



ISUZU  
Environmental Report  
2002

# Environmental Management — Our Vision

Seeking a Healthy Co-existence for Vehicles and the Global Environment



**Yoshinori Ida**

President and Representative Director

Appointed as director in 1994, managing director in 1999, and president in 2000. Personal motto: "Sekisei" (Sincerity Moves Heaven) by Kaishu Katsu.\*

\* Kaisyu Katsu (1823-1899): A prominent statesman who made great contributions to the modernization of Japan by opening it up to the world and building a modern state.

The activities of society and industry depend heavily on energy from fossil fuels. So do the vehicles we use as our principle means of transportation. This makes the issue of co-existence between vehicles and the global environment a major challenge for society.

At Isuzu we place a high priority on global environmental issues in our business management. We are working to conserve the environment throughout the life cycle of the vehicle — through the development, manufacturing, use, and end-of-use phases. We are also working actively to contribute to environmental conservation in local communities and society.

One example of such efforts is our work to develop advanced clean diesel engines that are friendly to the earth, with excellent combustion efficiency, high fuel efficiency, and reduced CO<sub>2</sub> emissions—the major cause of global warming, which poses the greatest of environmental challenges. In addition, Isuzu has acquired ISO 14001 certification at all our plants in Japan, as well as our major overseas plants, and will steadily improve its environmental management systems, including those that further promote vehicle recycling.

Regarding exhaust emission regulations, we see it as our social responsibility to comply with new regulations, as far in advance of deadlines as possible. In June 2002, Isuzu became Japan's first

vehicle manufacturer to launch the sales of light-duty trucks that meet Japan's exhaust emission regulations that are coming into effect in 2003.

Recognizing the importance of proactive and steady efforts for environmental conservation, Isuzu will continue to do its best in promoting protection of the global environment. We hope this report will help deepen your understanding of our environmental initiatives, and we will continue to expand our efforts to provide such information in the future. Your suggestions and comments would be greatly appreciated.



"I enjoy hiking in the mountains and like to be in nature. I think it's important for corporate citizens as well as individuals to preserve natural landscapes that are familiar to our generation, so that future generations can enjoy them too."

## Corporate Outline

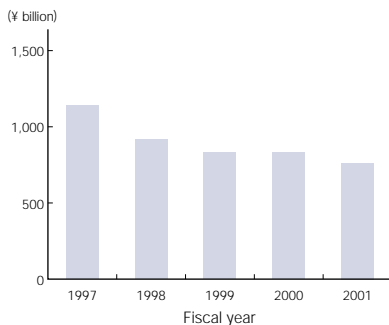
### Corporate Philosophy

We offer our customers around the world high quality products and services, and we resolve to develop our business in a way that contributes to human needs and social welfare.

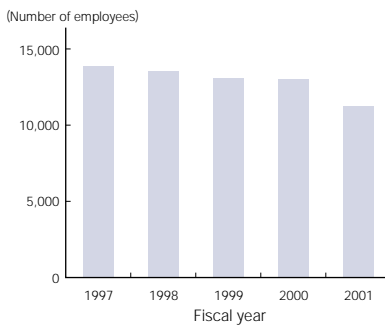
### Corporate Data

President: Yoshinori Ida  
 Capital: ¥ 90.3 billion (as of March 31, 2002)  
 Business Operations: Manufacture, sales and service of motor vehicles, internal combustion engines, and their parts  
 Sales: ¥ 761.9 billion (for the period ended March 2002)  
 Ordinary Profit: ¥ 2.1 billion (for the period ended March 2002)  
 Product Lineup: Heavy- to light-duty trucks, buses, sport-utility vehicles (SUVs), engines and components  
 Employees: 11,226 (as of March 31, 2002)  
 Offices and Plants: Head office, Fujisawa Plant, Tochigi Plant, Kawasaki Plant, Hokkaido Plant, Hokkaido Proving Ground, etc.

### Sales



### Employees



### Editorial Policy

The Isuzu Environmental Report 2002 has been prepared with reference to the Environmental Reporting Guidelines issued by Japan's Ministry of the Environment and the Sustainability Reporting Guidelines issued by the GRI.\* We strove to provide information in a readable and easy-to-understand format to convey our management's approach to the environment, Isuzu's efforts to produce environmentally friendly vehicles, and the world's trend toward environmentally friendly diesel engines. Our first Environmental Report was published in fiscal 1999; this report represents the fourth edition.

\*GRI: The Global Reporting Initiative is an international organization founded with the aim of formulating and spreading guidelines for sustainability reporting that can be applied worldwide. One feature of these guidelines is the emphasis on reporting the balanced performances of economic, environmental, and social aspects of business activities.

### Scope of Report

Primarily covers the environmental efforts in Japan by Isuzu Motors Limited.

### Period Covered

The data used are for fiscal 2001 (April 1, 2001 – March 31, 2002). Information on activities includes periods before and after fiscal 2001.

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# Environmental Vision

Isuzu aims to reduce society's environmental impact primarily by developing and providing clean diesel-powered vehicles.



**Koza Sakaino**

Chairperson of the Global Environment Committee  
Executive Vice President and Director  
Senior Division Executive, Sales Headquarters



Primarily engaged in overseas and domestic sales. Appointed as director of Isuzu Motors Limited in 1994. Served as president of American Isuzu Motors Inc. Appointed as managing director of Isuzu Motors Limited in 1998, and as vice-president and director in 2002. Chairperson of the Global Environment Committee.

**Personal comments on my eco-friendly life**

"I try to use the bus whenever I can. I have traveled by bus throughout Japan, from Wakkanaï in the North to Miyazaki in the South."

● **Business Operations and Environmental Issues**

Commercial vehicles, Isuzu's major product line, account for 90% of the cargo transportation in Japan and are essential to our daily life. In this sense, Isuzu is directly connected with the problems of global warming, the depletion of fossil fuel resources and other environmental issues. Considered this way, Isuzu plays a key role in society and at the same time must bear some responsibility for protection of the environment. We have made the global environment a top priority in our management, and we aim to conduct business operations in a way that contributes to protection of the environment. In Japan, many people harbor some misperceptions about diesel and its environmental impacts. But manufacturers of diesel engines and diesel-powered vehicles are committed to develop cleaner diesel engines that emit fewer emissions, and I would like readers of this report and other stakeholders to realize that with their high thermal efficiency, diesel engines have enormous potential to help slow global warming, and that they can also run on various alternative fuels that could replace fossil fuels.

● **Minimizing Environmental Impact throughout the Life Cycle**

The manufacture of good products is not the only responsibility of manufacturers. We must provide products and services that not only satisfy our customers but that also have the lowest possible environmental impact in all phases of the life-cycle, from manufacture to sale, maintenance, and end of use. Isuzu is focusing on the development and sale of clean diesel engines throughout the life cycle of the vehicle, and promoting the use of clean energy vehicles —powered by compressed natural gas (CNG) and liquefied petroleum gas (LPG)— in large cities, where actions are urgently needed to reduce air pollution. In the domestic market, the Isuzu ELF series has a market share exceeding 70% in its class of CNG-powered vehicles. Regarding manufacturing processes, we have acquired ISO 14001 certification for environmental

management systems at all domestic plants and major overseas sites. This year, we achieved our goal of moving toward zero emissions and a recyclability rate of 90%. We will work to achieve further reductions in waste output and environmental impact.

● **Complying Proactively with Regulations, Enhancing Services**

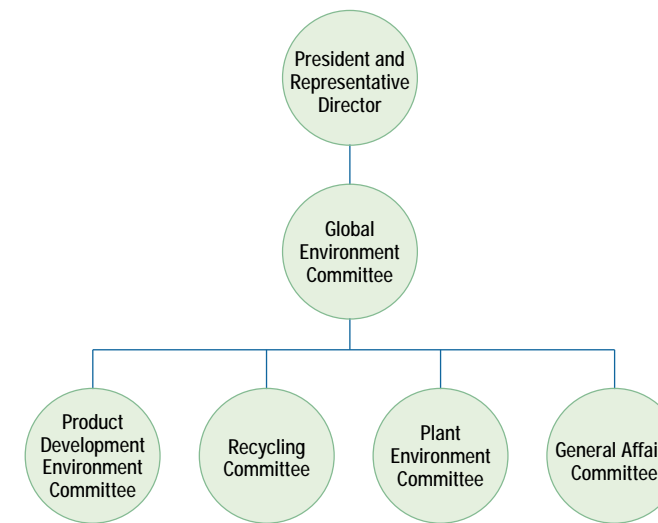
With the launch of the new ELF light-duty truck series in June 2002, Isuzu became Japan's first vehicle manufacturer to comply with the coming exhaust emission regulations entering into force in 2003. Because the ELF series conforms with the regulations concerning low-pollution vehicles set by seven Tokyo-area and six Kansai-area local governments, and with the Tokyo Metropolitan Ordinance on Environmental Preservation, these vehicles can be used without concern about compliance, even with Tokyo's stringent standards entering into force in the future. We are complying with the Fluorocarbons Recovery and Destruction Law and Automobile Recycling Law, which were enacted during the most recent session of the Japanese Diet. In addition, we offer various services for our customers, such as the "Mimamori-Kun" vehicle diagnostic system, which encourages eco-friendly driving and contributes to environmental conservation and operating cost reduction. Our oxidation catalytic converter will help comply with the stricter regulations on particulate matter (PM). A CNG filling station we have installed at our Fujisawa Plant demonstrates an initial step toward building the infrastructure for the broader use of clean energy vehicles.

● **Isuzu in Society and Its Responsibility**

In order to solve environmental problems, systems of the entire society need to change. We think that tax incentives, grants and other legal forms of support are necessary to further increase low-pollution vehicles. It is also necessary to address the problem traffic congestion caused by the heavy use of private and other vehicles, and increase the availability of public transportation such as buses. Drivers should also stop unnecessary engine idling and follow legal requirements for vehicle maintenance and inspection. For these purposes, it is important for Isuzu to expand its communication efforts, including the provision of information on its environmental conservation policy and activities. Isuzu was Japan's first commercial vehicle manufacturer to publish an environmental report, and this is the fourth year for this report. We would appreciate your comments and suggestions for improvements in our environmental activities and this report.

■ **Organization and Structure**

Isuzu's company-wide environmental efforts are led by the Global Environment Committee.



**Isuzu Charter on the Global Environment** (established in May 1992)

**Policies in Coping with the Global Environment**

1. Throughout the life of vehicle from production to usage and disposal, we will cope with the conservation of environment with positive stance.
2. In order to leave beautiful earth to our descendants, not only through business activities but also as citizens of the earth, we will cope with environmental conservation activities of locality and society with positive stance.

**Action Directives**

1. In production processes of vehicles, we will minimize consumption of energy, control to minimize emissions, and thus cope with the conservation of environment.
2. With regard to exhaust gas, noise, etc. which are generated in the process of using vehicles, we will cope with reduction through development and production of vehicles. Also, through developing logistics systems, we will think out rational logistics and will thus cope with the conservation of environment.
3. Realizing that resources are finite, we will aim to provide vehicles which are loved by customers for long time, and we will, in order to make our vehicles recyclable in disposal process, thoroughly cope with the thought of recycling.

Isuzu is committed to preserve the global environment, and has taken the initiative to develop activities aimed at balancing economic development with environmental conservation. To this end, the Isuzu Global Environment Committee was established back in August 1990. In May 1992, we established the Isuzu Charter on the Global Environment with our special environmental logo including the slogan "FOR THE FUTURE OF MANKIND AND THE EARTH."

**Messages from Readers**



**Takehiko Murayama**

Professor, Interdisciplinary Fields, School of Science and Engineering, Waseda University

You have made advances in your environmental conservation activities by accomplishing previous years' environmental goals, such as reducing waste and improving product recyclability. Another noteworthy point is the launch of clean diesel vehicles in advance of tougher exhaust emission regulations in 2003. I would urge you to establish more specific numerical targets in some areas, such as for the reduction of substances that have environmental impacts during the developmental phase and for improvements in logistics and distribution, and to set higher environmental goals for the production phase. Public awareness of the health effects of particulate matter in diesel exhaust emissions is increasing. In this context, and to reduce CO2 emissions, I encourage you to continue your efforts to eliminate these emissions as the most important challenge in your environmental conservation activities.



**Yoko Hagi**

Principal Lecturer of an ISO Training Organization  
Associate/principal consultant, L.M.J. Japan K.K.  
Representative of Saphia Corporation

In my review of your fiscal 2001 environmental goals I paid the most attention to your efforts to reach the goal of zero emissions during production and your development and promotion of clean energy vehicles. After all, the ultimate responsibility for vehicle manufacturers trying to preserve and improve the environment is to have no emissions of substances that have environmental impacts. To this end, environmentally sound design and thorough efforts for waste reduction are essential. In fiscal 2001, you achieved remarkable results, such as the attainment of a milestone towards zero emissions and the successful launch of the new ELF light-duty truck series. I hope that you will make further advances as a key player in global environmental conservation through your philosophy for clean diesel engines. I also encourage you to further promote the plan for reduction of lead use, an item rated as "unsatisfactory" in your self-evaluation, and to aim to accomplish all your other targets.



**Masakatsu Iwasa**

Representative Secretary  
Tokyo Jyonan Environmental Counselors' Association  
Technical Advisor to Kanagawa Prefecture

It is important for an environmental report to show a company's figure through the environmental dimensions of the business. In this sense, this year's Environmental Report is well designed to provide information in an easy to understand way on Isuzu's efforts to cope with increasing environmental demands through technology. In recent years, there has been a tendency to use awards and independent reviews of environmental reports as a way to evaluate corporate environmental management. However, customers can experience and judge a company's environmental awareness directly through its products (vehicles, in Isuzu's case). I'm impressed by Isuzu's positive and constant efforts as described in the Site Report. This awareness is backed by the environmental activities at each manufacturing site. I hope you will continue to address environmental problems and be an industry leader on these issues.



**Akihiko Tsuyama**

Environmental cartoonist  
Creates environmental cartoons for children's educational magazines.

I can see great improvements since last year's report, in areas such as the volume of waste going to landfills. I think that the final goal should be to build a system where all resources used — whether it be during manufacturing, driving, or whatever — are used in a closed loop cycle. The use of renewable materials and renewable energy at the manufacturing stage should also be encouraged. Recently the media have covered stories about local governments and citizen groups growing canola crops and making canola oil, then trying to utilize the leftover cooking oil as fuel for diesel engines. Isuzu's active participation in such initiatives would help accelerate the use of diesel engines, as environmentally sound engines.

# Isuzu's Environmental Impact FOR THE FUTURE OF MANKIND AND THE EARTH

Isuzu's trucks and buses are essential for cargo and passenger transport, our SUVs make life more enjoyable, and our diesel engines are used in industrial machines — in our own way we are contributing to meet the needs of society.

However, vehicles have an impact on the environment at every stage, from procurement of materials, through manufacturing, use, disposal and recycling. We realize that reducing such environmental impacts is our corporate responsibility.

Our business requires many resources for vehicle components and materials, and in the manufacturing process energy, water and other resources are used in great quantities. In addition, vehicles in operation consume significant amounts

of energy and emit substances with environmental impact, including exhaust emissions, one of which is CO<sub>2</sub>. We make a constant effort to reduce these impacts by trying to determine the inputs and outputs of environmental aspects of the entire business operations, from material procurement to the recycling of used products. We are working to expand the coverage and increasingly refine our initiatives to protect the environment.

Isuzu is working for environmentally-friendly vehicles based on the following approaches:

- 1) Always stay ahead of the times.
- 2) Contribute to environmental preservation by improving diesel engines.

Isuzu has been working to achieve cleaner exhaust emissions from diesel engines. In fiscal 2002, we launched the new ELF light-duty truck series, the first in Japan to comply with the new exhaust emission regulations that become effective in 2003.

We will further improve the diesel engine's high fuel efficiency, thus contributing to the internationally need to control global warming by reducing CO<sub>2</sub> emissions. Also, we are working to develop electric-diesel hybrid vehicles.

In Europe, diesel-powered vehicles are considered to be a class of eco-friendly vehicles. Isuzu is committed to contributing to protection of the environment, which we see as our responsibility as a leading manufacturer of diesel engines.

To constantly reduce the environmental impact of our manufacturing activities, and to promote environmentally conscious management, Isuzu has worked to establish ISO 14001 environmental management systems. Not only all four plants in Japan but also five major overseas plants and the Isuzu Engineering Division have acquired ISO 14001 certification.




In fiscal 2001, we achieved an interim goal of waste reduction toward the goal of producing zero emissions at all domestic plants, and we will endeavor to make further improvements.


We will make constant efforts for steady improvements with an emphasis on critical environmental aspects of individual stages of our business operations.


-  Manufacturing sites in Japan: 4 plants
-  Employees in Japan: 11,226(12,597)

### INPUT

**Total Energy Consumption**  
105,000 kℓ(crude oil equivalent)  
(130,000 kℓ)

-  Electricity: 69%(66%)
-  Natural gas: 23%(20%)
-  Petroleum: 8%(14%)



**Water consumption**  
 2,240,000 m<sup>3</sup>  
(2,440,000 m<sup>3</sup>)


**Main material suppliers**  
 Main material suppliers: 470 companies(470)






### OUTPUT

**Products**  
Sales: ¥ 761.9 billion  
(¥ 829.9 billion)

-  Sales in Japan: 64,000 units (75,000)
-  Exports: 162,000 units (170,000)

**Air**  
 CO<sub>2</sub> emissions: 176,000tonnes(230,000)

**Waste**  
 Total generated: 60,600 tonnes (66,000)  
 Landfill disposal: 990 tonnes (2,600)

**Waste Water**  
 Water discharge: 2.18 million m<sup>3</sup>  
(2.19 million m<sup>3</sup>)

Note: Figures in parentheses represent data for the previous fiscal year.

# Summary of Environmental Initiatives in Fiscal 2001

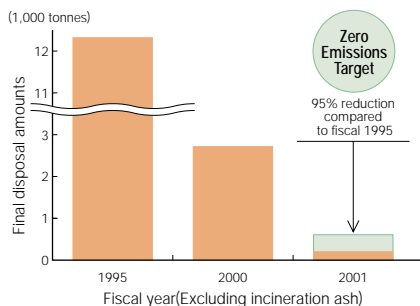
Major achievements of Isuzu's fiscal 2001 initiatives to protect the environment are summarized below. For details, please refer to the pages indicated.

