our actions with the aim of maximizing and making the best use of our limited resources.

Reducing Industrial Waste and Proper Disposal

FY 2001 Results

In FY 2001, the total emissions of waste, including reusable materials and industrial waste, was 118,881 tons. Of this industrial waste accounted for 57,616 tons. Of this total industrial waste disposed of, 79% or 45,528 tons were reused or recycled, 9,721 tons were used in on-site landfills, 1,502 tons were intermediately disposed of by a third party and 865 tons were used as landfill outside the site.

During this period, owing to the start-up of operating at the Higashichita Plant which manufactures foundry parts, the company saw an increase in the amount of slag used as landfill.

In the future we plan to promote disposal measures for slag, which accounts for 80% of our industrial waste.

Aiming for Zero Emissions*2

■Phasing Out Direct Landfills*3 at Five Plants

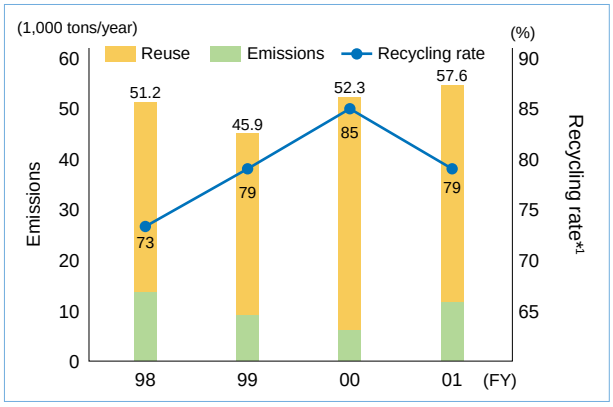
One of the targets stated in our Third Environmental Action Plan is elimination of direct landfills by FY 2003.

With few years of landfill life remaining, we realized that waste should not be seen as something to be discarded but rather as a material to be converted back into a resource. Reflecting this, we sought new methods to reuse or recycle waste.

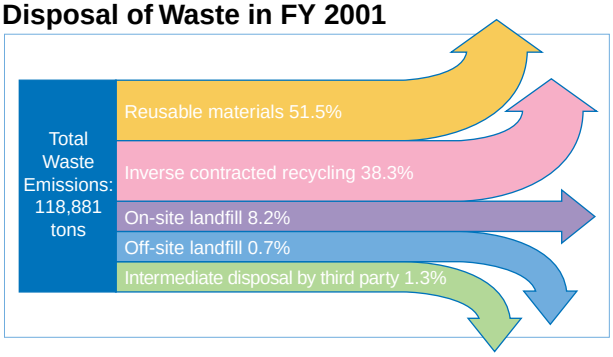
As a result of our efforts, we eliminated direct landfills at the Nagakusa Plant in FY 2000, and we achieved our target of "zero" direct landfills at our plants in Kariya, Kyowa, Takahama, and Hekinan in FY 2001, two years earlier than planned.

The Obu and Higashichita plants are also working to achieve the same target by FY 2003.

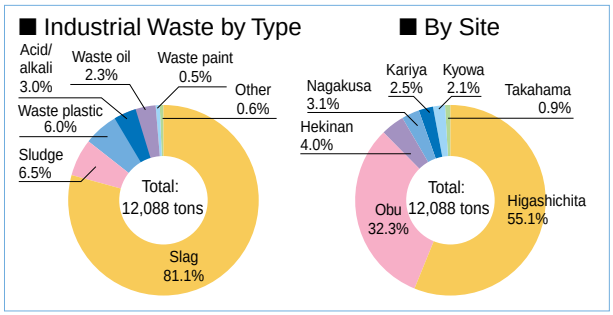
Industrial Waste Emissions



Disposal of Waste in FY 2001



Industrial Waste in FY 2001



*1 Recycling rate: Rate of industrial waste reused or recycled
*2 Zero emissions: Defined by Toyota Industries as a reduction in landfill waste of over 95% compared to FY 1998 levels
*3 Direct landfill waste: Industrial waste which is directly disposed of without intermediate treatment such as crushing or incineration

■Eliminating Indirect Landfill Waste*4

In November 2000, the Nagakusa Plant set up a zero emissions project with the goal of reducing indirect landfill to zero. The project team was the main actor in identifying key issues and promoting activities.

To promote zero emissions at this plant, plant employees inspected waste disposal areas and promoted active communication through the publishing of a newsletter on zero emissions, via the submission of reports to the division manager. As a result, each section worked to thoroughly separate its garbage and the plant achieved its target of zero indirect landfill by March 2002.

Zero Emissions Newsletter

Red Card

Establishing a Recycling Center (Nagakusa Plant)

The plant established a recycling center in March 2002. This was to support activities aimed at zero indirect landfill.

The center mainly handles the dismantling of parts which contain a mixture of metals and plastics and the separation of wastes collected during cleaning. This aided the promotion of recycling and improved the quality of recycling activities.

Reducing Municipal Waste and Proper Disposal

FY 2001 Results

We are reducing municipal waste such as paper, cardboard, and scrapped wood. On top of this, we carefully separate all the waste disposed of by our offices to ensure easy recycling. In FY 2001, total emissions from our sites were 1,120 tons. Of this total, the disposal of 185 tons was consigned out, while the remainder was reused or recycled.

Our recycling rate in FY 2001 was 83% for municipal waste.

Municipal Waste Reduction

■Using "Green" Office Supplies

At the Nagakusa Plant, the use of designated green office supplies is being promoted for many of the goods used at the plant. These products are made from recycled materials, are easy to dismantle, have long product lives, or are easy to recycle. The aim is to purchase those products which have the smallest impact on the environment.

Key Issues and Examples of Activities

	Details
Key Issues	Selection of facilities to carry out the recycling of waste following intermediate disposal
	Promotion of further understanding through the selection of workers to help attain zero emissions and parties responsible for waste disposal areas
	Inspection of waste disposal areas Meetings to report the improvements made in the workplace to the division manager
	Publication of Zero Emissions Newsletter (notification on how to separate garbage, introduction of activities that have been conducted, etc.)
Examples of Activities	Patrol of waste disposal areas Improvement awareness on the importance of separating garbage by issuing "yellow cards" and "red cards" to those not following rules
	Increasing visibility within the waste disposal area (transparent garbage pails for separating garbage)

Separating Garbage at the Recycling Center

In addition, as a part of environmental awareness activities, an in-house fair at the Nagakusa Plant was held to introduce these efforts to many of the company's other plants.

■Septic Tank Sludge Reduction at the Kyowa Plant

We have installed a septic tank suited to the number of our employees. Our wastewater gathered here is treated. During the normal maintenance of a septic tank, it is necessary to periodically drain the sludge out of the tank. This sludge is then treated as municipal waste.

To reduce sludge and alleviate the impact from this wastewater, the Kyowa Plant is using microorganisms in its three septic tanks on a trial basis. The unique characteristic of this treatment method is the organic compounds are decomposed into carbon dioxide and water by an enzyme produced by the microorganism.

As of March 2002, the plant no longer generates sludge. Owing to the exceptional results, the plant aims to continue its assessment of this method.

*4 Indirect landfill waste: Industrial waste which is used as landfill after crushing or incineration

Reducing Environmental Impact of Production Activities

Reducing Water Use

We are striving to reduce water consumption*1 from the standpoint of preserving water resources and minimizing the environmental impact of wastewater. In FY 2001, each of our plants surveyed its consumption of water resources to detect the production processes that use excess water.

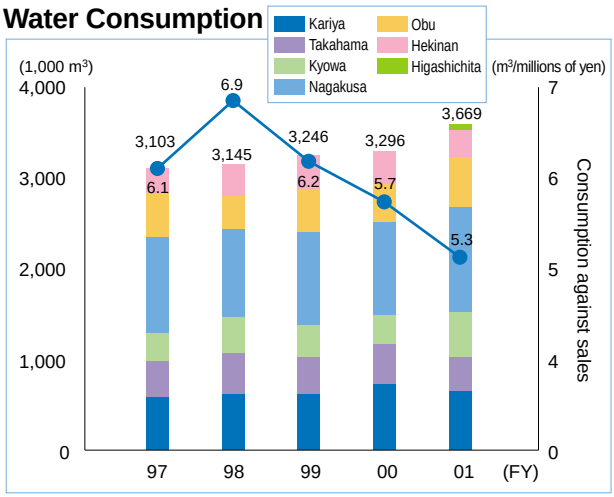
At the Compressor Division and the Nagakusa Plant, flow meters were installed at each of the process points where it was believed excess water was being consumed. We plan to install flow meters at the other plants as well, to measure excess water usage during certain processes of production. In this fashion, we are working to promote the reduction of water consumption.

During the construction of the Higashiura Plant, industrial water was unavailable. As an alternative, wastewater from the production process was recycled and a system to allow the utilization of rainwater was installed. This reduced water consumption and also supported the efficient use of this resource.

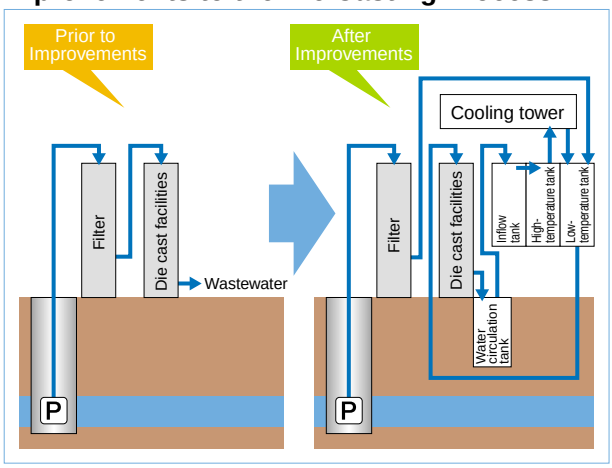
Wastewater emitted from the washing process during tin plating is being recycled. Our target is to recycle 40% of the water used during tin plating. We project this will allow us to conserve about 80,000 tons of water per year.