## Zero Emissions Target Accomplished at All Plants

As a result of our proactive efforts in all domestic plants, in fiscal 2001 Isuzu accomplished the goal of reducing landfill disposal of industrial waste by 95% compared to the fiscal 1995 level (excluding incineration ashes) by the end of fiscal 2001. The actual figure of reduction was 97.6%. We will undertake further activities to clear the more rigorous numerical target to reduce landfill disposal to one tonne or less per month per plant by the end of fiscal 2003.

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## Results and Targets in Reducing Final Disposal



## ELF-KR Series, Japan's Cleanest Diesel Engine Vehicle, Was Launched

We launched the ELF-KR series of trucks, meeting the tougher 2003 exhaust emission regulations in Japan two years before their enforcement. An oxidation catalytic converter is installed as standard equipment to reduce particulate matter. These trucks comply with the low-pollution vehicle regulations specifically set by seven Tokyo-area and six Kansai-area local governments. They will also meet the stricter regulatory levels set by the Tokyo Metropolitan Government to enter into force in 2005. This new series is not only environmentally friendly but also makes economic sense, as it enjoys a 1% tax incentive, provided that a newly purchased vehicle is registered by the end of September 2003.

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ELF-KR

## Clean Energy Vehicles

We introduced CNG- and LPG-powered vehicles, the ELF light-duty truck series, FORWARD medium-duty truck series, and large and medium-sized buses, which emit no black smoke and dramatically reduced nitrogen oxide (NOx) emissions in exhaust. In addition to the cleaner exhaust emissions, these vehicles boast good torque even at low-speeds. Sales of these vehicles for urban cargo and public transport rise every year, giving Isuzu a top market share in Japan.

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ERGA mio CNG-powered Non-step Bus

## "Smoother-G" Transmission Boosts Fuel Efficiency

The "Smoother-G" mechanical fully-automatic transmission was introduced to the GIGA series heavy-duty trucks — a first to have this type of transmission for a tractor manufactured in Japan. With this transmission, the otherwise-painstaking clutch operations are fully automatic at every speed, from truck starting to stopping. Because the gear shifting is always optimized, the driver's fatigue is significantly reduced. This automation of the shifting work enables the same level of energy-efficiency in driving as would be achieved by a skillful driver.

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GIGAMAX Tractor (equipped with "Smoother-G" transmission)

## Recyclability Rate Exceeds 90%

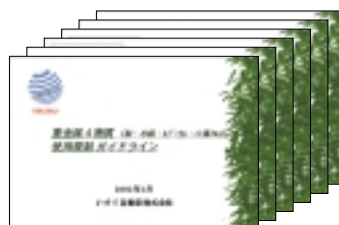
The recyclability of new vehicles launched in 2002 was improved to over 90% for all vehicles tested.

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## New Guidelines Control Use of the Four Heavy Metals

With the aim of reducing the amounts of substances with environmental impact contained in shredder dust from waste vehicles, we are making an effort for the gradual reduction and total phase-out of the use of lead, mercury, cadmium and hexavalent chromium.

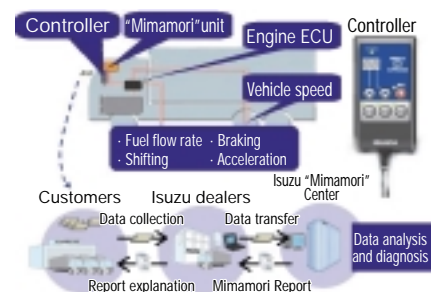
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## Launch of "Mimamori-Kun" Vehicle Diagnostic System

To help our customers achieve the optimum driving and fuel efficiency, we have introduced the "Mimamori-Kun" vehicle diagnostic system. Based on actual driving data, we give recommendations to our customers to make their driving safer and more fuel-efficient. This system is already in operation for the GIGA series heavy-duty trucks.

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Flowchart of "Mimamori-Kun" System

# Environmental Goals and Accomplishments

## Environmental Management

| Environmental Goals in Fiscal 2001  | Achievement in Fiscal 2001   | Self-evaluation | Mid-term Target  | Refer to |
|---|--|-----------------|--|----------|
| <b>ISO 14001 certification for environmental management systems</b><br>-Isuzu Engineering Division<br>-Isuzu Motors Germany GmbH.<br>-Isuzu Engine Manufacturing Co., Thailand Ltd. (Thailand)<br>-Isuzu Motors Co., Thailand Ltd. (Thailand) | -Isuzu Engineering Division Certified June 2001<br>-Isuzu Motors Germany GmbH. Certified August 2001<br>-Isuzu Engine Manufacturing Co., Thailand Ltd. (Thailand) Certified July 2001<br>-Isuzu Motors Co., Thailand Ltd. (Thailand) Certified February 2002 | ■               | Continued improvement of environmental management system | P9       |
| -Issuance of the Environmental Report in September 2001   | -The Environmental Report (in Japanese) was issued in September 2001; the English version was issued in December.  | ■               | Further improvement of the contents                      | P29      |

## Products and Product Development Stage

| Environmental Goals in Fiscal 2001   | Achievement in Fiscal 2001  | Self-evaluation | Mid-term Target  | Refer to   |
|--|---|-----------------|--|------------|
| <b>Improve fuel efficiency to prevent global warming</b><br>-Launch a new product with improved fuel efficiency.   | -A new model of the GIGA series heavy-duty tractor was launched in October 2001 with improved fuel efficiency by 14%, by adopting the "Smoother-G" fully-automated mechanical transmission.   | ■               | Highest fuel efficiency in its class   | P13<br>P17 |
| <b>To clean exhaust emissions</b><br>-Launch a low-emission vehicle as early as possible.<br><br>-Launch equipment for reducing particulate matter for vehicles already in use.  | -The ELF-KR light-duty truck was launched in June 2002 to meet the 2003 exhaust emission regulations.<br>-A particulate matter removal kit to attach to the oxidation catalytic converter was launched in May 2002 to meet requirements of the Tokyo Metropolitan Ordinance on Environmental Preservation.  | ■               | Early launch in fiscal 2003 of equipment to significantly reduce particulate matter emissions. | P13<br>P17 |
| <b>Reduce external noise</b><br>-Meet noise regulations set in 2001.   | -ELF series light-duty trucks were launched in June 2002.<br>-FORWARD series medium-duty trucks (up to 150 kW) were launched in February 2002.  | ■               | —  | P14<br>P17 |
| <b>Clean energy vehicles</b><br>-To promote the development and sales of clean energy vehicles.  | -1,511 units sold of ELF CNG-powered light-duty trucks with market share more than 70%.<br>The number of models was increased from 16 to 27 with cost reduction of about ¥250,000 per unit.<br>-888 units sold of ELF LPG-powered light-duty trucks.<br>113 units sold of FORWARD CNG-powered medium-duty trucks. The number of models was doubled from 18 to 36.<br>A project for building CNG filling stations is ongoing (scheduled to be completed in fiscal 2002). | ■               | Develop electric-diesel hybrid vehicles.   | P14<br>P26 |
| <b>Improve recyclability</b><br>-Raise the recyclability of new vehicles to over 90% by 2002.  | -Dismantling studies confirmed that the recyclability rate exceeded 90% for all vehicles in June 2002.  | ■               | —  | P15        |
| <b>Reduce the use of substances with environmental impact</b><br>-Reduce use of lead to one-third or less of fiscal 1996 levels by 2005.<br>-Formulate a plan for gradual reduction and eventual elimination of the use of lead, mercury, cadmium and hexavalent chromium. | -Reduced use of lead by more than half compared to fiscal 1996 levels for all vehicles in 2000.<br>-Guidelines to control the four substances formulated in January 2002.   | ■*              | Reduce use of lead to one-third or less of fiscal 1996 levels by 2005.                         | P14<br>P15 |

\* We have encountered difficulties in reducing the use of lead.

## Factories and Production at Plants

| Environmental Goals in Fiscal 2001  | Achievement in Fiscal 2001   | Self-evaluation | Mid-term Target   | Refer to   |
|---|--|-----------------|---|------------|
| <b>Energy saving to prevent global warming</b><br>-Improve energy efficiency by 1% per year (average per unit of production)<br>-Stabilize CO <sub>2</sub> emissions for a 30% reduction compared to fiscal 1990 levels by 2010 | -Increased 2.6% compared to the previous year and 25% compared to fiscal 1990.<br>-Reduced 60% compared to fiscal 1990 (total emissions 176,000 tonnes). | ■               | 30% reduction of CO <sub>2</sub> emissions compared to fiscal 1990 levels by 2010 | P19        |
| <b>Waste Reduction</b><br>-Achieve zero emissions at all domestic plants. (To reduce landfill disposal by 95% compared to fiscal 1995 levels [excluding incineration ashes])  | -The interim zero emissions goal was achieved at all domestic plants<br>Reduced 97.6% compared to fiscal 1995 levels.                                    | ■               | 1 tonne/month at each plant by the end of fiscal 2003                             | P20<br>P23 |
| <b>Control and reduce substances with environmental impact</b><br>-Reduce emissions of VOCs* (from painting processes) by 45 g/m <sup>2</sup> by the end of fiscal 2005   | -57g/m <sup>2</sup>  | ■               | 45 g/m <sup>2</sup> by the end of fiscal 2005                                     | P21        |

\* VOCs: Volatile organic compounds

## Distribution and Sales

| Environmental Goals in Fiscal 2001  | Achievement in Fiscal 2001   | Self-evaluation | Mid-term Target    | Refer to |
|---|--|-----------------|--------------------|----------|
| <b>Improve transportation efficiency to prevent global warming</b><br>-Improve energy efficiency of vehicles already in use, thus helping reduce CO <sub>2</sub> emissions.   | -To help users improve fuel efficiency, the "Mimamori-Kun" vehicle diagnostic system was brought into operation in January 2002. | ■               | —                  | P26      |
| <b>Assist customers to make exhaust emissions cleaner</b><br>-Provide assistance for users in developing vehicle replacement plans to meet the exhaust emission regulations, and to install equipment to reduce particulate matter. | -Planning support program "Eco Solution Plan" was brought into operation in June 2002.   | ■               | —                  | P26      |
| <b>Streamline logistics</b><br>-Boost the use of returnable and steel containers to 62%.  | -Achieved 65%.   | ■               | 65% in fiscal 2002 | P25      |

■ Target achieved    ■ Progress made    ■ Target not achieved

# Environmental Management System

## Establishment and Operation of the Environmental Management System

Isuzu has established an environmental management system to reduce the environmental impact of its business activities and to strengthen the company's capacity to deal with environmental issues. We obtained ISO 14001 certification for all four plants in Japan by March 2000, and in terms of developmental divisions and major overseas plants, with the August 2002 certification of the DMAX, Ltd. engine plant in Ohio, USA, our introduction of environmental management systems has been completed more or less on schedule.

### Engineering Division Acquires ISO 14001 Certification

The Isuzu Engineering Division acquired ISO 14001 certification in June 2001. To promote the manufacturing of environmentally sound products, we integrated into our quality and environmental management systems the view that the environment constitutes one important part of product quality itself. We also established a new framework for planning product-related environmental strategies, with expert committees on key issues to evaluate the environmental impacts of Isuzu's major products. We will establish a system for controlling regulated substances and recycling as soon as possible and tackle the challenges of product development with environmentally sound design as an integral part of our business activities.

## Environmental Audits

We conduct environmental audits to assess and make constant improvements to the environmental management systems at our plants. Isuzu's environmental audits comprise the internal audits conducted on a regular basis, once or twice a year, and the inspections and reviews for renewal by an external certification organization.

To enhance the self-auditing capabilities of each plant, we are training newly appointed internal environmental auditors and provide refresher programs for those who have been certified.



Auditor training session



ISO 14001 Certificate

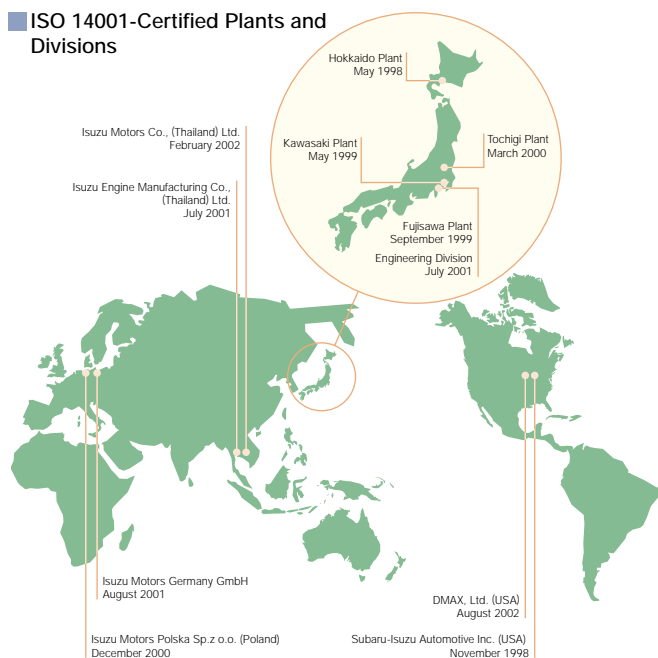


Certification ceremony

## Results of Environmental Audits

| Plant or division   | Review results   |
|---|--|
| <b>Hokkaido Plant</b><br>Review for renewal<br>April 2002 | Certification was renewed, as the requirements were being met, the environmental management system was being operated appropriately, and improvements were being made. Although there was one case of minor non-compliance (unclear data on some legal regulatory items), remedial actions were immediately taken. |
| <b>Kawasaki Plant</b><br>Review for renewal<br>April 2002 | Certification was renewed, as the requirements were being met, the environmental management system was being operated appropriately, and improvements were being made. No new issues were raised.  |
| <b>Fujisawa Plant</b><br>Surveillance<br>August 2001      | Continued certification was approved, as the requirements were being met and the environmental management system was functioning efficiently. No new issues were raised.   |
| <b>Tochigi Plant</b><br>Surveillance<br>February 2002     | Continued certification was approved, as the requirements were being met and the environmental management system was functioning efficiently. No new issues were raised.   |
| <b>Engineering Division</b><br>Initial audit<br>June 2001 | Certification was granted, as the requirements were being met and the overall, environmental management system had been appropriately established and operated. No new issues were raised.   |

## ISO 14001-Certified Plants and Divisions



## Compliance with Environmental Laws and Regulations

Isuzu works hard to go beyond merely complying with environmental laws and regulations; we go further, to reduce the environmental impact of our business activities by voluntarily establishing stricter standards for ourselves than the national and local standards. We hold plant environmental committee meetings on regular basis to confirm compliance with legal requirements and discuss day-to-day maintenance of standards. In fiscal 2001, Isuzu was completely in compliance with all environmental regulations.

## Product Recalls for Environmental Reasons

In fiscal 2001, there were no environment-related recalls. We have one environmentally related lawsuit under way on the health effects of exhaust emissions.



# Creating Environmentally Sound Products

## Development Approach/Life Cycle Assessments



### Yoshihiro Tadaki

Chairperson of the Product Development Environment Committee

Originally involved in designing and developing diesel engines, he was appointed as a corporate director in 2000. Currently Division Executive of the Engineering Division (Operations Headquarters) and Chairperson of the Product Development Environment Committee. Isuzu's Engineering Division is aiming to minimize environmental impacts, with an emphasis on diesel engines and diesel-powered vehicles. In June 2001, the division acquired ISO 14001 certification for its environmental management system. Using the life cycle assessment (LCA) approach, we seek to reduce environmental impacts in seven major areas, including fuel efficiency, exhaust emissions and external noise. As a result of these efforts, Isuzu was able to launch the ELF-KR light-duty truck series in June 2002, complying with tough new exhaust emission regulations that come into force in 2003. We will continue our efforts in this direction.

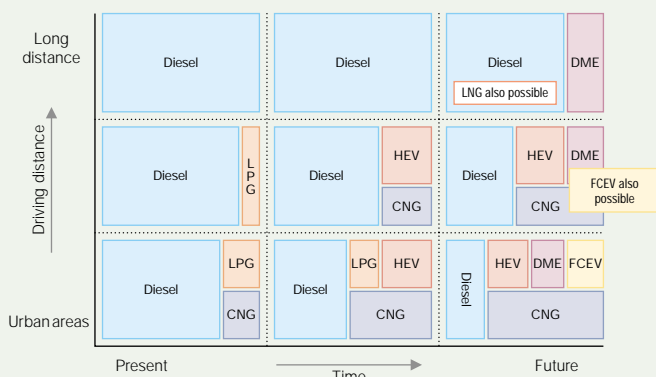
#### Personal comments on my eco-friendly life

I enjoy gardening and am moved by the abundance of nature. If the weather is good on weekends, I always work in the garden. It feels as restful as if I lived in the countryside.

### Development Approach for Eco-friendly Vehicles

Diesel-powered vehicles play a central role in all road transportation today, from short to long distances. Eco-friendly diesel powered vehicles are expected to appear in the coming years that are adapted to a range of uses. Isuzu is taking advantage of the high thermal efficiency and fuel efficiency of diesel engines, which also permit the use of various alternative fuels, and is making a major effort to clean the exhaust emissions that are one disadvantage of diesel engines. Isuzu's CNG-powered vehicles come in various models and are well-suited for driving in urban areas, where distances traveled are short and air pollution should be reduced significantly, and we expect they will greatly increase in the future. In addition, today the automobile and related industries are also researching and developing low-pollution vehicles. In the near future, hybrid vehicles featuring low fuel consumption and clean exhaust emissions will likely be available for cargo transport in cities. Later, DME/GTL-powered vehicles, which run on fuels synthesized from coal or natural gas, will likely be developed for a broad range of purposes, from short- to long-distance transportation. Fuel cell-powered vehicles, which are drawing attention today for their potential in passenger cars, are also thought to hold promise for use in commercial vehicles, in the medium- to long-term. Isuzu is working to develop next-generation eco-friendly vehicles, built on the foundations of our technical know-how that we've accumulated over many years in the manufacture of diesel engines.