The rainwater utilization system consists of a tank which can store a maximum of 160 m³ of rainwater. The water stored in this tank is used for watering plants and in toilets. (For more details on our Higashiura Plant, see pages 36-37.)

Water Consumption



Improvements to the Die Casting Process



Improvements at the Obu Plant

■Reusing Water Used as Coolant in the Die Casting Process

During the die casting process, a product reaches temperatures of 200-300 ˚C just after being removed from the mold. It is then cooled in water. Conventionally the high-temperature water discharged was discarded.

In FY 2001, a storage reservoir for collecting the water and a cooling tower were installed. The wastewater is now being cooled and recycled for reuse. This is expected to save 35,000 m³ of water per year.

■Reducing Loss of Replenished Water Recovered from Die Casting

Water is used as a coolant during the die casting process. Once used, the wastewater is then circulated through the cooling tower and recycled for use.

Owing to the high temperature of the water used for cooling the die cast parts, water lost through evaporation must be replenished. However, the cooling tower was not capable of adapting to the change in water flow used during the production process; therefore, sometimes there was an overflow of water. This water was treated and released to nearby rivers.

To adjust to the fluctuation in water flow, a large reservoir was constructed in FY 2001. This is projected to result in a savings of 2,400 m³ of water per year.

*1 Water consumption: The amount of municipal, industrial and underground water used

Reducing Environmental Impact of Distribution System

We are implementing various distribution and packaging measures to reduce the environmental impact caused by the transport of raw materials or products.

Distribution Measures

Actions at TOYOTA Material Handling Company

Reducing CO_2 by Streamlining Distribution

TOYOTA Material Handling Company provides highly convenient truck deliveries following pre-set routes for more than half the forklift trucks transported domestically.

Since FY 2000, we have been streamlining our distribution in an effort to curtail CO_2 emissions and reduce air pollutants such as particulate matter (PM).

Previously, we suffered from poor distribution efficiency. This was due to the fact that our sales outlets handled shipments on their own. Because of this, products were shipped directly from Toyota Industries in small loads. To remedy this problem, since FY 2001 we have centralized the management of distribution and improved the efficiency of our transport through consolidated shipments for each sales area.

Packaging Measures

Actions at the Textile Machinery Division

Reducing Wood Use Following Changes in Packing Methods

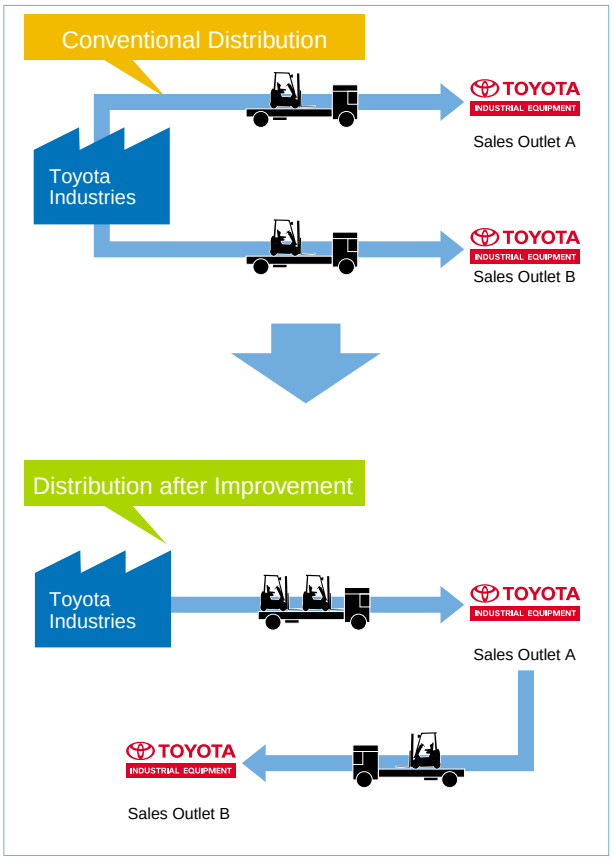
The Textile Machinery Division frequently ships heavy items overseas. From the standpoint of quality control, wood packing was used to ensure a stable method of encasing products.

From the perspective of the conservation of nature and resources, beginning FY 2000, the division has reviewed its packing methods to reduce wood use.

In FY 2001, the division started to use reinforced cardboard packaging, plastic palettes, and steel guards for packing. Reflecting this, the division was able to reduce its consumption of wood.

These policies led to reuse and recycling of packaging materials and also reduced the load of each transport. This in turn contributed to energy conservation at the distribution level.

Outline of Improvements to the Distribution System



Changes in Packing Methods

Environmental Communications

Internal Communications

Sharing Environmental Technologies

We publish an in-house technological bulletin, the *Toyota Industries Technical Report*, and hold in-house exhibitions with the goal of sharing technology between our different divisions.

In February 2002, we published the 44th edition of the *Toyota Industries Technical Report*. This was the first time since we began printing the bulletin in 1980 that we focused on environmental issues. In this edition we introduced the various environmental technologies developed by each of our divisions.

This edition carried a special article contributed by Professor Togawa of the Research Center for Coal Mining Materials at Kyushu University, who is well-known in the field of economic geography. The article summarizes the relationships between economic phenomenon and waste/recycling. Moreover, at our in-house technological exhibition in March 2002, each of our divisions introduced product technology developed to handle recent environmental issues. In this fashion, we aim to promote in-house communications.

In-House Technological Exhibition

Movie Night

In January 2002, we began showing movies on the environment as a new method to promote environmental communication among our employees.

We showed the film *Erin Brockovich*, which is based on a true story. The movie is about the largest indemnity suit in the U.S. in which a private citizen took on a major corporation for dumping the hazardous substance hexavalent chromium. Many people related to various divisions at Toyota Industries showed up to watch the movie, including Director Takenaka. We received many comments after the showing.

Some people were moved, saying it was the first time to see such a movie. Others commented on the serious health impacts that hexavalent chromium can have.

Movie Announcement

In-House Magazine

Our in-house magazine plays an important role as a tool to convey information to our employees. In FY 2001, one of the key words in our magazine was “environment.” We focused on creating many related feature reports as a way to raise the environmental awareness of our employees.

In the November 2001 edition, we introduced the latest information on the environmental technologies Toyota Motor Corporation uses in its automotive manufacturing. In the March 2002 edition, we covered activities carried out in conjunction with our suppliers related to environmentally preferable purchasing. In all, we reported eleven different stories on environmental information. In a reader questionnaire, we found that the level of environmental awareness among our employees is increasing and many said they now have a deeper understanding of related issues.

Article Related to the Environment in the In-House Magazine

▲March 2002 edition

◀November 2001 edition

Communications outside the Company

Web Site

We launched our environmental Web site in April 2002. Our goal is to get our stakeholders to have a deeper understanding of our environmental conservation activities.

The site covers our environmental management such as the acquisition of ISO 14001 certification, specific environmental activities, and the latest environmental information. It also includes previous editions of our environmental reports.

Community Involvement

We fully participate in, contribute to and support various events and volunteer activities which focus mainly on environmental conservation and beautification.

Typical activities include clean-up of areas near our production sites such as roadways, parking lots, and train stations. We collect items for our bazaar, and send volunteers to help out at the Ozutsumi Nishiike Iris Cluster, the protected species of Kariya. The key figures handling our volunteer activities are the members of our Heartful Club, our in-house volunteer organization, and manager-level employee associations.

■Volunteer Clean-Up Teams

One of the actions that our manager-level employee associations and plants carry out is the beautification of the area surrounding our plants.

In FY 2001, eighteen clean-up events were carried out by our plants and 1,338 employees participated in all.

All the garbage collected was thoroughly separated. Clean-up efforts help to increase awareness among our employees on environmental conservation.

■Bazaar for Social Welfare Facilities

People donated their unused household items, which were put to good use at the bazaar. Over 1,000 items are donated in September every year, the month we have designated as the month for recycling.

In FY 2001, we donated 1,663 items to the Chubu Goodwill Bank and other social welfare facilities located in same communities as our production sites.

■Nature Preservation Activities

In addition to our contributions to the World Wildlife Fund (WWF), we recruit volunteers to take part in nature preservation activities in various regions. Volunteer staff work to preserve and nurture forests and wildlife. In FY 2001, twenty-five people participated in such programs.

Environmental Web Site

URL: http://www.toyota-industries.com/environment/

Volunteer Clean-Up Activity

Bazaar

Volunteer Activities for Natural Environmental Preservation

Environmental Activities of Subsidiaries

Activities of Domestic Subsidiaries

Tokyu Co., Ltd.

Actions in FY 2001

■Reducing Sludge Released during the Grinding Process

Sludge, emitted from the grinding of compressor components which are Tokyu's main product, accounted for 40% of all industrial waste released. For this reason, Tokyu aims to reduce grinding sludge emitted by 50% by FY 2005, compared to FY 1999 levels.

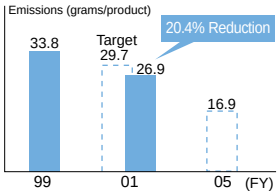
As a result of standardization and management of the temperature of the grinding liquid, its density and the angle at which the grindstone is set, sludge per product fell to 26.9 grams per product in FY 2001, compared with 33.8 grams per product in FY 1999, a 20.4% reduction.

In addition, to make better use of resources, Tokyu has begun recycling its grindstones.

Corporate Overview
Established: 1941
Capital: ¥135 million
Employees: 250
Business activities:
1 Manufacturing and sale of compressor components
2 Design, manufacturing, and sale of casting equipment
3 Design, manufacturing, and sale of specialized machinery
Headquarters: Oguchi, Niwa, Aichi

On the 60th anniversary of its founding, November 2001, the company acquired ISO 14001 certification.
Basic policies
(1) Maximum curtailment of energy usage and minimum use of raw materials in production
(2) Success based on profit-oriented policies
(3) Improving employee awareness and corporate structure

■Reduction in Grinding Sludge
(grams per product)



Future Activities

The environmental management system does not end once third-party certification is acquired but requires that the PDCA cycle be repeated continuously. Tokyu's goal is to improve performance by continually making improvements on a yearly basis.

Tokaiseiki Co., Ltd.

Actions in FY 2001

To promote achieving the environmental objectives and targets, Tokaiseiki established three working groups. Those in charge of accomplishing the targets serve as the head of each working group. Responsibilities and authorities are made clear.

■Energy Working Group –Conserving Energy–

To reduce CO_2 emissions, Tokaiseiki is carrying out a company-wide energy conservation campaign.

In FY 2001, Tokaiseiki aimed to decrease CO_2 emissions per product by 1% compared to levels in FY 2000. To realize this target, company rules were set and an investigation was made of the lighting and ventilation to conserve energy, and production processes to detect air leaks. In addition, detailed management of boiler operations was implemented to boost efficiency. As a result, Tokaiseiki was able to outperform the target, and reduced CO_2 emissions by 1.8%.

■Resource Utilization Subcommittee –Controlling Waste Emissions and Active Involvement in Recycling–

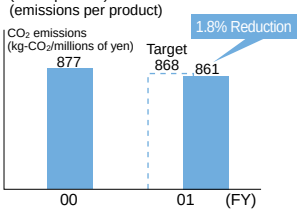
In FY 2001, Tokaiseiki aimed to reduce its waste emissions by 10% over FY 2000. Actions included the minimization of waste throughout the office and production sites, the recycling of waste through the separation of waste, and improved operating efficiency of a system to concentrate waste oil emitted during the processing stage. Reflecting these efforts, Tokaiseiki was able to widely reduce waste oil and plastic, two substances which account for the majority of its waste. Consequently, Tokaiseiki was able to reduce its total waste emissions by around 40%.

Corporate Overview
Established: August 1936
Capital: ¥98 million
Employees: 230
Business activities:
1 Die cast and machinery processing (compressor components, engine parts)
2 Products made from plastic
Headquarters: Nakaizumi, Iwata, Shizuoka

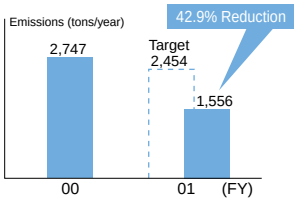
Acquired ISO 14001 certification in March 2002

Basic policies
(1) Production with the least environmental impact
(2) Improving productivity and cost effectiveness
(3) Full participation in the fortification of corporate structure

■Reduction in CO_2 Emissions
(Headquarters)
(emissions per product)



■Reduction in Waste Emissions



Future Activities

The development of an environmental management system is the first step Tokaiseiki has taken in its effort to fulfill its responsibility to society. Tokaiseiki plans to continue improving its environmental management system. In meeting its social responsibility, Tokaiseiki aims to improve productivity and reduce cost, while at the same time strengthen its corporate structure.

Activities of Overseas Subsidiary

BT Industries Group

Status of Environmental Actions

BT Industries' work on environmental improvements has intensified in recent years due to increased concern for the environment from stakeholders.

The environmental policy of the BT Industries Group (BT) states that environmental work should promote sustainable development through continuous improvements. Preventive work and resource conservation are the key elements in this work.

The focus for BT had previously been on environmental issues associated with production processes, and a large number of environmental-improvement investments were made at production facilities.

More recently the emphasis has shifted to the environmental impact of BT's products. Environmentally oriented product development has therefore become an important future area.

ISO 14001 Certification

BT is working toward the goal of having all of its production facilities certified according to ISO 14001 or its equivalent in the near future. At year-end 2001 four of seven production facilities were certified: two in Mjölby, Sweden, one in Brantford, Canada, and one in Greene, U.S.

BT is establishing an environmental management system for its other production facilities in order to acquire certification by March 2004. (For details on the status of certification, see page 11.)

Among the sales and service companies, part of the U.K. company is certified according to ISO 14001. In the Swedish sales and service company, a process to acquire certification is underway.

Actions of FY 2001

BT carries out the establishment of new facilities and changes production methods so that it may improve the environment.

BT also considers the life cycles of its products and how to reduce substances of concern or improve the recyclability of its products.

BT is also eco-labeling its products with ISO 14021 type II*[1] labels.

Group Overview

BT Industries Group is composed of 78 subsidiaries and affiliates (as of December 31, 2001) under the holding company BT Industries AB.

Business activities:

Development, production, and sale of indoor industrial equipment

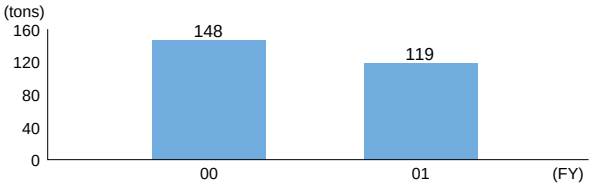
Location: Sweden (BT Industries AB)

■Environmental Measures in the Production Process

At BT, the reduction of VOCs (Volatile Organic Compounds) released during painting processes is a priority. By switching from a liquid coating with solvent-based paints to water-based coatings or powder painting, the release of solvents into the air is reduced. Powder painting is used at four of BT's seven production facilities.

In FY 2001, BT eliminated approximately twenty-nine tons of VOCs, or 20% compared to the previous fiscal year, by utilizing these measures as well as conducting evaluations of cleaning thinners and high solid paint materials.

■Comparative Total VOC Emission Levels of BT Group (as a whole)



Future Activities

Environmental impacts have a great influence on the development and design of products. BT thinks that environmentally oriented product development is the key to reducing environmental impact. BT considers what harmful effect substances of concern may have and is definitive in drawing the line between "blacklist" and "gray list" substances.

At BT, substances on a special "blacklist," such as cadmium, will be eliminated. Levels are already very low. BT's electric trucks contain less than 0.02% of these substances by weight. There is also a "gray list" of substances that will be used as little as possible. The goal is for the trucks to contain less than 0.1% of substances on the gray list by weight.

In 2002 work will continue to find replacements for substances on both lists. Efforts to eco-label more truck models are continuing as well.

*1 Type II Labelling based on ISO 14021 Environmental Labels and Declarations standard: An international standard for environmental labelling, self-declaration by a manufacturer to describe the environmentally conscious functions/features of its product

Feature Story A New Eco-Plant in Higashiura

Higashiura is our eighth production plant. Located in Higashiura, Chita-gun, Aichi prefecture, the plant was completed in June 2002 and operations began in July.

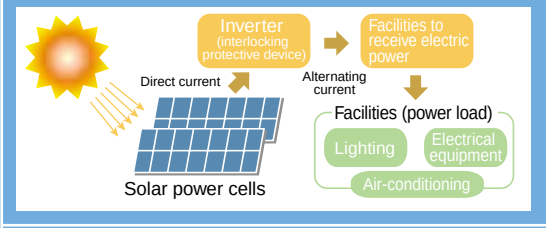
The plant is located in a hilly, green region. The concept of the plant's construction is to use natural energy and attain harmony with the surrounding environment. Much consideration was given to the environment. To reduce electric power consumption in operations by 20% compared to conventional plants of the same size and production capacity, clean energy systems such as solar and wind power generators were introduced. In addition, plans for the effective use of water were implemented.

To blend in with the surrounding environment, 47.8% of the premises are covered with greenery. To create a pleasant space for employees and visitors, a 1,200 m^2 lake is situated in the center of the grounds. Further efforts are being made to maintain the greenery in and around the plant facilities.

Introduction of a Clean Energy System

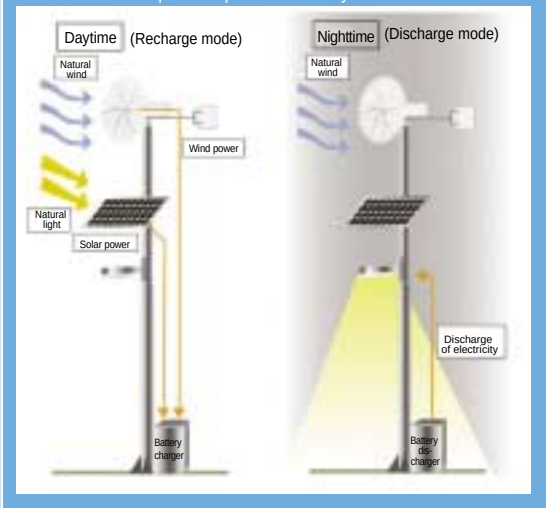
1 Solar Energy System

Solar energy panels were set up on the office roof, outer walls, and upper portion of the main gate.



2 Wind-Generated Outdoor Lighting System

A wind power generator was set up to take advantage of the unique wind power in the hilly terrain.



Full View of the Higashiura Plant

3 Volume Reduction System

The volume of water-soluble coolant emitted from the cutting process is being reduced through the introduction of a condenser. The condensed waste oil is collected by a vendor and effectively used to generate thermal energy.

4 Harmony with the Surrounding Environment

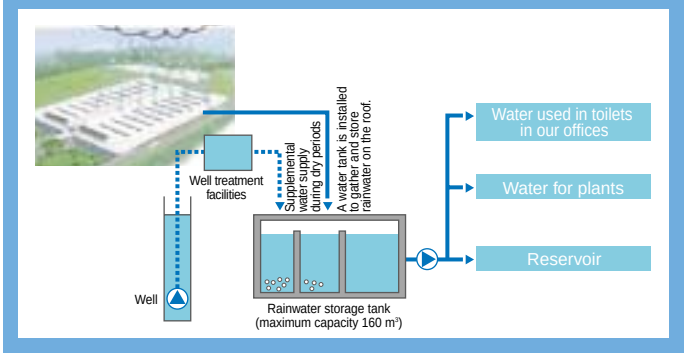
47.8% of the total 245,001 m^2 on which the plant is located is covered with greenery.
In the middle of the grounds is a lake. We achieved the creation of a very pleasant atmosphere.

5 Extra High Efficiency Distribution Transformer

As an energy conservation step, an extra high efficiency distribution transformer to reduce electrical power loss was introduced.

6 System to Make Use of Rainwater

The system can store a maximum of 160 m^3 of rainwater. This is used effectively in toilets and for watering plants.