### Trends in Development of Eco-friendly Vehicles



CNG: Compressed natural gas  
 LPG: Liquefied petroleum gas  
 LNG: Liquefied natural gas  
 DME: Dimethyl ether  
 GTL: Gas to liquids (liquid fuel manufactured from natural gas)  
 HEV: Hybrid electric vehicle  
 FCEV: Fuel cell electric vehicle

### Our Approach to Life Cycle Assessment

#### Developing Vehicles That Have a Low Environmental Impact over the Entire Life Cycle

As heavy-duty commercial vehicles can cover 1.2 million kilometers during their lifetimes, better fuel efficiency could result in significant differences in total energy consumption and CO<sub>2</sub> emissions over the lifetime of a vehicle. If we consider the life cycle assessment (LCA) approach, it is clear that diesel-powered vehicles could help control global warming thanks to their lower CO<sub>2</sub> emissions, compared to gasoline-powered vehicles.

One major challenge with diesel, however, is reducing the emissions of nitrogen oxides (NOx), particulate matter (PM) and black smoke in vehicle exhaust. We have achieved reductions by improving combustion and after treatment devices, and will continue to develop and apply advanced technologies to make further achievements. We are taking various approaches to reduce the environmental impact of vehicles at every stage of the life cycle, such as further reductions of external noise, a shift to more environmentally friendly materials, less use of refrigerants in air conditioners, and the promotion of green procurement.

#### Creating an Environmentally Sound Product—the Case of Diesel-Powered Vehicles

- 1 Improve fuel efficiency and reducing CO<sub>2</sub> emissions
- 2 Produce cleaner exhaust emissions
- 3 Develop vehicles that run on cleaner energy
- 4 Reduce external noise
- 5 Reduce the use of substances with environmental impact
- 6 Improve recyclability
- 7 Reduce the use of refrigerants in air conditioners

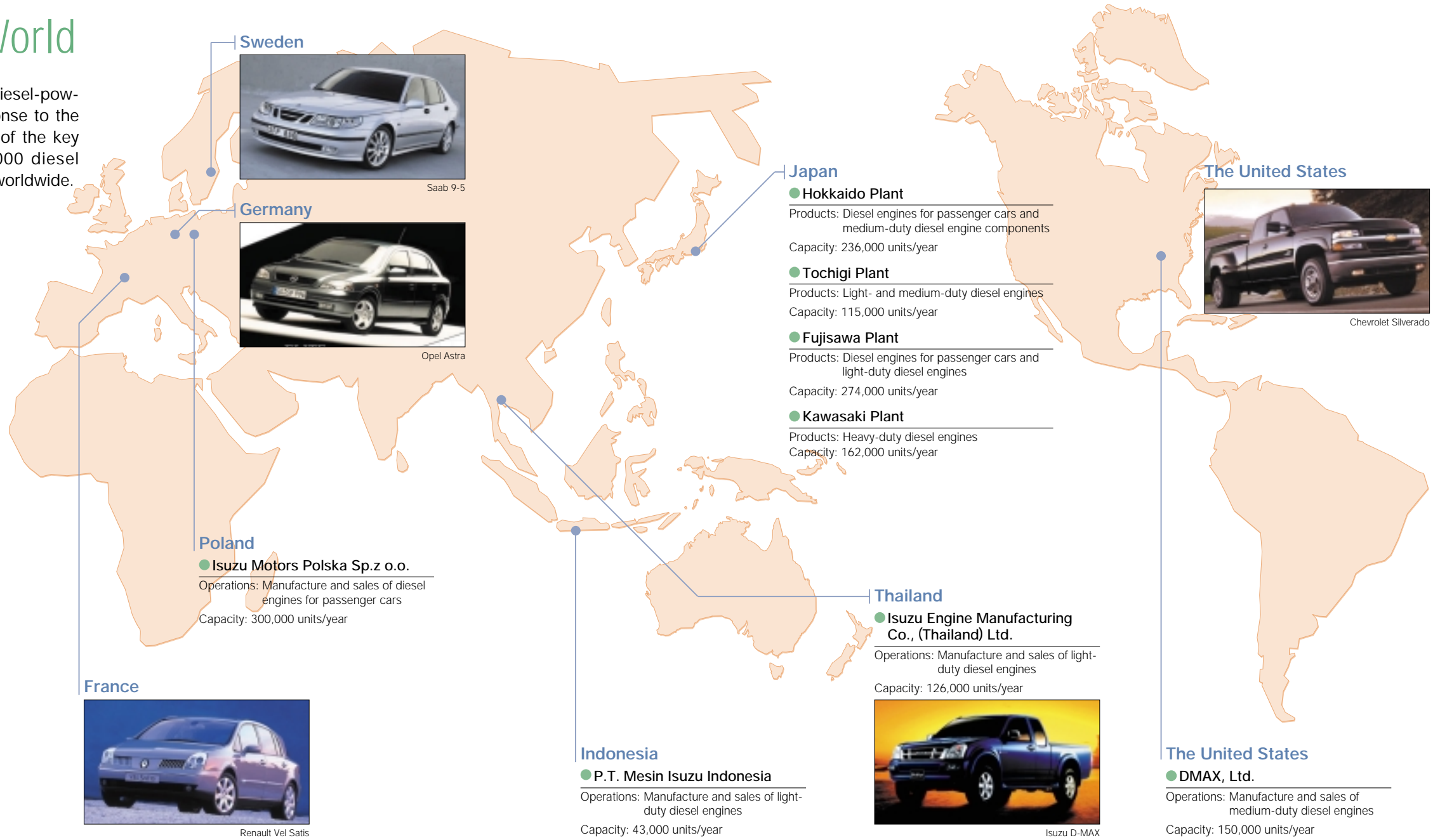
#### Systems that Assist the Design of Environmentally Sound Products

System for assessing environmental and social impacts over the entire life cycle  
 Design support system for reducing environmental impacts  
 Chemical management system to help reduce the use in products of substances that have environmental impacts

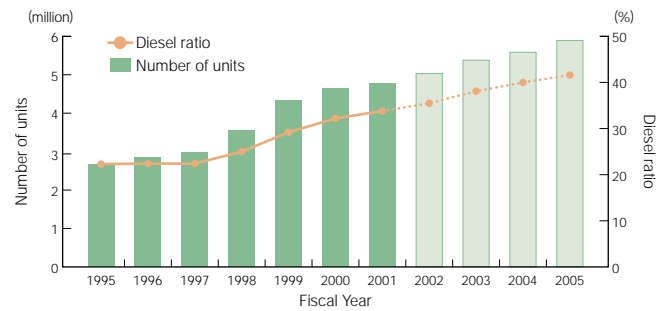
# Isuzu's Clean Diesel Engines — At Work Around the World

In recent years, there has been a shift from gasoline- to diesel-powered vehicles in Europe and the United States in response to the need to prevent further global warming. Isuzu is one of the key players in this shift. We have manufactured 710,000 diesel engines (including industrial engines) at our nine plants worldwide.

Diesel engines are well-appreciated in Europe, to the extent that about 50% of the passenger cars in France and Spain are diesel-powered. A trend for a dramatic increase in diesel-powered vehicles is associated with increased concern about global warming. As CO<sub>2</sub> emissions from the combustion of fossil fuels accelerate global warming, this concern has emerged about the state of the global environment in the years to come, such as flooding due to rising sea levels. Against this background, diesel engines are being increasingly used, as they emit less CO<sub>2</sub> and consume less fuel than other engines. The world's precious oil resources are limited and should be used carefully and with the lowest possible environmental impact. In this sense, Isuzu believes that the demand for diesel-powered passenger cars will grow in Japan in the future as it has in Europe. Although the image of diesel vehicles emitting black smoke still persists in Japan, diesel engines are becoming cleaner every year. When Japan's new exhaust emission regulations come into effect in 2005, they will be the toughest in the world. And we expect that the spread of cleaner diesel-powered vehicles will enhance the image of the diesel engine.



■ The Shift Toward Diesel Passenger Vehicles in EU Countries



● Sweden

In the autumn of 2001, an Isuzu-made V6 diesel engine was introduced to the Saab 9-5 luxury sedan. We successfully passed the test of the severe cold weather conditions of northern Europe, and satisfied the expectations of Saab, a company with its technology rooted in a long history as an aircraft manufacturer.

● France

In the spring of 2002, an Isuzu V6 diesel engine was introduced to the Renault Vel Satis new concept luxury car. The motor journalists who test-drove the car gave it top marks for the powerful and environmentally friendly diesel engine.



● Germany

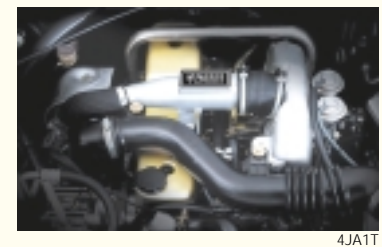
In the fall of 2001, Opel Astra and Corsa models adopted a 1.7-liter diesel engine made by Isuzu. Equipped with this compact engine, which features high output and clean exhaust emissions, the Astra ECO4 received accolades from one of Germany's top motor vehicle magazines.



● Thailand

Isuzu launched a fully redesigned model of a one-ton pickup truck manufactured in Thailand under the name Isuzu D-MAX in May 2002. Since 1996, Isuzu's truck of the same class has ranked first in market share for six consecutive years, with a total of 960,000 sold. In addition to further improvements in the already highly-praised cost performance and durability, the Isuzu D-MAX offers elegantly designed styling and comfortable interiors based on well-balanced sense and ergonomics. Isuzu D-MAX is equipped with a new type of powerful and environmentally-friendly direct injection diesel engine meeting the EURO II regula-

tions, giving it a competitive edge in the market. We plan to sell 70,000 units of this model in Thailand in 2002.



● Japan

In June 2002 we launched a new model of ELF series trucks, the best selling of our diesel-powered vehicles, two years in advance of tough new exhaust emission regulations that go into effect in Japan in 2003. This model employs a common rail super high-pressure fuel injection system for the first time for a light-duty diesel-powered truck in Japan. Its precise fuel injection is controlled electronically, completely eliminating any visible black smoke.



● The United States

Isuzu developed and supplies a new generation high-output V8 diesel engine for GM's full-size pickup truck, the Chevrolet Silverado and GMC Sierra. Featuring high output and low fuel consumption, the Duramax 6600 engine has contributed this truck's dramatic rise in the U.S. market share from 3% to more than 30% for the same class, in only one year. This engine has dramatically changed the consumer image of diesel-powered vehicles in the world's biggest market. The Duramax 6600 (8GF1) received Ward's "Ten Best Engine Award" for its second consecutive year in January 2002.

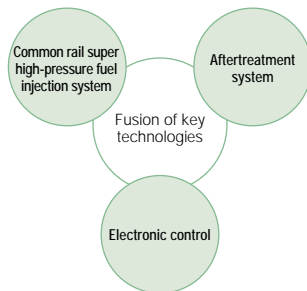


# Creating Environmental Technologies

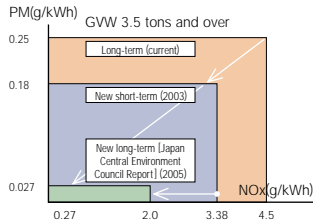
## Cleaner Exhaust Emissions

In advance of tough new exhaust emission regulations as new short-term regulations that go in effect in 2003 in Japan, we were able to develop clean technologies for light- and medium-duty diesel-powered vehicles. These state-of-the-art technologies include an electronically controlled common rail super high-pressure fuel injection system, four intake and exhaust valves, a cooled exhaust gas recirculation (EGR) system, and an oxidization catalytic converter. The ELF-KR series was equipped with the newly developed 4HL1 and 4HL1-N engines, and the significantly improved 4HJ1 engine was launched with NOx and PM emissions reduced by about 30%, hydrocarbon (HC) by more than 85% and carbon monoxide (CO) emissions by more than 70%, which will meet the tough new regulations.

### Isuzu Diesel Technologies and Expertise

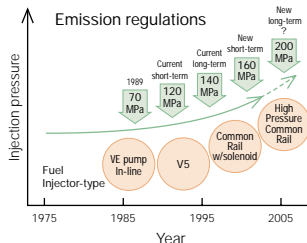


## NOx and PM Standards



The suggested standards of Japan's new long-term regulations are equivalent to EURO-5 (2008) and the PM standards are stricter than the EURO-4 (2005) (same as EURO-5) standard.

## Increases in Fuel Injection Pressure

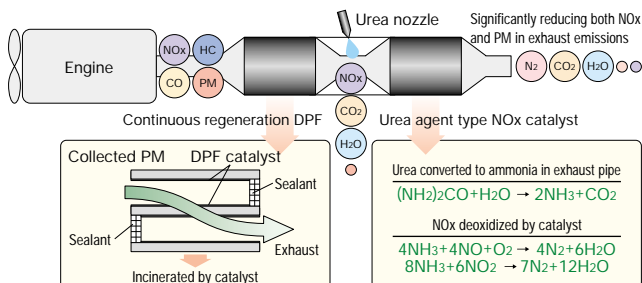


## Precision Fuel Injection Control



We have developed two types of oxidization catalytic converter kits to reduce PM emissions during use: one for all Isuzu commercial vehicles and buses in compliance with Japan's 1994 exhaust emission regulations with PM reduction rate exceeding 40% for low-sulfur light oil and one for all Isuzu commercial vehicles and buses in compliance with the current 1998-99 regulations with PM reduction rate of 30%. These are specified by the Tokyo Metropolitan Ordinance on Environmental Preservation. Now we are working to develop a continuously regenerating diesel particulate filter (DPF) \*system with a catalyst to significantly reduce particulate matter and black smoke emissions, in order to comply with the exhaust emission regulations (new long-term regulations) that will become effective in 2005.

## Combination of Continuously Regenerating DPF and NOx Catalyst (Urea Agent Type)



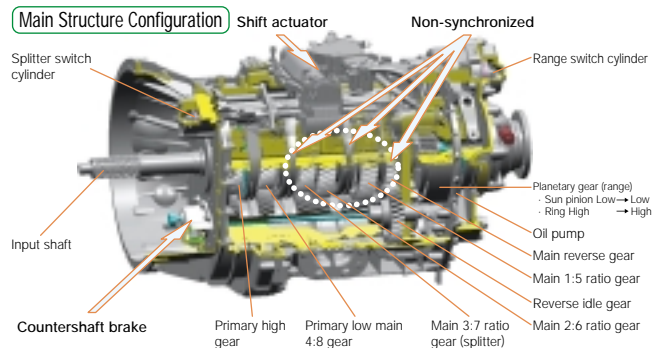
## Technologies to Boost Fuel Efficiency and Reduce CO2 Emissions

With their efficiency in converting fuel into motive power, diesel engines can cut CO2 emissions by 20 to 40% compared to gasoline engines. Another advantage is their high durability. Diesel-powered vehicles can travel more than 1.5 million kilometers during their lifetime. Diesel engines are thus most suitable for use in commercial vehicles, which require both fuel economy and durability.

Isuzu is working to improve the fuel economy of the engine itself and as well as that of the vehicle as a package. For the GIGA heavy-duty trucks and tractor series, by introducing the newly developed "Smoother-G" fully automated mechanical transmission we achieved a remarkable 14% improvement in fuel efficiency compared to the manual transmission model, by reducing fluctuations in fuel consumption caused by the manner of driving.

We provide various services to help our customers make use of these superior features (see page 26).

## "Smoother-G" Transmission Mechanism



## Features of Smoother-G Control

- Automatic clutch control when starting**
  - A linear control valve for clutch control was introduced for the first time for a vehicle made in Japan.
  - Same smooth clutch control as by a skilled driver, even when starting in motion
- Same shift control as by a skilled driver**
  - Minimized velocity change shock by sophisticated engine/transmission control
  - **Minimized damage to transmission and other components**
  - **Safe and reliable driving**
- Energy-efficient shifting**
  - Multi-step smooth shifting
  - Shifting schedule customized to engine torque characteristics
  - **Same high fuel efficiency as by a skilled driver**

\* DPF (diesel particulate filter) system: A filter to capture particulate matter and black smoke.

## Topics Top Energy Conservation Award

Isuzu's Idling Stop and Start System received the Chairman's Award from the Energy Conservation Center for the twelfth annual awards, sponsored by the Agency of Natural Resources and Energy. The first such system to be developed and installed by Isuzu on buses in Japan, it allows a fuel efficiency improvement of 10% for city driving. It is included as standard equipment on the large-size ERGA route bus, and as optional equipment in the FORWARD medium-duty truck.



## Creating Environmental Technologies

### Development and Marketing of Clean Energy Vehicles

Isuzu is actively carrying out research and development of alternative-energy vehicles to find solutions for the problems of world's dwindling petroleum resources and air pollution in large cities. We have already developed, and are now manufacturing and selling CNG-powered trucks and buses and LPG-powered trucks.

We are also developing diesel-electric hybrid ELF light-duty trucks featuring the excellent fuel efficiency of diesel engines.

In addition, in an initiative commissioned by Japan's Ministry of Economy, Trade and Industry we are now developing engines powered by dimethyl ether, a next-generation clean alternative fuel, and testing them in medium-sized buses and light-duty trucks.

### CNG-powered Vehicles (comply with Japan's Green Purchasing Law)

|                     | Model name | Model code | Number of models | Maximum payload or seating capacity | Engine model | Displacement (L) |
|---------------------|------------|------------|------------------|-------------------------------------|--------------|------------------|
| Commercial vehicles | ELF        | KR-N*R     | 9                | 2000-4000 kg                        | 4HF1         | 4.334            |
|                     | FORWARD    | KK-F*R     | 16               | 3600-7900 kg                        | 6HA1         | 8.226            |
| Buses               | GALA mio   | KK-LR      | 1                | 55-61 persons                       | 6HA1         | 8.226            |
|                     | ERGA mio   | KK-LR      | 1                | 55 persons                          | 6HA1         | 8.226            |
|                     | ERGA       | KK-LV      | 2                | 70-75 persons                       | 6HA1         | 8.226            |
|                     |            | KK-LV      | 4                | 70-85 persons                       | 8PF1         | 15.201           |

### Other Initiatives: Reducing Noise, Using Less Refrigerant in Air Conditioners

Below are other examples of our technical innovations to reduce the environmental impact throughout the life cycle of each vehicle.

#### External Noise Reduction

In Japan, under the world's most stringent noise regulations, Isuzu pays much attention to vehicle noise, even at the vehicle design stage. Our efforts to create quieter vehicles include developing a pilot fuel injection system in diesel engines to reduce both noise and exhaust emissions, and analyzing the pathways followed by engine combustion sounds.