8 Water Recycling System

To reduce water use during the surface finishing process, a filtering system was introduced. By recycling/purifying water tainted during the surface finishing, the plant's water usage was cut by 40% compared with conventional plants.

9 Use of Eco-Cables

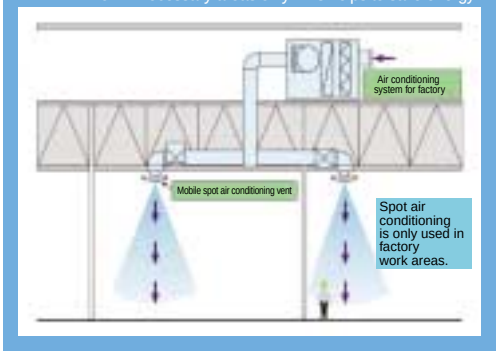
Electric cables that do not include hazardous substances such as PVCs or lead were used.

13 Automated Lighting System

Lighting was stabilized by using natural light from the roof and inverter power. This contributes to the reduction in electric power loss and extends the life of machinery.

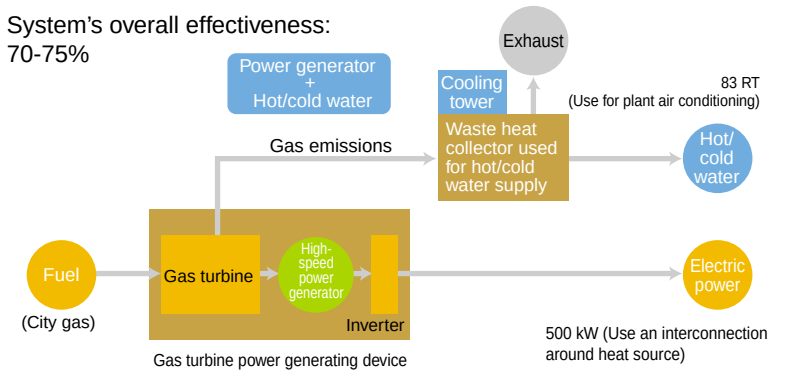
7 Barrier-Zone Air Conditioning System

This system allows for the air conditioning to be turned on in necessary areas only. This helps to save energy.



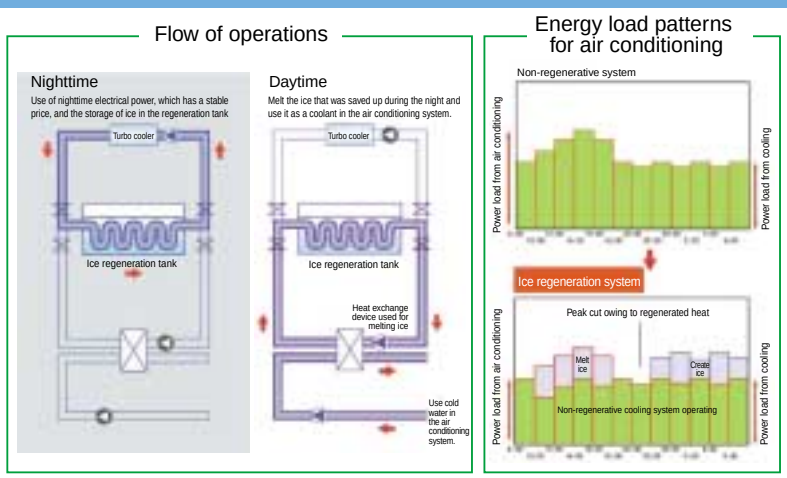
10 Cogeneration System

Energy is used effectively through the introduction of a cogeneration system.



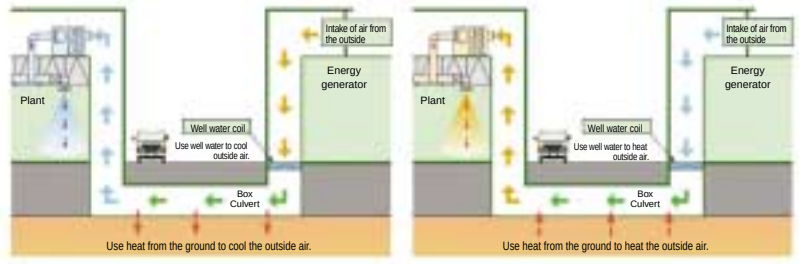
11 Ice Storage Air Conditioning Heat Transfer System

Electric power is used effectively by using electricity during the night.



12 System Utilizing a Cooling Tube and Heat Obtained from Well Water

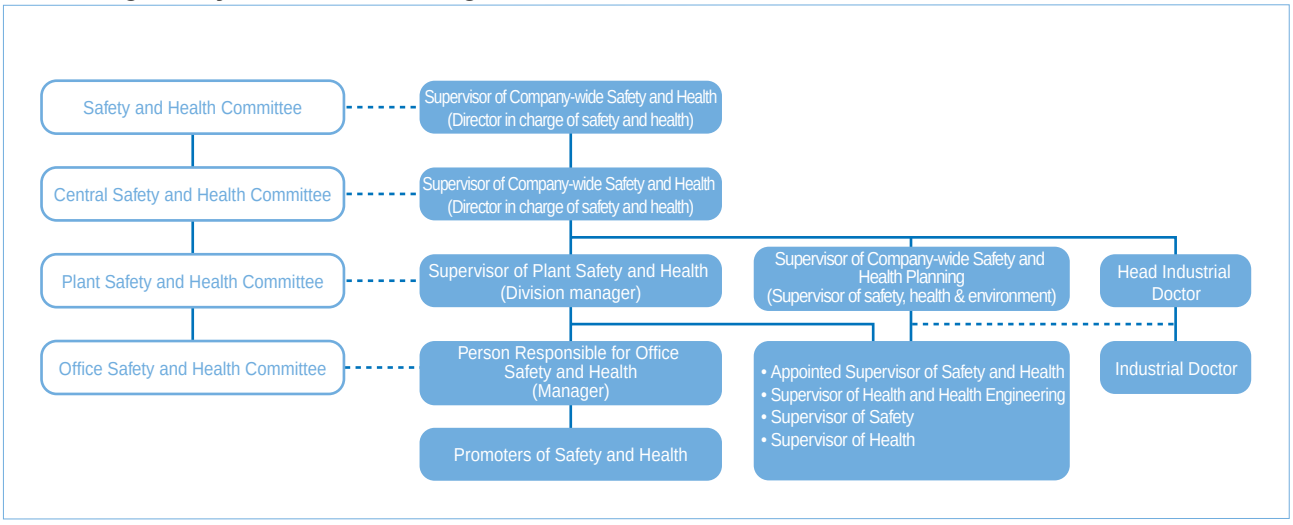
Cooling and heating of the plant is done using well water and geo-heat.



Safety and Health Management

Each and every one of our employees is a valuable asset. We believe it is a company's responsibility to ensure the safety and health of our employees. Based on the concept of respect for the individual, together with all of our employees, we actively strive to create a workplace that safe, pleasant, and healthy for everyone.

Promoting Safety and Health Management



Safety and Health Activities

Here at Toyota Industries, we independently established our voluntary standards for carrying out safety and health activities to remain in compliance with the Industrial Safety and Health Law and other related laws.

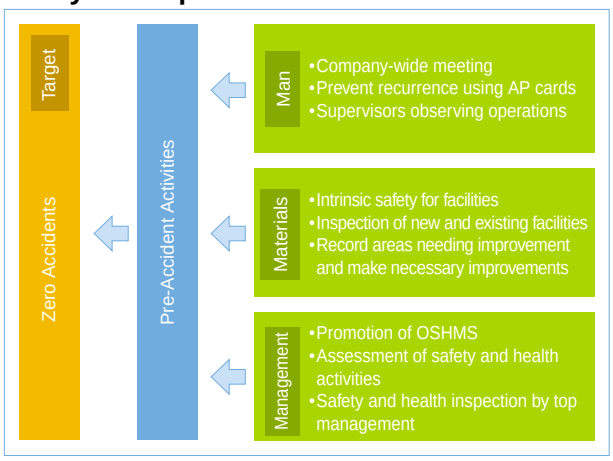
To ensure the safety of our employees, we hold a company-wide meeting four times a year in which everyone participates. For the safety of our facilities, we promote intrinsic safety activities into which safety and health are incorporated from the design stage. From the standpoint of management, we implement numerous activities to diagnose and assess safety and health levels in the workplace.

To promote an Occupational Safety and Health Management System, we held training programs for managers based on our safety and health management manual in FY 2001. Currently, we are setting up safety and health management systems at each of our production sites.

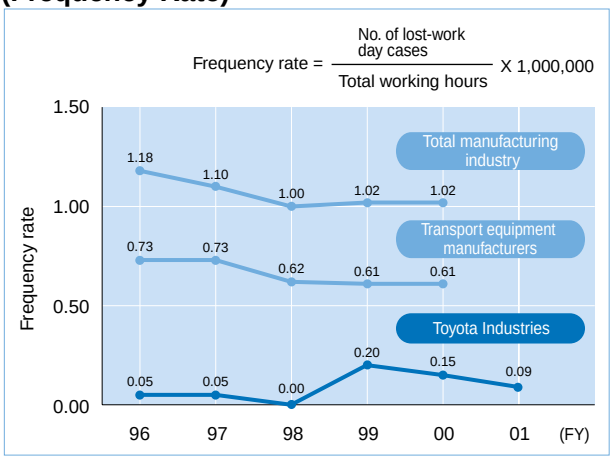
The aim of our safety and health activities is to achieve a working environment that is pleasant for all. We are striving to make improvements in the workplace from a technological standpoint, to deal with the summer heat and noise and to reduce the workload.

Improvements to the Workplace (Low-Noise Nutrunner)

Safety Concepts



Frequency of On-the-Job Accidents (Frequency Rate)



Promoting Health

To achieve a healthy setting for our employees, we actively conduct activities aimed at promoting both the physical and psychological health of our employees. Our efforts are conducted in coordination with the Ministry of Health, Labor and Welfare's measures on the maintenance and promotion of physical and mental health.

Programs include classes on how to improve daily lifestyles, prevention of lower back aches, and other health education and guidance courses. We have been successful in our efforts thus far.

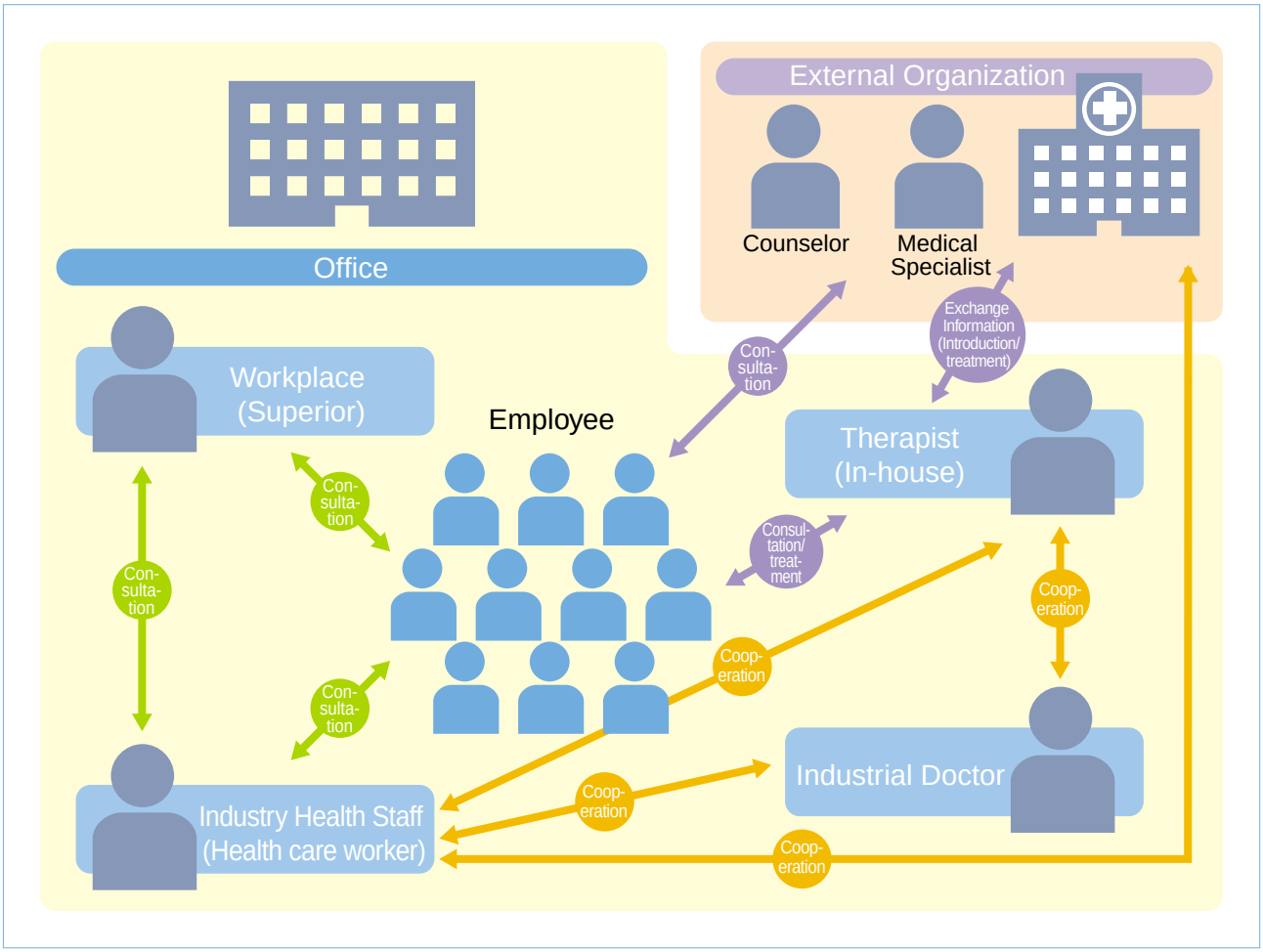
To further our endeavors, we hold group walks and no-smoking campaigns in the spring and fall. In FY 2001, 232 employees participated in our spring and fall walks.

We also seek to support a healthy mind. To do so, we have established a system that serves the psychological needs of our employees, hold classes on mental health, and offer health counseling. We have also set up a Web site on health management utilizing the intranet.

Monitoring Health during the "Challenge Course"

Nature Walk

Mental Fitness System



Environmental Data

Kariya Plant

Headquarters, Textile Machinery Division, Compressor Division ● Location: Toyoda-cho, Kariya, Aichi

Environmental Impact Mass Balance

INPUT

Electricity		84,497 MWh
Gas	LPG	–
	City gas	5,427 km^3
Fuel	Petroleum	782 kl
	Cokes	–
Water		642 km^3
Chemical substances		103 tons
Paper		53 tons

Kariya Plant

OUTPUT

Air	CO_2	70 kt-CO_2
	NOx	9,461 m^3N
	SOx	361 m^3N
Water	Total wastewater	715 km^3
	Total COD	4,863 kg
	Total T-N	2,460 kg
	Total T-P	29 kg
Municipal waste	Emissions	216 tons
	Recycling rate	70%
	Direct landfill	–
Industrial waste	Emissions	1,866 tons
	Recycling rate	84%
	Direct landfill	27 tons

PRTR

Chemical Substance	Amount Handled	Released Volume					Transferred Volume			Volume Recycled	Volume Removed	Consumption Volume
		Air	Water	Soil	On-Site Landfill	Total	Waste	Sewage	Total			
Bisphenol A type epoxy resin	1,131	–	–	–	–	–	376	–	376	–	–	756
Ethylbenzene	1,241	25	–	–	–	25	–	–	–	–	–	1,216
Xylene	86,911	80,783	–	–	–	80,783	4	–	4	–	–	6,124
Toluene	10,437	1,653	–	–	–	1,653	7	–	7	–	–	8,777
Poly (oxyethylene) alkyl ether (alkyl C=12-15)	2,976	–	–	–	–	–	2,976	–	2,976	–	–	–
Dioxins	0.024	–	–	–	–	–	0.024	–	0.024	–	–	–

Air (Complying with the Air Pollution Control Law, Prefectural Ordinances)

Item	Equipment	Control Value	Actual Measurement (Maximum)
NOx (ppm)	Boiler	104	93
		120	61
		144	94
		150	79
		171	90
		237	89
	Gas turbine	50	41
Particulate matter (g/m^3N)	Boiler	0.1	0.003
		0.2	0.059
	Gas turbine	0.05	0.002

Water (Complying with the Water Pollution Prevention Law, Prefectural Ordinances)

Item	Control Value	Actual Measurement		
		Maximum	Minimum	Average
pH	5.8-8.6	7.3	6.7	6.9
BOD	25 (20)	15.8	1.0	6.2
COD	–	17.1	0.6	6.8
SS	30 (20)	1.8	0.1	0.5
Oil	5	2.9	0.1	0.6
Phenol	5	N.D.	N.D.	N.D.
Copper	1	0.016	0.003	0.008
Zinc	5	0.100	N.D.	0.017
Soluble iron	10	0.200	0.077	0.114
Soluble manganese	10	0.109	0.009	0.036
Total chromium	2	0.009	N.D.	0.003
Total nitrogen	(15)	5.52	0.96	3.44
Total phosphorus	(2)	0.050	N.D.	0.04
Cadmium	0.1	N.D.	N.D.	N.D.
Total cyanide	1	N.D.	N.D.	N.D.
Lead	0.1	0.014	N.D.	0.005
Hexavalent chromium	0.5	0.010	N.D.	0.010
Arsenic	0.1	0.004	0.001	0.003
Total mercury	0.005	0.0007	N.D.	0.0006
Selenium	0.1	0.001	N.D.	0.001
Boron	10	0.15	N.D.	0.07
Fluorine	8	0.26	0.05	0.12

*Environmental impact mass balance: See page 5 for details on how to read this data.
*PRTR: Unit: kg/year Dioxins: mg-TEQ/year
The volume removed represents the quantity of PRTR-designated substances that have been converted into another substance through incineration, neutralization, decomposition or chemical reaction.
The consumption volume represents the quantity of PRTR-designated substances that have been converted into another substance due to some type of reaction and has been used in or attached to a product which leaves the plant site.
None of the company's production sites discharge sewage.

Takahama Plant

TOYOTA Material Handling Company ● Location: Toyoda-cho, Takahama, Aichi

Environmental Impact Mass Balance

INPUT

Electricity		26,687 MWh
Gas	LPG	–
	City gas	5,613 km^3
Fuel	Petroleum	242 kl
	Cokes	–
Water		385 km^3
Chemical substances		456 tons
Paper		43 tons

Takahama Plant

OUTPUT

Air	CO_2	31 kt-CO_2
	NOx	8,120 m^3N
	SOx	–
Water	Total wastewater	158 km^3
	Total COD	869 kg
	Total T-N	1,154 kg
	Total T-P	1 kg
Municipal waste	Emissions	324 tons
	Recycling rate	89%
	Direct landfill	–
Industrial waste	Emissions	1,246 tons
	Recycling rate	91%
	Direct landfill	30 tons

PRTR

Chemical Substance	Amount Handled	Released Volume					Transferred Volume			Volume Recycled	Volume Removed	Consumption Volume
		Air	Water	Soil	On-Site Landfill	Total	Waste	Sewage	Total			
Zinc compounds (water-soluble)	1,156	–	5	–	–	5	227	–	227	–	–	923
Ethylbenzene	3,638	563	–	–	–	563	–	–	–	–	–	3,075
Ethylene glycol	75,193	–	–	–	–	–	–	–	–	–	–	75,193
Xylene	281,457	219,618	–	–	–	219,618	42,171	–	42,171	6,703	–	12,965
Styrene	1,513	1,513	–	–	–	1,513	–	–	–	–	–	–
Toluene	91,762	29,395	–	–	–	29,395	33,364	–	33,364	10,318	–	18,685
Benzene	877	62	–	–	–	62	–	–	–	–	–	815
Dioxins	5.3	0.1	–	–	–	0.1	5.2	–	5.2	–	–	–