Thanks to these efforts, the idling noise of new ELF light-duty truck launched in June 2002 is two decibels quieter than previous models. This is an important achievement if one considers the need to reduce the engine noise, especially while engine idling at night and during loading and unloading.

### Reducing the Use of Substances with Environmental Impact

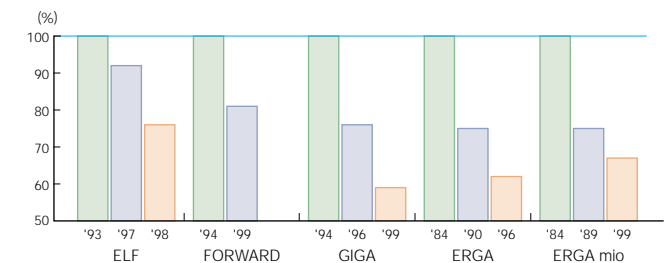
Isuzu is actively working to reduce our use of four major substances: lead, hexavalent chromium, cadmium and mercury. For fiscal 2001, we established specific targets for a gradual phase-out, for each model and type of equipment we produce. Guidelines that we have set for this initiative include targets and implementation schedules, and we are using these not only internally but are also calling for the cooperation of our suppliers.

|                     |  |
|---------------------|--|
| Lead                | Reduce amount used to one-tenth or less (one-quarter or less for large vehicles) of 1996 levels by 2006. |
| Hexavalent chromium | Gradual phase-out of use in new vehicles between 2003 and 2008.  |
| Cadmium             | Gradual phase-out of use in new vehicles between 2003 and 2007.  |
| Mercury             | Complete phase-out in 2004 models, excluding some lighting equipment and indicator devices.              |

### Reducing the Use of Refrigerants in Air Conditioners

In 1993, Isuzu completely phased out the use of CFC12 refrigerants which destroy the ozone layer and switched to HFC134a, a CFC-alternative. As HFC134a is also a greenhouse gas, however, it too must be phased out. Thus, during model changes and on other occasions Isuzu makes an effort to reduce the actual amount of refrigerants used in air conditioners.

### Reducing the Use of Air Conditioner Refrigerant in Each Isuzu Vehicle



## Green Procurement

### Promoting Green Procurement

In November 2000 we released the Isuzu Green Procurement Guidelines to facilitate cooperative and comprehensive efforts with our suppliers to reduce the environmental impact of the materials we purchase. In the Guidelines, we urge suppliers to obtain ISO 14001 certification or to establish an equivalent environmental management system by the end of 2003. We also request them to submit data on substances used in their parts and materials, and to replace or reduce the use of regulated substances.

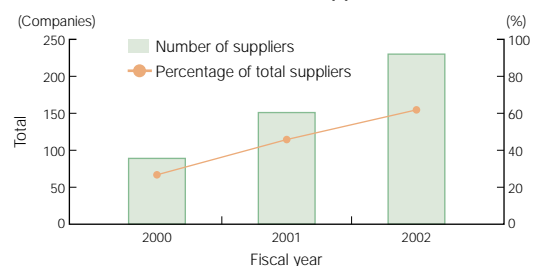


First Environmental Seminar

In fiscal 2001, Isuzu held a seminar entitled "Guide to Environmental Management Systems" to support our suppliers. As a result, 73 of the 371 suppliers closely associated with Isuzu acquired ISO 14001 certification in fiscal 2001, bringing the number of ISO 14001-certified suppliers to 230, 62% of the total.

In addition, we provide information on green purchasing via the Green Purchasing Network's GPN Database in Japan.

### ISO 14001 Certification of Isuzu's Suppliers



## Recycling Initiatives



### Yoshito Mochizuki

Chairperson of the Recycling Committee

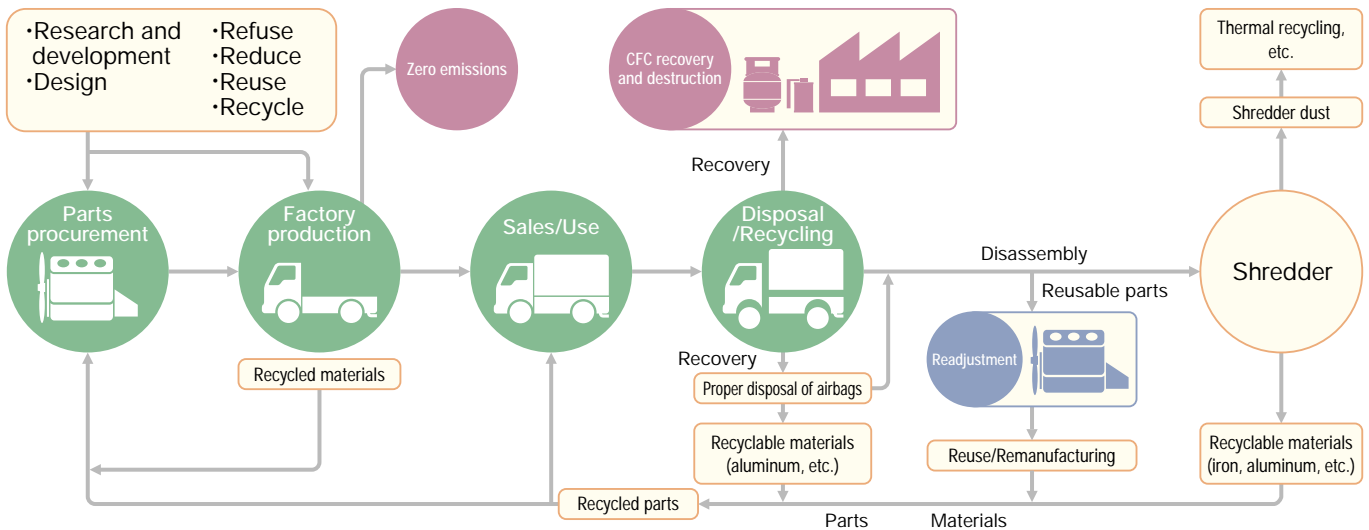
After working primarily in planning for overseas operations, in 1999 was appointed as director Isuzu Motors Limited and later as president of American Isuzu Motors Inc. In 2001 was appointed as executive director of Isuzu Motors Limited. Currently Division Executive of the Sales Planning Division (Sales Headquarters), and Chairperson of the Recycling Committee.

To use the world's limited resources efficiently, vehicles must be manufactured based on designs that take into account recyclability and the reuse of parts, right from the design phase. Isuzu views automobile recycling in a comprehensive way. Our product recycling efforts inside the company have been successful, including the establishment of what we call "Remani Net" (Remanufacturing Net) which facilitates the efficient use of reusable parts and makes possible a recyclability rate exceeding 90%. This is all thanks to intensive research into vehicle dismantling and then our efforts to reflect those findings in new vehicle design. These successes will make it possible to meet the strict laws and regulations on recycling that will be enforced in many countries, and to offer our customers vehicles that comply with regulations and have a lower environmental impact.

#### Personal comments on my eco-friendly life

When I was a high school student I belonged to the school's swimming club, and since then I have enjoyed swimming as a hobby. After a leisurely 1,000-meter swim I feel quite refreshed. When I'm in water, I feel one with nature.

### Vehicle Life Cycle



### Concept of Vehicle Recycling

As legislation pays increasing attention to issues relating to recycling, the expectations for manufacturers to respond grow steadily. In Japan, for example, the Basic Law Concerning the Promotion of Establishing the Recycling-based Society went into force in May 2000, the Recycled Resource Use Promotion Law was amended in April 2001, the CFC Recovery and Destruction Law went into force in June 2001, and the Automobile Recycling Law went into force in July 2002. As the handling of vehicles at the end of their useful life becomes a growing concern in society, not only in Japan but in Europe as well, the role of automobile manufacturers in addressing this issue also grows. Through technology and information exchanges with the GM Group manufacturers on recycling, Isuzu is actively working from a global perspective to improve recycling technology. We will continue our extensive cooperation with environment-related industries and other industrial sectors, with the aim of being a company that truly fosters a recycling-based society.

### Recycling Initiatives throughout the Vehicle Life Cycle

We divide a vehicle's life cycle into four stages — research and development, manufacturing, use, and end-of-use — and are carrying out research and other

initiatives to promote recycling. We take into account such things as which materials are suitable for currently-available recycling methods, designs that allow ease of dismantling, and the proper processing of the dismantled materials that result.

### Our Voluntary Action Plan

Isuzu established the Voluntary Action Plan for Recycling Vehicles in February 1998 to promote the proper processing and recycling of vehicles at the end of their useful life.

#### ● Improving Recyclability Rates

Isuzu set the goal of boosting the recyclability of new vehicles to over 90% (calculated by Isuzu's independent criteria, on a weight basis) starting in 2002, and as a result of our research into the dismantling of vehicles, confirmed that we have achieved recyclability rates exceeding 90% for all vehicles evaluated.

#### ● Reducing the Use of Substances with Environmental Impact

For models released in 2000 and later, by the end of that year we achieved the goal of reducing the use of lead in new vehicles to one-half of fiscal 1996 levels or less. We are now working aggressively to achieve a reduction to one-third of fiscal 1996 levels or less, by the end of fiscal 2005.

## Recycling Initiatives

### Initiatives at the Research and Development Phase

#### — Research by dismantling —

Isuzu started in October 1998 to research the ease of dismantling its vehicles and recycling the materials, and completed this work in June 2002. The research began with the ELF series, and then moved on to the FORWARD, GIGA and other commercial vehicles, sport-utility vehicle BIGHORN, WIZARD, and also one-ton pickup trucks.

We evaluated the recyclability rate of each vehicle from the standpoint of the workers dismantling, including such aspects as the ease of removing fuel and oil, ease of dismantling the parts that should be removed first, and the readability of markings to help identify the materials. Our findings were used to make suggestions to improve new vehicle design, and were also applied for some models currently in production.

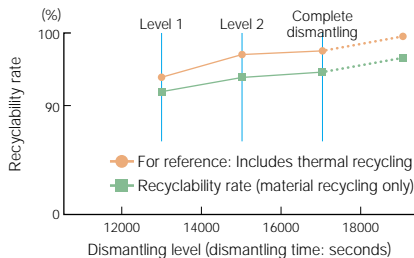


Testing the ease of dismantling interior panels

#### — Design for Environment (DFE) —

We have evaluated the cost of vehicle disposal and the environmental impacts in the manufacturing and disposal phases by studying the process of dismantling Isuzu ELF trucks. The results have helped product designs to meet environmental and economic requirements. Vehicle recyclability generally increases as more time and effort is put into dismantling, but the operation also becomes more expensive. We are making use of our data to determine the best balance between the level of dismantling (i.e., the time required) and the recyclability rate, in the context of the numerical targets of our Voluntary Action Plan, in order to clarify the problems that need to be resolved, and to generate suggestions on how to boost the cost-effectiveness of the dismantling process.

### Dismantling Time and Recyclability Rates

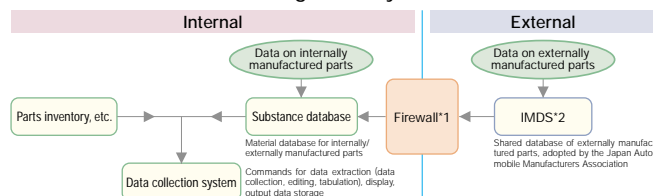


### Initiatives at the Design and Manufacturing Phases

#### — Establishing an environmental management system —

To ensure good environmental quality of our products (vehicles and components) starting at the design phase, we are creating an environmental management system that will enable us to determine recycling rates and control amounts of substances with environmental impact used. Although we are currently using a simple calculation system, in the future Isuzu will develop its own independent environmental management system based on a unified global parts data collection system of the entire automobile industry in Japan. We will work to more accurately monitor and increase recycling rates, and monitor substances with environmental impact, and to reduce and phase out their use.

### Future Environmental Management System



\*1 Firewall: A function to prevent unauthorized access. \*2 IMDS: International Material Data System

### Initiatives at the End-of-Use Phase

#### — Reuse and remanufacturing —

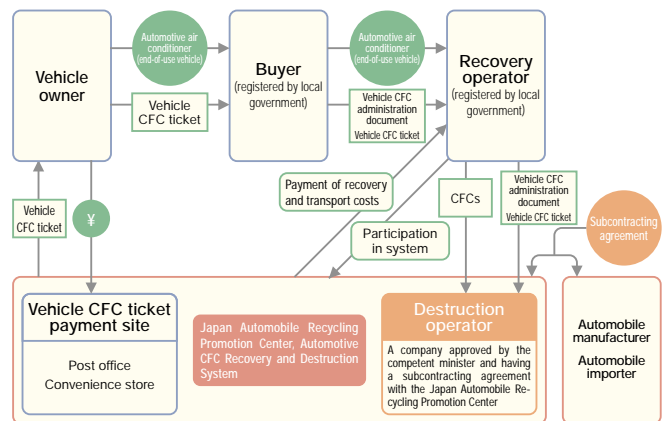
To promote the reuse of parts from vehicles at the end of their useful life, our domestic sales division is linked with the domestic distributors through an intranet network we call "Remani Net" (Remanufacturing Network). Through this network, we exchange information concerning unnecessary parts in dealer stock and reusable parts, in order to use them more efficiently. Items posted on the system range from remanufactured diesel engines to powertrain components and other parts. As we move toward being a recycling-based society and people's awareness rises, systems such as these will likely grow in popularity.

### Recycling Initiatives at the Disposal Phase

#### — Recovery and destruction of CFCs —

Following the entry into force of the CFC Recovery and Destruction Law in Japan, starting in October 1 of 2002, vehicle manufacturers are required to completely recover and destroy CFCs in used automobile air conditioners. As a member of the Japan Automobile Manufacturers Association, Isuzu has worked to establish an automotive CFC recovery and destruction system as part of a project sponsored by the Japan Automobile Recycling Promotion Center. Prior to starting the system, we held explanatory meetings for the concerned personnel in our company and entered a subcontracting agreement with the Japan Automobile Recycling Promotion Center. Through such efforts, we are committed to fulfill our responsibilities as a vehicle manufacturer.

### Vehicle CFC Recovery and Destruction System



### Environmental Impact Assessment Using the LCA Approach

Isuzu collects used plastic bumpers (in the Tokyo metropolitan area only), and in order to expand their possible applications we considered recycling them for use in wheel wells. To evaluate this idea, we conducted a life cycle assessment to determine the degree that this recycling would reduce the burden on the environment.

Similarly, we will continue to use the LCA method to help prioritize which efforts we should implement, and to consider the best methodologies we should use to reduce environmental impacts.

# New Products in 2001

Working to reduce the environmental impacts of all our commercial vehicles.

## Reducing Environmental Impacts

Commercial diesel-powered vehicles provide cargo transport for industry and the economy. In contrast, passenger cars are designed to meet people's individual needs. In this context, these vehicles play a valuable role in society. But because of the exhaust emissions and noise, there is a need to reduce their environmental impacts.

Isuzu has for many years aimed for a good balance between the dimensions of "environment and safety" and "economic and life cycle cost." With regard to exhaust emissions, for example, increasingly strict regulations are a sign of ever-greater expectations towards not only new vehicles but also those that are already in use. During product development, Isuzu places the highest priority on meeting such expectations of society.

### ● Improving the Isuzu GIGA Series: Environmentally friendly Trucks

- Isuzu equipped the GIGA tractor with a mechanical fully automatic transmission, the Smoother-G," thus improving safety and fuel economy. This is the first Japanese-made tractor to have this type of transmission.
- The 6WG1 intercooler turbo engine was equipped in the GIGA dump truck custom body series. Fuel consumption was reduced by about 15% compared to the conventional models with a non-aspirated engine, and at the same time this change helped to meet new Japanese emissions regulations of 1.8 g/kWh for particulate matter, well before the regulations become effective in 2003.
- A short cab model was introduced to the lineup of twin steer-axle trucks, making the cargo deck about 300 mm longer than the sleeper cab model, and boosting loading capacity to accept two extra pallets (JIS-standard T11).



GIGA MAX Tractor equipped with "Smoother-G" transmission

### ● Isuzu ELF Light-Duty Truck Series

- We launched the ELF-KR series, which complies with tough new exhaust emission regulations, two years before they take effect, in 2003. Equipped with a common rail super high-pressure fuel injection system, four intake and exhaust valves for more efficient fuel combustion, a cooled EGR system, and an oxidization catalytic converter as standard equipment, all 367-model trucks have been designated as low-pollution vehicles by seven Tokyo-area local governments (including the Tokyo Metropolitan Government) and six Kansai-area local governments. The ELF-KR series is also in compliance with the stricter regulations of the Tokyo Metropolitan Ordinance on Environmental Preservation, which take effect in 2005.
- Under the Local Tax Law, vehicles in compliance with the 2003 regulations will enjoy a 1% reduction of the automobile acquisition tax, provided that they are newly registered by the end of September 2003.
- An inexpensive and easy-to-use system to stop unnecessary engine idling, suitable for urban delivery vehicles (excluding some models), was added as standard equipment.
- These trucks comply with noise regulations effective in 2001. External idling noise was also reduced by about 2 decibels for non-regulated vehicles.

- To meet the dramatically increasing demand for CNG-powered clean energy vehicles, the lineup of our CNG vehicles was increased from 16 to 27 models and their prices were significantly reduced, by about 250,000 yen per vehicle.



ELF-KR

#### Engine-Idling Restrictor in Isuzu ELF-Series Trucks

If the driver puts the shift lever into "neutral" and sets the parking brake or opens the door to leave the truck while the engine is still running, the engine stops automatically. The engine is re-started manually.

### ● FORWARD Medium-Duty Truck Series

- An oxidization catalytic converter was made available as optional equipment in the FORWARD series. This equipment allows trucks to comply with the stricter regulations of the Tokyo Metropolitan Ordinance on Environmental Preservation that take effect in 2005.
- Compliance with the 2001 noise regulations was achieved for models equipped with 6HL1-N engines.
- The number of models of CNG-powered clean-energy vehicles was increased from 18 to 36.



FORWARD CNG-Powered Truck

- Trucks were equipped with the new "Smoother-F" clutch pedal free mechanical transmission to improve driving economy and safety.



FORWARD equipped with "Smoother-F" transmission

### ● All Truck and Bus Models

Isuzu launched the sales of oxidization catalytic converter kits as add-on equipment to reduce particulate matter emissions. These kits will enable vehicles to meet stricter emissions regulations of the Tokyo Metropolitan Ordinance on Environmental Preservation, which take effect in 2005.

● **Isuzu ERGA Bus Series: Friendly to People, Environment and Operators**

We upgraded the ERGA large-size route bus series to comply with Japan's Barrier-Free Transportation Law, by including easier access for elderly and handicapped passengers, and adding fixtures for wheelchairs. The ERGA series was also designed to comply with standard non-step specifications for easier access, and prices were reduced in order to promote greater use of these buses. We launched a CNG model of route buses (type A) that conform to non-step specifications.



ERGA CNG-Powered Non-Step Bus

Some models are equipped with an oxidization catalytic converter, which will enable them to comply with the stricter regulations of the Tokyo Metropolitan Ordinance on Environmental Preservation, set to take effect in 2005.

A non-step CNG model that complies with the Traffic Barrier Free Law was added to the ERGA mio medium-sized bus series.

■ **Environmental Data on New Products in Fiscal 2001**

| Series  |  | ELF KR   |   | ELF CNG   | ELF LPG   | FORWARD   | FORWARD CNG   | GIGA MAX Tractor  | ERGA Non-Step CNG   |   |   |
|---|--|--|---|---|---|---|---|---|---|---|---|
| Model   |  | KR-NKR81EA   | KR-NPR72GR  | KR-NKR81EAV (M)   | KR-NPR72PV (M)  | KK-FRR35H3S   | KK-FSR33K4S (M)   | KL-EXD52D   | KL-LV280(TYPE A)  |   |   |
| Launch  |  | June 2002  | June 2002   | April 2002  | April 2002  | February 2002   | August 2001   | October 2001  | January 2002  |   |   |
| Engine  | Model  | 4HL1-N   | 4HJ1  | 4HF1 (M)  | 4HG1 (M)  | 6HL1-N  | 6HA1 (M)  | 6WG1-TC   | 8PF1  |   |   |
|   | Total displacement (liters)                  | 4.777  | 4.985   | 4.334   | 4.570   | 7.166   | 8.226   | 15.681  | 15.201  |   |   |
|   | Fuel   | Diesel   | Diesel  | Compressed natural gas (CNG)                                  | Liquefied petroleum gas (LPG)                               | Diesel  | Compressed natural gas (CNG)                                  | Diesel  | Compressed natural gas (CNG)                                  |   |   |
|   | Maximum output (kW (PS))                     | 96(130)  | 114(155)  | 88(120)   | 92(125)   | 132(180)  | 140(190)  | 382(520)  | 177(240)  |   |   |
|   | Exhaust aftertreatment device                | Oxidization catalyst   | Oxidization catalyst  | Three-way catalyst  | Three-way catalyst  | Oxidization catalyst (OPT)                                    | Three-way catalyst  | Oxidization catalyst (OPT)                                    | Three-way catalyst  |   |   |
| Maximum loading and seating capacity (kg/persons)                                     |  | 2000   | 3000  | 2000  | 3500  | 4200  | 7900  | 9800(5th wheel)   | 76/81   |   |   |
| Environmental information   | CO <sub>2</sub> emissions (g/km)             |  | 281.3   | 281.3   | —   | —   | 339   | —   | 944.4   | —   |   |
|   | Exhaust emissions                            | Compliance level   |   | 2003 diesel-powered vehicle regulations                       | 2003 diesel-powered vehicle regulations                     | 2001 gasoline-powered vehicle regulations                     | 2001 gasoline-powered vehicle regulations                     | 1998 diesel-powered vehicle regulations                       | 1998 gasoline-powered vehicle regulations                     | 1999 diesel-powered vehicle regulations                       | 1998 gasoline-powered vehicle regulations                     |
|   |  | 13-mode regulatory levels (g/kWh)  | CO  | 2.22  | 2.22  | 16  | 16  | 7.4   | 51  | 7.4   | 51  |
|   |  |  | HC  | 0.87  | 0.87  | 0.58  | 0.58  | 2.9   | 1.8   | 2.9   | 1.8   |
|   |  |  | NOx   | 3.38  | 3.38  | 1.4   | 1.4   | 4.5   | 4.5   | 4.5   | 4.5   |
|   | PM   | 0.18   | 0.18  | —   | —   | 0.25  | —   | 0.25  | —   |   |   |
|   | Designated low-pollution vehicles            | Seven Tokyo-area prefectural and municipal governments including the Tokyo Metropolitan Government | Complies  | Complies  | Complies  | Complies  | —   | Complies  | —   | Complies  |   |
|   |  | Six Kansai-area prefectural or municipal governments   | Complies  | Complies  | Complies  | Complies  | —   | Complies  | —   | Complies  |   |
|   | Compliance with Japan's Green Purchasing Law |  | —   | —   | Complies  | Complies  | —   | Complies  | —   | Complies  |   |
|   | Noise  | Compliance level (unit: dBA)   |   | 2001 regulations Regulation standard (acceleration noise): 80 |   | 2001 regulations Regulation standard (acceleration noise): 80 | 2001 regulations Regulation standard (acceleration noise): 80 | 2001 regulations Regulation standard (acceleration noise): 80 | 2001 regulations Regulation standard (acceleration noise): 80 | 2001 regulations Regulation standard (acceleration noise): 82 | 1998 regulations Regulation standard (acceleration noise): 81 |
| Amount of refrigerant used in air conditioners (May vary according to specifications) |  | HFC134a (a CFC-alternative) 450 g  | HFC134a (a CFC-alternative) 450 g                           | HFC134a (a CFC-alternative) 450 g                             | HFC134a (a CFC-alternative) 450 g                           | HFC134a (a CFC-alternative) 650 g                             | HFC134a (a CFC-alternative) 650 g                             | HFC134a (a CFC-alternative) 500 g                             | HFC134a (a CFC-alternative) 5600 g (ceiling type)             |   |   |
| Recycling   | Parts made of easily-recycled materials      | Cargo deck spacers, bumpers, external door protectors, etc.  | Cargo deck spacers, bumpers, external door protectors, etc. | Cargo deck spacers, bumpers, external door protectors, etc.   | Cargo deck spacers, bumpers, external door protectors, etc. | Front grip hinges, console, interior trim, etc.               | Front grip hinges, console, interior trim, etc.               | Front grip hinges, console, interior trim, etc.               | In compliance with the non-step bus standard specifications   |   |   |
|   | Material labeling for plastic parts          | Yes (more than 100 g used)   | Yes (more than 100 g used)                                  | Yes (more than 100 g used)                                    | Yes (more than 100 g used)                                  | Yes (more than 100 g used)                                    | Yes (more than 100 g used)                                    | Yes (more than 100 g used)                                    | Yes (more than 100 g used)                                    |   |   |
|   | Sodium azide in airbags                      | Not used   | Not used  | Not used  | Not used  | Not used  | Not used  | Not used  | Not used  |   |   |

(M): Modified

● **For more environmental information on our products...**

Environmental information by vehicle type: [www.isuzu.co.jp/cv/env\\_info/car](http://www.isuzu.co.jp/cv/env_info/car) (in Japanese)

Listing of Vehicles Complying with Japan's Green Purchasing Law: [www.isuzu.co.jp/cv/env\\_info/green](http://www.isuzu.co.jp/cv/env_info/green) (in Japanese)



# Creating Environmentally Sound Factories

## Priorities for Creating Environmentally Sound Factories



### Hiromasa Tsutsui

Chairperson of the Plant Environment Committee

Engaged primarily in manufacturing engineering and planning. Appointed as director in 1996, and as executive director in 1999. Division Executive of the Manufacturing Division, Operations Headquarters. Chairperson of the Plant Environment Committee

In the Manufacturing Division, the Plant Environmental Committee leads in setting priorities as we work to reduce the company's environmental impacts, with the aim of having "environmentally sound plants that are open to their communities." In fiscal 2001, as a result of great efforts by all employees, we accomplished our targets toward the goal of zero emissions of industrial waste from our plants, which is now the highest priority of the Manufacturing Division. In addition, all major overseas plants have now acquired ISO 14001 certification. We will continue with ongoing efforts to make continuous improvements.

#### Personal comments on my eco-friendly life

It is my family's policy to use energy-saving electrical appliances at home. We are very conscious about energy conservation. For example, we use a motion-detector for the hallway lights to turn them on only when needed.

Vehicle manufacturing has environmental impacts that range from the local area of the factory, all the way up to the global scale. If we are to be successful in our environmental initiatives, we consider it important to set our priorities based on an accurate grasp of the facts.

Led by the Plant Environment Committee, we are promoting the initiatives to consider the environment in all manufacturing activities, in order to accomplish our top goals, such as addressing the issues global warming and reducing our emissions of industrial waste and substances with environmental impact. To facilitate these activities, we have established environmental management systems that comply with ISO 14001 at all domestic factories and major overseas factories, and are working to make our factories environmentally sound. We also engage in environmental communications with local residents and are strengthening our collaboration with suppliers in Japan and overseas as part of our commitment to have "open" factories.

In fiscal 2001, we met our targets on the path towards generating zero emissions of industrial waste, our highest priority goal. For examples of efforts at our individual plants, please see "Efforts to Achieve Zero Emissions at Each Isuzu Plant" on page 23.

### Initiatives to Create Environmentally Sound Factories That Are Open to Their Communities

Waste reduction

Energy conservation

Control and reduction of substances with environmental impact

Prevention of air and water pollution, compliance with laws

Effective use of resources

## Energy Conservation Initiatives

### Energy Consumption and Conservation

The need to control global warming is a challenge of a global scale. In order to contribute to efforts to limit global warming and at the same time strengthen our corporate performance, we have given a high priority to energy saving at our plants and are working to reduce CO<sub>2</sub> emissions.

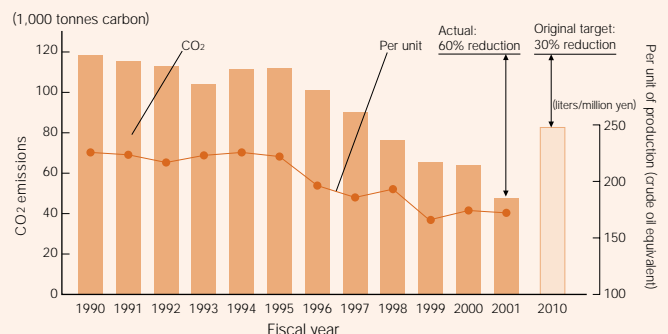
At our plants, energy conservation committees, set up within the framework of our ISO 14001 environmental management systems, have had good results using "energy conservation patrols," which identify and rectify areas needing improvement. In addition, we have established and started implementing our own "Guidelines on Energy-Efficient Design and Management for the Construction and Repair of Facilities." We have also set "energy management standards" for machinery and equipment, based on Japan's Law Concerning the Rationalization of Energy Use, and are now applying them at one after another of our plants.

Our efforts in fiscal 2001 resulted in a 25% reduction of CO<sub>2</sub> emissions compared to the previous year and a 3% improvement in energy consumption per unit of production. These achievements reflect not only the results of the improvements list below, but also changes in production volumes.

#### Examples of Successful Initiatives

- Improved production efficiency by integrating production lines.
- Better use of lighting and motive energy (e.g., lowering lights to improve brightness of actual work area)
- Installation of inverters on pumps in order to optimize efficiency
- Avoided idling of equipment

### Actual CO<sub>2</sub> Emissions



By these energy saving activities including integration of production processes, we have already achieved our energy-related CO<sub>2</sub> emissions reduction target for the year 2010.

## Waste Reduction Initiatives

### Isuzu's Zero Emissions Target

Isuzu had made it a top priority to achieve the target of reducing waste volume (excluding incineration ash) sent to landfills by 95% compared to fiscal 1995 levels, by the end of fiscal 2001. Led by the Plant Environment Committee, we conducted a wide range of activities at each plant. In fiscal 2001, we were able to successfully reduce the volume of waste sent to landfills by 97.6%, surpassing our original target. This represents an important milestone toward achieving zero emissions. Slogans, approaches and examples used by each plant are reported on page 23. Always seeking further improvements, we set a new goal to reduce landfill waste to less than 1 tonne (including incineration ashes) per month, per plant, by the end of fiscal 2003.

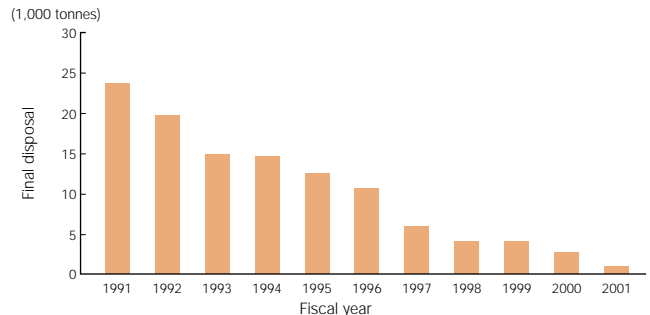
### Reducing Waste and Increasing Resource-Recycling

We have conducted a wide range of initiatives to achieve our goals. These included not only efforts to reduce the generation of waste overall and expand our resource-recycling, but also to involve all workers, to make our efforts and results visible, and to secure cooperation inside and outside the company, as well as other organizational aspects. Efforts such as reducing defective products, cooperating with suppliers (who were requested to help minimize waste), and identifying which departments were generating the most waste, for example, resulted in significant reductions in waste volume. In our efforts to boost resource-recycling, the most important factor was having all workers cooperate to separate waste and recover resources. Dismantling equipment that consists of many parts has enabled us to recycle that type of waste as well. Ideas proposed by employees who came upon ideas from their routine work or at home were useful in establishing waste reduction systems, such as one we started to collect waste in polyethylene buckets. Cooperation, information exchange and technical exchange with waste management businesses and other local companies also played a significant role.

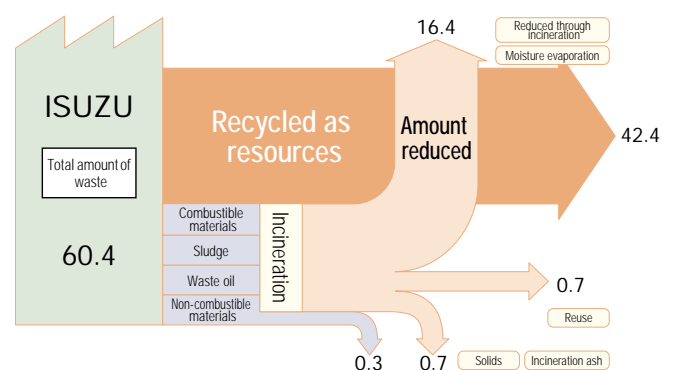
#### Major Initiatives

- Sorted collection and recycling of waste: establishment of recycling centers, establishment of new sorting rules.
- Expansion of resource-recycling by dismantling and disassembling.
- Adoption of polyethylene bucket collection method helped clarify where waste was generated.
- Acting on employees' suggestions led to the development of new equipment to separate oil and water, etc.
- Sharing enthusiasm about zero emissions activities: publishing of "Environmental News," zero emissions reports, etc.
- Cooperation with suppliers: helped reduce waste generated from parts delivery, etc.
- External cooperation: signing "joint environmental declarations" with buyers of waste materials, participation in "Zero Emissions Network."

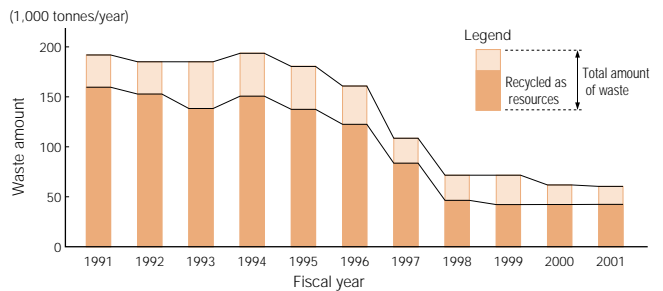
### Reductions in Final Waste Disposal from All Plants



### Waste Treatment and Disposal (fiscal 2001)



### Total Amount of Waste and Recycled Resources



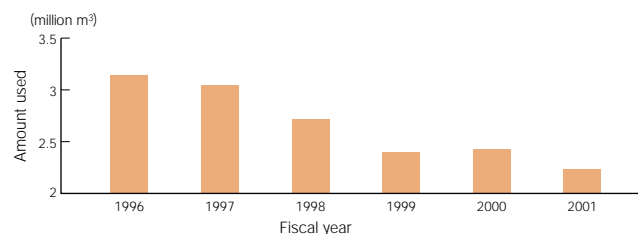
## Conservation of Resources

### Effective Use of Resources

- We spare no efforts to ensure continuous improvement in the effective use of resources, by setting targets that are in line with the introduction of the ISO 14001 environmental management systems in each plant. We have made a device to recovery and reuse cutting lubricant (nicknamed "shishiodoshi") and an oil-water separator to facilitate the reuse of cutting lubricant, hydraulic fluid, and cleansing agents, etc., and to extend their useful lives. As a result, we have significantly reduced the consumption of these resources.
- We are also working to make constant improvements to limit the production of by-products such as metal scrap. We have made steady improvements by reducing defective products due to machining failures, etc., thanks to more precise control of machinery and equipment, and by expanding the use of the "fracturing split method" to eliminate the cutting process and reduce cutting dust.
- We are also working to reduce water consumption, and achieved an 8% reduction in fiscal 2001. Initiatives included lowering the pressure of water

supply used for cleaning by 10%, conserving water by reusing water-soluble cutting lubricant, using rainwater to dilute wastewater that is to be treated, conserving water by recycling water-soluble cutting lubricant, reducing the amount of water wasted in factory cafeterias by improving tap water pipes, and raising awareness using posted messages that urge people to conserve water.

### Water Usage (Total)



# Reducing the Use of Substances with Environmental Impact

## Reducing the Use of Substances with Environmental Impact

More and more, society is calling for a reduction in the use of substances with environmental impact. Isuzu has constructed an integrated system that combines the information from our material purchase management system with that of our PRTR management system, which complies with Japan's PRTR Law,\* to reduce the risks of environmental pollution and damage caused by such substances. With this system, Isuzu is working to monitor, control and reduce the substances covered by the law.