Air (Complying with the Air Pollution Control Law, Prefectural Ordinances)

Item	Equipment	Control Value	Actual Measurement (Maximum)
NOx (ppm)	Boiler	120	95
	Gas turbine	35	27
	Oven	184	39
	Incinerator	200	95
Particulate matter (g/m^3N)	Boiler	0.1	0.03
	Gas turbine	0.05	0.002
	Oven	0.2	0.13
	Incinerator	0.25	0.04
Hydrogen chloride (g/m^3N)	Incinerator	700	110
Dioxins (ng-TEQ/m^3N)	Incinerator	80	2.6

Water (Complying with the Water Pollution Prevention Law, Prefectural Ordinances)

Item	Control Value	Actual Measurement		
		Maximum	Minimum	Average
pH	5.8-8.6	7.4	6.7	7.0
BOD	25 (20)	11.9	0.7	5.3
COD	–	8.1	2.6	5.5
SS	30 (20)	3.4	N.D.	0.5
Oil	5	1.7	N.D.	0.5
Phenol	1	N.D.	N.D.	N.D.
Copper	1	0.013	0.003	0.006
Zinc	5	0.200	N.D.	0.034
Soluble iron	5	0.110	0.054	0.091
Soluble manganese	5	0.155	0.018	0.061
Total chromium	2	0.011	N.D.	0.004
Total nitrogen	(15)	10.56	2.40	7.30
Total phosphorus	(2)	0.050	N.D.	0.01
Cadmium	0.1	N.D.	N.D.	N.D.
Total cyanide	1	N.D.	N.D.	N.D.
Lead	0.1	0.015	N.D.	0.005
Hexavalent chromium	0.5	N.D.	N.D.	N.D.
Arsenic	0.1	0.005	N.D.	0.003
Total mercury	0.005	N.D.	N.D.	N.D.
Selenium	0.1	0.001	N.D.	0.001
Boron	10	0.19	N.D.	0.07
Fluorine	8	0.39	0.01	0.16

*Air: Control values are based on the emissions standards stated in the Air Pollution Control Law or prefectural ordinances. Actual measurements show the maximum value for measurements taken.

*Water: Unit measurements are in mg/ℓ , excluding pH. Control values are based on the emissions standards stated in the Water Pollution Prevention Law and prefectural ordinances. The control value in parentheses is the daily average.
pH: Hydrogen Ion Concentration BOD: Biochemical Oxygen Demand COD: Chemical Oxygen Demand SS: Suspended Solids
N.D.: Not Detected (less than specified amounts)

Environmental Data

Kyowa Plant

Technology Development Center, Machinery & Tools Sub-Division, Mechatronics Engineering Sub-Division
● Location: Kyowa-cho, Obu, Aichi

Environmental Impact Mass Balance

INPUT

Electricity		35,705 MWh
Gas	LPG	–
	City gas	1,739 km^3
Fuel	Petroleum	–
	Cokes	–
Water		492 km^3
Chemical substances		8 tons
Paper		20 tons

Kyowa Plant

OUTPUT

Air	CO_2	28 kt-CO_2
	NOx	2,485 m^{3}N
	SOx	–
Water	Total wastewater	584 km^3
	Total COD	1,168 kg
	Total T-N	2,856 kg
	Total T-P	76 kg

Municipal waste	Emissions	179 tons
	Recycling rate	90%
	Direct landfill	–
Industrial waste	Emissions	580 tons
	Recycling rate	56%
	Direct landfill	131 tons

PRTR

Chemical Substance	Amount Handled	Released Volume					Transferred Volume			Volume Recycled	Volume Removed	Consumption Volume
		Air	Water	Soil	On-Site Landfill	Total	Waste	Sewage	Total			
Xylene	1,025	1,025	–	–	–	1,025	–	–	–	–	–	–
Toluene	2,420	2,420	–	–	–	2,420	–	–	–	–	–	–
Lead and its compounds	4,432	–	–	–	–	–	–	–	–	2,231	2,201	–

Air (Complying with the Air Pollution Control Law, Prefectural Ordinances)

Item	Equipment	Control Value	Actual Measurement (Maximum)
NOx (ppm)	Boiler	120	64
		142	66
Particulate matter (g/m^{3}N)	Boiler	0.1	0.002
		0.3	0.003

Water (Complying with the Water Pollution Prevention Law, Prefectural Ordinances)

Item	Control Value	Actual Measurement		
		Maximum	Minimum	Average
pH	5.8-8.6	7.6	6.6	7.0
BOD	25 (20)	8.0	0.2	1.3
COD	–	6.9	0.2	2.0
SS	30 (20)	9.6	N.D.	1.2
Oil	2	0.7	N.D.	0.2
Phenol	5	N.D.	N.D.	N.D.
Copper	1	0.086	0.011	0.036
Zinc	5	0.150	N.D.	0.092
Soluble iron	10	0.300	0.094	0.150
Soluble manganese	10	0.078	0.004	0.028
Total chromium	2	0.014	N.D.	0.005
Total nitrogen	(15)	7.44	1.20	4.89
Total phosphorus	(2)	0.48	N.D.	0.13
Cadmium	0.1	N.D.	N.D.	N.D.
Total cyanide	1	N.D.	N.D.	N.D.
Lead	0.1	0.013	N.D.	0.005
Hexavalent chromium	0.5	0.01	N.D.	0.01
Arsenic	0.1	N.D.	N.D.	N.D.
Total mercury	0.005	N.D.	N.D.	N.D.
Selenium	0.1	0.001	N.D.	0.001
Boron	10	0.45	0.02	0.19
Fluorine	8	0.51	0.09	0.27

Note: The Kyowa Plant's data for discharged water includes wastewater released by TIBC which is located on the same plant site.

*Environmental impact mass balance: See page 5 for details on how to read this data.
*PRTR: Unit: kg/year Dioxins: mg-TEQ/year
The volume removed represents the quantity of PRTR-designated substances that have been converted into another substance through incineration, neutralization, decomposition or chemical reaction.
The consumption volume represents the quantity of PRTR-designated substances that have been converted into another substance due to some type of reaction and has been used in or attached to a product which leaves the plant site.
None of the company's production sites discharge sewage.

Nagakusa Plant

Vehicle Division ● Location: Nagakusa-cho, Obu, Aichi

Environmental Impact Mass Balance

INPUT

Electricity		50,507 MWh
Gas	LPG	129,000 kg
	City gas	13,943 km^3
Fuel	Petroleum	2,207 kl
	Cokes	–

Water	1,229 km^3
Chemical substances	1,235 tons
Paper	19 tons

Nagakusa Plant

OUTPUT

Air	CO_2	71 kt-CO_2
	NOx	13,834 m^3N
	SOx	–
Water	Total wastewater	731 km^3
	Total COD	7,752 kg
	Total T-N	2,194 kg
	Total T-P	51 kg

Municipal waste	Emissions	138 tons
	Recycling rate	100%
	Direct landfill	–
Industrial waste	Emissions	1,995 tons
	Recycling rate	81%
	Direct landfill	–

PRTR

Chemical Substance	Amount Handled	Released Volume					Transferred Volume			Volume Recycled	Volume Removed	Consumption Volume
		Air	Water	Soil	On-Site Landfill	Total	Waste	Sewage	Total			
Zinc compounds (water-soluble)	13,505	–	365	–	–	365	2,336	–	2,336	–	–	10,804
2-Aminoethanol	1,094	–	–	–	–	–	–	–	–	–	1,094	–
Bisphenol A type epoxy resin	5,020	–	–	–	–	–	331	–	331	–	–	4,689
Ethylbenzene	39,522	21,048	–	–	–	21,048	–	–	–	3,714	–	14,759
Ethylene glycol	526,522	1,650	–	–	–	1,650	–	–	–	–	–	524,872
Xylene	398,989	222,088	–	–	–	222,088	1,394	–	1,394	69,928	11,864	93,714
Organic tin compounds	3,763	–	–	–	–	–	–	–	–	–	151	3,612
1,3,5-trimethylbenzene	9,554	8,121	–	–	–	8,121	–	–	–	1,433	–	–
Toluene	220,628	83,472	–	–	–	83,472	19	–	19	13.383	2,940	12,811
Nickel compounds	2,101	–	193	–	–	193	857	–	857	–	–	1,051
Benzene	5,314	3	–	–	–	3	–	–	–	–	–	5,311
Poly (oxyethylene) alkyl ether (alkyl C=12-15)	2,538	–	102	–	–	102	51	–	51	–	102	2,284
Formaldehyde	3,458	3.458	–	–	–	3,458	–	–	–	–	–	–
Manganese and its compounds	3,196	–	99	–	–	99	540	–	540	–	–	2,557
Dioxins	4.80	3.52	–	–	–	3.52	1.28	–	1.28	–	–	–

Air (Complying with the Air Pollution Control Law, Prefectural Ordinances)

Item	Equipment	Control Value	Actual Measurement (Maximum)
NOx (ppm)	Boiler	142	92
		144	110
		171	69
	Gas turbine	80	79
	Oven	184	120
		218	90
		237	5
	Incinerator	200	54
Particulate matter (g/m^3N)	Boiler	0.2	0.002
		0.25	0.003
		0.3	0.004
	Gas turbine	0.05	0.008
	Oven	0.1	N.D.
		0.2	0.021
		0.35	0.014
	Incinerator	0.25	0.12
Hydrogen chloride (g/m^3N)	Incinerator	700	N.D.
Dioxins ($ng\text{-}TEQ/m^3N$)	Incinerator	80	0.073

Water (Complying with the Water Pollution Prevention Law, Prefectural Ordinances)

Item	Control Value	Actual Measurement		
		Maximum	Minimum	Average
pH	5.8-8.6	7.9	6.1	6.5
BOD	25 (20)	5.4	N.D.	1.8
COD	–	17.6	5.5	10.6
SS	30 (20)	13.6	1.2	6.4
Oil	5	1.0	N.D.	0.4
Phenol	5	N.D.	N.D.	N.D.
Copper	1	0.022	0.002	0.010
Zinc	5	0.850	0.200	0.496
Soluble iron	5	0.350	0.080	0.149
Soluble manganese	5	0.500	0.048	0.136
Total chromium	2	0.009	N.D.	0.003
Total nitrogen	(15)	5.09	1.63	3.00
Total phosphorus	(2)	0.19	N.D.	0.07
Cadmium	0.1	N.D.	N.D.	N.D.
Total cyanide	1	N.D.	N.D.	N.D.
Lead	0.1	0.015	N.D.	0.006
Hexavalent chromium	0.5	N.D.	N.D.	N.D.
Arsenic	0.1	0.007	N.D.	0.004
Total mercury	0.005	N.D.	N.D.	N.D.
Selenium	0.1	0.001	N.D.	0.001
Boron	10	0.14	0.02	0.08
Fluorine	8	1.29	0.21	0.61

*Air: Control values are based on the emissions standards stated in the Air Pollution Control Law or prefectural ordinances. Actual measurements show the maximum value for measurements taken.

*Water: Unit measurements are in mg/ℓ , excluding pH. Control values are based on the emissions standards stated in the Water Pollution Prevention Law and prefectural ordinances. The control value in parentheses is the daily average.
pH: Hydrogen Ion Concentration BOD: Biochemical Oxygen Demand COD: Chemical Oxygen Demand SS: Suspended Solids
N.D.: Not Detected (less than specified amounts)

Environmental Data

Obu Plant

Compressor Division, Engine Division ● Location: Ebata-cho, Obu, Aichi

Environmental Impact Mass Balance

INPUT

Electricity		78,470 MWh
Gas	LPG	–
	City gas	8,733 km^3
Fuel	Petroleum	184 kl
	Cokes	10,196 tons
Water		556 km^3
Chemical substances		686 tons
Paper		6 tons

Obu Plant

OUTPUT

Air	CO_2	105 kt-CO_2
	NOx	1,221 m^{3}N
	SOx	11,386 m^{3}N
Water	Total wastewater	373 km^3
	Total COD	1,862 kg
	Total T-N	1,035 kg
	Total T-P	11 kg

Municipal waste	Emissions	119 tons
	Recycling rate	50%
	Direct landfill	–
Industrial waste	Emissions	43,095 tons
	Recycling rate	91%
	Direct landfill	3,771 tons

PRTR

Chemical Substance	Amount Handled	Released Volume					Transferred Volume			Volume Recycled	Volume Removed	Consumption Volume
		Air	Water	Soil	On-Site Landfill	Total	Waste	Sewage	Total			
Antimony	15.507	–	–	–	–	–	–	–	–	–	–	15,507
Bisphenol A	5,000	–	–	–	–	–	–	–	–	5,000	–	–
Xylene	7,882	5,160	–	–	–	5,160	–	–	–	–	–	2,722
Chromium and chromium (III) compounds	107,170	4	–	–	–	4	–	–	–	–	–	107,166
Hexamethylenetetramine	50,576	–	–	–	–	–	–	–	–	–	–	50,576
Toluene	4,848	1,583	–	–	–	1,583	–	–	–	–	–	3,264
Nickel	35,405	10	–	–	–	10	–	–	–	–	–	35,395
Phenol	15,134	2	–	–	–	2	–	–	–	–	–	15,132
Poly (oxyethylene) alkyl ether (alkyl C=12-15)	1,396	–	–	–	–	–	1,321	–	1,321	–	–	75
Poly (oxyethylene) nonylphenyl ether	1,209	–	–	–	–	–	54	–	54	–	–	1,155
Formaldehyde	4,172	2,671	–	–	–	2,671	–	–	–	–	–	1,501
Manganese	406,374	2	–	–	–	2	–	–	–	–	–	406,372
Molybdenum	30,859	–	–	–	–	–	–	–	–	–	–	30,859

Air (Complying with the Air Pollution Control Law, Prefectural Ordinances)

Item	Equipment	Control Value	Actual Measurement (Maximum)
NOx (ppm)	Boiler	120	66
Particulate matter (g/m^{3}N)	Melting furnace	0.1	0.008
	Boiler	0.1	0.003

Water (Complying with the Water Pollution Prevention Law, Prefectural Ordinances)

Item	Control Value	Actual Measurement		
		Maximum	Minimum	Average
pH	5.8-8.6	7.7	6.9	7.2
BOD	25 (20)	6.9	0.6	3.6
COD	–	9.1	1.2	5.0
SS	40 (30)	6.4	N.D.	2.3
Oil	2	0.7	N.D.	0.2
Phenol	1	N.D.	N.D.	N.D.
Copper	1	0.011	0.002	0.007
Zinc	5	0.350	N.D.	0.114
Soluble iron	10	0.112	0.088	0.099
Soluble manganese	10	0.094	0.023	0.059
Total chromium	2	0.010	N.D.	0.004
Total nitrogen	(15)	5.52	0.48	2.78
Total phosphorus	(2)	0.05	N.D.	0.03
Cadmium	0.05	N.D.	N.D.	N.D.
Total cyanide	1	N.D.	N.D.	N.D.
Lead	0.1	0.018	N.D.	0.006
Hexavalent chromium	0.5	N.D.	N.D.	N.D.
Arsenic	0.1	0.006	N.D.	0.004
Total mercury	0.005	0.0008	N.D.	0.0007
Selenium	0.1	0.002	N.D.	0.002
Boron	10	0.15	0.02	0.07
Fluorine	8	0.21	0.04	0.12

*Environmental impact mass balance: See page 5 for details on how to read this data.
*PRTR: Unit: kg/year
The volume removed represents the quantity of PRTR-designated substances that have been converted into another substance through incineration, neutralization, decomposition or chemical reaction.
The consumption volume represents the quantity of PRTR-designated substances that have been converted into another substance due to some type of reaction and has been used in or attached to a product which leaves the plant site.
None of the company's production sites discharge sewage.

Hekinan Plant

Engine Division ● Location: Hama-cho, Hekinan, Aichi

Environmental Impact Mass Balance

INPUT

Electricity		48,820 MWh
Gas	LPG	1,000 kg
	City gas	9,628 km^3
Fuel	Petroleum	–
	Cokes	–
Water		298 km^3
Chemical substances		212 tons
Paper		13 tons

Hekinan Plant

OUTPUT

Air	CO_2	54 kt-CO_2
	NOx	4,714 m^{3}N
	SOx	–
Water	Total wastewater	105 km^3
	Total COD	304 kg
	Total T-N	276 kg
	Total T-P	3 kg
Municipal waste	Emissions	144 tons
	Recycling rate	96%
	Direct landfill	–
Industrial waste	Emissions	1,889 tons
	Recycling rate	74%
	Direct landfill	5 tons

PRTR

Chemical Substance	Amount Handled	Released Volume					Transferred Volume			Volume Recycled	Volume Removed	Consumption Volume
		Air	Water	Soil	On-Site Landfill	Total	Waste	Sewage	Total			
Benzene	1,190	49	–	–	–	49	–	–	–	–	–	1,141
Ethylbenzene	2,874	23	–	–	–	23	–	–	–	–	–	2,851
Ethylene glycol	165,723	–	–	–	–	–	862	–	862	–	–	164,861
Xylene	15,208	137	–	–	–	137	–	–	–	–	–	15,071
Toluene	27,332	936	–	–	–	936	16	–	16	–	–	26,380

Air (Complying with the Air Pollution Control Law, Prefectural Ordinances)

Item	Equipment	Control Value	Actual Measurement (Maximum)
NOx (ppm)	Boiler	100	60
	Gas turbine	35	12
Particulate matter (g/m^{3}N)	Boiler	0.1	0.003
	Gas turbine	0.04	0.002

Water (Complying with the Water Pollution Prevention Law, Prefectural Ordinances)

Item	Control Value	Actual Measurement		
		Maximum	Minimum	Average
pH	5.8-9.0	7.8	6.5	7.1
BOD	–	22.3	N.D.	3.3
COD	20 (15)	8.8	0.2	2.9
SS	25 (20)	3.4	N.D.	0.4
Oil	2	0.7	N.D.	0.2
Phenol	1	N.D.	N.D.	N.D.
Copper	1	0.009	0.002	0.006
Zinc	3	0.200	N.D.	0.059
Soluble iron	3	0.200	0.054	0.103
Soluble manganese	5	0.066	0.020	0.048
Total chromium	2	0.012	N.D.	0.004
Total nitrogen	(15)	7.68	0.24	2.64
Total phosphorus	(2)	0.100	N.D.	0.03
Cadmium	0.1	N.D.	N.D.	N.D.
Total cyanide	1	N.D.	N.D.	N.D.
Lead	0.1	0.014	N.D.	0.006
Hexavalent chromium	0.5	0.01	N.D.	0.01
Arsenic	0.1	0.007	N.D.	0.004
Total mercury	0.005	0.0005	N.D.	0.0005
Selenium	0.1	0.001	N.D.	0.001
Boron	230	0.20	N.D.	0.08
Fluorine	15	0.34	N.D.	0.14

*Air: Control values are based on the emissions standards stated in the Air Pollution Control Law or prefectural ordinances. Actual measurements show the maximum value for measurements taken.