In 1997, we participated in a pilot project sponsored by the then Environment Agency, and also in a survey by the Japan Federation of Economic Organizations, and established our own "Management Regulations on Regulated Substances." With the target substances classified into three grades

**Results of the Fiscal 2001 PRTR Compliance Survey (substances handled in amounts of 5 tonnes or more are listed)** (Unit: kg)

| Name of substance            | Substance number | Amount handled | Amount released |              |      |          |
|------------------------------|------------------|----------------|-----------------|--------------|------|----------|
|                              |                  |                | Air             | Public water | Soil | Landfill |
| Water-soluble zinc compounds | 1                | 20372          | 0               | 0            | 0    | 0        |
| Ethanolamine                 | 16               | 5106           | 0               | 0            | 0    | 0        |
| Ethylbenzene                 | 40               | 19856          | 210             | 0            | 0    | 0        |
| Ethylene glycol              | 43               | 896907         | 50              | 0            | 0    | 0        |
| Xylene (isomer mixture)      | 63               | 696251         | 558300          | 0            | 0    | 0        |
| Toluene                      | 227              | 317896         | 157800          | 0            | 0    | 0        |
| Lead and its compounds       | 230              | 12346          | 0               | 0            | 0    | 0        |
| Nickel compounds             | 232              | 3835           | 0               | 0            | 0    | 0        |
| Benzene                      | 299              | 10363          | 0.34            | 0            | 0    | 0        |
| Manganese and its compounds  | 311              | 10550          | 0               | 0            | 0    | 0        |
| Dioxins                      | 179              | —              | 20.79*          | 0            | 0    | 0        |

\* Unit: mg-TEQ

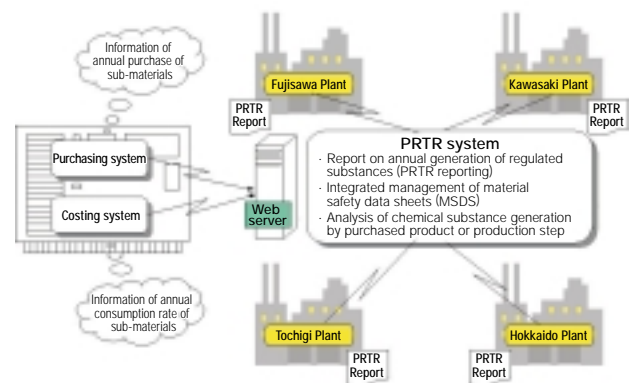
(use prohibited, use conditional, and use with caution acceptable) in the Regulations, we are working to properly manage, control and reduce their use, within the ISO 14001 environmental management system of each plant.

The Fiscal 2001 PRTR Compliance Survey for Isuzu as a whole covered 11 substances. The use of toluene and xylene in the painting process accounts for a major proportion of the chemicals we use, and we are working to reduce their use by improving the recovery rate of cleaning thinner and using paints that require less thinner.

In fiscal 2001, we completely phased-out the use of dichloromethane as a cleaning agent in heat treatment and masking processes and replaced it with an alkaline cleaning agent not covered by the PRTR Law\*. We will make further efforts to reduce our use of PRTR-specified substances.

\* PRTR Law: Law Concerning Reporting, etc., of Releases to the Environment of Specific Chemical Substances and Promotion of the Improvement of Their Management

## Outline of Isuzu's PRTR System

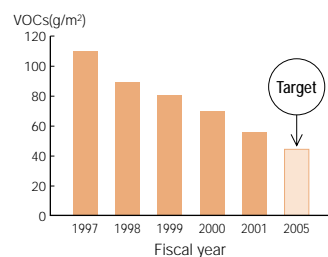


# Preventing Air and Water Pollution

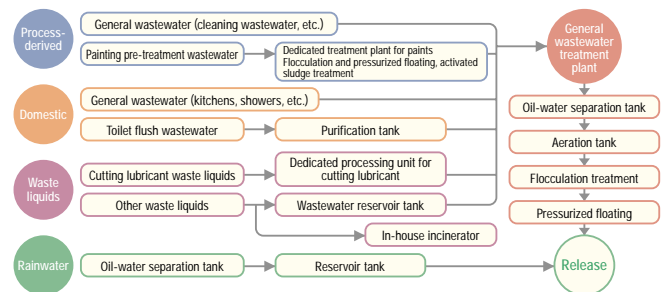
## Reducing the Use of Volatile Organic Compounds (VOCs)

VOCs are substances used in the vehicle body painting process. In fiscal 2001, Isuzu's rate of use was 57g/m<sup>2</sup>, representing a 48% reduction compared to the fiscal 1996 level. Our major efforts for their reduction included an improvement of the cleaning thinner recovery rate (to about 78%). We will work to further reduce VOCs, with a target of achieving 45g/m<sup>2</sup> t by the end of fiscal 2005, by maintaining or improving the thinner recovery rate and introducing paints with reduced solvent.

**Use of VOCs in the Painting Process**



## Wastewater Treatment at the Fujisawa Plant



## Control of Dioxins

Currently three Isuzu plants in Japan are equipped with an incinerator. Two of these will soon be shut down, efforts are being made to reduce the amount of industrial waste generated, and waste treatment will be contracted to outside operators. Although the operation of the incinerator of the Fujisawa Plant will be continued, it has already cleared the emissions regulation standards\* that went into effect in December 2002, and comprehensive efforts are being made at the plant, including equipment improvements, precise control of combustion, and reductions of the amount incinerated.

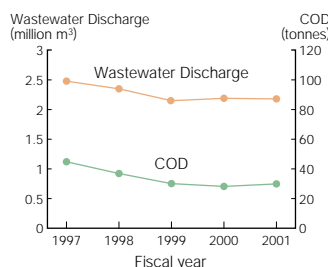
We have also worked to avoid the use of chlorine in cutting lubricant for machining, which is used in large quantities. At the Hokkaido Plant, we have successfully converted to a new type of cutting lubricant that has equivalent cutting performance and comparable cost. For both water-soluble and oil-soluble cutting lubricants, a 100% conversion has been completed at this plant.

\* The actual measured value was 0.17ng-TEQ /m<sup>3</sup> (about 1/60th of the regulatory standard of 10ng-TEQ /m<sup>3</sup>). ng = one billionth of a gram

## Air and Water Pollution Prevention

We have established voluntary targets stricter than the legal regulations to prevent air and water pollution. Under our ISO 14001 environmental management systems, the status of waste management and legal compliance are reported to the Plant Environmental Committee. While working to meet our targets, we are also endeavoring to reduce the use of harmful substances.

**Wastewater Discharge and COD\* Levels**



\* COD: Chemical oxygen demand

## Storage of PCBs

We have submitted reports as required under Japan's PCB Special Measures Law and are storing and handling PCBs in a safe way. At the end of fiscal 2001, Isuzu held a total of 1,674 pieces of equipment containing PCBs, including condensers, transformers and fluorescent light ballast (including some equipment still in use).

# Site Report - Activities at the Tochigi Plant

This report features Isuzu's Tochigi Plant, which specializes in the machining of powertrain parts (mainly axle assemblies) for all of our vehicle models, and the production of engines for light-duty trucks.



**Shu Nakayama**

Plant Manager, Tochigi Plant/General Manager, Powertrain Manufacturing Dept. No. 3

Has been engaged in machining and assembly of engines, transmissions and axles since joining Isuzu. Appointed to current position in October 2001.

### ● Improving Efficiency: Our Key to Environmental Protection

What is the best approach to protect the environment? In the Tochigi Plant, all employees have been engaged in activities to reduce environmental impact by improving production efficiency. Specifically, we have made constant efforts to avoid carrying excess stock and to prevent defective products. Excess stock is inefficient both in cost and storage. A defective product means that the resources and time consumed have been wasted. As a result of concerted efforts, we reduced our stock by 30% from the first half to the last half of fiscal 2001. We lowered the rate of defective products by 70% compared to two years earlier and will work to achieve further reductions.

### ● Initiatives Adapted for Each Plant

The Tochigi Plant features a number of production lines for engines and axle parts. On each line, we have made an effort to ensure that flaws are easily

detected. As a part of these initiatives, we have successfully reduced waste volumes year by year through constant efforts such as integration to standardize and reduce the types of cutting lubricant used and dry machining. Dramatic reductions of environmental impacts do not easily occur on the production line. Improvements cannot be achieved without constant effort, such as through meetings at the start and end of work, as well as the sharing of findings and achievements between personnel. We are achieving significant results by measures such recycling the cutting lubricant and water obtained using moisture- and oil-removal equipment that is based on the principle of "shishi-odoshi" a bamboo faucet found in traditional Japanese gardens.

### ● Plant-Wide Energy Conservation Initiatives

The start of lunch hour is moved later during the summer to 12:30 for the manufacturing division and 12:45 for the clerical division with the cooperation of the labor union at Isuzu. With this time shift, the operation of machine has been reduced during hours of peak power consumption, enabling us to reach an agreement with our power supplier under more favorable conditions, and also contributing to energy conservation in the society.

In manufacturing industries, daily production output inevitably fluctuates day-to-day. With this situa-

tion in mind, we started what we call a "migratory bird production" style. We operate machinery only as long as is necessary to meet decreased production levels, and when that machinery is not needed, the operators move to other production work. Meanwhile, all power for the unused equipment is turned off, including standby power. Another worthwhile effort was lowering the height of lighting to increase the brightness where light is actually needed. Through this, we were able to cut in half the number of fluorescent lamps used. For our future efforts, we will work to reduce the byproducts of manufacturing such as cutting lubricant.



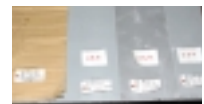
Saving energy by using fewer fluorescent lights



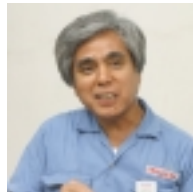
**Shuichi Horie**

Line Manager

We have replaced cardboard boxes with reusable plastic cartons. We have also motivated our suppliers to raise their awareness of environmental conservation by returning unnecessary packing material back to them. Our next goal is to remove all waste bins from our plant. This is just one of the signs that environmental awareness is spreading at the Tochigi Plant.



Plastic reusable boxes



**Nobuhiro Nishigaki**

Manager, Power Unit Maintenance Section/ISO 14001 EMS Management Representative



**Satoru Kobayashi**

Manager, Operation Control Group/ISO 14001 EMS Management Senior Staff

## ■ A Model Site Overseas

### ● Initiatives at Isuzu's Thai Plant

Isuzu's Thai Plant IMCT has a 38-year history and Isuzu has been the top-selling brand of commercial vehicles in the Thai market for 19 consecutive years. Isuzu has earned a good reputation for fuel efficiency and durability, as well as customer- and community-oriented marketing.

In April 2002, we started the production of the all-new D-MAX one-ton pickup truck series, and took the opportunity of the new launch to make this a "clean plant." The facilities obtained ISO 14001 certification in February 2002, two months ahead of schedule. To be a leader of the Thai society, the plant had to become a model for other Thai companies. Our activities included improvements in measures to prevent oil and chemical spills. Examples include raising the floor level at sites that handle chemicals, as a countermeasure against flooding due to the squalls that are common in Thailand, and installation of oil dikes. There are some aspects requiring greater environmental consideration than in Japan. We have also succeeded in halving the amount of sludge from the wastewater treatment plant, reusing treated wastewater to water trees in the plant site, and conserving energy by reducing the amount of electricity and leakage of compressed air supplied from compressors.

We work to maintain good communications with the local community and contribute to society by serving as a coordinator for the recycling activities of companies in the region and providing financial support from the Isuzu Group Fund for primary and middle school students.

For two consecutive years, IMCT received the "Company and Union, Good Relations Award" from the governor of the province of Samutprakan, for having good relations between the company and labor union.



ISO 14001 certificate



IMCT



**Yuji Kosaka**

President, IMCT & IEMT

Primarily engaged in plant quality control and manufacturing. Appointed as manager of the Quality Control Division of the Kawasaki Plant in April 1993. Appointed as executive of the Tochigi Plant in April 1999. Appointed as president of Isuzu Motors Co., (Thailand) Ltd. (IMCT) and Isuzu Engine Manufacturing Co., (Thailand) Ltd. (IEMT) in June 2001.

# Efforts to Achieve Zero Emissions at Each Isuzu Plant

As a result of proactive efforts to move toward zero emissions, in 2001 Isuzu accomplished its goal of reducing the amount of industrial waste (excluding incineration ash) sent to landfills by 95% compared to fiscal 1995 levels, by the end of fiscal 2001, in all domestic plants. The activities of each plant are described below.

## Tochigi Plant

Land area.....1,154,185m<sup>2</sup>  
Green space.....126,272m<sup>2</sup>



### Slogan

Make comprehensive efforts to boost efficiency of Isuzu Manufacturing Management (IMM) activities, to achieve zero emissions, to avoid of processing flaws, and to reduce stock.

"Care for the environment is not an isolated issue. It's a part of product quality. Let's work to achieve zero emissions." This is the approach used at the Tochigi Plant. This plant has a large number of machining lines — about half of industrial waste generated here consists of waste oil and other liquids. Our efforts focused on recycling this waste. "Oil integration" as a part of IMM activities made it possible to recycle the waste cutting lubricant from machining chip processors. This improvement, combined with our development of "shishi-odoshi" and a centrifuge separator led to significant achievements.

### Highlight

Using "shishi-odoshi" and other devices that we have developed, we have been able to recover cutting lubricant and oil that adheres to machining chips, allowing us to reduce the amounts of waste oil and liquid by about 30% compared to fiscal 2000 levels.



This "shishi-odoshi" recovers oil. Devised on the principle of the bamboo faucet found in traditional Japanese gardens.

## Hokkaido Plant

Land area.....1,480,744m<sup>2</sup>  
Green space.....62,154m<sup>2</sup>



### Slogan

The zero emissions challenge—a factory that uses no incinerator.

Because the Hokkaido Plant has no incinerator, we had much difficulty in moving toward the goal of zero emissions. However, concerted efforts helped us meet not only our initial goal, but also a higher goal of waste reduction to one tonne of waste per month. Also important were our proactive efforts, for example, to get waste management companies to understand our desire to recycle, and the signing of a joint environmental declaration with them. These activities were reported in the Tomakomai Minpo and Hokkaido Shimbun newspapers in January 2002.

### Highlight

Using our custom-built "dokan" press, we are able to reduce the moisture content in polishing dust, allowing us to recycle it into steel rods for construction use.



Our custom-built "dokan" press made of earthen pipe and cylinder.

## Fujisawa Plant

Land area.....886,781m<sup>2</sup>  
Green space.....157,310m<sup>2</sup>



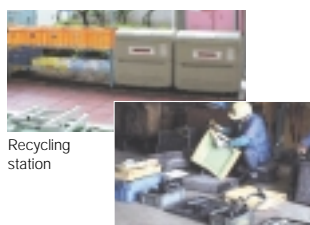
### Slogan

Protect the environment through sorted waste collection!

Our zero emissions project started with an extensive three-month analysis of the situation. The Fujisawa Plant has a large number of departments, so although the total volume of waste was large, it was difficult to determine the actual facts about waste generation and disposal—who, how, and how much? However, it was clear that the waste included a great deal of potential resources, making us confident that thorough sorting and waste collection would produce reusable resources from nearly all waste items. Led by the Recycling Committee with the slogan "Promote Sorted Collection," we made significant improvements.

### Highlight

We promoted recycling by formulating rules for sorting of 22 waste items and by establishing the Recycling Center, with the aims of proper sorting and collection of waste and disassembly or dismantling of items for recycling. We dramatically reduced the volume of waste going to the landfill.



Working at the Recycling Center

## Kawasaki Plant

Land area.....367,829m<sup>2</sup>  
Green space.....20,806m<sup>2</sup>



### Slogan

Boost profits—the zero-waste and reduce-reuse-recycle strategy!

The Recycling Committee was established when we started our zero emissions project. The members created "Project X" for the Kawasaki Plant, whose themes included seeking profitability in environmental initiatives, revising old approaches and methods, and promoting teamwork at the factory to achieve results. We made significant achievements by starting with a survey on the status of waste generation and disposal, and then focusing on waste liquids, miscellaneous garbage and waste wood, which account for the majority of the waste treatment expenditures at the plant.

### Highlight

Using plastic buckets for waste collection has helped clarify amounts of waste generated by type and by department, helping us to reduce waste by 30 to 40%. We have also saved on the cost of garbage bags.



Waste collection by garbage compressor truck, similar to the type used for household garbage.

# Environmental Data by Plant

Following table shows the air and water quality data for each plant and a comparison to regulated standards.