*Water: Unit measurements are in mg/ℓ , excluding pH. Control values are based on the emissions standards stated in the Water Pollution Prevention Law and prefectural ordinances. The control value in parentheses is the daily average.
pH: Hydrogen Ion Concentration BOD: Biochemical Oxygen Demand COD: Chemical Oxygen Demand SS: Suspended Solids
N.D.: Not Detected (less than specified amounts)

Environmental Data

Higashichita Plant

Engine Division ● Location: Nittou-cho, Handa, Aichi

Environmental Impact Mass Balance

INPUT

Electricity		33,147 MWh
Gas	LPG	–
	City gas	1,141 km^3
Fuel	Petroleum	75 kl
	Cokes	749 tons
Water		67 km^3
Chemical substances		60 tons
Paper		2 tons

Higashichita Plant

OUTPUT

Air	CO_2	29 kt-CO_2
	NOx	188 m^3N
	SOx	225 m^3N
Water	Total wastewater	30 km^3
	Total COD	126 kg
	Total T-N	184 kg
	Total T-P	7 kg
Municipal waste	Emissions	–
	Recycling rate	–
	Direct landfill	–
Industrial waste	Emissions	6,945 tons
	Recycling rate	4%
	Direct landfill	6,622 tons

PRTR

Chemical Substance	Amount Handled	Released Volume					Transferred Volume			Volume Recycled	Volume Removed	Consumption Volume
		Air	Water	Soil	On-Site Landfill	Total	Waste	Sewage	Total			
Antimony	1,516	–	–	–	–	–	–	–	–	–	–	1,516
Nickel	2,125	–	–	–	–	–	–	–	–	–	–	2,125
Manganese and its compounds	47,777	–	1	–	331	332	1,254	–	1,254	–	–	46,191
Molybdenum and its compounds	4,375	–	–	–	–	–	–	–	–	–	–	4,375
Chromium and chromium (III) compounds	4,575	–	–	–	–	–	–	–	–	–	–	4,575

Air (Complying with the Air Pollution Control Law, Prefectural Ordinances)

Item	Equipment	Control Value	Actual Measurement (Maximum)
NOx (ppm)	Melting furnace	120	9
Particulate matter (g/m^3N)	Melting furnace	0.1	0.004

Water (Complying with the Water Pollution Prevention Law, Prefectural Ordinances)

Item	Control Value	Actual Measurement		
		Maximum	Minimum	Average
pH	6.0-8.0	8.0	6.5	7.6
BOD	15	9.5	0.3	2.3
COD	15	10.4	0.2	4.2
SS	15	7.8	N.D.	1.5
Oil	2	0.7	N.D.	0.2
Phenol	0.5	0.01	N.D.	0.01
Copper	1	0.017	0.003	0.008
Zinc	1	0.350	N.D.	0.171
Soluble iron	0.5	0.123	0.075	0.095
Soluble manganese	0.5	0.124	0.018	0.073
Total chromium	0.2	0.011	N.D.	0.004
Total nitrogen	10	9.60	3.60	6.15
Total phosphorus	1	0.670	N.D.	0.23
Cadmium	0.1	N.D.	N.D.	N.D.
Total cyanide	1	N.D.	N.D.	N.D.
Lead	0.1	0.019	N.D.	0.007
Hexavalent chromium	0.5	0.02	N.D.	0.01
Arsenic	0.1	0.001	N.D.	0.001
Total mercury	0.005	0.0006	N.D.	0.0006
Selenium	0.1	0.001	N.D.	0.001
Boron	230	0.33	0.10	0.23
Fluorine	5	1.31	0.5	0.93

*Environmental impact mass balance: See page 5 for details on how to read this data.
*PRTR: Unit: kg/year
The volume removed represents the quantity of PRTR-designated substances that have been converted into another substance through incineration, neutralization, decomposition or chemical reaction.
The consumption volume represents the quantity of PRTR-designated substances that have been converted into another substance due to some type of reaction and has been used in or attached to a product which leaves the plant site.
None of the company's production sites discharge sewage.
*Air: Control values are based on the emissions standards stated in the Air Pollution Control Law or prefectural ordinances. Actual measurements show the maximum value for measurements taken.
*Water: Unit measurements are in mg/ℓ, excluding pH. Control values are based on the emissions standards stated in the Water Pollution Prevention Law and prefectural ordinances. The control value in parentheses is the daily average.
pH: Hydrogen Ion Concentration BOD: Biochemical Oxygen Demand COD: Chemical Oxygen Demand SS: Suspended Solids
N.D.: Not Detected (less than specified amounts)

Milestones of Environmental Activities

Date	Major Environmental Activities
1984	Use of trichloroethylene fully phased out at all production plants
March 1993	• Environmental Committee, CFC Reduction Subcommittee, and Waste Reduction Subcommittee established • Communications and Public Relations Subcommittee, Recycling Subcommittee, and Energy Subcommittee established • Environmental plan (First Environmental Action Plan) established
April 1993	Hekinan Plant receives a special award at the 12th Aichi Prefecture Greenery Competition
September 1993	Hekinan Plant receives an award at the 12th National Greenery Promotion Convention sponsored by Japan Greenery Research and Development Center
February 1995	Use of trichloroethane at all production plants fully phased out
August 1995	Name of CFC Reduction Subcommittee changes to Chemical Management Subcommittee
September 1995	Hekinan Plant receives a Greenery Award from the Chubu Bureau of Economy, Trade and Industry
January 1996	Name of Recycling Subcommittee changes to Product Technology Subcommittee
	Plant Environmental Committee established
May 1996	Second Environmental Action Plan (FY 1996 to FY 2000) established
August 1996	Use of organic chloride-based solvents at all production plants fully phased out
August 1997	Name of Chemical Management Subcommittee changes to Pollution Prevention Subcommittee
October 1997	Nagakusa Plant acquires ISO 14001 certification
October 1998	Kariya Plant (Compressor Division) acquires ISO 14001 certification
December 1998	Takahama Plant acquires ISO 14001 certification
March 1999	Use of HCFC during the manufacturing of electronic equipment fully phased out
November 1999	Hekinan Plant acquires ISO 14001 certification
December 1999	First Environmental Report published
	Report on PRTR pilot project (FY 1998) published
January 2000	Kyowa Plant acquires ISO 14001 certification (subsidiary TIBC, situated adjacent to the Kyowa Plant, also acquires the certification)
February 2000	Name of Waste Minimization Subcommittee changes to Resource Utilization Subcommittee
March 2000	Obu Plant acquires ISO 14001 certification
August 2000	Third Environmental Action Plan (FY 2001 to FY 2005) established
October 2000	Kariya Plant (Textile Machinery Division) acquires ISO 14001 certification
March 2001	Guidelines for reducing substances of concern, recycling design, and environmentally preferable purchasing issued
April 2001	Disclosure of environmental conservation activities related to the soil and underground water (trichloroethylene)
October 2001	Kariya Plant (headquarters) acquires ISO 14001 certification
	Acquisition of ISO 14001 extended to the technical departments of Textile Machinery and Compressor divisions
February 2002	Communications and Public Relations Subcommittee begins to serve as General Secretariat for environmental activities
	Guidelines for evaluating the environmental impacts of products issued
April 2002	Environmental section of our Web site established
	Risk Communication Guidelines issued

Results of the Environmental Report Questionnaire 2001

We value the opinions and thoughts of our readers. We take into consideration the view of our readers to create a better report with a broader range of information. These are just some of the viewpoints and thoughts we received regarding our Environmental Report 2001.

Points that Were Praised

- "Toyota Industries' active involvement in environmental conservation backed by its environmental management system."
- "Disclosure of soil and underground water remediation activities."
- "Getting an understanding of Toyota Industries' business and environmental activities cleared away the uncertainties I had thus far."
- "Easy to understand as the report contains many graphs and pictures."

Points to Be Improved

- "More concrete information on activities and results related to PRTR and waste."
- "Environmental aspects could be made clearer by clarifying mass balance."
- "Fortifying development of environmentally conscious products by aiming for better environmental management."
- "Information on activities by division makes it easy to understand what is going on at each plant or office but the information also contains data on production activities and product development, making it difficult for the average person to understand."
- "Does not really show how Toyota Industries is going about environmentally preferable purchasing."
- "The report would have more impact if the company included more information on its unique activities or featured specific topics."

In Conclusion

Thank you for reading Toyota Industries Corporation's Environmental Report 2002.

In creating this report, we took into mind the opinions we received from those who read our 2001 report. We reviewed the report's structure and content, and expanded coverage of our environmental accounting activities.

In addition, we enhanced our disclosure of data pertaining to our environmental conservation activities. We plan to continue to improve the content of our report by focusing on the opinions of our readers. In order to report our environmental conservation activities to a wide audience, we aim to continue publishing our environmental report. The next edition is scheduled for release in July 2003.

We have enclosed a questionnaire with this report and invite you to complete it. We value our readers' opinions and take them into consideration when creating future environmental reports and in our environmental activities.

Please refer to our environmental Web site for more information on our activities.

URL: http://www.toyota-industries.com/environment/

July 2002

(English Translation)

Independent Review Report

July 3, 2002

Tadashi Ishikawa
President, Toyota Industries Corporation

We, Chuo Sustainability Research Institute Corporation, have been asked to carry out a review of the Environmental Report 2002 (the "Report"), which is the responsibility of Toyota Industries Corporation (the "Company"). The objective of this review is to provide an independent opinion on the following:

- Whether the data collection and aggregation processes used to compile the Report were conducted, in a reasonable manner, in accordance with the Company's policy and rules; and
- Whether the data and information included in the Report are consistent with the supporting documents obtained and tested during our review.

Currently there are no generally accepted standards for environmental assurance. Therefore, we have referred to emerging practices and guidance to perform this review.

Our review procedures are based on sampling tests. We performed the following procedures:

- Analyzed data associated with the data and information included in the Report;
- Conducted interviews with persons responsible for the preparation of the data and information included in the Report;
- Traced sampled data from the Report to supporting documents; and
- Assessed the data collection and aggregation processes, both at the headquarters and selected sites we visited.

Our opinion expressed in this report is associated only within the scope of our review procedures.

Also, there are no generally accepted standards for environmental reporting that we can refer to in the performance of our review. Therefore, the Report is the responsibility of, and has been prepared voluntarily by, the Company.

This independent review report does not provide any assurance of the completeness of the data and information included in the Report.

On the basis of the above work, we have reached the following opinion:

- The data collection and aggregation processed used to compile the Report were conducted, in a reasonable manner, in accordance with the Company's policy and rules.
- The data and information included in the Report are consistent with the supporting documents obtained and tested during our review.
- There are no significant data or information that should be corrected.

Chuo Sustainability Research Institute Corporation
(ChuoAoyama Audit Corporation Group)