## ● Tochigi Plant

### Air Quality

| Item                                   | Equipment                               | Regulated standard | Actual measurement |         |
|--|---|--------------------|--------------------|---------|
|  |   |                    | Maximum            | Average |
| NOx<br>(ppm)                           | Boiler                                  | 230                | 91.2               | 76.2    |
|  | Metal furnace                           | 200                | 133.0              | 133.0   |
| Dust and soot<br>(mg/Nm <sup>3</sup> ) | Boiler                                  | 250                | 15.0               | 8.0     |
|  | Metal furnace                           | 200                | 17.0               | 10.5    |
|  | Incinerator                             | 250                | 95.0               | 74.0    |
| SOx(Nm <sup>3</sup> /h)                | (Regulated standard on total emissions) | 17.5/K             | 1.8                | 1.15    |

## ● Hokkaido Plant

### Air Quality

| Item                        | Equipment                               | Regulated standard                           | Actual measurement |         |
|-----------------------------|---|--|--------------------|---------|
|                             |   |  | Maximum            | Average |
| NOx<br>(Nm <sup>3</sup> /h) | GUH                                     | Regulated standard on total emissions<br>6.3 | 1.13               | 0.067   |
|                             | Boilers                                 |  |                    |         |
|                             | Nitride heat treatment furnace          |  |                    |         |
|                             | Aluminum-smelting furnace               |  |                    |         |
|                             | Aluminum heat-treatment furnace         |  |                    |         |
| Dust and soot<br>(kg/h)     | GUH                                     | Regulated standard on total emissions<br>3.5 | 0.21               | 0.011   |
|                             | Boilers                                 |  |                    |         |
|                             | Nitride heat treatment furnace          |  |                    |         |
|                             | Aluminum-smelting furnace               |  |                    |         |
|                             | Aluminum heat-treatment furnace         |  |                    |         |
| SOx(Nm <sup>3</sup> /h)     | (Regulated standard on total emissions) | 2.6  | 0.034              | 0.002   |

## ● Fujisawa Plant

### Air Quality

| Item         | Equipment                                    | Regulated standard                      | Actual measurement |         |
|--------------|--|---|--------------------|---------|
|              |  |   | Maximum            | Average |
| NOx<br>(ppm) | Boiler                                       | 125                                     | 100                | 100     |
|              | Cogeneration system                          | 50                                      | 49                 | 49      |
|              | Incinerator                                  | 150                                     | 73                 | 73      |
|              | Heat treatment furnace (continuous gas feed) | 200                                     | 110                | 110     |
|              | Aluminum melting furnace                     | 200                                     | 36                 | 32      |
|              | 3rd painting (drying furnace)                | 230                                     | 22                 | 21      |
|              | 4th painting (drying furnace)                | 230                                     | 24                 | 24      |
|              | SOx(Nm <sup>3</sup> /h)                      | (Regulated standard on total emissions) | 21.82              | 1.6     |

## ● Kawasaki Plant

### Air Quality

| Item                                   | Equipment                               | Regulated standard | Actual measurement |         |
|--|---|--------------------|--------------------|---------|
|  |   |                    | Maximum            | Average |
| NOx<br>(ppm)                           | Boiler                                  | 150                | 100                | 62      |
|  | Air conditioner                         | 105                | 48                 | 37      |
|  | Unit heater                             | 150                | 45                 | 42      |
|  | Metal oven                              | 200                | 17                 | 14      |
| Dust and soot<br>(mg/Nm <sup>3</sup> ) | Boiler                                  | 100                | 10                 | 10      |
|  | Unit heater                             | 150                | 20                 | 15      |
|  | Metal oven                              | 200                | 27                 | 10      |
| SOx(Nm <sup>3</sup> /h)                | (Regulated standard on total emissions) | 2.9                | -                  | -       |

### Water Quality

| Item                        | Regulated standard | Actual measurement |         |         |
|-----------------------------|--------------------|--------------------|---------|---------|
|                             |                    | Maximum            | Minimum | Average |
| pH                          | 5.8-8.6            | 7.6                | 6.8     | 7.3     |
| COD (mg/l)                  | Max 25, average 20 | 16.0               | 5.2     | 9.9     |
| BOD (mg/l)                  | Max 25, average 20 | 8.6                | 1.7     | 3.8     |
| SS (mg/l)                   | Max 50, average 40 | 14.0               | 1.6     | 11.7    |
| Oil content (mg/dl)         | 5                  | ≤1.0               | ≤1.0    | ≤1.0    |
| Copper content (mg/l)       | 3                  | 0.05               | 0.05    | 0.05    |
| Zinc content (mg/l)         | 5                  | 0.6                | 0.05    | 0.15    |
| Soluble iron content (mg/l) | 3                  | 0.12               | 0.01    | 0.08    |
| Accidents                   | None               |                    |         |         |
| Complaints                  | None               |                    |         |         |

### Water Quality

| Item               | Regulated standard | Actual measurement |         |         |
|--------------------|--------------------|--------------------|---------|---------|
|                    |                    | Maximum            | Minimum | Average |
| pH                 | 6-8                | 7.6                | 6.8     | 7.2     |
| COD (mg/l)         | 50                 | 23.0               | 7.4     | 15.7    |
| BOD (mg/l)         | 50                 | 7.3                | ≤0.5    | 2.5     |
| SS (mg/l)          | 50                 | 7.0                | 1.0     | 3.0     |
| Oil content (mg/l) | 4                  | 1.0                | ≤0.5    | 0.6     |
| Accidents          | None               |                    |         |         |
| Complaints         | None               |                    |         |         |

### Water Quality

| Item                        | Regulated standard | Actual measurement |         |         |
|-----------------------------|--------------------|--------------------|---------|---------|
|                             |                    | Maximum            | Minimum | Average |
| pH                          | 5.8-8.6            | 7.9                | 7.1     | 7.7     |
| COD (mg/l)                  | 60                 | 23.0               | 9.0     | 15.3    |
| BOD (mg/l)                  | 60                 | 14.0               | 5.0     | 8.2     |
| SS (mg/l)                   | 90                 | 12.0               | ≤5.0    | 5.6     |
| Oil content (mg/dl)         | 5                  | 2.0                | 1.0     | 1.2     |
| Copper content (mg/l)       | 3                  | ≤0.05              | ≤0.05   | ≤0.05   |
| Zinc content (mg/l)         | 3                  | ≤0.1               | ≤0.1    | ≤0.1    |
| Soluble iron content (mg/l) | 10                 | ≤0.5               | ≤0.5    | ≤0.5    |
| Accidents                   | None               |                    |         |         |
| Complaints                  | None               |                    |         |         |

### Water Quality

| Item                        | Regulated standard                            | Actual measurement   |                                |                |                        |
|-----------------------------|---|--|--------------------------------|----------------|------------------------|
|                             |   | Maximum  | Minimum                        | Average        |                        |
| pH                          | 5.8-8.6                                       | 7.7  | 6.3                            | 6.9            |                        |
| COD (mg/l)                  | 60  | 8.8  | 5.0                            | 5.7            |                        |
| BOD (mg/l)                  | 60  | 8.1  | 5.0                            | 5.5            |                        |
| SS (mg/l)                   | 90  | 15   | 5.0                            | 8.7            |                        |
| Oil content (mg/dl)         | 5   | 4.5  | ≤1.0                           | 1.2            |                        |
| Copper content (mg/l)       | 3   | 0.05   | 0.05                           | 0.05           |                        |
| Zinc content (mg/l)         | 3   | 0.1  | 0.1                            | 0.1            |                        |
| Soluble iron content (mg/l) | 10  | 0.5  | 0.5                            | 0.5            |                        |
| Accidents                   | Description                                   | Responses  | Prevention                     | Date           | Penalties, fines, etc. |
|                             | Discharge of small amount of scum in effluent | Reconsider of work procedures and inspections                  | Installed alarm                | April 2001     | None                   |
| Complaints                  | Poor combustion in carbonization furnace      | Reconsideration of standard operating procedures and education | Installed reserve oxygen meter | September 2001 | None                   |
|                             | None  |  |                                |                |                        |

Notes 1. Data for fiscal 2001 (April 2001 to March 2002).

2. Standards shown are the strictest among those stipulated by environmental laws, ordinances, or pollution prevention agreements.

3. COD: Chemical oxygen demand BOD: Biochemical oxygen demand SS: Density of suspended solids in water

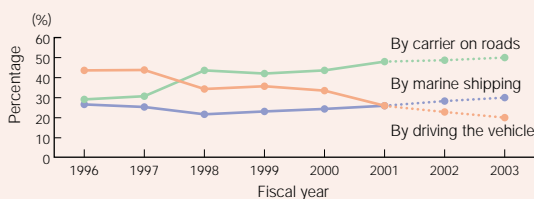
# Logistics, Distribution, and Environmental Accounting

## Logistics

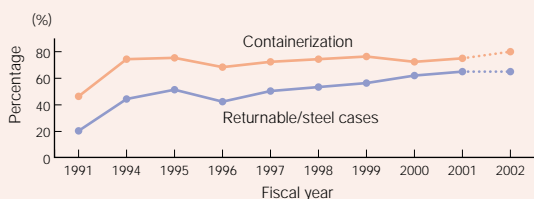
### Rationalizing Our Products and Procurement Logistics

To reduce the emissions and energy consumption that arise when we deliver our vehicles to the market, we are shifting away from the past practice of driving the actual vehicle, in favor of using car and truck carriers, as well as ocean transport by ship. In fiscal 2002, as a result of improving our coordination with sales companies and making logistics more systematic, we were able to increase the percentage of deliveries sent by vehicle carrier and by ship. To transport components for local production overseas, we are increasing containerization and the use steel cases to reduce the need for packaging and packing materials made from wood. In fiscal 2001, we promoted a complete shift to such returnable cases for deliveries to Asia and Africa. We are now focusing on in South America. A 100% shift to containerization and steel cases is expected for these remaining destinations during fiscal 2002.

### Vehicle Deliveries: Changes in Transport Modes Used by Isuzu in Japan



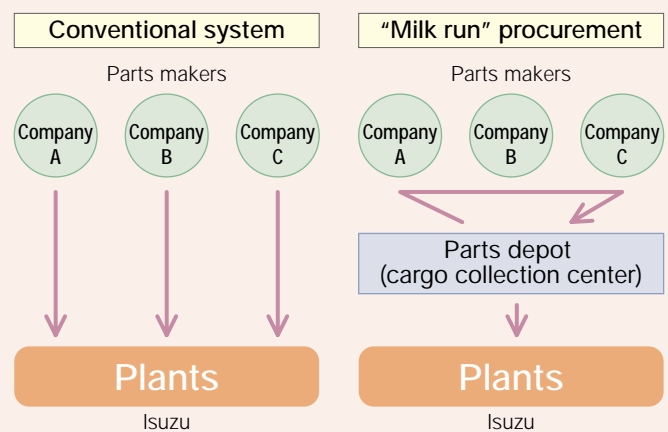
### Packaging Materials



### Improving Procurement Logistics

Isuzu became Japan's first vehicle manufacturer to introduce a full-scale "milk run" system for procurement logistics. In the milk run system, Isuzu, as the parts purchaser, collects cargoes using its own fleet of trucks, instead of having the parts manufacturer deliver the parts. This system improves the cargo loading efficiency for delivery vehicles and enables efficient control of the number of vehicles used, thus significantly reducing exhaust emissions and energy consumption. We have steadily expanded the milk run system since its introduction in 1995. Today, 90% of the parts manufacturers not constrained by geography are covered by this system. In addition, Isuzu LINEX Corporation, an Isuzu's subsidiary company of transport, makes parts deliveries to other vehicle manufacturers, a task previously done by parts manufacturers using the same trucks as those for parts delivery to Isuzu. These changes have raised the efficiency of our logistics system.

### Isuzu's "Milk Run" Procurement System



## Environmental Accounting

### Environmental Accounting for Fiscal 2001

Environmental accounting, which provides data on costs and benefits of activities, offers important indicators to help promote effective and sustainable activities to protect the environment as well as business operations. Isuzu uses environmental accounting as a tool to provide information about our environmental activities to customers and shareholders through Isuzu Environmental Reports, and to assist management decisions that will help us accomplish our environmental objectives and goals. As a next step, we will work to improve the accuracy of environmental accounting, the range of effects covered by reporting, balance between costs and physical effects, and information disclosure.

In fiscal 2001, the total expenditures for environmental protection remained

almost unchanged from the previous year. More than 90% of the energy consumption over the entire life cycle of a vehicle, especially trucks, is consumed during actual use of the vehicle. Aware of this, to reduce the burden on the environment, Isuzu has made the largest proportion of these expenditures for product research and development, including development of the new ELF light-duty trucks. Thanks to this focus, these trucks were able to comply with tough new exhaust emission regulations well before they come into effect in 2003. As in the previous year, environmental effects were quantified using only tangible data about the manufacturing process. In the category of waste reduction, we accomplished our target for zero emissions (see page 20), resulting in a significant reduction in waste treatment costs.

### Costs for Environmental Protection in Fiscal 2001

(Units: million yen)

| Category                                 | Description of major efforts  | Amount |
|--|---|--------|
| 1) Business area costs                   |   |        |
| 1. Pollution prevention                  | Reduction of volatile organic compounds (VOCs), etc.  | 161    |
| 2. Global environmental protection       | Compressor overhaul, etc.   | 23     |
| 3. Resource circulation                  | Investment for waste disposal and zero emission efforts, etc.   | 386    |
| 2) Upstream/downstream costs             | Dismantling research, purchasing of returnable racks, etc.  | 117    |
| 3) Management activity costs             | ISO 14001 certification renewal, environmental education, personnel costs, etc.   | 265    |
| 4) Research and development costs        | Research and development of products with reduced environmental impact, early compliance with new short-term exhaust emission regulations | 25,181 |
| 5) Social activity costs                 | Social contributions, support of environmental activities, etc.   | 299    |
| 6) Environmental damage costs            | Reserves for environmental, litigation costs, etc.  | 81     |
| Total costs for environmental protection |   | 26,513 |

### Effects of Environmental Protection in Fiscal 2001

(Units: million yen)

| Cost Reduction Effects  |                       |
|---|-----------------------|
| Cost reduction by energy conservation                                 | 139                   |
| Reduction in waste treatment costs                                    | 169                   |
| Reduction in tap water, sewage water and industrial water consumption | 18                    |
| <b>Total</b>  | <b>326</b>            |
| Physical Effects  |                       |
| CO <sub>2</sub> emissions   | 58,000 tonnes         |
| Waste disposal  | 1,610 tonnes          |
| Water consumption   | 200,000m <sup>3</sup> |

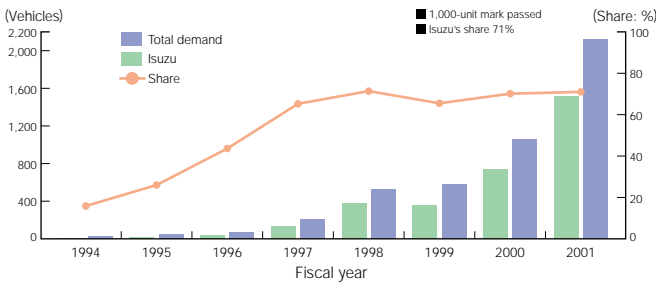
## Distribution and Services

### Initiatives for Environmentally Sound Distribution and Services

#### Expanding clean energy vehicles

Regarding the sales of environmentally friendly vehicles, each year we find that interest is growing in not only diesel-powered low pollution vehicles, but also in CNG-powered vehicles for city transport. Isuzu has started line production of the CNG-powered ELF and FORWARD series of trucks in response to growing demand, and has been working to reduce their prices for further expansion. Isuzu has enhanced the product lineup and marketability by applying to CNG vehicles the cutting-edge technologies that we have cultivated over many years with diesel engines, thus steadily increasing sales.

#### The CNG-powered ELF—New Vehicles Registrations

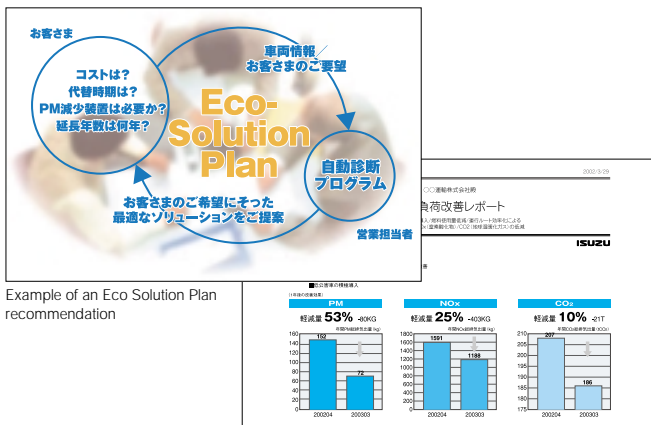


#### Suggestions to Users for Vehicles Now in Use to Meet Exhaust Emission Standards

Isuzu has launched what we call "Eco Solution Plan," a free service that uses an automatic diagnostic program to suggest measures that could be taken to help a vehicle comply with exhaust emission regulations, and to also conduct an "environmental impact simulation."

To help customers comply with regulations stipulated by Japan's Automobile NOx/PM Law and local governmental regulations such as the Tokyo Metropolitan Ordinance on Environmental Preservation, we provide them with a summary of recommendations on a vehicle-by-vehicle basis about the most appropriate action to take, its optimal timing and cost. The recommendation is one of four possible options: (1) no action, (2) installation of a diesel particulate filter (DPF) system, (3) installation of an oxidation catalyst, and (4) purchase of a new vehicle that conforms with current exhaust emission regulations or with the new regulations that take effect in 2003 (only ELF-KR available on the market at present). Through this service, we support our customers involved in transportation or other businesses in planning their own measures to comply with exhaust emission regulations.

We also conduct simulations for customers of ways to reduce NOx, PM and CO<sub>2</sub> emissions, and help them prepare plans on how to reduce their environmental impacts.



Example of a report on how to reduce environmental impacts

#### Driver Training to Improve Fuel Efficiency

Fuel efficiency fluctuates considerably depending on how a vehicle is driven. Aware of this fact, Isuzu has sponsored the "Economy and Quality Driving School" (formerly called Economy and Safety Driving School) since 1996, in order to promote fuel-efficient driving. In fiscal 2001, 658 participants joined the sessions, and the cumulative total since 1996 is 15,980.

#### Next-Generation Driving Diagnostic System

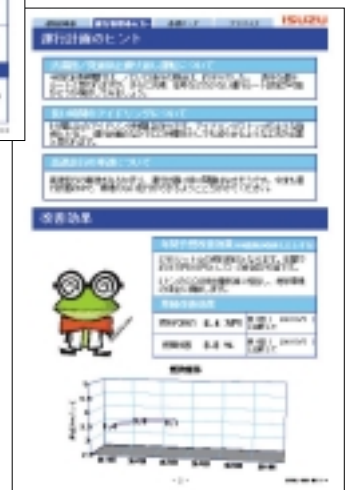
In January 2002, we started the operation of the "Mimamori-Kun" vehicle diagnostic system for the GIGA heavy-duty truck series. A range of driving data is collected by on-board monitoring equipment, and then analyzed in order to provide diagnostic information and recommend appropriate ways to reduce fuel consumption and drive more safely. It is done on a vehicle-by-vehicle basis. This system was operating on about 250 GIGA-series trucks at the end of July 2002. More than half of the customers reported an average reduction of 15% in fuel consumption.

In August 2002, "Mimamori-Kun" was improved to enable data analysis and diagnosis not only for individual vehicles, but also individual drivers or driving conditions. We are working now to increase the number of vehicles covered by this system.

#### Driving diagnostic report



#### Driving plan suggestions and predicted impacts



#### CNG Station Installation Plan

We are planning to install a compressed natural gas filling station by the end of fiscal 2002, at a location in Isuzu's Fujisawa Plant that faces the public road. The station will also supply CNG to the general public.

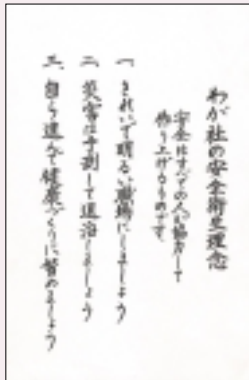


# Community and Social Relations

## Workplace Safety and Health

### Basic Policy: Creating Safe and Pleasant Workplaces

Isuzu aims to make its workplaces accident-free, safe and pleasant. Our philosophy is that "Safety Depends on Everyone's Cooperation." Our focus is accident-prevention, and our main messages to personnel are "Prevent Industrial Accidents, Traffic Accidents and Fires," "Improve the Work Environment" and "Promote Health." To prevent industrial accidents we pay particular attention to learning from case study of similar incidents, and promoting thorough safety awareness.



Isuzu's safety and health philosophy

### Key Issues and Actual Efforts

| Key Issues                          | Actual efforts  |
|-------------------------------------|---|
| Prevention of industrial accidents  | <ul style="list-style-type: none"> <li>Observing safety rules and follow-up by management</li> <li>Raising awareness about non-routine operations</li> <li>Ensuring safety during long consecutive holidays</li> <li>Providing safety instructions for operation of in-plant vehicles</li> <li>Reporting manufacturing equipment accident cases to all employees, and sharing information on preventive measures</li> </ul> |
| Prevention of fires                 | <ul style="list-style-type: none"> <li>Strengthening of painting plant management system and "buddy" patrols</li> <li>Making company-wide improvements based on lessons from past fire incidents</li> <li>Review warning signs posted at facilities where dangerous substances are stored</li> </ul>  |
| Improving the workplace environment | <ul style="list-style-type: none"> <li>Implementing environmental assessments and improvements when starting operation of newly installed or moved production lines</li> <li>Systematic implementation of suggestions from workplaces</li> </ul>  |
| Prevention of traffic accidents     | <ul style="list-style-type: none"> <li>Reporting of traffic accidents to all employees, and sharing information on preventive measures</li> <li>Providing a variety of traffic safety education</li> <li>Conducting seatbelt checks and patrolling employee parking lots</li> </ul>   |
| Promotion of employee health        | <ul style="list-style-type: none"> <li>Promoting physical and mental health programs, medical check-ups, and health guidance programs</li> <li>Ongoing implementation of the "Total Health Promotion Plan 35" for 35-year olds</li> </ul>   |

### Preventing Traffic Accidents

Isuzu's efforts to promote traffic safety include showing traffic safety films, which 10,820 employees have already participated in total, and providing traffic safety education for new employees. Other awareness-raising activities conducted throughout the year include seatbelt checks, patrols of employees parking lots, providing safe route maps for commuters, offering drills for bicycle and motorcyclists, and distribution of traffic safety pamphlets.

### Promoting Total Health

We have not only developed health management programs to ensure fulfilling lives for our own employees, and but also have offered a seminar entitled "Caregiving Techniques From Morning to Bedtime" for employees and their families. The objective of the seminar is to provide guidance and drills for family members who provide or may someday need to provide home care, so that the care recipient can avoid becoming bedridden. Lectures include basic knowledge about home care, followed by actual practice, including meals, dressing, hygienic care, and bedsores prevention. Finally, guidance on health management for the caregiver is provided. This seminar was highly appreciated by the participants, all of whom wanted to have the program continued.

### Activities of the Health Promotion Center

| Total health promotion                   |                     | Particulars and implementation  |
|--|---------------------|---|
| Prevention of lifestyle-related diseases | Seminars            | Diabetes, hypertension, osteoporosis, obesity prevention, hyperlipemia, dental health, cooking seminar, THP35, lecture meetings (11 events during the year) |
| Lifestyle improvement                    | "Challenge courses" | No-smoking, exercise, dietary life, and no alcohol days (each event once each year)   |
| Life plan                                | Seminars            | May, July, October, December 2001, February 2002 (5 events during the year)   |
| Mental health                            | Counseling, etc.    | Counseling and telephone advise available throughout the year   |
| Caregiving classes                       | Seminars            | March 2002  |
| Recreational activities                  | Hiking              | Nearly every month (10 times during the year)   |



"From Morning to Bedtime" Caregiving Seminar



Hiking at Hakone in September 2001

### Employees' Voluntary Activities: USE21

Workers of the product development department have organized the USE21 voluntary working group and are actively working in different subgroups. The Fire Prevention Subgroup holds first-aid lectures and drills at the Disaster Prevention Center. The Traffic Safety Subgroup holds safe-driving lectures. The Industrial Accident Prevention Subgroup offers a variety of educational programs with lectures and drills, including vehicle crash tests and trainings for risk-prediction. These activities are making significant contributions to the prevention of industrial accidents and also to help newly recruited employees adapt to the workplace.



USE21 first-aid class

## Employee Awareness-Raising /Personnel Management

### Employee Awareness-Raising

#### Environmental Education Programs for Employees

Isuzu is actively providing its employees basic training on environmental issues and Isuzu's environmental efforts in order to increase their awareness and motivation for action. The training is provided on many occasions, including when employees join the company and later are promoted, and at various levels in the organization. In addition, all employees receive special training on environmental management systems, and in-house courses are available to selected employees of the 44 companies that have their workers at Isuzu plants. Our company newsletter, the "Isuzu Shimbun," carries a special report on the year's environmental activities, in the environment month edition each June. In fiscal 2001, the newsletter began a series of articles entitled "A Look at World of Diesel Engines," in order to promote the proper understanding of diesel engines among employees let them know about how diesel engines are at work overseas, including Antarctica. In fiscal 2002, we launched the "Spirit-Up Campaign" to encourage the active involvement of all employees in environmental activities. To boost employee awareness, we created "Why We Make Diesel Engines" posters that explain the advantages of diesel engines, the core of Isuzu's business, from the viewpoint of the global environment.



"Why We Make Diesel Engines"



"Firing Up the Pioneer Spirit"

#### Events surrounding Environment Month

| Event  | Description   | Audience   |
|--|---|--|
| Company newsletter (monthly)                 | Activity reporting in "Isuzu Shimbun"   | All employees  |
| First-aid drills                             | Lectures and drills for cardio-pulmonary resuscitation, stopping bleeding, etc.   | Factory workers  |
| 18th "Asunaro" (For a Better Future) Seminar | Discussion on life planning, self-education, health, etc.   | Middle- and advanced-age employees and their families in the Hokkaido area |
| In-house awards                              | In response to an idea competition, awards were presented for 20 excellent environmental suggestions out of 400 received.   | Kawasaki Plant   |
|  | Award to the plant manager making the top environmental contribution  | Hokkaido Plant   |
| Issuance of environmental booklet            | Environmental booklet entitled "Diesel Seminar" is published to raise employee awareness and promote communications with customers  | Customers, all employees and their families                                |
| Plant newsletters                            | "Environmental News" is distributed to workplaces to share environmental awareness at all plants.   | All employees  |
| Environmental education for new employees    | Environmental education by the Global Environment Committee and the ISO compliance offices of all plants  | New employees  |
| Clean-up and beautification campaigns        | Cleaning around plants, "Full-with-Flower" campaign, participation in tree-planting festival, aluminum can collection and donation to welfare center for people with disabilities | Volunteers at each plant   |
| Energy and resource conservation at plants   | Power saving activities and energy conservation patrols   | Company headquarters and all plants  |

#### Efforts to Promote Sorted Waste Collection and Achieve Zero Emissions

Of all the activities conducted to help us toward our goal of zero emissions, efforts to promote sorted waste collection have contributed the most to raising the environmental awareness of our employees. New rules for waste collection were established to increase recycling at each plant, with the number of waste categories increased from just over 10 to a total of 22. Each employee was given a full explanation to ensure his or her understanding of the new rules. Periodic checks and feedback on implementation of the rules helped to boost their awareness and cooperation.

### Personnel Management

#### Our Approach to Personnel Management

A company is really its people. We cannot contribute to society by providing products and services that satisfy our customers unless the workers who make them are top-notch. Aware that human resources are our most important asset, Isuzu has worked to develop a company-wide employee education system that complies with ISO/OS9000\* standards. Technical education and language training are provided for newly recruited employees and for personnel at all levels, with an emphasis on each employee's motivation and personal development. We are also working to nurture the skills needed to meet the demands of manufacturing at production sites. Leaders have been appointed to be in charge of basic and higher skills training in the Manufacturing as well as Engineering Divisions. They work to help employees acquire and improve basic skills with a skills testing system, and to organize programs for transferring skills from highly-skilled employees to others.

#### Gender Equity

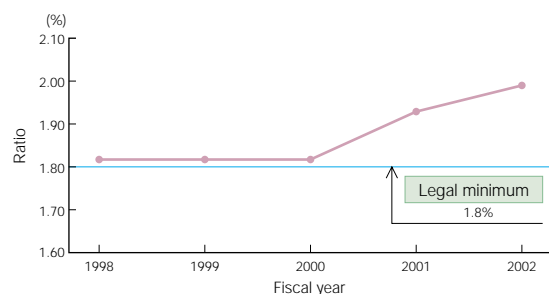
Isuzu has no gender inequity in recruiting, training and treatment of employees. As of May 2002, Isuzu has 513 female employees, including those in managerial positions and posts overseas. Isuzu will continue to actively recruit women to help us meet the demands of a globalizing society.

#### Creating an Accessible Workplace for Seniors and Persons with Disabilities

The Isuzu Charter on the Global Environment encourages active participation in society and in environmental preservation as a citizen of this planet. This philosophy also includes the concept of "normalization," or providing support so that elderly and persons with disabilities are able to participate actively in society. Isuzu employs disabled persons on a regular basis, and during the past five years their proportion of employees has exceeded the legally-required level of 1.8%. Isuzu also supports an internship system by a school for the deaf by accepting one or two students for workplace experience, for about one week every August. Isuzu is working to help disabled employees work in the company on a long-term basis, mainly by on-the-job training programs. In 2001, one Isuzu employee received the Tokyo Governor's Award for workers who have disabilities and work in long-term employment, and two received the Excellent Worker's Award in 2001. We will continue our efforts to ensure that our workplace environment is friendly for employees physically and mentally.

\* QS9000: Quality control system requirements for suppliers of vehicle components and materials

#### Employment Ratio of Persons with Disabilities



## Environmental Communication

### Information Disclosure

#### Providing Information through Environmental Reporting

Isuzu started publishing environmental reports in 1999 to help people to understand our initiatives to address environmental issues. We were Japan's first commercial vehicle manufacturer to publish such reports, and the fiscal 2001 edition was our third such report. We distribute copies at seminars, lectures, and environmental events organized by Isuzu as well as other occasions, in order to provide this information to as many people as possible.

*Fiscal 1999 4,500 copies in Japanese*

*Fiscal 2000 6,300 copies in Japanese, 750 copies in English*

*Fiscal 2001 5,250 copies in Japanese, 950 copies in English*

#### Isuzu Corporate Website

Our website provides past issues of our environmental reports as well as other information.

Isuzu Environmental Report

[www.isuzu.co.jp/company/eco/2002\\_en](http://www.isuzu.co.jp/company/eco/2002_en)

Environmental information on each vehicle line

[www.isuzu.co.jp/cv/env\\_info/car](http://www.isuzu.co.jp/cv/env_info/car) (in Japanese)

Listing and actual shipments of vehicles complying with Japan's Green Purchasing Law

[www.isuzu.co.jp/cv/env\\_info/green](http://www.isuzu.co.jp/cv/env_info/green) (in Japanese)

"Diesel Seminar," which provides information about diesel engines

[www.isuzu.co.jp/semi](http://www.isuzu.co.jp/semi) (in Japanese)

#### Educational Booklets

We have revised and published a series of "Diesel Seminar" booklets, which aim to promote a better understanding of diesel engines among the general public. In response to good reviews, an additional 10,000 copies were printed. In fiscal 2001, we also published "ISUZU Clean Diesel Engines" in English, based on the Japanese version of "For the Better Understanding of Diesel," to promote awareness about diesel engines as they become more popular worldwide. We also update and publish "What's CNG?" in Japanese every year to answer questions about CNG-powered vehicles.



Diesel Seminar

What's CNG?

ISUZU Clean Diesel Engines

### Providing Speakers, Participating in Events

Isuzu sponsors various environmental seminars and lectures, and provides speakers, for our customers, suppliers, media, the public and students of elementary, middle and high schools. We also welcome interviewers and others seeking information, and participate in a range of events and exhibitions. In March 2002, the thirty-third assembly of the Natural Gas Vehicle Forum, sponsored by the Japan Natural Gas Association, was held at the Isuzu Headquarters with the participation of 200 people.



Natural Gas Vehicle Forum



Eco-Car World exhibit



ENEX2002



Environmental Fair of Fujisawa City

### Networking for Local Environmental Conservation

In September 2001, the Tomakomai Zero Emissions Network was established by Isuzu and seven other environmentally conscious companies in the Tomakomai area in order to exchange information and technology concerning zero emissions activities. Isuzu is actively working as one of the core members to help the community become a recycling-oriented one.

### Transportation Flow Experiment

Isuzu participated in a transportation flow experiment, proposed by the government of Fujisawa City to help find ways to reduce traffic congestion and conserve energy. Its objectives were to lessen traffic jams by smoothing flows and motivating vehicle users to take public transportation. It included three experiments: park-and-ride, car-sharing, and ride-sharing. Isuzu provided five passenger cars at no charge for ride-sharing, and installed parking and charging equipment for three electric vehicles. Some employees also participated in the testing.



Electric vehicle parking and charging equipment

## Contributions to Society

### Clean-Ups Around Factories

Isuzu conducts voluntary clean-up activities around our corporate headquarters and factories. The Hokkaido and Tochigi plants have large-scale clean-ups once or twice every year. The corporate headquarters, Kawasaki Plant and Fujisawa Plant have small-scale clean-ups between one and three times every month. In the October 2001 clean-up at the Hokkaido Plant, 29 bags of litter were collected, as well as large waste items such as cooler boxes. In May, a total of 1,870 Fujisawa Plant employees and their family members gathered for an annual volunteer clean-up at Shonan Beach, with a dragnet fishing and beach cleaning event.



Isuzu headquarters



Tochigi Plant



Shonan Beach

#### Major Clean-up Activities

| Plant                  | Activities   |
|------------------------|--|
| Hokkaido Plant         | Surrounding area (April and October)   |
| Fujisawa Plant         | Surrounding area (twice every month)<br>Area surrounding nearby railway station (bimonthly)<br>Volunteer beach clean-up (May), joined by 1,870 employees or their families |
| Corporate headquarters | Nearby park (monthly), joined by retired employees   |
| Tochigi Plant          | Clean-up of surrounding area (July), joined by 120 employees   |
| Kawasaki Plant         | Surrounding area and commuter roads (once or twice every month)  |

### Cooperating with Tree-Planting

Isuzu is cooperating with local tree-planting programs, to promote its involvement in local communities. In May 2001, the Hokkai Plant participated in the Tomakomai City Tree Planting Festival and planted 60 tall 15-year-old cherry trees in Nishiki Onuma Park. In the same year, 50,000 trees and shrubs were planted on 400,000 square meters at the Hokkaido Plant, to absorb carbon dioxide and promote local greenery.



Tomakomai City Tree Planting Festival

### Support for National South Pole Expeditions

Isuzu has provided its engineers to support national observational expeditions at the South Pole, since the first expedition by Japan in 1956 until the forty-third expedition this year. Through this, Isuzu has supported or cooperated in observations of the global environment, including the ozone hole and global warming. This year, our engineers are devoted themselves to starting a cogeneration system powered by an Isuzu diesel engine, in order to restore activities at Dome Station, which had been out of operation for five years.

### Overseas Contributions

Isuzu also works overseas to make contributions to society.

- In support of the restoration activities after the September 11, 2001 terrorist attacks in the United States, Isuzu's North American subsidiary made a donation to the American Red Cross, and provided vehicles at no charge.
- At the February 2002 Winter Olympic Games in Salt Lake City, Isuzu provided vehicles on the request of the Canadian national team. They were used to provide transportation for the skating team, which turned in excellent results as the world's fastest skaters.
- Isuzu donated a pickup truck to the Sisters of Saint Mary in the Democratic Republic of Congo (formerly Zaire) in April 2001 via the Lectures in Support of Overseas Japanese Missionaries' Activities,\* a non-governmental organization represented by novelist Ayako Sono. This truck will help in the transport of food and medicine, as well as people needing medical care.

\* A non-governmental organization operating in African and South American villages to provide various programs such as literacy education, treatment of endemic diseases, and provision of meals for children suffering from malnutrition.

## Afterword

### Improvements in Response to Readers' Comments in Last Year's Report

We toiled to finish our editorial work on this environmental report amid the sweltering heat of the summer of 2002, weather that forces us to wonder if global warming is indeed accelerating.

Here is some of the progress on points raised in the readers' comments in last year's report. Regarding waste reduction efforts, we accomplished our target on the way to zero emissions. The specific activities of each plant are shown on page 23. With regard to rationalizing our logistics operations, please see the description of the Isuzu "Milk Run" system for parts procurement on page 25, as an example of our activities. Now three years after introducing our environmental accounting system, we increased our budget for environmental research and development in order to improve the environ-

mental performance of our vehicles, despite a reduction of annual sales by more than 8% compared to the previous year. As a result, we were able to successfully launch light duty trucks equipped with clean diesel engines, making these the first vehicles in Japan that meet tough new exhaust emission regulations becoming effective in 2005. This achievement gives us great pleasure, as a company and as individuals working for the protection of the environment

It is our corporate commitment to make further efforts toward a sustainable society, by seeking to further reduce the environmental impacts of diesel engines, which we believe have the potential to achieve even greater environmental performance. We value your comments and suggestions, and will use them to help us continue evolving as a company.



#### Eco Planning Group, Public Relations Department

Members: Shuko Takahashi  
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**ISUZU**

**Cover Message:** The front cover illustrates a sustainable society, in which human activity and life on the planet are in a state of harmony.



This booklet uses 100% recycled paper (OK Mat Coat Green 100, 85% whiteness) with highly biodegradable soy ink for easy recycling.

Heartway Co., Ltd. assisted in the design and preparation of this brochure.

## Environmental Report 2002

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